FOREWIND



DOGGER BANK
TEESSIDE A & B

October 2013

# Draft Environmental Statement
# Chapter 11 Appendix A Ornithology Technical Report



**BTO Research Report No. 643**

# Ornithology Technical Report for the Proposed Dogger Bank Teesside A and B Offshore Wind Farm Projects

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A report carried out by the British Trust for Ornithology
under contract to Forewind Ltd

**August 2013**

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The British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU
Registered Charity No. 216652

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## GLOSSARY AND ABBREVIATIONS

**BAP** – UK Biodiversity Action Plan
**Barrier effects** – the obstruction or prevention of normal movement through an area due to the presence of a wind farm, creating the need for a diversion of flyways of receptors, with potential detrimental costs.
**BDMPS** – "Biologically Defined Minimum Population Scale", arises from a need to attribute impacts of effects in the non-breeding season to populations of birds that are qualifying features of protected sites; it is defined by NE/JNCC (2013b) as the a species-specific reference unit limited to the smallest geographical range and population scale that can be supported by current evidence based on an understanding of non-breeding distributions. This includes consideration of knowledge of the influx of birds abroad, mixing with the SPA populations, in relation to the total biogeographic population
**Biogeographic population** - biogeographic population estimate for the receptor
**Birds Directive** – The European Council Directive on the Conservation of Wild Birds
**BTO** – British Trust for Ornithology
**Buffer** – the area surrounding a wind farm where the effect of disturbance/displacement may still be felt albeit at a potentially lower displacement rate than the wind farm area itself
**CIs** – Confidence Intervals
**CIA** – Cumulative Impact Assessment
**Collision risk** – the possibility of direct collision between birds and wind turbines, assessment of which is made through a collision risk model (CRM)
**DECC** – Department of Energy and Climate Change
**Disturbance/displacement** – Disturbance represents a stimulus that alters the normal behaviour of birds in an area, for instance, reaction to presence of a boat or helicopter during construction, of which the worst case represents displacement from the area; displacement therefore constitutes the net result of birds being unable to use the area as a result of the initial disturbance, representing effective habitat loss
**Displacement rate** – for any given species, the proportion of birds from the baseline population, that may be displaced from the footprint of the wind farm and surrounding buffer, for instance due to construction/decommissioning or operational activities
**EIA** – Environmental Impact Assessment
**Effect** – the potential issues associated with a proposed development for receptors
**ESAS** – European Seabirds-at-Sea database
**FEPA** – Food and Environment Protection Act
**GAM** – General Additive Model
**Habitat loss or change** – the direct alteration to habitat as a result of wind farm related activities, which may also have indirect effects (positive or negative) on other taxa such as benthic communities and fish that in turn may impact upon birds.
**Habitats Directive** – The European Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora
**HAM** – Habitat association modelling, the combination of environmental covariates and abundance or presence data of receptors to produce a smoothed density surface from which predictions and thus population estimates can be made; in this technical report, HAMs were used to produce final population estimates for all projects
**HRA** – Habitats Regulations Assessment
**Impact** – the consequences of an effect for a receptor

**IPC** – Infrastructure Planning Commission (IPC)
**JNCC** – Joint Nature Conservation Committee
**Macro-avoidance** – far-field evasive action taken by a flying bird to avoid the wind farm
**Magnitude** – the size of an effect acting upon a receptor; note, for disturbance/displacement, the magnitude reported encompasses sensitivity of receptors to both disturbance and habitat loss
**MCZ** – Marine Conservation Zone
**MHWM** – mean high water mark
**Micro-avoidance** – the evasive action taken by a bird in the vicinity of individual wind turbines within the wind farm to avoid collision
**MLWM** – mean low water mark
**Mortality rate** – for any given species, the proportion of those birds displaced that then die, for instance, due to being unable to find alternative foraging habitat
**National population** – national population estimate for the receptor
**NE** – Natural England
**NEWS** – Non-estuarine Coastal Waterbird Survey
**NNR** – National Nature Reserve
**OSPAR** – the Oslo-Paris Convention guiding international cooperation on the protection of the marine environment of the North-East Atlantic
**Overall sensitivity** – the combination of a receptor's value and the species-specific sensitivity
**Protected site** – either an SPA, Ramsar site or SSSI that contains receptors qualifying as designated features based on the populations (national and/or bio-geographic) that the site itself holds.
**Protected site suite** – the suite of protected sites bordering the North Sea corresponding to OSPAR Greater North Sea region
**Receptor** – the interest features that can "receive" an impact of an effect
**RSPB** – Royal Society for the Protection of Birds
**Ramsar Site** – wetland sites designated under the 1971 Convention on Wetlands of International Importance
**SAC** – Special Area of Conservation, designated under the EC Habitats Directive
**Significance** – the overall significance of the impact of an effect assessed, depending on the effect, through a matrix of overall sensitivity and magnitude (e.g. barrier effect / collision risk), or value and magnitude (e.g. disturbance/displacement)
**SNH** – Scottish Natural Heritage
**SPA** – Special Protection Area, designated under the EC Birds Directive
**Species-specific sensitivity** – the specific sensitivity of the receptor to the effect, reflecting adaptability, the degree to which a receptor can avoid or adapt to an effect, tolerance, the ability of a receptor to accommodate temporary or permanent change without significant adverse impact, and recoverability, the temporal scale over and extent to which a receptor will recover following an effect
**SSSI** – Site of Special Scientific Interest
**Value** – the non-impact sensitivity, a measure of the receptor's importance, rarity and worth in particular based on existing designations and its wider conservation status
**WeBS** – Wetland Bird Survey

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# 1. INTRODUCTION

## 1.1 Background

This technical report provides baseline results and an assessment of impacts for ornithology for the Dogger Bank Dogger Bank Teesside A and B projects proposed for the Dogger Bank Zone, a round three lease area in the North Sea awarded to Forewind Ltd. The Dogger Bank Zone, as a whole, has an area of 8,660km$^2$. Forewind has a target to achieve consent for 9GW of projects in the Dogger Bank zone. The priority is to secure the first six projects, each up to 1.2GW, or a total installed capacity of 7.2GW.

1.1.1 The report provides a characterisation of the existing environment and an assessment of impacts for ornithology for the Dogger Bank Teesside A area, the Dogger Bank Teesside B area and the two areas combined (with associated results for the export cable corridor and the export cable landfall site) during their construction, operation and decommissioning phases.

1.1.2 Locations of Dogger Bank Teesside A and B, and the Dogger Bank Zone as a whole, together with four further proposed projects considered in the cumulative impact assessment in this report, are shown in Figure 1.1.

1.1.3 The report particularly draws on results of dedicated surveys undertaken across the Dogger Bank Zone from January 2010 to June 2012. These data are used to provide a baseline characterisation for the proposed development areas for birds.

## 1.2 Legislation, Planning and Guidance

**Legislation**

1.2.1 This section provides an overview to the international conventions, European directives and UK legislation that are relevant to the ornithological assessment. Key international/European legislation of relevance includes:

1.2.2 **The 1971 Convention on Wetlands of International Importance – the Ramsar Convention**, which protects wetland sites to promote the conservation and wise-use of wetlands of international importance and their resources. The convention requires contracting parties to designate suitable wetlands within their own territory for inclusion in the list of Wetlands of International Importance (Article 2) and to incorporate into their planning the conservation of the areas included in this list (Article 3). It also outlines needs for compensation – "Where a Contracting Party in its urgent national interest, deletes or restricts the boundaries of a wetland included in the List, it should as far as possible compensate for any loss of wetland resources and, in particular, it should create additional nature reserves for waterfowl and for their protection, either in the same area or elsewhere, of an adequate portion of the original habitat (Article 4)". Many Ramsar sites are also designated as Special Protection Areas (SPAs) – see below.

1.2.3 **The European Council Directive on the Conservation of Wild Birds (the 'Birds Directive') (79/409/EEC codified by Directive 2009/147/EC)**. Articles 2 and 3 of the Birds Directive aim to maintain the populations of all wild bird species across their natural range. Article 4 also provides international protection, by means of the designation of Special Protection Areas (SPAs), for sites that support more than 1% of the biogeographic population of any bird species or are important in maintaining the range of the species, significant numbers of any species named in Annex I of the Directive, or assemblages of 20,000 or more individual birds. The Birds Directive satisfies the commitments of the European Community under the 1980 Bonn Convention on the Conservation of Migratory Species of Wild Animals.

1.2.4 **The European Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora ('the Habitats Directive') (92/43/EEC)** which provides international protection, by means of the designation of Special Areas of Conservation (SACs), for sites selected for particular habitats and species which are listed in Annexes I and II of the Habitats Directive. The Conservation (Natural Habitats, & c.) Regulations 1994, in respect of England and Wales, transposed the Habitats Directive into national law; subsequent amendments have been consolidated by the Conservation of Habitats and Species Regulations 2010.

1.2.5 **The Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007** (the Offshore Habitats Regulations) transpose the Habitats and Birds Directives into national law. The Offshore Habitats Regulations came into force on 21 August 2007. These Regulations apply to the UK's offshore marine area, which covers waters beyond 12 nautical miles, within British Fishery Limits and the seabed within the UK Continental Shelf Designated Area.

1.2.6 **The Wildlife and Countryside Act 1981** consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and the Birds Directive in the UK. The Act provides protection for wild birds by making it an offence to kill, injure, or take any wild bird or take, damage or destroy the nest or eggs of a wild bird. The Act also provides for the designation of Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR) in the UK.

1.2.7 Given the location of the proposed projects in the North Sea, there is a need to consider its potential impact on protected sites not only within the UK, but also other countries. The assessment thus considered a regional study area defined by the Greater North Sea Oslo – Paris Convention (OSPAR) region (http://www.ospar.org) which encompasses Orkney and Shetland, the east coast of Great Britain and the North Sea coasts of France, Belgium, the Netherlands, Germany, Denmark, Sweden and Norway (Figure 1.2). This is a geographically and ecologically distinct area, covering the coastline of the Greater North Sea area, and therefore covers the sites most likely to be potentially impacted by effects associated with projects in the Dogger Bank Zone. Details of the relevant protected sites for marine birds are provided in two appendices. Appendix 1 provides an

overview, by species, of protected sites (SPAs, Ramsar sites, SSSIs in the UK) within the wider North Sea region considered in the ornithology technical report at which breeding seabirds are a feature. Appendix 2 provides details of other protected sites in the region at which seabirds are passage or wintering features.

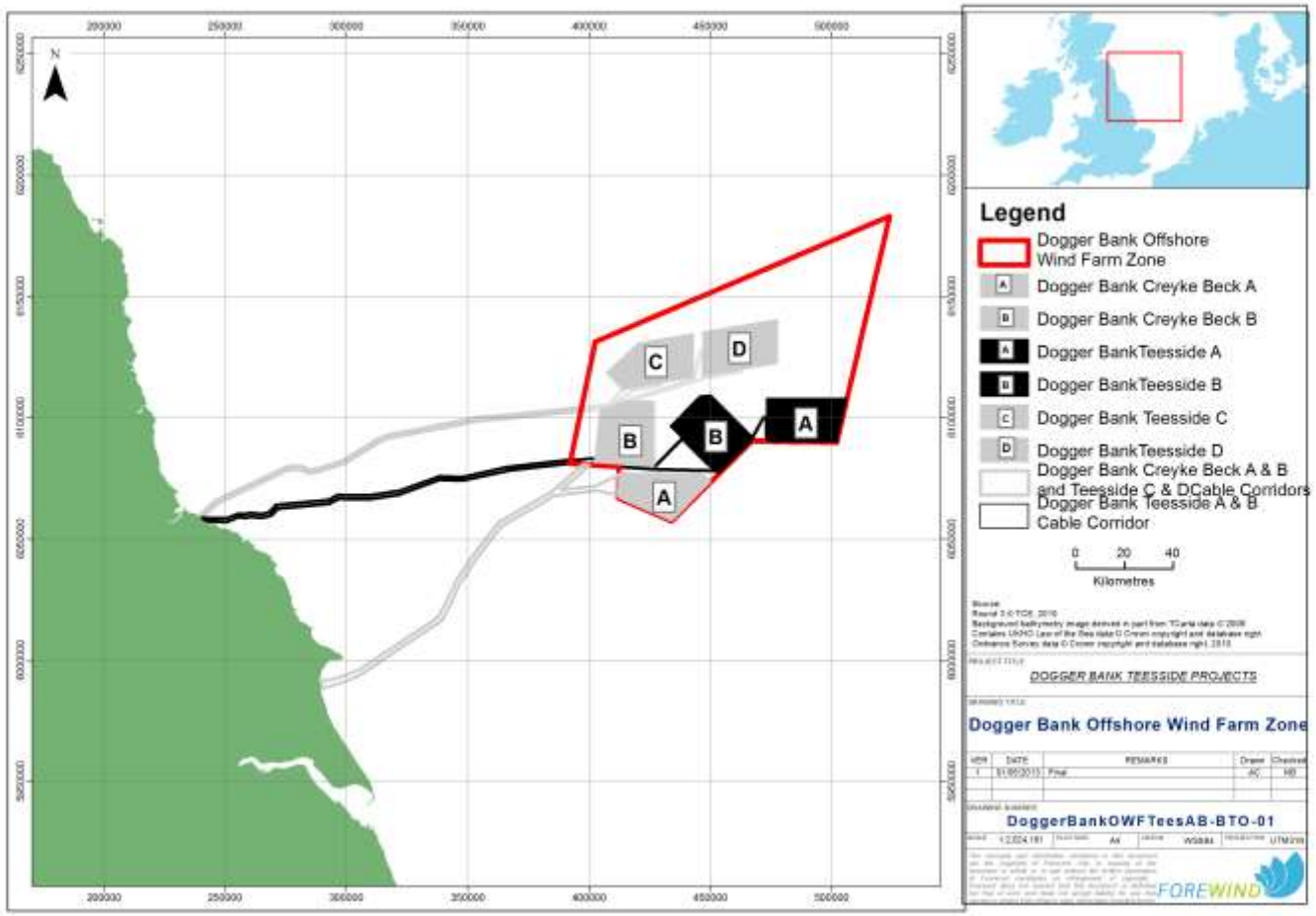



**Figure 1.1** The sites of the proposed Dogger Bank Teesside A and Dogger Bank Teesside B projects within the Dogger Bank Zone, together with the proposed export cable corridor for these projects and the Dogger Bank Creyke Beck A, Dogger Bank Creyke Beck B, Dogger Bank Teesside C and Dogger Bank Teesside D projects considered in the cumulative assessment.

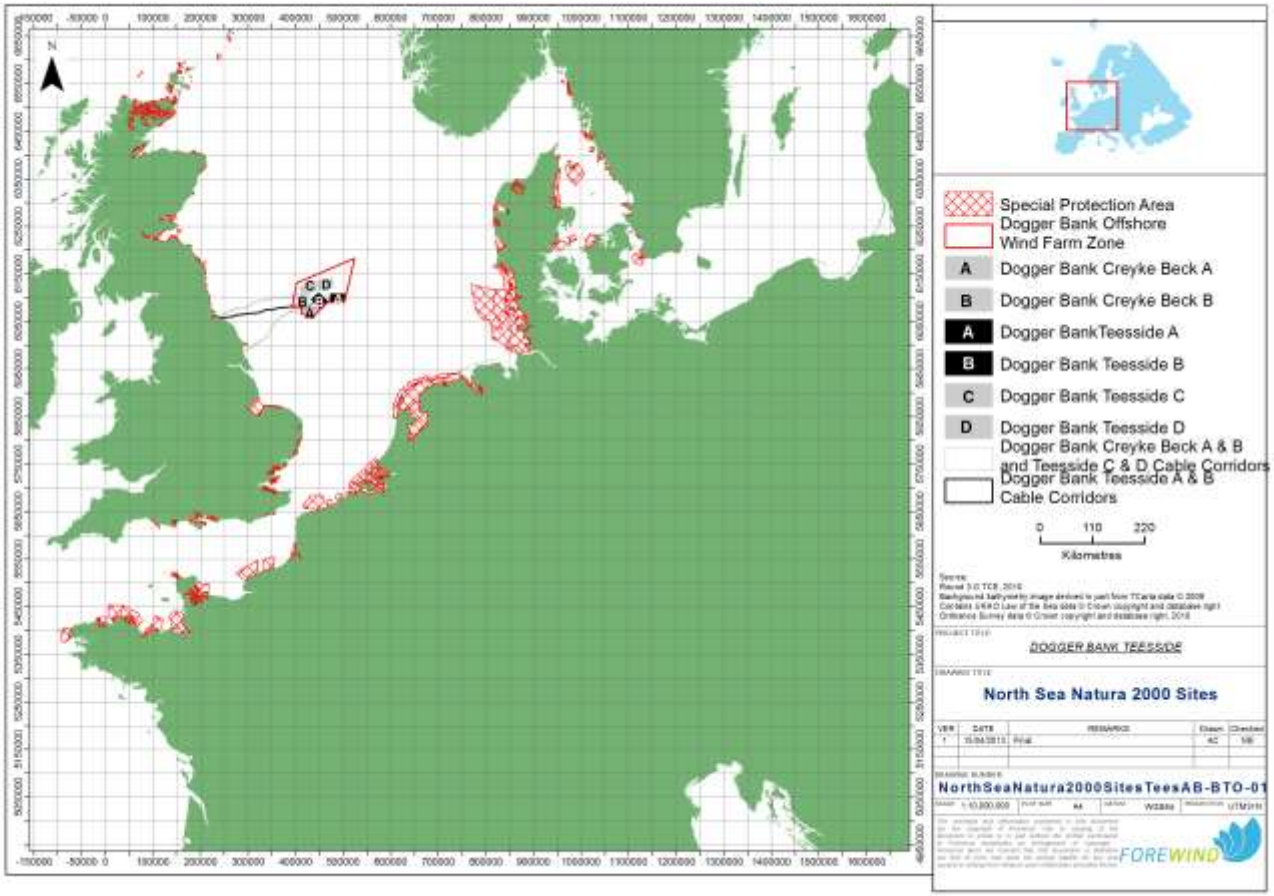



**Figure 1.2** The Greater North Sea OSPAR region considered within this assessment and Special Protection Areas (SPAs) whose breeding features were considered in this region (see Appendix 1).

**Planning**

1.2.8 National Policy Statements, such as the Renewable Energy Infrastructure (EN-3) statement (DECC 2011), highlight that offshore wind farms have the potential to impact on birds through:

i. Collisions with rotating blades;
ii. Direct habitat loss;
iii. Disturbance from construction activities such as the movement of construction/decommissioning vessels and piling;
iv. Displacement during the operational phase, resulting in loss of foraging/roosting areas; and
v. Impacts on bird flight lines (i.e. barrier effect) and associated increased energy use by birds for commuting flights between roosting and foraging areas.

1.2.9 It is also noted that the presence of wind turbines can have positive benefits for ecology and biodiversity.

1.2.10 Specific guidance within this statement relating to birds, taken into account in undertaking this assessment, includes:

i. The scope, effort and methods required for ornithological surveys should have been discussed with the relevant statutory advisor;
ii. Relevant data from operational offshore wind farms should be referred to in the applicant's assessment;
iii. Collision risk modelling for certain species may be appropriate for the assessment. Data collected to be used and the assessment conducted to a standard agreed with the relevant statutory advisor;
iv. Applicants will be expected to adhere to requirements in respect to FEPA licence requirements (now Marine Licence).

1.2.11 Further guidance and associated stakeholder comments received in the scoping opinion from the former Infrastructure Planning Commission (IPC) on the overall proposal for the Dogger Bank Offshore Wind Farm are outlined in Appendix 3 (see also section 1.3 below).

**Guidance**

1.2.12 The technical report draws on a number of reports and other publications (a full reference list is given at the end of this report).

1.2.13 With respect to the baseline surveys and analyses, and to the assessment, key publications include:

- Buckland S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L. & Thomas, L. 2001. *Introduction to distance sampling: estimating abundance of biological populations*. Oxford University Press, Oxford, UK.
- Camphuysen, C.J., Fox, A.D., Leopold, M.F. and Petersen, I.K. 2004. *Towards standardised seabirds at sea census techniques in connection with environmental impact assessments for offshore wind farms in the U.K. A comparison of ship and aerial sampling methods for marine birds, and their applicability to offshore wind farm assessments*. Koninklijk Nederlands Instituut voor Onderzoek der Zee Report to COWRIE.
- Thomas, L., Laake, J.L., Rexstad, E., Strindberg, S., Marques, F.F.C., Buckland, S.T., Borchers, D.L., Anderson, D.R., Burnham, K.P., Burt, M.L., Hedley, S.L., Pollard, J.H., Bishop, J.R.B. & Marques, T.A. 2009. *Distance 6.0. Release 1*. Research Unit for Wildlife Population Assessment, University of St. Andrews, UK. http://www.ruwpa.st-and.ac.uk/distance/

1.2.14 With respect to the assessment, key publications include:

- Band, W. 2012. *Using a collision risk model to assess bird collision risks for offshore windfarms*. Strategic Ornithological Support Services Project SOSS-02.
- Band, W., Madders, M., & Whitfield, D.P. 2007. Developing field and analytical methods to assess avian collision risk at wind farms. In: de Lucas, M., Janss, G.F.E. & Ferrer, M. (eds.) *Birds and Wind Farms: Risk Assessment and Mitigation*, pp.259-275. Quercus Edicions, Madrid, Spain.
- Cook, A.S.C.P., Wright, L.J., Burton, N.H.K. 2012. *A review of flight heights and avoidance rates in relation to offshore wind farms*. Strategic Ornithological Support Services Project SOSS-02. BTO Research Report 618. BTO, Thetford.
- Furness, R.W. & Wade, H. 2012. *Vulnerability of Scottish seabirds to offshore wind turbines*. MacArthur Green Ltd. Report to Marine Scotland.
- Garthe, S. & Hüppop, O. 2004. Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. *Journal of Applied Ecology*, 41, 724-734.
- Institute of Ecology and Environmental Management (IEEM). 2006. *Guidelines for ecological impacts assessment in the United Kingdom*. IEEM.
- Institute of Ecology and Environmental Management (IEEM). 2010. Guidelines for Ecological Impact Assessment in Britain and Ireland: Marine and Coastal.
- King, S., Maclean, I., Norman, T. & Prior, A. 2009. *Developing guidance on ornithological cumulative impact assessment for offshore wind farm developers*. Report commissioned by COWRIE. Available at http://www.offshorewind farms.co.uk/.
- Maclean, I.M.D, Wright, L.J., Showler, D.A. and Rehfisch, M.M. 2009. *A review of assessment methodologies for offshore windfarms*. BTO Report to COWRIE.
- Natural England (NE) & Joint Nature Conservation Committee (JNCC). 2012. *Joint Natural England and JNCC Interim Advice Note: Presenting information to inform assessment of the potential magnitude and consequences of displacement of seabirds in relation of Offshore Windfarm Developments*. NE/JNCC.

- Percival, S.M., Band, B. & Leeming, T. 1999. *Assessing the ornithological effects of wind farms: developing a standard methodology*. Proceedings of the 21st British Wind Energy Association Conference 1999.
- Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W., Burton, N.H.K. 2012. Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* doi:10.1016/j.biocon.2011.12.009
- Wright, L.J., Ross-Smith, V.H., Massimino, D., Dadam, D., Cook, A.S.C.P. & Burton, N.H.K. 2012. *Assessing the risk of offshore wind farm development to migratory birds designated as features of UK Special Protection Areas (and other Annex 1 species)*. Strategic Ornithological Support Services Project SOSS-05. BTO Research Report No. 592. BTO, Thetford.


## 1.3 Stakeholder Consultation

1.3.1 Consultation with stakeholders has been held with regard to both the proposed survey methods and approaches used to analyse the resultant datasets, and with regard to the assessment methodology. These consultations have taken place over the course of the survey and assessment phases of the work and have been an iterative process. The key points of all consultation and guidance received, and details of how comments have been addressed, are summarised in Appendix 3 of this technical report.

1.3.2 Initial guidance and associated stakeholder comments received in the scoping opinion from the former Infrastructure Planning Commission (IPC) on the first project (Project One) initially planned for the Dogger Bank Offshore Wind Farm are outlined in Appendix 3. While the position of this project within Tranche A was undecided at the time of the scoping report, the guidance and comments received still have pertinence to the subsequent Dogger Bank Teesside projects.

1.3.3 A meeting to discuss the combined boat and aerial survey methodology was held between Forewind Ltd, the surveyors, Gardline Ltd and Hi-Def Surveying Ltd and the Joint Nature Conservation Committee (JNCC) in April 2010. As a result of this, a review of the methodology was instigated, led on by the British Trust for Ornithology (BTO). A follow-up meeting was held in November 2010 with stakeholder representation from JNCC and the Royal Society for the Protection of Birds (RSPB) to report initial results from this, covering: i. A review of survey data collection protocols; ii. A review of the survey approach and whether this was sufficient to provide a robust characterisation of the populations of seabirds present in the Zone and tranche areas within this; iii. Identification of the key species for assessment and the likely effects for these species; and iv. A review of potential methodologies for assessing effects on migratory species. The report on this review, which details stakeholder discussion, was completed in April 2011 (Austin *et al.* 2011).

1.3.4 More detailed discussion of the assessment methodology was initiated in a meeting held on 18 May 2011 in London between representatives of Forewind Ltd, BTO, RSPB and JNCC. The purpose of this meeting was to discuss the review and the outcome

of the survey trial and the proposed approach for future surveys, and to discuss the approach for the Environmental Impact Assessment and Habitats Regulations Assessment.

1.3.5 Building on this, a workshop was held on 11 April 2012 in Peterborough, to discuss the approach for the Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA) in greater detail, which included stakeholder representation from JNCC, Natural England (NE), RSPB and the Wildlife Trusts. This workshop was focussed on work being undertaken for the assessment associated with the Dogger Bank Creyke Beck A and B projects. However, due to the commonality of approaches used for that assessment and for the assessment for the Dogger Bank Teesside A and B projects, the discussion and outcomes of the workshop are also pertinent here. As a result of this workshop, two documents were produced for stakeholder review: i. A document detailing assumptions and methodology regarding the geographical scope of the assessment; and ii. A document providing details of the ecological assumptions used in the assessment methodology. Stakeholder comments on these documents and details of how these comments have been addressed are outlined in Appendix 3.

1.3.6 A further meeting was held on 11 March 2013, with stakeholder representation from JNCC, Natural England and RSPB, to discuss the HRA screening report for the Dogger Bank Creyke Beck A and B projects produced in alongside that assessment and related assumptions in the ornithological technical report methodology. Discussions, related advice notes produced by NE/JNCC (2012, 2013a, 2013b) prior to this meeting and subsequent comments from NE were also drawn from in producing this assessment. A further meeting will be held in due course to discuss the HRA screening for Dogger Bank Teesside A and B projects.

1.3.7 Following the consultation phase for the Dogger Bank Creyke Beck A and B projects, a meeting was held on 19 July 2013, with stakeholder representation from JNCC, Natural England and RSPB. The work presented here reflects the comments received through this consultation; details of how these comments have been addressed are again outlined in Appendix 3.

## 2. OFFSHORE ENVIRONMENT – BASELINE METHODOLOGY

### 2.1 Baseline Data Collection – Boat-Based Surveys

2.1.1 Since January 2010, intensive boat-based surveys have been undertaken by Gardline Environmental Ltd on a monthly basis, within the Dogger Bank Zone on board the survey vessels MV Sea Profiler (January to September 2010) and MV Vigilant (October 2010 to June 2012). In total, almost 2,500 hours of survey data have been collected over a distance of over 42,000km (Table 2.1).

2.1.2 The surveys followed the methodology of Camphuysen *et al.* (2004). Data were collected from the front bridge deck of the vessel which travelled at a speed of 10 knots, following straight line transects across the study site. Data collection followed the requirements of distance sampling, with the survey area covered by a series of transects. The vast size of the Dogger Bank Zone means that transect lines are split into 21 primary lines, each 8km apart, and 20 secondary lines, also 8km apart, but equidistant between the primary lines so that, when all lines are completed, transects are separated by 4km. Adverse weather conditions and, during the winter months, limited daylight, meant that it was not always possible to cover all 41 transects; accordingly, the primary lines were completed first to try and ensure that a representative sample of the whole survey area was covered completely.

2.1.3 Observation boxes were used to provide a degree of shelter from the elements and to facilitate data collection in windy or wet conditions. The observer height of eye was approximately 10m above sea level. Three observers were present in the box, two observing and the other acting as a scribe. All data were collected during daylight hours, when visibility was greater than 300m, wave height was 2.5m or less and sea state was five or under.

**Table 2.1** Survey effort and distance travelled on a monthly basis during boat surveys of the Dogger Bank offshore wind farm Zone from 2010 to 2012.

| Month | Survey effort (hours.min) | Distance travelled (km) |
|---|---|---|
| Jan-10 | 12.36 | 157.65 |
| Feb-10 | 9441 | 1,164.78 |
| Mar-10 | 141.11 | 1,734.23 |
| Apr-10 | 194.42 | 2,300.05 |
| May-10 | 116.43 | 1,368.22 |
| Jun-10 | 112.1 | 2,252.79 |
| Jul-10 | 108.05 | 1,147.36 |
| Aug-10 | 111.54 | 1,235.52 |
| Sep-10 | 8.19 | 127.185 |
| Oct-10 | 107.59 | 1,992.5 |
| Nov-10 | 58.42 | 1,156.9 |
| Dec-10 | 75.48 | 1,433.8 |
| Jan-11 | 64.44 | 1,244.12 |
| Feb-11 | 45.46 | 856.52 |
| Mar-11 | 129.38 | 2,445.34 |
| May-11 | 96.13 | 1,771.21 |
| Jun-11 | 126.40 | 2,430.70 |
| Jul-11 | 131.19 | 2,431.29 |
| Aug-11 | 130.31 | 2,432.69 |
| Sep-11 | 126.29 | 2,382.39 |
| Nov-11 | 98.38 | 1,832.48 |
| Dec-11 | 42.44 | 813.014 |
| Jan-12 | 56.04 | 1073.13 |
| Mar/Apr-12 | 128.08 | 2433.01 |
| May-12 | 126.55 | 2433.89 |
| Jun-12 | 120.40 | 2372.10 |

2.1.4 Observers collected data from a 90° area to the bow of the vessel at one minute intervals, where the distance of birds recorded on the sea was assigned to one of five bands (0-50m, 50-100m, 100-200m, 200-300m or >300m). For flying birds, observers used the snapshot method to provide a single count of birds flying within the transect at that time. Data were collected during daylight hours.

2.1.5 Three observers were used during the data collection, one to collect the data perpendicular to the boat, one to collect "snapshot" counts and a third resting. Roles were rotated during the surveys, and the surveyor resting communicated with the bridge and informed the surveyors when to cease and commence observations. Observers were equipped with 8x or 10x binoculars, hand-held Global Positioning System (GPS) devices, dictaphones and a rangefinder tool.

2.1.6 Observers also monitored the height of flying birds, and recorded the height in different bands. These bands varied through time: between February 2010 and November 2010 bands of 0-20m, 20-180m and >180m were used, between December 2010 and February 2011 a fourth band was added covering 20-25m, and from February 2011 onwards a fifth band was added covering 25-50m. The mast

heights of the vessels used were 18m from the water, which gives the observers a good reference point from which to ascertain flying heights. The band from 20-25m is specifically used for swans, geese, northern gannet, cormorant, skuas, gulls and terns, which are considered most sensitive to collisions with wind turbines (this height range representing the likely lowest point of wind turbine blades). Accuracy decreases the further from the vessel the flying bird is observed. To limit the bias of this inaccuracy the observers recorded their confidence levels when recording flying birds in Band 2 (20-25m). The confidence levels are recorded in five different levels: V = Very high confidence, H = High confidence, M = Moderate confidence, L = Low confidence and N = No confidence. Direction of flight is also recorded.

## 2.2 Baseline Data Collection – Aerial Surveys

2.2.1 Aerial surveys have been carried out over the Dogger Bank Zone by Hi-Def Surveying Ltd since spring 2010 and have continued into 2012 (Table 2.2). Survey transects were aligned north-south and were 300m wide and 3km apart. Planes flew at a height of around 2000 feet (600m), recording high definition video images on four cameras. Survey transects were alternately designated as primary or secondary. All primary transects within the Dogger Bank Zone were covered over the course of a day, to ensure complete coverage, with two planes flying concurrently. Secondary transects across the Dogger Bank Zone were then covered over a second day, if possible on the following day, to supplement the data collected from the surveys of the primary transects.

2.2.2 The resultant images were viewed by trained reviewers at Hi-Def, who identified objects for further analysis. Images were then passed to specialist ornithologists at WWT consulting, who sought to identify the images to species level with the aid of video enhancement software. A quality check is carried out on the images by blind reviewing 20% of the data and ensuring that a minimum of 90% agreement is reached between reviewers for this subset of data.

2.2.3 Whilst identification to species level was sought, this was not always possible, and birds were instead assigned to one of 14 species groups, these included:

- Arctic tern/common Tern;
- auk species;
- big bird;
- black-backed gull species;
- tern species;
- diver species;
- fulmar/gull species;
- grey gull species;
- gull species;
- large gull species;
- large wader species;
- shearwater species/auk species;
- skua species;
- small gull species.

**Table 2.2** Aerial surveys of the Dogger Bank Zone from 2010 to 2012.

| Date | Start time | End time | Wind speed (knots) | Cloud height (ft) | Agreement (%)[1] |
|---|---|---|---|---|---|
| 26/01/2010 | | | | | |
| 09/02/2010 | | | | | |
| 11/02/2010 | | | | | |
| 23/02/2010 | | | | | |
| 06/03/2010 | | | | | |
| 07/03/2010 | | | | | |
| 22/04/2010 | 11:13 | 16:29 | 10 | 2,000 | 90 |
| 22/04/2010 | 13:14 | 17:08 | 10 | 2,000 | 91 |
| 23/04/2010 | 09:19 | 13:00 | 8 | | 94 |
| 30/04/2010 | 10:41 | 13:30 | 8 | | 91 |
| 12/05/2010 | 11:44 | 15:36 | 10 | 2,300 | 90 |
| 13/05/2010 | 10:49 | 14:40 | 10 | 2,500 | 92 |
| 13/05/2010 | 11:38 | 15:25 | 10 | 2,500 | 92 |
| 26/05/2010 | 11:20 | 13:38 | 7 | 2,500 | 92 |
| 15/06/2010 | 10:26 | 14:48 | 20 | | 94 |
| 15/06/2010 | 11:17 | 15:10 | 22 | 2,000 | |
| 16/06/2010 | 09:17 | 13:15 | 5 | | 92 |
| 16/06/2010 | 10:36 | 15:08 | 10 | 2,100 | 96 |
| 21/07/2010 | 12:24 | 16:33 | | | 95 |
| 21/07/2010 | 17:29 | 21:44 | | | 90 |
| 23/07/2010 | 11:24 | 15:50 | | | 90 |
| 23/07/2010 | 16:24 | 20:25 | | | 91 |
| 05/08/2010 | 11:19 | 15:24 | 15 | 1,700 | 92 |
| 05/08/2010 | 12:15 | 16:32 | 15 | 1,600 | 94 |
| 14/08/2010 | 12:02 | 15:50 | 15 | | 92 |
| 14/08/2010 | 12:58 | 17:15 | 10 | | 93 |
| 02/09/2010 | 11:09 | 15:12 | 10 | 2,200 | 92 |
| 02/09/2010 | 11:10 | 15:33 | 12 | | 90 |
| 03/09/2010 | 10:40 | 14:58 | 8 | 1,500 | 95 |
| 03/09/2010 | 10:44 | 15:02 | 10 | 1,500 | 98 |
| 16/10/2010 | 11:16 | 15:19 | 10 | 2,500 | 92 |
| 16/10/2010 | 12:18 | 16:25 | 15 | 2,500 | 94 |
| 17/10/2010 | 11:01 | 15:04 | 12 | | 90 |
| 17/10/2010 | 12:05 | 16:21 | 10 | 2,500 | 91 |
| 14/11/2010 | 11:29 | 15:16 | 15 | 2,000 | 92 |
| 14/11/2010 | 11:30 | 15:32 | 10 | 1,800 | 95 |
| 16/11/2010 | 10:21 | 14:53 | 10 | 1,200 | 91 |
| 16/11/2010 | 10:21 | 14:45 | 10 | 1,200 | 90 |
| 11/12/2010 | 12:03 | 15:46 | 40 | 1,500 | 90 |
| 11/12/2010 | 12:06 | 15:42 | 40 | 1,500 | 90 |
| 12/12/2010 | 10:49 | 15:09 | 25 | 2,800 | 92 |
| 12/12/2010 | 10:58 | 15:15 | 30 | 2,200 | 91 |
| 08/03/2011 | 10:33 | 14:11 | | | |
| 08/03/2011 | 10:44 | 14:23 | | | |
| 11/03/2011 | 10:59 | 14:32 | | | |
| 11/03/2011 | 11:01 | 15:05 | | | |
| 11/03/2011 | 12:42 | 15:44 | | | |

| Date | Start time | End time | Wind speed (knots) | Cloud height (ft) | Agreement (%)[1] |
|---|---|---|---|---|---|
| 21/03/2011 | 10:51 | 15:28 | | | |
| 21/03/2011 | 11:18 | 14:02 | | | |
| 22/03/2011 | 11:21 | 15:08 | | | |
| 26/03/2011 | 11:03 | 14:40 | | | |
| 26/03/2011 | 11:04 | 14:55 | | | |
| 04/04/2011 | 10:45 | 14:07 | | | |
| 14/04/2011 | 11:44 | 15:08 | | | |
| 15/04/2011 | 10:31 | 14:11 | | | |
| 16/04/2011 | 10:26 | 14:03 | | | |
| 03/05/2011 | 10:25 | 13:54 | neg. | 3,000 | 96.5 |
| 03/05/2011 | 10:34 | 14:07 | neg. | 3,000 | 90 |
| 04/05/2011 | 10:42 | 14:30 | neg. | 3,000 | 97.4 |
| 04/05/2011 | 10:48 | 14:53 | neg. | 3,000 | 93 |
| 05/05/2011 | 10:28 | 14:04 | 8 | 2,000 | 95.5 |
| 05/05/2011 | 10:57 | 14:31 | 8 | 2,000 | 92.4 |
| 23/06/2011 | 11:35 | 15:17 | 10 | 2,000 | 91.5 |
| 23/06/2011 | 18:02 | 21:48 | 10 | 3,600 | 95.8 |
| 23/06/2011 | 10:07 | 13:58 | 10 | 3,600 | 96.3 |
| 23/06/2011 | 19:05 | 22:27 | 10 | 2,000 | 94.2 |
| 24/06/2011 | 19:02 | 23:05 | 5 | 2,500 | 92.6 |
| 24/06/2011 | 11:21 | 14:41 | 5 | 2,500 | 93.8 |
| 15/08/2011 | 10:47 | 13:44 | | | |
| 17/08/2011 | 11:46 | 14:39 | | | |
| 19/08/2011 | 12:11 | 14:56 | 10 | 1,500 | |
| 15/08/2011 | 10:50 | 13:41 | | | |
| 17/08/2011 | 11:41 | 14:23 | | 1,300-1,500 | |
| 19/08/2011 | 12:05 | 14:49 | | 1,500-2,000 | |
| 15/08/2011 | 10:25 | 13:15 | | 1,500 | |
| 17/08/2011 | 11:52 | 14:48 | | 1,300-1,500 | |
| 21/09/2011 | 10:25 | 13:34 | 15-20 | 1,500 | 97.60 |
| 22/09/2011 | 10:27 | 13:31 | 20-25 | 1,500 | 98.60 |
| 22/09/2011 | 10:24 | 13:24 | 20-25 | 1,500 | 93.60 |
| 21/09/2011 | 10.41 | 13:55 | 20-25 | 1,500 | 83.60 |
| 23/09/2011 | 10:25 | 13:11 | 15 | | 99.00 |
| 21/09/2011 | 10:16 | 13:04 | 14 | 1,400-2,000 | 93.50 |
| 22/09/2011 | 10:55 | 13:41 | 16 | | 98.20 |
| 23/09/2011 | 10:22 | 13:08 | 11 | 1,000 | 93.70 |
| 13/10/2011 | 11:39 | 14:28 | | | 91.90 |
| 13/10/2011 | 11:01 | 14:18 | 8 | | 95.70 |
| 12/10/2011 | 11:29 | 14:10 | | 1,500-3,000 | 92.20 |
| 12/10/2011 | 10:57 | 13:31 | | | 91.20 |
| 14/10/2011 | 10:42 | 13:27 | | 2,500 | 92.50 |
| 13/10/2011 | 11:15 | 14:05 | | | 92.00 |
| 14/10/2011 | 10:51 | 13:41 | 10-15 | 5,000 | 94.30 |
| 15/10/2011 | 10:41 | 13:59 | 10 | 3,000 | 92.80 |
| 27/11/2011 | 10:27 | 13:31 | | | 92.65 |
| 28/11/2011 | 10:34 | 13:18 | | | 90.90 |
| 28/11/2011 | 10:27 | 13:16 | 25-30 | 2,500 | 90.10 |
| 29/11/2011 | 10:07 | 13:37 | 50 | 1,500-2,000 | 90.30 |

| Date | Start time | End time | Wind speed (knots) | Cloud height (ft) | Agreement (%)[1] |
|---|---|---|---|---|---|
| 27/11/2011 | 10:26 | 13:40 | 40 | 2,500 | 90.41 |
| 29/11/2011 | 09:58 | 13:06 | 20 | 2,500 | 94.70 |
| 28/11/2011 | 10:17 | 13:25 | 20 | 2,500 | 96.90 |
| 30/11/2011 | 09:36 | 10:37 | 30 | 2,500 | 94.00 |
| 16/01/2012 | 11:29 | 14:42 | 12 | 2,200 | 32.30 |
| 16/01/2012 | 11:25 | 14:31 | | 2,500 | 93.80 |
| 17/01/2012 | 11:18 | 14:35 | 15 | 2,500 | 92.70 |
| 17/01/2012 | 11:23 | 14:26 | 15 | 2,500 | 93.00 |
| 17/01/2012 | 11:12 | 14:15 | 15 | | 90.40 |
| 19/01/2012 | 11:06 | 12:44 | 25 | 2,500 | 90.90 |
| 19/01/2012 | 10:53 | 12:32 | 30 | 2,000 | 94.50 |
| 01/02/2012 | 09:32 | 12:44 | 15 | 2,500 | 95.10 |
| 01/02/2012 | 09:42 | 12:40 | 25 | 3,000 | |
| 11/02/2012 | 11:36 | 14:37 | 0 | 2,500 | 92.40 |
| 11/02/2012 | 11:35 | 14:18 | 0 | 2,500 | 94.80 |
| 01/03/2012 | 09:55 | 15:14 | | Nil | 91.50 |
| 01/03/2012 | 10:02 | 15:07 | | Nil | 91.30 |
| 08/03/2012 | 10:19 | 15:42 | 10 | 3,000 | 96.60 |
| 08/03/2012 | 11:34 | 15:57 | 10 | | 91.20 |
| 19/03/2012 | 11:31 | 13:05 | 15 | 1,500 | 91.80 |
| 19/03/2012 | 11:26 | 13:26 | 15 | 1,500 | 91.20 |
| 20/03/2012 | 11:55 | 15:10 | 10 | 3,000 | 94.10 |
| 20/03/2012 | 11:57 | 15:13 | 10 | 3,000 | 92.10 |
| 20/03/2012 | 11:34 | 15:01 | 10 | | 94.50 |
| 21/03/2012 | 11:22 | 14:19 | 10 | Nil | 92.70 |
| 21/03/2012 | 11:21 | 14:36 | 10 | Nil | 96.60 |
| 13/04/2012 | 11:52 | 13:15 | 10 | 2,200 | 31.30 |
| 13/04/2012 | 11:51 | 13:26 | | 2,000 | 97.20 |
| 15/04/2012 | 12:52 | 15:58 | 20 | 1,500 | 95.50 |
| 15/04/2012 | 12:28 | 15:23 | 20 | 2,100 | 92.60 |
| 16/04/2012 | 12:29 | 15:26 | 20 | 2,500 | 92.90 |
| 16/04/2012 | 12:52 | 16:09 | 20 | 2,500 | 95.40 |
| 16/04/2012 | 12:39 | 15:38 | 10 | 2,500 | 91.30 |
| 25/05/2012 | 12:33 | 14:06 | 5 | Nil | 90.70 |
| 25/05/2012 | 12:30 | 13:58 | 5 | Nil | 91.10 |
| 26/05/2012 | 11:42 | 14:42 | 5 | Nil | 93.60 |
| 26/05/2012 | 11:40 | 14:39 | | | 92.90 |
| 27/05/2012 | 11:30 | 14:09 | 5 | | 90.80 |
| 27/05/2012 | 11:23 | 14:16 | | | 90.20 |
| 28/05/2012 | 11:44 | 13:44 | 10 | | 90.70 |
| 13/06/2012 | 11:53 | 13:08 | | | |
| 13/06/2012 | 11:57 | 14:15 | 10 | 2,500 | 98.70 |
| 13/06/2012 | 11:48 | 14:33 | 20 | 2,200 | |
| 30/06/2012 | 11:40 | 13:23 | 10 | | 91.30 |
| 30/06/2012 | 11:45 | 13:31 | 20 | 1,250 | 95.50 |

[1] The % agreement between aerial surveyors and independent assessors of bird identification (based on a 20% sample of the data).

## 2.3 Derivation of the Baseline Population Estimates

**Model-based population estimates**

2.3.1 Population estimates for January 2010 to June 2012 were derived using a modelling approach which combined data collected from aerial and boat-based surveys (Figure 2.1). Whilst it can be assumed that 100% of birds within each transect are detected by aerial surveys (though for diving species – divers, auks – this might not always be the case and consideration of this issue is given in the assessment of impacts), identification of these birds to species level is frequently not possible. Similarly, whilst identification to species level is likely to be accurate using data collected during boat-based surveys, attraction to, and disturbance by, boats as well as the time taken to complete the survey, means that the total number of birds detected may give an inaccurate picture of the number using the Dogger Bank Zone. Consequently, the data collected from aerial surveys were used to inform the total number of birds within the survey area, whilst data collected from the boat-based surveys were used to inform the species make-up.

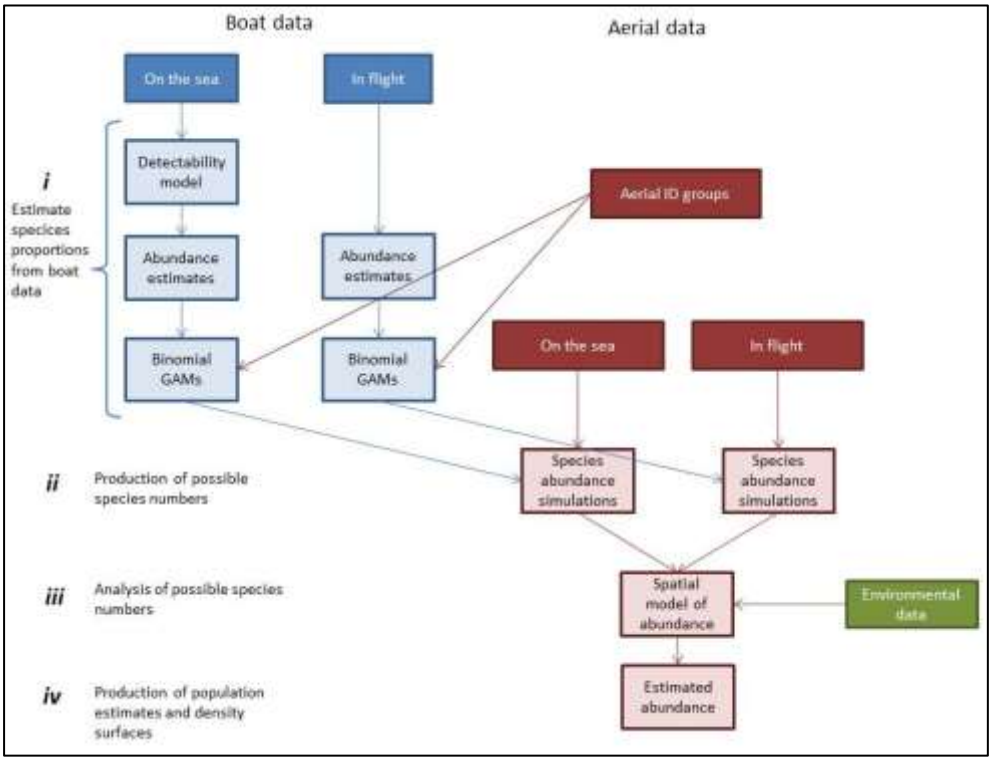



**Figure 2.1** Diagrammatic representation of the modelling process

***Boat-based data***

2.3.2 The first stage of the modelling procedure was to distance-correct the observations of birds on the sea to account for differences in detectability (Buckland *et al.* 2004). Detection probability on the line was assumed to be 1 and sea state, swell height, visibility, cloud, rain, group size and vessel were fitted as covariates (Marques *et al.* 2009). Only observations identified to species level were analysed and observations

from the first two distance bands were pooled. Observations from the final band were not analysed.

2.3.3 For each species, a half normal detection function was fitted using the mrds package in R (R Core Development Team 2012, Thomas *et al.* 2010) and model selection was carried out using backwards stepwise selection. The final parsimonious models were used to estimate the abundance of each species within each transect on the sea surface.

2.3.4 Aerial observations were recorded in species groups (see section 2.2 for details), the proportional composition of which will vary over time. Therefore, the distance-corrected sea-surface species abundances were summed within 5 km transect sections. A binomial Generalized Additive Model (GAM) was used to model the proportion of birds of a given ID group which were of a particular species. The proportion of each group composed of a given species was assumed to vary over time with a non-parametric smooth. The fitted model was:

$$\text{logit}(Pgs)=\beta_0 \text{latitude}+\beta_1 \text{longitude}+f(d) \quad \text{[Eq. 1]}$$

where Pgs is the probability that an individual of group g is species s, f(d) is a thin plate regression spline on day d, a continuous variable increasing incrementally over the entire survey period (Fig 2.2). Generalized cross-validation was used to select the final degrees of freedom of the smooth. Binomial GAMs were fitted using package "mgcv" (Wood 2004) in R (R Development Core Team, 2012). For a small number of models there was complete separation, with some periods where all or none of the birds in a species group were of a particular species. In these cases there was non-convergence, and the model was therefore constrained so that the smooth was the same each year, instead of over the course of the entire survey. This increased the sample size of observations, and led to convergence in most of these cases. For two models there was still separation, and a single month (October, based on inspection of the data) was used as variable factor in the model to describe temporal variation in proportions.

2.3.5 The same binomial GAM procedure was also used to model the proportional species composition of different species groups, of birds which were observed from the boat but in flight. It was assumed that all birds in flight within the boat transect were observed and, therefore, detectability was not incorporated.

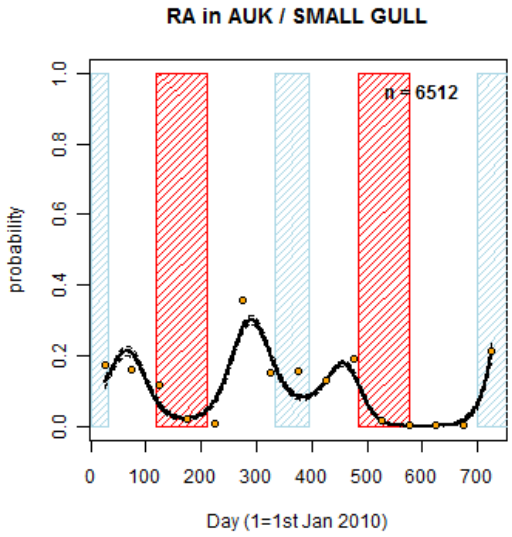



**Figure 2.2** Example graph showing results from a binomial GAM for razorbill in the Auk/Small Gull grouping, showing the probability of a bird recorded in this category (n = 6512) being razorbill from days since the 1st January 2010.

***Aerial survey data***

2.3.6 The aerial surveys did not identify all individuals to species, but almost all individuals were identified to a species group. Therefore, information from the boat surveys about the proportional species composition of these groups was used to produce several possible realisations of the species in the aerial surveys. The aerial dataset also recorded birds on the sea, and in the air, and as the proportional composition of these species groups may vary, due to varying behaviour, the relevant binomial GAMs of birds recorded from the boat surveys, both on the sea surface and in the air, were used. For each species, s, we produced 119 random realisations of species assignments and hence abundances in each 5km transect section, based on the aerial data and the boat survey GAMs, were produced using the following procedure for each species (s):

2.3.7 The probability that individual i, observed on the aerial surveys, was species s, was estimated from the binomial GAM, relevant to the species group for that individual.

logit(psi) = logit(pgsi) + r*se(logit(pgsi) [Eq. 2]

where psi is the probability that individual i, is species s, pgsi is the estimated probability from the binomial GAM, of individual i, of species group g, being species s; and r is a random draw from N(0, 1).

2.3.8 An expected number of individuals of species s, across all aerial observations is calculated, by randomly generating Bernoulli draws for each individual observation. The randomly generated expected abundance (Ns) of species s for each monthly aerial survey was:

$N_s = \sum_{i=1}^{n} b_{is}$ [Eq. 3]

where $b_{is}$ is a Bernoulli random draw with probability $p_{is}$ that individual i is species s. This estimate does not take account of any identification to species, only the species group that each observation was assigned to.

2.3.9 Some observations i, were identified to species level. These were randomly assigned to the given species with probability 0.8 where the confidence was "probable", and 1.0 where the confidence was "certain". The total of those randomly assigned to the species was defined as As for species s. An additional Ns-As individuals, of those not assigned to species level, were assigned to species s, based on the probabilities pis.

2.3.10 The result of the above process was for each species, 119 possible realisations of abundance and locations, for birds on the sea and in the air separately, based on assignments of different individuals to the species concerned in each random realisation. The variation in these realisations accounted for the uncertainty in the binomial GAMs

2.3.11 Abundance was estimated for eleven species regularly occurring in the survey area: northern gannet, northern fulmar, Arctic skua, great skua, little auk, puffin, razorbill, common guillemot, black-legged kittiwake, lesser black-backed gull and great black-backed gull. For each of these species, and for each of the 119 realisations for each species, a GAM was fitted relating abundance (the sum of abundance on the sea and in the air) to environmental predictors. The error distribution was specified as a negative binomial, based on residual distributions and normal QQ plots. Each abundance realisation was aggregated on a grid of size two nautical miles (approximately 3.5km), which was used for all spatial analyses.

2.3.12 The full saturated model was specified as:

log(count) ~ SST + season + season*depth + season*sandeels + season*dist_shore + season*dist_colony + f1(day) + offset(log_effort) [Eq. 4]

where:

- "count" is one of the 119 realisations of species abundance within a grid square during an aerial survey;
- "depth" is the average depth in the grid square;
- "sandeels" is a measure of the density of Danish fishing vessels of over-15m in length, as obtained from the Danish Vessel Monitoring System (VMS) for 2010 and 2011 (for 2012, due to an absence of up-to-date data, an average value based on 2010 and 2011 was used). The Danish fishing vessels that use the Dogger Bank effectively represent the sandeel fishery in the area and these data thus represent a proxy for spatial sandeel abundance, which is the most important food resource for the species we include in this analysis;
- "dist_shore" the shortest distance to a European coast;
- "dist_colony" the species-specific inverse distance squared to colonies, weighted by colony size. This described the accessibility of the square to the breeding colonies;

- "f1(day)" a non-parametric smooth on days since the 1st January 2010 (a continuous variable).

2.3.13 Generalized cross-validation was used to select the final degrees of freedom. The season variable was a factor, which denoted whether the aerial survey took place in the breeding season or non-breeding season, to account for central-place foraging constraints. For two species, guillemot and razorbill, a post-breeding period when individuals may periodically return to the colony (e.g. Wanless & Harris 1986), was defined. These seasons were defined on a species specific basis (see Table 2.4). The effects of depth, sandeels, dist_shore and dist_colony may all vary with season, as the behaviour of the birds may vary seasonally, so interactions between the season factor and these variables were tested. The effort was the area covered by all aerial transects within that square, in that month. It was calculated by the sum of the areas of camera transects which intersected each grid square, and the log of this was used as the offset. Model selection was by backwards stepwise selection using z-tests and chi-squared tests as diagnostic criteria for variable inclusion. As previously, the modelling was conducted in R with the "mgcv" package.

***Population estimates and density surfaces***

2.3.14 The final model for each abundance realisation was used to predict the abundance of each species on a complete grid (i.e. predictions based on 100% coverage) for the central date in each month over the total survey period. This predictive grid also spanned beyond the original modelled area – therefore caution should be placed in interpreting the full map distributions. However, squares required for population estimates did not span outside the modelled data.

2.3.15 Predictions from each spatial GAM for each realisation were generated. Predicted estimates of species numbers for each GAM also incorporated modelled error. Estimates were then combined for each species, in each month, taking the median, 5th and 95th quantiles of abundance for each grid square. Hence each estimated abundance for each month could be plotted for each species to show spatial variation in abundance.

2.3.16 Estimates of population across the entire zone were produced by summing grid square estimates for each realisation across the Dogger Bank Zone, adjusting for grid squares with partial overlap of the area, and then taking the median, 5th and 95th quantiles of total population from across the 119 total abundance estimates for each species.

$$M_s = \sum_{k=1}^{K} p_k \hat{a}_{sk} \text{ [Eq. 5]}$$

where Ms is the estimated abundance for species s over the whole zone, pk is the proportion of grid square k which is in the Dogger Bank Zone and $\hat{a}_{sk}$ is the estimated abundance of species s in grid square k.

**Population estimates for less numerous marine birds**

2.3.17 Species accounts are also provided in the baseline results for all other marine bird species that occurred in the Dogger Bank Zone during boat surveys in numbers of 10 or more. For these other potentially important species – common scoter, white-billed diver, sooty shearwater, European storm-petrel, pomarine skua, herring gull, black-headed gull, common gull, little gull and Arctic tern – numbers were insufficient to estimate populations following the methodology described above. For these species, population sizes for each project area were derived by first estimating a monthly estimate of density by dividing the total number of birds seen during boat surveys by the total boat survey effort in the months they were recorded. This density estimate was then scaled up to give a total population estimate for each species within the relevant project. As only a single estimate of density was available using this approach, it was not possible to generate confidence limits around the population estimates.

## 2.4 Other Data Sources Reviewed

2.4.1 Prior to 1979, little was known about the offshore distribution of marine birds within the North Sea. Data collected using aerial and boat-based surveys between 1979 and 2002 has been collated to form the European Seabirds at Sea (ESAS) database. Data from this dataset were extracted for both Dogger Bank Teesside A and Dogger Bank Teesside B within GIS, as a basis for estimating population size. A subset of the ESAS database was used by Skov *et al.* (1995) to identify important bird areas within the North Sea, the data contributing to this analysis are also summarised. These data were also utilised by Stone *et al.* (1995) to map the distribution of seabirds in Northwest European waters.

2.4.2 There are number of issues that must be taken into consideration when making comparisons of the population estimates derived by the baseline surveys and those based on the historical ESAS surveys:

i. The baseline population estimates are based on more recent and intensive survey than those obtained from ESAS. By utilising aerial survey data, they also account for biases that result from birds being attracted to, or disturbed by, survey vessels, and may therefore offer a more realistic estimate of the number of birds present within the project area;
ii. Due to the survey design for the baseline, it was possible to derive monthly population estimates. In contrast, ESAS population estimates are only available as combined monthly estimates across years or in some cases as a single estimate for the whole year. This makes it difficult to make direct comparisons of the population estimates derived by the two different sources of data.

## 2.5 Export Cable Corridor Baseline Populations

2.5.1 The export cable corridor planned for the Dogger Bank Teesside A and B projects, and those for the Dogger Bank Creyke Beck A and B, and Dogger Bank Teesside C and D projects, are shown in Figure 1.1. The export cable corridor planned for the Dogger Bank Teesside A and B projects runs for a distance of 158km from the boundary of the Dogger Bank Teesside A and B projects to the landfall near Redcar.

2.5.2 The potential export cable corridor area as a whole covers a total of 233km$^2$ with an average width of 1.5km. However, the cables themselves are only likely to cover a small portion of this area. A pair of cables would be associated with each Project, each with a diameter of approximately 300mm. Each cable would be placed in a corridor approximately 10m wide and separated from other cables by a distance of between 50m and 250m.

2.5.3 Due to the narrow width of the export cable corridor, and the small proportion of the area taken up by the cables, detailed surveys of the ornithological features of the area were not undertaken. Instead, a desk based review of data was undertaken to determine the numbers of different species potentially exposed to the export cable corridor for Dogger Bank Teesside A and B.

2.5.4 Data were obtained from two main sources. The ESAS database summarises data collected from boat and aerial surveys in the North Sea between 1979 and 2002. These data were processed in GIS to obtain mean and maximum densities for each species recorded within the export cable corridor and derive population estimates for the export cable corridor as a whole. However, as the potential export cable corridor covers a much larger area than that which will actually be affected by the operations associated with the laying of cables, it should be noted that these estimates are at least an order of magnitude greater than the numbers that could be impacted by effects associated with cable laying.

2.5.5 To provide further information of seabird activity within the area of the landfall, data were also obtained from recent county bird reports for Cleveland (Cleveland Bird Report 2011).

2.5.6 Species accounts are provided for all species recorded by the ESAS database in squares overlapping the export cable corridor.

## 2.6 Ornithology of the Intertidal Zone at the Export Cable Corridor Landfall

### Description of study area

2.6.1 The study area was defined as the area of at least 300m either side of the outer edge of the proposed cable corridor for the Dogger Bank Teesside A and B projects (see Figure 2.3), this distance representing the maximum distance at which coastal waterbirds typically show behavioural responses to human disturbance (see Smit & Visser 1993, Burton *et al.* 2002). It includes all the intertidal habitats located

between the mean high water mark (MHWM) and the mean low water mark (MLWM). The following grid squares are included in the study area (but not wholly): NZ6223, NZ6323, NZ6322 and NZ6422. The longest length of the study area is just under 2.1 km (but excluding the buffer it extends to less 1km – apparent discrepancies in the lengths arise due to the relative angle at which the cable corridor meets the coastline).

2.6.2 In general the study area is characterised as being predominantly coarse sand and gravel at the high shore which transitions into finer sand at the low shore with small amounts of gravel and shell fragments. In most areas there is a distinct strandline clearly marked by deposition of seaweed and debris which supports sand hoppers (*Talitrid saltator*). In the upper regions of the intertidal zone, there were localised areas of high abundance of bristle worm (*Scolelelpsis scolelelpsis/Scolelelpsis Scolelelpsis squamata*). Further down shore, the amphipods *Pontocrates arenarius* and *Bathyporeia pelagica* were also relatively abundant in localised areas. The macro algae *Enteromorpha spp.* also occurs sporadically at the low shore. More details can be found in the intertidal landfall study report (IECS 2012).

2.6.3 The landward edge of the study area at the northern end is immediately adjacent to small cliffs (approximately 6m in height) covered in maritime grasses. In addition cobbles/boulders have been positioned by the local council at the high shore, above the strandline, as a coastal defence measure. Whereas the landward edge of the study area at the southern end tends to be characterised by a sand dune system (IECS 2012). Phase I habitat information for the 1km squares NZ6222, NZ6223, NZ6322 and NZ6223 (Peak Ecology 2013) indicate that further inland (<500m), the following habitats occur: coastal grassland, arable fields, amenity grassland, broad leaved woodland (semi-natural) and residential/industrial land.

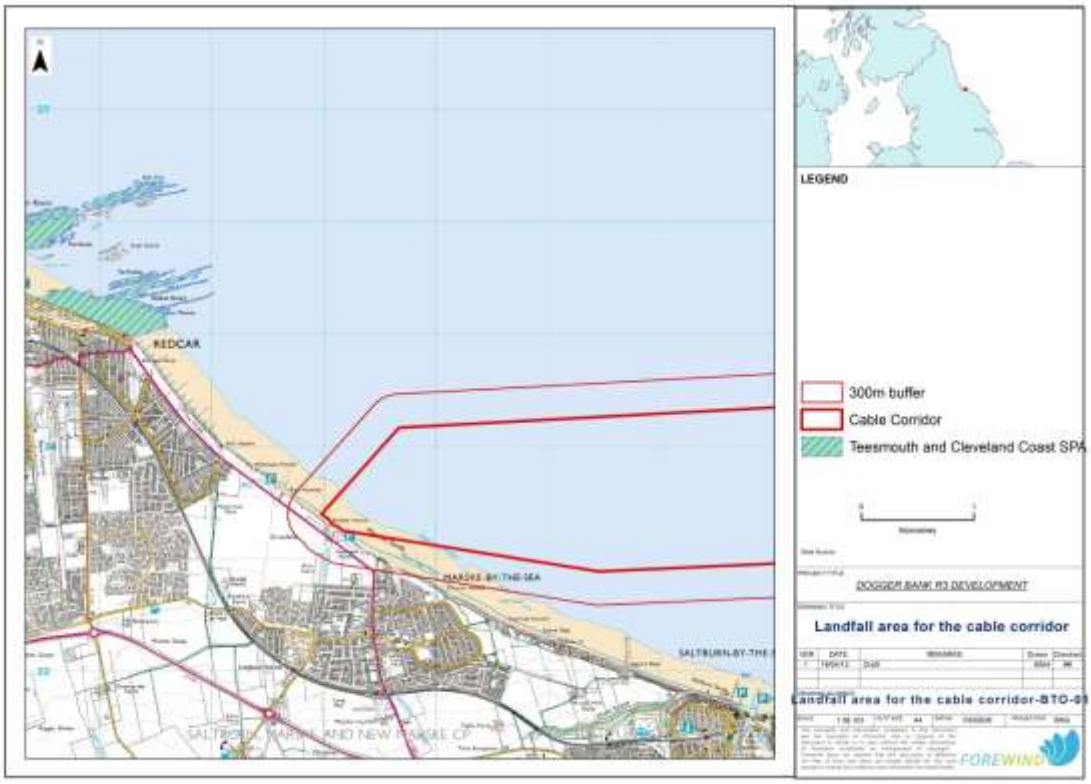



**Figure 2.3** Location of the export cable corridor (thick red outline) and 300m buffer (thin red outline) in relation to the nearest SPA.

2.6.4 Records of waders, seabirds and wildfowl above the MHWM are presented. This is because there is a strong inter-relationship between the intertidal zone and the onshore area immediately above the MHWS.

2.6.5 The closest coastal protected site is located to the west of the study area – the Teesmouth and Cleveland Coast SPA (which at its most eastern edge is just under 2km away). This SPA consists of a number of SSSIs which are as follows (distances to the study area and relevant ornithological features are shown in the parentheses):

- Redcar Rocks SSSI (<2km – red knot, ringed plover, sanderling and tufted duck);
- South Gare and Coatham Sands SSSI (<3.5km – red knot, ringed plover, sanderling, little tern);
- Seal Sands SSSI (<9km – common goldeneye, pochard, common redshank, common shelduck, red knot, and little tern);
- Seaton Dunes and Common SSSI (<9km – red knot, ringed plover and sanderling);
- Tees & Hartlepool Foreshore & Wetlands SSSI (<11km – northern shoveler, purple sandpiper, sanderling);
- Cowpen Marsh SSSI (<12km).

Qualifying features of the Teesmouth and Cleveland Coast SPA are: little tern, Sandwich tern, ringed plover, red knot and common redshank, and also, as part of the wintering waterbird assemblage, common shelduck, great cormorant, northern lapwing and sanderling (Stroud *et al.* 2001).

**Data collection**

2.6.6 In order to characterise the baseline ornithology of the study area, two methods of data collection were used: a desk based study and specially commissioned field surveys.

***Desk based study***

2.6.7 Data requests were made to the BTO for Wetland Bird Survey (WeBS) and Non-estuarine Coastal Waterbird Survey (NEWS) data.

2.6.8 WeBS is designed for monitoring non-breeding waterbirds in the UK on an annual basis. It is used to determine population sizes, determine trends in numbers and distribution and to identify important sites for water birds. WeBS counts are carried out at over 2000 wetland sites with a particular focus on estuaries and large inland still waters. Core counts are carried out on a monthly basis between September to March and, on the coast, aim to cover periods of high tides.

2.6.9 NEWS is a periodic survey designed to complement WeBS coverage by focussing on open coast. To date, the survey has been undertaken on three occasions these being the winters of 1984/85 (as the Winter Shorebird Count), 1997/98 and 2006/07. The survey is primarily designed to target waterbird species which occur in intertidal areas but records of birds which occur inland and out to sea can also be submitted. Inland boundaries are usually defined by such as changes in substrate (e.g. rock meeting sand) and features such as rocky outcrops.

***Field surveys***

2.6.10 Field surveys were carried over the two consecutive winters of 2011/12 and 2012/13 but there were differences in survey methodologies as well as the frequency/timing of visits.

2.6.11 In the winter of 2011/12, winter bird surveys (terrestrial) and inland sea-watch surveys were carried out. Additional surveys were also carried out at a further three sites located to the west of the study area and an additional site to the east, although these are not considered here. The wintering bird and inland sea-watch surveys were carried out on the same days and a total of eight visits were carried out between the months of November and March: 28/11/2011, 12/12/2011, 17/01/2012, 23/01/2012, 13/02/2012, 16/02/2012, 06/03/2012 and 08/03/2012. Each survey took 1.5 hours and the total visit to the site took a total of 3 hours. All surveys were completed during the period of 07:30am to 14:15pm.

2.6.12 In the winter of 2012/13, autumn passage, wintering bird surveys and inland sea watch surveys were carried out (see Figure 2.4 – the landward boundary was surmised by looking at the location of bird records provided). Additional surveys were carried out for inland arable fields between the villages of Yearby and Wilton although these are not considered here. The autumn passage/winter bird surveys (depending on the time of year) were carried out on the same days as the inland sea-watch surveys and a total of fourteen visits were carried out between the months of September and February: 20/09/2012, 27/09/2012, 01/10/2012, 11/10/2012, 02/11/2012, 30/11/2012, 11/12/2012, 19/12/2012, 17/01/2013, 25/01/2013, 12/02/2013, 27/02/2013, 27/02/2013, 28/02/2013. Durations of visits were not specified. The start time varied from 07.30 to 10.30.

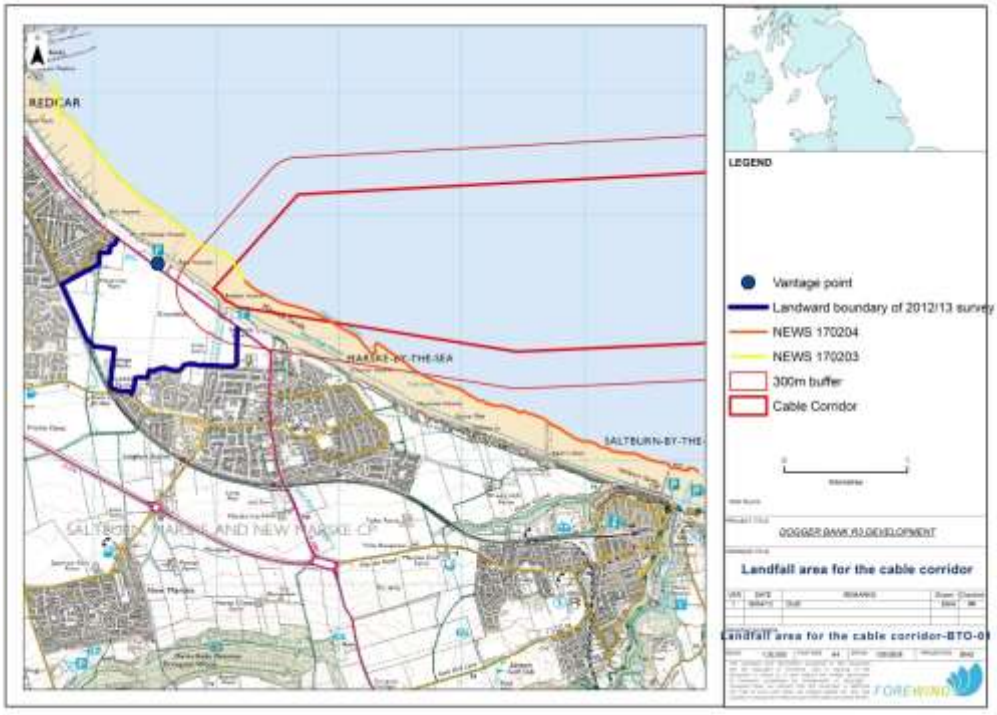



**Figure 2.4** Spatial overlap between the export cable corridor (thick red outline)/buffer (thin red outline) and the relevant bird surveys: NEWS (pink and yellow line); vantage point used during the winter bird and inland sea-watch surveys in 2011/12 and the inland sea-watch survey in 2012/13 (blue circle) and the inland extent of the winter bird surveys in the winter of 2012/13.

***Wintering bird survey 2011/12***

2.6.13 Data from the winter birds surveys in the winter of 2011/12 were collected using vantage point methodology (vantage point located at the coast car park at Millclose Howle, NZ625236 – see Figure 2.4). Observations covered the fields to the south-west end of the 1km square, rather than the coastline and therefore, there were no records of birds of relevance to the intertidal study.

***Inshore sea-watch survey 2011/12***

2.6.14 Inshore sea-watch surveys were carried out from the same vantage point used for the wintering bird surveys in 2011/12. Surveys were carried out in a varying tidal conditions, ranging between low and high water and for a range of sea states from 0 (calm) to 5/6 (rough/very rough), although there was a stated preference to avoid sea states of 5 and above as it could compromise the quality of the data (this is unlikely to have affected observations relevant to the intertidal area however). Visibility was reported as being good for all surveys (>3km). Records were all assigned as being inshore and included observations of birds seen on the sea, beach and the car park. In general, only observations of birds on the beach were considered to be of relevance to the intertidal baseline study but, there were a number of observations of waders which were not explicitly recorded as having been on the beach but, which were included.

***Autumn passage and wintering bird surveys 2012/13***

2.6.15 Surveys during the autumn passage and winter of 2012/13 were carried out using a combination of walkover, transect and vantage point methodology (vantage point was given as NZ6247423257 and is therefore considered to be the same as used in 2011/12). It was not stipulated, however, how effort was divided between these different methodologies for the two surveys. The order in which transects and vantage routes were carried out were alternated from one visit to the next. Transect routes were also reversed on subsequent visits. It was not possible to be certain which habitat types recorded during the autumn passage and wintering bird surveys were of relevance to the intertidal survey as the bird records were combined with those of the inshore sea-watch surveys in a summary table in the report. In this summary table, records were assigned to a variety of habitats of which the following were of relevance to the intertidal baseline study: coastal and beach (others were as follows: arable fields, coastal grassland, residential areas, hedgerows, bare ground, improved grassland, flying). It was necessary, therefore, to refer back to the individual field visit maps to look at the locations of bird records. Only records which occurred on the seaward side of the coast road and overlapped with the study area (including the buffer area) were regarded as being relevant to the intertidal study. All records of birds in flight were excluded. The maximum counts for across all site visits were used to estimate the population size.

***Inshore sea-watch survey 2012/13***

2.6.16 Inshore sea-watch surveys were carried out from the same vantage point used for the wintering/autumn bird surveys in 2012/13. Surveys were carried out in varying tidal conditions ranging between low and high water and also for a range of sea states from 0 (calm) to 5-7 (rough- high waves), although, there was a stated preference to avoid sea states of 5 and above as it could compromise the quality of the data (this is unlikely to have affected observations relevant to the intertidal area however). Visibility was reported as being good for all surveys (>2km). Observations

of birds which were relevant to the intertidal surveys were those recorded as being in the following habitats: coastal and beach (see above for further explanation).

## 2.7 Definition of National and Biogeographic Populations

2.7.1 Great Britain (GB) populations and thresholds for non-pelagic wintering gulls (black-headed gull, common gull, lesser black-backed gull, herring gull and great black-backed gull) are taken from Musgrove *et al.* (2011), following Banks *et al.* (2007) and Burton *et al.* (2013). It should be noted that these national winter population estimates for gulls come from a survey of terrestrial habitats and inshore waters (Banks *et al.* 2007, Burton *et al.* 2013) and thus, do not include birds that frequent offshore waters and so underestimate the overall national populations. Thus, the thresholds for non-pelagic wintering gulls are also minima.

2.7.2 For seabirds recorded during the summer months, GB population estimates are taken from Musgrove *et al.* (2013). Where GB populations are given as numbers of individuals, thresholds are taken as 1% of these values; where GB populations are given as numbers of pairs or nests, it is assumed that the overall number of individuals in the population is three times this and the 1% threshold calculated accordingly (following the standard protocol used in Stroud *et al.* 2004 and Wetlands International 2006, 2013 and followed by Kober *et al.* 2010).

2.7.3 Biogeographic populations and thresholds for seaduck, divers, terns and gulls are taken from Wetlands International (2013). For seabirds, biogeographic populations used follow Kober *et al.* (2010). Where possible, biogeographic population estimates for other seabirds are obtained from a Report on the Conservation Status of Migratory Waterbirds in the Agreement area of the African-Eurasian Waterbird Agreement (AEWA 2012) (e.g. for northern gannet, great skua, common guillemot, razorbill, little auk and Atlantic puffin). For Arctic skua, numbers are obtained from Mitchell *et al.* (2004) and numbers of pairs were converted into numbers of individuals as above. For common guillemot, numbers are obtained from Mitchell *et al.* (2004) with updated Norwegian numbers (Barrett 2006). For fulmar and black-legged kittiwake, numbers were also taken from Mitchell *et al.* (2004). Population estimates for pomarine skua are obtained from Furness (1996), with numbers of pairs converted into numbers of individuals as above.

2.7.4 It is assumed that the biogeographic 1% thresholds calculated based on breeding populations of seabirds are also applicable to the winter; the same assumption is not followed for GB 1% thresholds, as the birds that occur in Great Britain and British waters in winter may not be the same as those that occur in the summer. Thus, as indicated above, separate GB breeding season and GB winter 1% thresholds are applied within and outwith defined breeding seasons. National and international population thresholds for key species are given in Table 2.3.

2.7.5 Biogeographic population estimates are presented for both of the two sub-species of common guillemot that may be present in the study area. As it was not possible to separate sub-species in survey data, 1% thresholds are then calculated for both

populations combined and for the smaller of the two populations (Table 2.3). For lesser black-backed gull and herring gull, respective thresholds for *Larus fuscus graellsii* and *Larus argentatus argenteus* are used here following Holt *et al.* (2012).

2.7.6 Definitions of breeding periods, and additional post-breeding moulting periods, when birds may still be found in proximity to their colonies, follow Kober *et al.* (2010, 2012), with additional months included in these periods where the population estimates produced from the surveys suggest that this is appropriate (Table 2.4).

2.7.7 Where available, species' regional population estimates were obtained for the North Sea from Skov *et al.* (1995) (Table 2.5). It should, however, be noted that these estimates are significantly older than other estimates presented here, and the seabird populations have undergone significant changes since these estimates were compiled (Mitchell *et al.* 2004, JNCC 2012a).

2.7.8 Although they do not represent possible future population trends for the species, assessments of the current trends of the species' biogeographic populations, provided by Wetlands International (2013) and AEWA (2012), are also provided in this table for information.

**Table 2.3** Great Britain and biogeographic population estimates and 1% thresholds for marine bird species considered in detail in the baseline species accounts.

| Species | Season | GB population[1] | GB 1% threshold | Biogeographic population[1] | Biogeographic 1% threshold | Biogeographic population trend |
|---|---|---|---|---|---|---|
| Common scoter | Winter | 100,000 I | 1,000 | 550,000 I | 5,500 | Declining |
| | Breeding | 52 P | 50[3] | | | |
| White-billed diver | Winter | - | - | < 10,000 I | 100 | |
| Northern fulmar | Winter | - | - | 2,700,000-4,100,000 P | 102,000 | Unknown |
| | Breeding | 500,000 P | 15,000 | | | |
| Sooty shearwater | Breeding | - | - | 20,000,000 I | 200,000 | - |
| European storm-petrel | Breeding | 26,000 P | 780 | 300,000-680,000 P | 14,700 | - |
| Northern gannet | Winter | - | - | 967,000 I | 9,670 | Increasing |
| | Breeding | 220,000 N | 6,600 | | | |
| Pomarine skua | Breeding | - | - | 250,000-3,000,000 I | 16,250 | - |
| Arctic skua | Winter | - | - | 75,000 I | 750 | - |
| | Breeding | 2,100 P | 63 | | | |
| Great skua | Winter | - | - | 48,000 I | 480 | Increasing |
| | Breeding | 9,600 P | 288 | | | |
| Black-legged kittiwake | Winter | - | - | 6,600,000 I | 66,000 | Declining |
| | Breeding | 370,000 P | 11,100 | | | |
| Black-headed gull | Winter | 2,200,000 I | 22,000 | 3,700,000-4,800,000 I | 42,100 | Stable |
| | Breeding | 130,000 P | 3,900 | | | |
| Little gull | Winter | - | - | 72,000-174,000 I | 1,100 | Increasing |
| Common gull | Winter | 700,000 I | 7,000 | 1,200,000-2,250,000 I | 16,400 | Declining |
| | Breeding | 48,000 P | 1,440 | | | |
| Lesser black-backed gull[2] | Winter | 124,654 I | 1,200 | 530,000-570,000 I (*graellsii*)<br>325,000-440,000 I (*intermedius*) | 5,500 | Increasing |
| | Breeding | 110,000 P | 3,300 | | | |
| Herring gull[2] | Winter | 730,000 I | 7,300 | 1,300,000-3,100,000 I (*argentatus*)<br>990,000-1,050,000 I (*argenteus*) | 10,200 | Stable (*argentatus*)<br>Declining (*argenteus*) |
| | Breeding | 130,000 P | 3,900 | | | |

| Species | Season | GB population[1] | GB 1% threshold | Biogeographic population[1] | Biogeographic 1% threshold | Biogeographic population trend |
|---|---|---|---|---|---|---|
| Great black-backed gull | Winter | 75,860 I | 760 | 330,000-540,000 I | 4,200 | Increasing |
| | Breeding | 17,000 P | 510 | | | |
| Arctic tern | Breeding | 53,000 P | 1,590 | 1,000,000 I | 20,000 | Stable |
| Common guillemot | Winter | - | - | 4,800,000 I (*aalge*)<br>800,000 I (*albionis*) | 56,000 (combined)<br>8,000 (*albionis*) | Decreasing (*aalge*)<br>Increasing (*albionis*) |
| | Breeding | 880,000 P | 26,400 | | | |
| Razorbill | Winter | - | - | 1,380,000 I | 13,800 | Decreasing |
| | Breeding | 110,000 P | 3,300 | | | |
| Little auk | Winter | - | - | 117,000,000-133,000,000 I | 1,250,000 | Unknown |
| Atlantic puffin | Winter | - | - | 13,500,000 I | 135,000 | Increasing |
| | Breeding | 580,000 P | 17,400 | | | |

[1] I = individuals; P = pairs; N = nests; [2] threshold for *Larus fuscus graellsii* and *Larus argentatus argenteus* used here following Holt *et al.* (2012); for other assumptions, see text.[3]50 individuals taken as a minimum qualification for the 1% threshold.

**Table 2.4** Defined seasons of interest for the marine bird species considered in detail in the baseline species accounts.

| Species | Scientific name | Kober *et al.* (2010, 2012) | | | Seasonal definitions used here | | |
|---|---|---|---|---|---|---|---|
| | | Breeding/summer | Additional | Winter | Breeding/summer | Post-breeding[1] | Winter[2] |
| White-billed diver | *Gavia adamsii* | - | - | - | NOT PRESENT IN BREEDING SEASON[3] | | |
| Common scoter | *Melanitta nigra* | - | - | - | | | |
| Northern fulmar | *Fulmarus glacialis* | Mar-Jul | - | Aug-Feb | Mar-Sep | | Oct-Feb |
| Sooty shearwater | *Puffinus griseus* | Jul-Nov | | | NOT PRESENT IN BREEDING SEASON[3] | | |
| European storm-petrel | *Hydrobates pelagicus* | Jun-Oct | - | - | Jun-Oct | | |
| Northern gannet | *Morus bassanus* | May-Sep | - | Oct-Apr | Apr-Sep | | Oct-Mar |
| Pomarine skua | *Stercorarius pomarinus* | - | - | Aug-Nov | NOT PRESENT IN BREEDING SEASON[3] | | |
| Arctic skua | *Stercorarius parasiticus* | May-Aug | Sep-Nov | - | May-Aug | | Sep-Apr |
| Great skua | *Stercorarius skua* | May-Aug | - | Sep-Apr | May-Aug | | Sep-Apr |
| Black-legged kittiwake | *Rissa tridactyla* | May-Sep | - | Oct-Apr | Mar-Sep | | Oct-Feb |
| Black-headed gull | *Larus ridibundus* | Apr-Aug | - | Sep-Mar | Apr-Aug | | Sep-Mar |
| Little gull | *Larus minutus* | May-Jul | Aug-Nov | Dec-Apr | May-Jul | Aug-Nov | Dec-Apr |
| Common gull | *Larus canus* | May-Aug | - | Sep-Apr | May-Aug | | Sep-Apr |
| Lesser black-backed gull | *Larus fuscus* | May-Aug | - | Sep-Apr | May-Aug | | Sep-Apr |
| Herring gull | *Larus argentatus* | Apr-Aug | - | Sep-Mar | Apr-Aug | | Sep-Mar |
| Great black-backed gull | *Larus marinus* | Apr-Aug | - | Sep-Mar | Apr-Aug | | Sep-Mar |
| Arctic tern | *Sterna paradisaea* | May-Aug | - | - | May-Aug | | |
| Common guillemot | *Uria aalge* | May-Jun | Aug-Sep | Oct-Apr | May-Jul | Aug-Sep | Oct-Apr |
| Razorbill | *Alca torda* | May-Jun | Aug-Sep | Oct-Apr | May-Jul | Aug-Sep | Oct-Apr |
| Little auk | *Alle alle* | - | - | Nov-Mar | NOT PRESENT IN BREEDING SEASON | | |
| Atlantic puffin | *Fratercula arctica* | Apr-Jul | - | Aug-Mar | Apr-Aug | Sep-Oct | Nov-Mar |

[1] Includes migratory seasons;[2] Post-breeding seasons are considered for some species where dispersing moulting flocks might be considered to originate from proximate breeding colonies;[3] Species are not present in the North Sea during the breeding season, as these species only breed in the High Arctic; Definitions of breeding seasons for other species, where required, will follow Kober *et al.* (2010, 2012).

**Table 2.5** Monthly population estimates for key species within the North Sea, taken from Skov *et al.* (1995).

| Species | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common scoter | 77,780 | | 525,085 | | 570,301 | | | 238,990 | | | 77,780 | |
| Northern fulmar | 3,235,000 | | | 1,872,000 | | | | 1,023,000 | | 1,717,800 | | |
| Northern gannet | 171,200 | 150,340 | | 157,800 | | | | 90,950 | | 171,200 | | |
| Great skua | 30,000 | 12,200 | | 1,000 | | | | | 6,275 | | 30,000 | |
| Black-legged kittiwake | 575,000 | | 1,032,690 | | | | | | 575,000 | | | |
| Little gull | 9,000 | | | | 5,370 | | | 6,000 | | | | |
| Common gull | 48,890 | | | | 175,530 | | | 45,020 | | 21,800 | | |
| Lesser black-backed gull | 132,795 | 64,310 | | 15,315 | | | | 128,785 | | 121,720 | | 132,795 |
| Herring gull | 148,200 | | | 971,700 | | | | 280,650 | | | | 148,200 |
| Great black-backed gull | | | | 299,900 | | | | 17,900 | | 24,395 | | |
| Common guillemot | 1,848,400 | 1,426,100 | | 1,562,400 | | | | 802,700 | | 777,300 | | 1,7474,200 |
| Razorbill | 213,200 | | 218,620 | | 324,000 | | | 74,900 | | | | 213,200 |
| Little auk | | | 178 340 | | 852 690 | | | | | | | |
| Atlantic puffin | 179,100 | | 26,000 | | | 74,600 | | 155,000 | | | | |

## 2.8 Determining Value and Identification of Key Receptors (Species)

2.8.1 The baseline provides a detailed overview of which receptors (species) occur in the Dogger Bank Teesside A and Dogger Bank Teesside B areas, and their abundance and distribution within those areas. The 'value' (Percival *et al.* 1999) of these receptors will reflect existing designations and their wider conservation status (Table 2.6). The assessment first outlines the legal and policy framework relevant to each receptor, and, second, describes how the numbers of birds recorded during the baseline surveys of the study area relate to defined geographical scales (e.g. in relation to the species' biogeographic or Great Britain population, as discussed above).

2.8.2 For descriptive purposes only, value will also be classified according to the terminology used by Percival *et al.* (1999) to describe the sensitivity of receptors (Table 2.6).

**Table 2.6** Definition of terms relating to the value of the ornithological receptors (species) of the proposed Project areas (following Percival *et al.* 1999)

| Value | Definition |
|---|---|
| Very High | Feature species of Special Protection Areas (SPAs), Ramsar sites and Sites of Special Scientific Interest (SSSIs). |
| High | Other bird species that contribute to the integrity of an SPA, Ramsar site or SSSI<br>Species of international or national importance, i.e. those whose numbers surpass 1% of international or national populations<br>Ecologically sensitive species, e.g. large birds of prey or nationally rare species (< 300 breeding pairs in the UK). |
| Medium | Species of regional importance (either because of population size or distributional context).<br>EU Birds Directive Annex 1 species, EU Habitats Directive priority habitat/species and Wildlife and Countryside Act Schedule 1 species (if not covered above).<br>UK Biodiversity Action Plan (BAP) species (if not covered above). |
| Low | Any other species of conservation interest, such as those on the Birds of Conservation Concern lists (if not covered above). |

2.8.3 The geographic scope of the assessment is outlined in section 4.2, but it is important to note here that the projects being considered have the potential to affect not just breeding seabirds, but also non-breeding marine birds and migrants and, hence might affect sites across a wide geographical area. Thus, both seabird species that might forage within the area of the projects being considered from breeding colony SPAs, Ramsar sites and SSSIs and also other marine bird and migrant species that are features of SPAs, Ramsar sites and SSSIs and that may occur within the area of the projects being considered at other times of year are considered to be of Very High value.

2.8.4 Other species that occur in the project areas in internationally or nationally important numbers (i.e. surpassing respective 1% thresholds) are considered to be of at least High value.

2.8.5 Species are considered to be of regional importance, and hence of at least Medium value, if their numbers in the project areas are at least 1% of those that occur in the Dogger Bank Zone as a whole.

2.8.6 Key receptors carried through into the impact assessment for each project area include:

i. Seabird species that are features of breeding colony protected sites (SPAs, Ramsar sites, SSSIs in the UK) and whose potential maximum foraging ranges overlap with the project area/ export cable corridor (see Section 4 for more details);

ii. Marine bird species that occur in the Dogger Bank Zone/export cable corridor as a whole in nationally or internationally important numbers, i.e. for which the region is of importance;

iii. Migrant species that are features of SPAs in the UK and whose migration zones, as defined in the recent review by Wright *et al.* (2012), overlap with the project area/export cable corridor (see Section 4 for more details).

2.8.7 Note, data on the numbers of migrants observed during boat surveys were not used to generate population estimates for these species, as boat surveys were not designed to record migrants and as they only provide a (diurnal) snapshot of birds flying close to the sea, they will inevitably greatly underestimate overall numbers of migrants. Hence, the numbers of migrants estimated to pass through the project area (at risk height) was derived following the procedure outlined by Wright *et al.* (2012) – see Section 4 for more details. Results are provided directly in the assessment sections for Dogger Bank Creyke Beck A (section 5.2), Dogger Bank Creyke Beck B (section 5.3), Dogger Bank Creyke Beck A and B (section 6.2), and Dogger Bank Creyke Beck A and B and Dogger Bank Teesside A and B (section 6.3).

# 3 OFFSHORE ENVIRONMENT-BASELINE RESULTS

## 3.1 2010, 2010/11, 2011/12 Surveys of the Dogger Bank Zone

### Summary of survey data collected in 2010, 2010/11, 2011/12 for the Dogger Bank Zone

3.1.1 The numbers of all species recorded during boat surveys within the Dogger Bank Zone are presented in Tables 3.1 (for 2010), 3.2 (for 2010/11) and 3.3 (for 2011/12). In total, 243,037 birds of 131 different species were identified.

3.1.2 These include 37 species of seabird, 37 species of waterbird and 57 other terrestrial species. Only the locations of seabirds were recorded during these boat surveys, since these were the focus of the survey effort. Therefore, it is not possible to assign records of these other species, which are most likely to be migrants and will only pass through the Dogger Bank Zone briefly at certain times of year, to individual project areas within the Dogger Bank Zone.

### Baseline population estimates for marine bird species within the Dogger Bank Zone

3.1.3 Baseline population estimates for the Dogger Bank Zone as a whole for 21 marine bird species are shown in Table 3.4 (for 2010), Table 3.5 (for 2010/11) and Table 3.6 (2011/12). These were based on combined aerial and boat-based survey data for the 11 species for which sufficient data were available to allow this-northern fulmar, northern gannet, Arctic skua, great skua, black-legged kittiwake, lesser black-backed gull, great black-backed gull, common guillemot, razorbill, Atlantic puffin and little auk. For the remaining 10 species-common scoter, white-billed diver, sooty shearwater, European storm-petrel, pomarine skua, little gull, black-headed gull, common gull, herring gull and Arctic tern- these are based on densities obtained from boat-based survey data. These estimates are used to assess the regional importance of the individual project areas for each of the key species. Patterns in species' annual abundance broadly match those observed by Skov *et al.* (1995) for the North Sea as a whole, shown in Table 2.5.

3.1.4 At a zone level, the most abundant species were;

- Common guillemot, with a population of up to 153,538 (90% CIs 141,599-167,402);
- Razorbill, with a population of up to 54,809 (90% CIs 48,976-60,728);
- Black-legged kittiwake, with a population of up to 69,328 (90% CIs 60,120-79,837) (Tables 3.4, 3.5 and 3.6).

3.1.5 The Dogger Bank Zone hosted more than 1% of the Great Britain breeding population of northern fulmar in 2010, black-legged kittiwake in 2010, 2010/11 and 2011/12, great black-backed gull in 2010/11 and 2011/12, common guillemot in 2010, 2010/11 and 2011/12 and razorbill in 2010/11 and 2011/12. It hosted more than 1% of the biogeographic populations of common guillemot in January and

February 2010, March and April 2011, and March and April 2012. It hosted more than 1% of the biogeographic populations of razorbill in January, February, October, November and December 2010, February, March and April 2011, and February, March and April 2012 (Tables 2.3, 3.4, 3.5 and 3.6).

3.1.6 Based on the population sizes presented by Skov *et al.* (2005), over the course of the year, the Dogger Bank Zone hosted a significant proportion (> 1%) of the North Sea population of;

- Northern fulmar in May and June 2010;
- Northern gannet in October 2012, February to November 2011, and February to June 2012;
- Black-legged kittiwake in 2010, 2011 and 2012;
- Lesser black-backed gull in May to July 2010 and February 2012;
- Great black-backed gull in March to July 2010, March to May 2011 and May to June 2012;
- Common guillemot in January to June and August to September 2010, January to August 2011, and January to June 2012;
- Razorbill in January, February, March, October and November 2010, March and April 2011, and January and February 2012;
- Little auk in January, October and November 2010;
- Atlantic puffin in January to March and September to December 2010, January to May and August to September 2011, and January to March 2012(Table 2.5, 3.4, 3.5 and 3.6).

3.1.7 However, care should be taken when interpreting these values as they are 18 years older than the data presented here, and many seabird populations have undergone significant changes in the intervening time period (Mitchell *et al.* 2004, JNCC 2012a).

**Other species**

3.1.8 Several hundred million birds of many different species cross the North Sea every year from Europe and Scandinavia to Britain during spring and autumn migration (Hüppop *et al.* 2006). Many of these birds are likely to pass over the Dogger Bank Zone during these periods. The main species groups include waterbirds and terrestrial birds including raptors, owls, pigeons, swallows and martins, larks, wagtails, pipits, chats, thrushes, warblers, crows, starlings, finches and buntings. There is a general movement northwards in spring and south in autumn, but the scale of movement is often dependent on prevailing weather conditions and the time of year.

3.1.9 Waterbirds generally migrate between their breeding, staging (areas where they rest and feed up during migration) and wintering areas along regular routes or “flyways”. Research into wader migration has found that there are eight global flyways.

Waders moving up and down the east coast of England are considered part of the East Atlantic Flyway (Delaney *et al.* 2009).

3.1.10 Most waterbirds were recorded in low numbers, with Eurasian curlew being the most common species recorded in 2010 and 2010/11, with a peak of 36 in July. Pink-footed goose was the commonest in 2011/12 with 50 recorded in November (Tables 3.1, 3.2 and 3.3).

3.1.11 The most common identified terrestrial birds recorded in 2010 and 2010/11 were starling, redwing and meadow pipit, with respective peaks of 276, 245 and 133 in October. Starling, redwing and common blackbird with respective peaks of 127, 300 and 174 in November were the most common identified terrestrial birds recorded in 2011/12 (Tables 3.1, 3.2 and 3.3).

**Table 3.1** Numbers of birds of all species recorded during boat-based surveys of Dogger Bank Zone in 2010.

| Species | Scientific name | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Swan spp. | Cygnus spp. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Goose spp. | - | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bean Goose | *Anser fabalis* | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greylag goose | *Anser anser* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Duck spp. | *Anas* spp. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Eurasian Teal | *Anas crecca* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 3 |
| Mallard | *Anas platyrhynchos* | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pintail | *Anas acuta* | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tufted duck | *Aythya fuligula* | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common eider | *Somateria mollissima* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| Long-tailed duck | *Clangula hyemalis* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Common scoter | *Melanitta nigra* | 0 | 0 | 4 | 28 | 0 | 0 | 3 | 51 | 0 | 5 | 18 | 4 |
| Velvet scoter | *Melanitta fusca* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Goldeneye | *Bucephala clangula* | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| Goosander | *Mergus merganser* | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |

| Species | Scientific name | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diver spp. | *Gavia* spp. | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Red throated diver | *Gavia stellata* | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | 0 |
| Black throated diver | *Gavia arctica* | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Great northern diver | *Gavia immer* | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| White billed diver | *Gavia adamsii* | 0 | 1 | 9 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 11 |
| Northern fulmar | *Fulmarus glacialis* | 10 | 640 | 800 | 508 | 2,608 | 1,638 | 619 | 248 | 17 | 266 | 307 | 649 |
| Sooty shearwater | *Puffinus griseus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 45 | 4 | 3 |
| Manx shearwater | *Puffinus puffinus* | 0 | 0 | 0 | 0 | 1 | 5 | 12 | 0 | 0 | 0 | 0 | 0 |
| European storm-petrel | *Hydrobates pelagicus* | 0 | 0 | 0 | 0 | 0 | 7 | 3 | 0 | 0 | 0 | 0 | 0 |
| Northern gannet | *Morus bassanus* | 18 | 518 | 2,261 | 2,063 | 174 | 143 | 471 | 614 | 137 | 1,530 | 338 | 299 |
| Great cormorant | *Phalacrocorax carbo* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| European Shag | *Phalacrocorax aristotelis* | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grey heron | *Ardea cinerea* | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| Eurasian sparrowhawk | *Accipiter nisus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Osprey | *Pandion haliaetus* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Species | Scientific name | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kestrel | *Falco tinnunculus* | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 0 |
| Wader spp. | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 1 |
| Eurasian oystercatcher | *Haematopus ostralegus* | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ringed plover | *Charadrius hiaticula* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 |
| Great knot | *Calidris canutus* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| Sanderling | *Calidris alba* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 1 | 0 | 0 | 0 |
| Dunlin | *Calidris alpina* | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 12 | 0 | 1 | 0 | 0 |
| Jack snipe | *Lymnocryptes minimus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Woodcock | *Scolopax rusticola* | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Whimbrel | *Numenius phaeopus* | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| Eurasian curlew | *Numenius arquata* | 0 | 0 | 0 | 9 | 1 | 0 | 36 | 5 | 0 | 0 | 0 | 0 |
| Common sandpiper | *Actitis hypoleucos* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Eurasian redshank | *Tringa totanus* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 0 |
| Ruddy turnstone | *Arenaria interpres* | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 |
| Grey phalarope | *Phalaropus fulicarius* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 |

| Species | Scientific name | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Skua spp. | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| Pomarine skua | *Stercorarius pomarinus* | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 5 | 1 | 0 |
| Arctic skua | *Stercorarius parasiticus* | 0 | 0 | 0 | 2 | 10 | 2 | 5 | 14 | 8 | 18 | 1 | 1 |
| Great skua | *Stercorarius skua* | 0 | 1 | 0 | 8 | 1 | 6 | 12 | 20 | 12 | 29 | 5 | 1 |
| Gull spp. | | 0 | 0 | 9 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 126 |
| Sabine's gull | *Xema sabini* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Black-legged kittiwake | *Rissa tridactyla* | 100 | 2,164 | 3,180 | 3,099 | 854 | 300 | 3,742 | 720 | 123 | 2,631 | 1,055 | 2,163 |
| Black-headed gull | *Chroicocephalus ridibundus* | 0 | 0 | 0 | 5 | 3 | 0 | 67 | 0 | 6 | 10 | 0 | 1 |
| Little gull | *Larus minutus* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 121 | 0 | 0 |
| Mediterranean gull | *Larus melanocephalus* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common gull | *Larus canus* | 7 | 0 | 0 | 19 | 9 | 4 | 29 | 0 | 5 | 84 | 12 | 27 |
| Black-backed gull sp. | *Larus marinus/fuscus* | 2 | 3 | 5 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| Lesser black-backed gull | *Larus fuscus* | 0 | 0 | 17 | 606 | 215 | 386 | 112 | 67 | 1 | 9 | 33 | 3 |
| Herring gull | *Larus argentatus* | 77 | 225 | 49 | 32 | 54 | 18 | 2 | 2 | 2 | 17 | 37 | 146 |

| Species | Scientific name | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yellow-legged gull | *Larus michahelis* | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Great black-backed gull | *Larus marinus* | 1 | 416 | 249 | 136 | 64 | 26 | 25 | 35 | 8 | 57 | 66 | 266 |
| Glaucous gull | *Larus hyperboreus* | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tern spp. | *Sterna* spp. | 0 | 0 | 0 | 6 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 'Comic' tern | *Sterna hirundo/paradisaea* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| Common tern | *Sterna hirundo* | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| Arctic tern | *Sterna paradisaea* | 0 | 0 | 0 | 9 | 1 | 0 | 28 | 20 | 1 | 1 | 0 | 0 |
| Auk spp. | - | 0 | 0 | 375 | 38 | 20 | 7 | 164 | 0 | 79 | 1,742 | 449 | 1,688 |
| Guillemot/razorbill | *Uria aalge/ Alca torda* | 0 | 750 | 0 | 0 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common guillemot | *Uria aalge* | 136 | 2,134 | 4,389 | 1,045 | 468 | 236 | 2,958 | 940 | 135 | 4,496 | 1,854 | 2,980 |
| Razorbill | *Alca torda* | 234 | 0 | 1,317 | 465 | 58 | 0 | 225 | 5 | 53 | 3,502 | 610 | 400 |
| Little auk | *Alle alle* | 0 | 157 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 917 | 856 |
| Atlantic puffin | *Fratercula arctica* | 4 | 153 | 106 | 112 | 40 | 113 | 3 | 3 | 24 | 352 | 121 | 141 |
| Woodpigeon | *Columba palumbus* | 0 | 1 | 1 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Collared dove | *Streptopelia decaocto* | 0 | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

| Species | Scientific name | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Short-eared owl | *Asio flammeus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| Common swift | *Apus apus* | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| Skylark | *Alauda arvensis* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 |
| Barn swallow | *Hirundo rustica* | 0 | 0 | 0 | 2 | 10 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| House martin | *Delichon urbicum* | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pipit spp. | - | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meadow pipit | *Anthus pratensis* | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 8 | 113 | 0 | 0 |
| Yellow wagtail | *Motacilla flava* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| Grey wagtail | *Motacilla cinerea* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| Pied wagtail | *Motacilla alba* | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| Waxwing | *Bombycilla garrulus* | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 0 |
| Wren | *Troglodytes troglodytes* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Robin | *Erithacus rubecula* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Bluethroat | *Luscinia svecica* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black redstart | *Phoenicurus ochruros* | 0 | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 |

| Species | Scientific name | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Redstart | *Phoenicurus phoenicurus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 |
| Whinchat | *Saxicola rubetra* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Northern wheatear | *Oenanthe oenanthe* | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| Thrush spp. | - | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 |
| Ring ouzel | *Turdus torquatus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| Common blackbird | *Turdus merula* | 0 | 2 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 1 |
| Song thrush | *Turdus philomelos* | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 1 | 0 |
| Redwing | *Turdus iliacus* | 8 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 245 | 1 | 0 |
| Fieldfare | *Turdus pilaris* | 3 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 |
| Warbler spp. | - | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Locustella warbler spp. | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Grasshopper warbler | *Locustella naevia* | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sedge warbler | *Acrocephalus schoenobaenus* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Marsh warbler | *Acrocephalus palustris* | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reed warbler | *Acrocephalus* | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 5 | 0 | 0 |

| Species | Scientific name | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *scirpaceus* | | | | | | | | | | | | |
| Blackcap | *Sylvia atricapilla* | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 0 |
| Garden warbler | *Sylvia borin* | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lesser whitethroat | *Sylvia curruca* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Phylloscopus warbler spp. | *Phylloscopus* spp. | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chiffchaff | *Phylloscopus collybita* | 0 | 0 | 4 | 7 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 |
| Willow warbler | *Phylloscopus trochilus* | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Goldcrest | *Regulus regulus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 |
| Carrion crow | *Corvus corone* | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Starling | *Sturnus vulgaris* | 1 | 0 | 152 | 0 | 0 | 0 | 0 | 0 | 0 | 276 | 243 | 3 |
| Finch spp. | - | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chaffinch | *Fringilla coelebs* | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 77 | 0 | 0 |
| Brambling | *Fringilla montifringilla* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Greenfinch | *Carduelis chloris* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Siskin | *Carduelis spinus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| Linnet | *Carduelis cannabina* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| Species | Scientific name | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dark-eyed junco | *Junco hyemalis* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lapland bunting | *Calcarius lapponicus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 0 |
| Snow bunting | *Plectrophenax nivalis* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| Reed bunting | *Emberiza schoeniclus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Pallas's reed bunting | *Emberiza pallasi* | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

**Table 3.2** Numbers of birds of all species recorded during boat-based surveys of Dogger Bank Zone in 2010/11.

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Swan spp. | Cygnus spp. | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Duck spp. | *Anas* spp. | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 12 |
| Eurasian teal | *Anas crecca* | 0 | 0 | 0 | 0 | 4 | 3 | 0 | 0 | 1 | 0 | 0 | 0 |
| Aythya duck spp. | *Aythya* spp. | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | |
| Pochard | *Aythya ferina* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Tufted duck | *Aythya fuligula* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common eider | *Somateria mollissima* | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 1 | 0 | 0 | 0 |
| Long-tailed duck | *Clangula hyemalis* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common scoter | *Melanitta nigra* | 3 | 51 | 0 | 5 | 18 | 4 | 0 | 0 | 0 | 31 | 7 | 9 |
| Goldeneye | *Bucephala clangula* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Goosander | *Mergus merganser* | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diver spp. | *Gavia* spp. | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 |
| Red-throated diver | *Gavia stellata* | 0 | 0 | 0 | 7 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 |
| Black-throated diver | *Gavia arctica* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| White-billed diver | *Gavia adamsii* | 0 | 0 | 0 | 0 | 2 | 11 | 6 | 0 | 4 | 10 | 0 | 0 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northern fulmar | *Fulmarus glacialis* | 619 | 248 | 17 | 266 | 307 | 649 | 348 | 59 | 519 | 1,146 | 2,138 | 3,752 |
| Petrel spp. | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 |
| Sooty shearwater | *Puffinus griseus* | 0 | 4 | 0 | 45 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| Manx shearwater | *Puffinus puffinus* | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 9 |
| European storm-petrel | *Hydrobates pelagicus* | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Northern gannet | *Morus bassanus* | 471 | 614 | 137 | 1,530 | 338 | 299 | 390 | 745 | 3,726 | 1,860 | 337 | 1,736 |
| Great cormorant | *Phalacrocorax carbo* | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| European Shag | *Phalacrocorax aristotelis* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Little Egret | *Egretta garzetta* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Grey heron | *Ardea cinerea* | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 |
| Eurasian sparrowhawk | *Accipiter nisus* | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| Kestrel | *Falco tinnunculus* | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Wader spp. | - | 0 | 0 | 0 | 0 | 37 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| Eurasian oystercatcher | *Haematopus ostralegus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 |
| Ringed plover | *Charadrius hiaticula* | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Golden Plover | *Pluvialis apricaria* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Lapwing | *Vanellus vanellus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 |
| Great knot | *Calidris canutus* | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Sanderling | *Calidris alba* | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dunlin | *Calidris alpina* | 3 | 12 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| Jack snipe | *Lymnocryptes minimus* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Woodcock | *Scolopax rusticola* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Whimbrel | *Numenius phaeopus* | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Eurasian curlew | *Numenius arquata* | 36 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Common sandpiper | *Actitis hypoleucos* | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Eurasian redshank | *Tringa totanus* | 1 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Ruddy turnstone | *Arenaria interpres* | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grey phalarope | *Phalaropus fulicarius* | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 3 | 0 | 0 | 0 |
| Skua spp. | - | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 4 |
| Pomarine skua | *Stercorarius pomarinus* | 0 | 0 | 0 | 5 | 1 | 0 | 1 | 0 | 0 | 0 | 3 | 3 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arctic skua | *Stercorarius parasiticus* | 5 | 14 | 8 | 18 | 1 | 1 | 0 | 0 | 0 | 2 | 14 | 13 |
| Great skua | *Stercorarius skua* | 12 | 20 | 12 | 29 | 5 | 1 | 4 | 2 | 1 | 18 | 7 | 12 |
| Gull spp. | | 0 | 0 | 0 | 0 | 6 | 126 | 0 | 0 | 0 | 331 | 42 | 194 |
| Sabine's gull | *Xema sabini* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black-legged kittiwake | *Rissa tridactyla* | 3,742 | 720 | 123 | 2,631 | 1,055 | 2,163 | 1,379 | 1,512 | 7,793 | 6,315 | 2,563 | 7,260 |
| Black-headed gull | *Chroicocephalus ridibundus* | 67 | 0 | 6 | 10 | 0 | 1 | 0 | 2 | 10 | 7 | 4 | 0 |
| Little gull | *Larus minutus* | 1 | 0 | 0 | 121 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Common gull | *Larus canus* | 29 | 0 | 5 | 84 | 12 | 27 | 2 | 3 | 14 | 24 | 10 | 2 |
| Large gull spp. | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 |
| Black-backed gull sp. | *Larus marinus/fuscus* | 0 | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lesser black-backed gull | *Larus fuscus* | 112 | 67 | 1 | 9 | 33 | 3 | 2 | 0 | 0 | 261 | 239 | 231 |
| Herring gull | *Larus argentatus* | 2 | 2 | 2 | 17 | 37 | 146 | 29 | 8 | 31 | 12 | 62 | 3 |
| Glaucous gull | *Larus hyperboreus* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Great black-backed gull | *Larus marinus* | 25 | 35 | 8 | 57 | 66 | 266 | 297 | 120 | 176 | 173 | 82 | 26 |
| Tern spp. | *Sterna* spp. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 18 | 0 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 'Comic' tern | *Sterna hirundo/paradisaea* | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common tern | *Sterna hirundo* | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Arctic tern | *Sterna paradisaea* | 28 | 20 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 3 |
| Auk spp. | - | 164 | 0 | 79 | 1,742 | 449 | 1,688 | 953 | 525 | 2,415 | 0 | 0 | 0 |
| Common guillemot | *Uria aalge* | 2,958 | 940 | 135 | 4,496 | 1,854 | 2,980 | 1,701 | 3,071 | 7,359 | 2,712 | 1,590 | 1,204 |
| Razorbill | *Alca torda* | 225 | 5 | 53 | 3,502 | 610 | 400 | 964 | 479 | 2,352 | 1,494 | 97 | 94 |
| Little Auk | *Alle alle* | 0 | 0 | 0 | 32 | 917 | 856 | 173 | 117 | 187 | 1 | 0 | 0 |
| Atlantic puffin | *Fratercula arctica* | 3 | 3 | 24 | 352 | 121 | 141 | 152 | 116 | 343 | 225 | 70 | 54 |
| Feral pigeon | *Columba livia* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| Woodpigeon | *Columba palumbus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| Collared dove | *Streptopelia decaocto* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| Short-eared owl | *Asio flammeus* | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Common swift | *Apus apus* | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 |
| Unidentified Passerine | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| Lark spp. | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Skylark | *Alauda arvensis* | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barn swallow | *Hirundo rustica* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 13 | 2 |
| House martin | *Delichon urbicum* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Pipit spp. | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5+ | 0 | 0 | 0 |
| Meadow pipit | *Anthus pratensis* | 0 | 0 | 8 | 113 | 0 | 0 | 0 | 0 | 3 | 15 | 2 | 0 |
| Yellow wagtail | *Motacilla flava* | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Grey wagtail | *Motacilla cinerea* | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pied wagtail | *Motacilla alba* | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 3 | 0 | 0 |
| Waxwing | *Bombycilla garrulus* | 0 | 0 | 0 | 0 | 50 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| Wren | *Troglodytes troglodytes* | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Robin | *Erithacus rubecula* | 0 | 0 | 0 | 10 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 0 |
| Black redstart | *Phoenicurus ochruros* | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redstart | *Phoenicurus phoenicurus* | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Northern wheatear | *Oenanthe oenanthe* | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 1 |
| Thrush spp. | - | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 2 | 20 | 0 | 0 | 0 |
| Ring ouzel | *Turdus torquatus* | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common blackbird | *Turdus merula* | 0 | 0 | 0 | 5 | 1 | 1 | 1 | 4 | 23 | 1 | 1 | 0 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Song thrush | *Turdus philomelos* | 0 | 0 | 0 | 28 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Redwing | *Turdus iliacus* | 0 | 0 | 0 | 245 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Fieldfare | *Turdus pilaris* | 0 | 0 | 0 | 0 | 1 | 4 | 3 | 0 | 1 | 0 | 0 | 0 |
| Locustella warbler spp. | - | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reed warbler | *Acrocephalus scirpaceus* | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Blackcap | *Sylvia atricapilla* | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| Chiffchaff | *Phylloscopus collybita* | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 10 | 5 | 0 |
| Willow warbler | *Phylloscopus trochilus* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Goldcrest | *Regulus regulus* | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carrion crow | *Corvus corone* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| Starling | *Sturnus vulgaris* | 0 | 0 | 0 | 276 | 243 | 3 | 0 | 87 | 411 | 0 | 0 | 0 |
| Chaffinch | *Fringilla coelebs* | 1 | 0 | 0 | 77 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brambling | *Fringilla montifringilla* | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenfinch | *Carduelis chloris* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Siskin | *Carduelis spinus* | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Linnet | *Carduelis cannabina* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common crossbill | *Loxia curvirostra* | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Unidentified bunting | - | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lapland bunting | *Calcarius lapponicus* | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Snow bunting | *Plectrophenax nivalis* | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reed bunting | *Emberiza schoeniclus* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |

**Table 3.3** Numbers of birds of all species recorded during boat-based surveys of Dogger Bank Zone in 2011/12.

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Mar/Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Goose spp. | - | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bean goose | *Anser fabalis* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Pink-footed goose | *Anser brachyrhynchus* | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 | 0 |
| White-fronted goose | *Anser albifrons* | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| Greylag goose | *Anser anser* | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 |
| Barnacle goose | *Branta leucopsis* | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| Brent goose | *Branta bernicla* | 0 | 0 | 6 | 0 | 24 | 0 | 0 | 0 | 0 | 0 |
| Duck spp. | *Anas* spp. | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 8 | 2 | 0 |
| Wigeon | *Anas penelope* | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Eurasian teal | *Anas crecca* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Mallard | *Anas platyrhynchos* | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 |
| Pintail | *Anas acuta* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Long-tailed duck | *Clangula hyemalis* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Common scoter | *Melanitta nigra* | 18 | 41 | 6 | 30 | 45 | 4 | 0 | 43 | 0 | 73 |
| Velvet scoter | *Melanitta fusca* | 0 | 0 | 0 | 0 | 5 | 4 | 0 | 0 | 0 | 0 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Mar/Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Diver spp. | *Gavia* spp. | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 |
| Red-throated diver | *Gavia stellata* | 0 | 0 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black-throated diver | *Gavia arctica* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Great-northern diver | *Gavia immer* | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| White-billed diver | *Gavia adamsii* | 0 | 0 | 0 | 0 | 3 | 2 | 7 | 6 | 1 | 0 |
| Northern fulmar | *Fulmarus glacialis* | 1,114 | 2,514 | 762 | 736 | 137 | 487 | 190 | 1,382 | 3,861 | 1,290 |
| Sooty shearwater | *Puffinus griseus* | 0 | 3 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Manx shearwater | *Puffinus puffinus* | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| European storm-petrel | *Hydrobates pelagicus* | 1 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Leech's storm-petrel | *Oceanodroma leucorhoa* | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Northern gannet | *Morus bassanus* | 1,008 | 2,081 | 1,909 | 2,061 | 492 | 1,066 | 132 | 7,872 | 718 | 815 |
| Great cormorant | *Phalacrocorax carbo* | 0 | 4 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Grey heron | *Ardea cinerea* | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Great crested grebe | *Podiceps cristatus* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Eurasian sparrowhawk | *Accipiter nisus* | 0 | 0 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Mar/Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Kestrel | *Falco tinnunculus* | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 1 | 0 |
| Merlin | *Falco columbarius* | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Hobby | *Falco subbuteo* | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wader spp. | - | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 2 | 1 | 0 |
| Small wader sp. | - | 2 | 29 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Eurasian oystercatcher | *Haematopus ostralegus* | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Ringed plover | *Charadrius hiaticula* | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Golden plover | *Pluvialis apricaria* | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lapwing | *Vanellus vanellus* | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 |
| Great knot | *Calidris canutus* | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Little stint | *Calidris minuta* | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Purple Sandpiper | *Calidris maritima* | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dunlin | *Calidris alpina* | 1 | 4 | 9 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| Ruff | *Philomachus pugnax* | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Woodcock | *Scolopax rusticola* | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 0 |
| Godwit spp. | *Limosa* spp. | 0 | 0 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Mar/Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Whimbrel | *Numenius phaeopus* | 4 | 19 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 |
| Eurasian curlew | *Numenius arquata* | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green sandpiper | *Tringa ochropus* | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenshank | *Tringa nebularia* | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ruddy turnstone | *Arenaria interpres* | 10 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grey phalarope | *Phalaropus fulicarius* | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Skua spp. | - | 3 | 11 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| Small skua spp. | - | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Pomarine skua | *Stercorarius pomarinus* | 0 | 11 | 29 | 1 | 4 | 0 | 0 | 0 | 9 | 1 |
| Arctic skua | *Stercorarius parasiticus* | 8 | 57 | 81 | 1 | 1 | 1 | 0 | 1 | 10 | 6 |
| Great skua | *Stercorarius skua* | 8 | 43 | 259 | 35 | 6 | 7 | 1 | 4 | 6 | 4 |
| Gull spp. | - | 3 | 17 | 3 | 42 | 2 | 9 | 0 | 0 | 0 | 0 |
| Small gull spp. | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Sabine's gull | *Xema sabini* | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black-legged kittiwake | *Rissa tridactyla* | 1,438 | 4,085 | 951 | 389 | 621 | 1,781 | 509 | 11,504 | 1,831 | 1,992 |
| Black-headed gull | *Chroicocephalus ridibundus* | 36 | 44 | 13 | 74 | 6 | 0 | 0 | 5 | 1 | 1 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Mar/Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Little gull | *Larus minutus* | 4 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Common gull | *Larus canus* | 5 | 31 | 36 | 86 | 17 | 0 | 12 | 34 | 5 | 1 |
| Large gull spp. | - | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 55 | 48 | 0 |
| Black-backed gull spp. | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 66 |
| Lesser black-backed gull | *Larus fuscus* | 77 | 72 | 15 | 2 | 1 | 3 | 2 | 87 | 106 | 64 |
| Herring gull | *Larus argentatus* | 2 | 11 | 3 | 37 | 44 | 28 | 9 | 49 | 10 | 3 |
| Iceland gull | *Larus glaucoides* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Great black-backed gull | *Larus marinus* | 25 | 33 | 88 | 65 | 80 | 134 | 120 | 157 | 104 | 15 |
| Tern spp. | *Sterna* spp. | 26 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Sandwich tern | *Sterna sandvicensis* | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 'Comic' tern | *Sterna hirundo/paradisaea* | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 13 | 1 |
| Common tern | *Sterna hirundo* | 9 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Arctic tern | *Sterna paradisaea* | 30 | 19 | 4 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| Auk spp. | - | 0 | 0 | 0 | 24 | 16 | 38 | 44 | 13 | 3 | 2 |
| Guillemot/razorbill | *Uria aalge/ Alca torda* | 0 | 147 | 214 | 87 | 87 | 244 | 170 | 0 | 94 | 12 |
| Common guillemot | *Uria aalge* | 1,927 | 1,040 | 1,854 | 811 | 417 | 859 | 413 | 9,852 | 1,560 | 389 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Mar/Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Razorbill | *Alca torda* | 14 | 5 | 8 | 11 | 31 | 333 | 134 | 2,632 | 121 | 35 |
| Little Auk | *Alle alle* | 0 | 0 | 0 | 5 | 1,231 | 330 | 576 | 1 | 0 | 0 |
| Atlantic puffin | *Fratercula arctica* | 0 | 0 | 2 | 80 | 174 | 73 | 51 | 209 | 186 | 80 |
| Woodpigeon | *Columba palumbus* | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| Collared dove | *Streptopelia decaocto* | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| Owl spp. | - | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Long-eared owl | *Asio otus* | 0 | 0 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 |
| Short-eared owl | *Asio flammeus* | 0 | 0 | 1 | 12 | 8 | 1 | 0 | 0 | 1 | 0 |
| Common swift | *Apus apus* | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Unidentified Passerine | - | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 4 | 12 | 0 |
| Skylark | *Alauda arvensis* | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 0 |
| Hirundines | *Hirundinidae Spp.* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Sand martin | *Riparia riparia* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Barn swallow | *Hirundo rustica* | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 31 | 0 |
| House martin | *Delichon urbicum* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pipit spp. | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Mar/Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tree pipit | *Anthus trivialis* | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meadow pipit | *Anthus pratensis* | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 13 | 3 | 0 |
| Yellow wagtail | *Motacilla flava* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pied wagtail | *Motacilla alba* | 0 | 1 | 0 | 1 | 4 | 0 | 0 | 4 | 2 | 0 |
| Wren | *Troglodytes troglodytes* | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| Spotted Flycatcher | *Ficedula hypoleuca* | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Robin | *Erithacus rubecula* | 0 | 0 | 0 | 1 | 7 | 0 | 0 | 3 | 1 | 0 |
| Bluethroat | *Luscinia svecica* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Pied flycatcher | *Ficedula hypoleuca* | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Redstart | *Phoenicurus phoenicurus* | 0 | 1 | 4 | 0 | 4 | 0 | 0 | 1 | 0 | 0 |
| Whinchat | *Saxicola rubetra* | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Northern wheatear | *Oenanthe oenanthe* | 0 | 1 | 6 | 2 | 3 | 0 | 0 | 1 | 2 | 0 |
| Thrush spp. | - | 0 | 0 | 0 | 2 | 169 | 0 | 0 | 0 | 0 | 0 |
| Common blackbird | *Turdus merula* | 0 | 0 | 0 | 3 | 174 | 0 | 0 | 1 | 0 | 0 |
| Song thrush | *Turdus philomelos* | 0 | 0 | 0 | 20 | 44 | 0 | 0 | 0 | 0 | 0 |
| Redwing | *Turdus iliacus* | 0 | 0 | 0 | 30 | 300 | 0 | 0 | 1 | 0 | 0 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Mar/Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fieldfare | *Turdus pilaris* | 0 | 0 | 0 | 21 | 88 | 0 | 0 | 0 | 0 | 0 |
| Warbler spp. | - | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| Grasshopper warbler | *Locustella naevia* | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Acrocephalus warbler spp. | *Acrocephalus* spp. | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reed warbler | *Acrocephalus scirpaceus* | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackcap | *Sylvia atricapilla* | 0 | 0 | 0 | 3 | 8 | 0 | 0 | 1 | 2 | 0 |
| Garden warbler | *Sylvia borin* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| Whitethroat | *Sylvia communis* | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Phylloscopus warbler spp. | *Phylloscopus* spp. | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chiffchaff | *Phylloscopus collybita* | 0 | 1 | 3 | 2 | 1 | 0 | 0 | 4 | 2 | 0 |
| Willow warbler | *Phylloscopus trochilus* | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Crest spp. | *Regulus spp.* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Goldcrest | *Regulus regulus* | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Jackdaw | *Corvus monedula* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carrion crow | *Corvus corone* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Starling | *Sturnus vulgaris* | 0 | 0 | 0 | 17 | 127 | 1 | 0 | 2 | 0 | 1 |

| Species | Scientific name | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Mar/Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chaffinch | *Fringilla coelebs* | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 1 | 0 | 0 |
| Brambling | *Fringilla montifringilla* | 0 | 0 | 0 | 9 | 3 | 0 | 0 | 0 | 0 | 0 |
| Siskin | *Carduelis spinus* | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 |
| (common) Redpoll | *Carduelis flammea* | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Snow bunting | *Plectrophenax nivalis* | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| Reed bunting | *Emberiza schoeniclus* | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 |

**Table 3.4** Monthly population estimates for key species within the Dogger Bank Zone (90% CIs = where available) in 2010 based on models of combined aerial and boat survey data where possible, and extrapolations from densities obtained from boat survey data for remaining species.

| Species | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common scoter[1] | | | | | | | | 157 | | | | |
| White-billed diver[1] | 80 | | | | | | | | | | 80 | |
| Northern fulmar | 806 (654-1,014) | 1,570 (1,317-1,977) | 3,206 (2,027-6,655) | 10,111 (6,617-20,931) | 19,207 (12,993-39,804) | 18,334 (12,155-35,753) | 9,570 (6,265-17,825) | 3,655 (2,371-6,787) | 1,489 (968-2,805) | 1,166 (959-1,501) | 954 (796-1,197) | 1,144 (950-1,456) |
| Sooty shearwater[1] | | | | | | | | 88 | | | | |
| European storm-petrel | | | | | | | | | 335 | | | |
| Northern gannet | 860 (734-993) | 738 (628-864) | 925 (789-1,085) | 143 (119-171) | 328 (272-393) | 746 (630-880) | 1,256 (1,096-1,438) | 1,244 (1,095-1,409) | 700 (605-804) | 3,387 (2,942-3,840) | 1,458 (1,275-1,640) | 927 (792-1,063) |
| Pomarine skua[1] | | | | | | | | | 62 | | | |
| Arctic skua | 1 (0-922) | 1 (0-1,225) | 1 (0-212) | 1 (0-53) | 0 (0-29) | 1 (0-15) | 3 (0-16) | 7 (2-33) | 16 (4-78) | 13 (3-49) | 7 (0-36) | 4 (0-26) |
| Great skua | 6 (1-19) | 7 (2-18) | 7 (2-18) | 7 (2-17) | 7 (3-19) | 9 (4-22) | 12 (6-27) | 18 (10-36) | 23 (14-48) | 28 (16-54) | 27 (14-53) | 23 (11-47) |
| Black-legged kittiwake | 15,042 (12,299-18,646) | 22,309 (18,954-25,961) | 36,428 (30,839-42,108) | 16,305 (13,791-18,787) | 21,451 (18,328-24,404) | 21,235 (18,203-24,364) | 16,442 (14,142-19,239) | 10,979 (9,359-12,836) | 7,143 (6,016-8,343) | 18,556 (16,170-21,148) | 16,280 (14,155-18,078) | 17,846 (15,265-20,278) |
| Little gull[1] | | | | | | | | | | 208 | | |
| Black-headed gull[1] | | 40 | | | | | 155 | | | | | |
| Common gull[1] | | 56 | | | | | 153 | | | | | |
| Lesser black-backed gull | 66 (39-99) | 94 (54-150) | 247 (150-399) | 846 (571-1,398) | 2,568 (1,558-7,454) | 3,034 (1,841-9,540) | 1647 (850-5,001) | 530 (217-1,702) | 112 (35-312) | 34 (9-99) | 18 (4-46) | 17 (4-43) |
| Herring gull[1] | 317 | | | | | | | | | 317 | | |
| Great black- | 2,831 | 1,710 | 929 (603- | 509 (232- | 298 (126- | 210 (84- | 184 (84- | 216 (96- | 301 (159- | 515 (298- | 888 (566- | 1413 (983- |

| Species | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| backed gull | (2,222-3,457) | (1,235-2,221) | 1,328) | 1,644) | 1,096) | 745) | 694) | 807) | 495) | 758) | 1,194) | 1,889) |
| Arctic tern[1] | | | | | 38 | | | | | | | |
| Common guillemot | 91,709 (82,557-99,991) | 109,389 (99,237-118,683) | 72,396 (66,516-78,822) | 35,228 (31,839-38,805) | 11,139 (9,855-12,411) | 10,082 (8,972-11,211) | 13,209 (11,805-14,726) | 45,576 (38,451-51,597) | 69,204 (58,164-78,392) | 76,441 (69,120-83,624) | 82,274 (75,029-89,241) | 77,670 (70,817-84,177) |
| Razorbill | 36,469 (31,559-40,961) | 45,432 (41,062-49,950) | 19,552 (17,665-21,684) | 5,302 (4,649-6,229) | 353 (275-450) | 451 (348-584) | 1,142 (877-1,398) | 6,767 (5,302-8,343) | 12,232 (9,621-14,901) | 43,295 (38,852-47,061) | 28,025 (25,714-30,904) | 15,710 (14,142-17,559) |
| Little auk | 31,439 (18,804-46,158) | 5,907 (3,784-8,976) | 114 (58-233) | 1 (0-3) | | | | 3 (1-8) | 107 (54-205) | 2,024 (1,412-3,071) | 12,540 (9,963-17,099) | 21,909 (17,530-29,213) |
| Atlantic puffin | 3,616 (2,439-5,898) | 6,121 (4,739-8,325) | 5,028 (3,979-5,989) | 1,298 (962-1,685) | 660 (485-856) | 494 (360-656) | 558 (413-742) | 810 (591-1,076) | 6,183 (4,842-7,822) | 9,654 (7,589-12,396) | 5,434 (4,355-6,569) | 6,842 (5,607-8,209) |

[1] Numbers of birds were insufficient to estimate monthly population estimates through the preferred modelling approach.

**Table 3.5** Monthly population estimates for key species within the Dogger Bank Zone (90% CIs = where available) in 2010/11 based on models of combined aerial and boat survey data, where possible, and extrapolations from densities obtained from boat survey data for remaining species.

| Species | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common scoter[1] | | 174 | | | | | | | | | | |
| White-billed diver[1] | | | | | 80 | | | | | | | |
| Northern fulmar | 9,570 (6,265-17,825) | 3,655 (2,371-6,787) | 1,489 (968-2,805) | 1,166 (959-1,501) | 954 (796-1,197) | 1,144 (950-1,456) | 1,694 (1,419-2,068) | 2,379 (2,043-2,898) | 1,520 (1,120-2,414) | 1,743 (1,307-2,736) | 1,996 (1,495-3,149) | 2,392 (1,805-3,785) |
| Sooty shearwater[1] | | 88 | | | | | | | | | | |
| European storm-petrel[1] | | | 335 | | | | | | | | | |
| Northern gannet | 1,256 (1,096-1,438) | 1,244 (1,095-1,409) | 700 (605-804) | 3,387 (2,942-3,840) | 1,458 (1,275-1,640) | 927 (792-1,063) | 1,128 (952-1,305) | 2,719 (2,349-3,093) | 9,124 (7,993-10,310) | 2,219 (1,915-2,564) | 3,914 (3,412-4,431) | 4,573 (3,983-5,144) |
| Pomarine skua[1] | | | 62 | | | | | | | | | |
| Arctic skua | 3 (0-16) | 7 (2-33) | 16 (4-78) | 13 (3-49) | 7 (0-36) | 4 (0-26) | 3 (0-22) | 2 (0-17) | 2 (0-14) | 2 (0-16) | 4 (0-22) | 6 (0-29) |
| Great skua | 12 (6-27) | 18 (10-36) | 23 (14-48) | 28 (16-54) | 27 (14-53) | 23 (11-47) | 18 (8-40) | 14 (6-32) | 12 (6-28) | 14 (7-30) | 20 (10-39) | 33 (19-59) |
| Black-legged kittiwake | 16,442 (14,142-19,239) | 10,979 (9,359-12,836) | 7,143 (6,016-8,343) | 18,556 (16,170-21,148) | 16,280 (14,155-18,078) | 17,846 (15,265-20,278) | 24,426 (20,904-27,607) | 39,942 (34,941-44,720) | 68,724 (60,589-77,773) | 30,954 (27,217-35,014) | 39,444 (34,728-44,120) | 35,199 (30,437-39,767) |
| Little gull[1] | | | | 208 | | | | | | | | |
| Black-headed gull[1] | | 156 | | | | | | 40 | | | | |
| Common gull[1] | | 154 | | | | | | 56 | | | | |
| Lesser black-backed gull | 1647 (850-5,001) | 530 (217-1,702) | 112 (35-312) | 34 (9-99) | 18 (4-46) | 17 (4-43) | 33 (10-70) | 92 (38-166) | 287 (161-450) | 690 (413-1,144) | 1,095 (667-2,164) | 923 (536-1,867) |
| Herring gull[1] | | | | 317 | | | | | | | | |
| Great black-backed gull | 184 (84-694) | 216 (96-807) | 301 (159-495) | 515 (298-758) | 888 (566-1,194) | 1,413 (983-1,889) | 1,905 (1,406- | 1,979 (1,517- | 1,609 (1,194- | 938 (580-1,860) | 598 (330-1,220) | 388 (179-863) |

| Species | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2,431) | 2,476) | 2,062) | | | |
| Arctic tern[1] | 38 | | | | | | | | | | 38 | |
| Common guillemot | 13,209 (11,805-14,726) | 45,576 (38,451-51,597) | 69,204 (58,164-78,392) | 76,441 (69,120-83,624) | 82,274 (75,029-89,241) | 77,670 (70,817-84,177) | 74,384 (67,691-80,851) | 84,881 (77,812-91,746) | 107,597 (99,202-115,812) | 126,714 (115,872-137,614) | 61,745 (54,513-68,129) | 40,962 (36,045-44,912) |
| Razorbill | 1,142 (877-1,398) | 6,767 (5,302-8,343) | 12,232 (9,621-14,901) | 43,295 (38,852-47,061) | 28,025 (25,714-30,904) | 15,710 (14,142-17,559) | 11,811 (10,608-13,499) | 17,645 (16,028-19,865) | 36,919 (34,100-40,526) | 54,809 (48,976-60,728) | 4,632 (3,533-5,515) | 1,302 (928-1,671) |
| Little auk | | 3 (1-8) | 107 (54-205) | 2,024 (1,412-3,071) | 12,540 (9,963-17,099) | 21,909 (17,530-29,213) | 14,877 (11,707-19,177) | 6,886 (5,654-8,912) | 2,351 (1,804-3,159) | 463 (320-719) | 60 (33-124) | 9 (4-23) |
| Atlantic puffin | 558 (413-742) | 810 (591-1,076) | 6,183 (4,842-7,822) | 9,654 (7,589-12,396) | 5,434 (4,355-6,569) | 6,842 (5,607-8,209) | 8071 (6,823-9,750) | 9,656 (8,199-11,303) | 10,486 (8,911-12,200) | 4,619 (3,629-5,601) | 2,591 (2,093-3,230) | 1,191 (937-1,529) |

[1] Numbers of birds were insufficient to estimate monthly population estimates through the preferred modelling approach.

**Table 3.6** Monthly population estimates for key species within the Dogger Bank Zone (90% CIs = where available) in 2011/12 based on models of combined aerial and boat survey data, where possible, and extrapolations from densities obtained from boat survey data for remaining species.

| Species | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common scoter[1] | | 174 | | | | | | | | | | |
| White-billed diver[1] | | | | | 80 | | | | | | | |
| Northern fulmar | 2,875 (2,144-4,522) | 3,030 (2,274-4,739) | 2,423 (1,821-3,794) | 2,771 (2,332-3,397) | 1,319 (1,119-1,602) | 702 (599-871) | 587 (449-761) | 2,034 (1,545-2,583) | 4,335 (2,376-8,972) | 8,777 (4,787-17,601) | 10,944 (5,834-22,754) | 4,946 (2,585-10,598) |
| Sooty shearwater[1] | | 88 | | | | | | | | | | |
| European storm-petrel[1] | | | 336 | | | | | | | | | |
| Northern gannet | 4,329 (3,775-4,854) | 3,703 (3,259-4,132) | 2,666 (2,315-3,017) | 14,337 (12,397-16,399) | 4,027 (3,465-4,581) | 999 (852-1,151) | 349 (284-439) | 3,845 (3,136-4,685) | 20,886 (17,495-24,788) | 7,980 (6,736-9,647) | 13,103 (10,902-15,784) | 3762 (3,074-4,625) |
| Pomarine skua[1] | | | 62 | | | | | | | | | |
| Arctic skua | 16 (1-46) | 34 (6-75) | 49 (13-109) | 27 (6-77) | 10 (0-50) | 2 (0-245) | 1 (0-17) | 1 (0-22) | 1 (0-44) | 1 (0-740) | 2 (0-7650) | 2 (0-109,794) |
| Great skua | 58 (35-92) | 89 (59-130) | 104 (71-148) | 83 (54-125) | 42 (24-74) | 15 (6-35) | 7 (3-20) | 4 (1-15) | 4 (0-15) | 4 (0-18) | 5 (0-23) | 6 (0-39) |
| Black-legged kittiwake | 21,089 (18,061-24,023) | 8,781 (7,551-10,026) | 3,159 (2,695-3,620) | 4,947 (4,194-5,674) | 3,293 (2,837-3,727) | 3,753 (3,280-4,235) | 6,743 (5,799-7,750) | 33,921 (29,541-39,131) | 69,328 (60,120-79,837) | 30,768 (26,681-35,912) | 37,259 (32,063-42,836) | 22,068 (18,761-25,482) |
| Little gull[1] | | | | 208 | | | | | | | | |
| Black-headed gull[1] | 156 | | | | | | | 41 | | | | |
| Common gull[1] | 153 | | | | | | | 56 | | | | |
| Lesser black-backed gull | 506 (242-1,075) | 230 (101-541) | 88 (37-203) | 46 (19-94) | 32 (15-57) | 33 (20-51) | 63 (35-113) | 227 (130-447) | 352 (213-723) | 453 (255-1,173) | 932 (308-3,401) | 798 (171-2,860) |
| Herring gull[1] | | | | 317 | | | | | | | | |
| Great black- | 281 (119- | 258 (111- | 322 (159- | 404 (252- | 521 (349- | 644 (459- | 850 (660- | 1,284 | 1,163 (804- | 881 (518- | 589 (317- | 312 (133- |

| Species | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| backed gull | 695) | 631) | 547) | 595) | 718) | 865) | 1080) | (927-1,665) | 1,580) | 1,821) | 1,295) | 700) |
| Arctic Tern[1] | 37 | | | | | | | | | | 37 | |
| Common guillemot | 21,834 (19,127-23,930) | 23,654 (19,848-26,629) | 13,578 (11,478-15,339) | 8,596 (7,799-9,541) | 8,827 (8,035-9,751) | 11,951 (10,939-13,006) | 17,664 (16,072-19,167) | 76,278 (69,501-83,027) | 134,812 (123,739-145,599) | 153,538 (141,599-167,402) | 52,537 (46,961-58,647) | 32,820 (29,429-36,774) |
| Razorbill | 263 (166-361) | 147 (77-217) | 81 (44-119) | 351 (233-475) | 822 (584-1,020) | 2,278 (1,777-2,636) | 5405 (4632-6485) | 32,999 (28,783-38,566) | 47,367 (42,066-53,839) | 47,554 (41,150-54,313) | 5,522 (4,393-6,951) | 8,383 (6,645-10,472) |
| Little auk | 3 (1-9) | 4 (1-12) | 28 (12-59) | 331 (199-504) | 2,656 (1,940-3,438) | 6,720 (5,403-8,352) | 4105 (3338-5377) | 3,576 (2,511-5,760) | 481 (285-900) | 86 (42-189) | 54 (22-130) | 37 (11-122) |
| Atlantic puffin | 555 (417-744) | 330 (242-450) | 1,403 (1,030-1,819) | 1,621 (1,193-2,090) | 826 (593-1,069) | 1,066 (810-1,333) | 1287 (1009-1559) | 2,875 (2,417-3,423) | 3,122 (2,645-3,820) | 1,243 (1,013-1,532) | 1,152 (946-1,439) | 792 (660-1,038) |

[1] Numbers of birds were insufficient to estimate monthly population estimates through the preferred modelling approach.

## 3.2 Baseline Population Estimates for the Dogger Bank Teesside A, Dogger Bank Teesside B, and Dogger Bank Teesside A and B projects

### Introduction

3.2.1 The following section provides a baseline overview of the conservation status, populations and distributions of 21 marine bird species-common scoter, white-billed diver, northern fulmar, sooty shearwater, European storm-petrel, northern gannet, pomarine skua, Arctic skua, great skua, black-legged kittiwake, little gull, black-headed gull, common gull, lesser black-backed gull, herring gull, great black-backed gull, Arctic tern, common guillemot, razorbill, Atlantic puffin and little auk-in the areas of the Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects. Section 3.3 provides an overview of numbers of these species in the area of the export cable corridor.

3.2.2 For northern fulmar, northern gannet, Arctic skua, great skua, black-legged kittiwake, lesser black-backed gull, great black-backed gull, common guillemot, razorbill, Atlantic puffin and little auk, monthly population estimates (derived from boat and aerial surveys undertaken in 2010, 2010/11 and 2011/12 following the methodology described in section 2.3) are provided for Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects and these project areas with buffers (2km for gulls and 4km for other species-see section 4). Figures are also provided of the monthly estimated distributions of these species across the Dogger Bank Zone as a whole (derived from the population modelling).

3.2.3 For common scoter, white-billed diver, sooty shearwater, European storm-petrel, pomarine skua, herring gull, black-headed gull, common gull, little gull and Arctic tern, for which it was not possible to estimate populations following the modelling approach used for more numerous species, population estimates for Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects are summarised in Table 3.7.

**Table 3.7** Monthly population estimates for common scoter, white-billed diver, sooty shearwater, European storm-petrel, pomarine skua, little gull, black-headed gull, common gull, herring gull and Arctic tern within the Dogger Bank Teesside projects.

| Species | Months present | Monthly population estimate | | |
|---|---|---|---|---|
| | | Dogger Bank Teesside A | Dogger Bank Teesside B | Dogger Bank Teesside A+B[1] |
| White-billed diver | Nov-Apr | 7 | 7 | 15 |
| Common scoter | Aug-Dec | 16 | 16 | 32 |
| Sooty shearwater | Aug-Nov | 9 | 8 | 16 |
| European storm-petrel | Sep | 30 | 31 | 61 |
| Pomarine skua | Sep-Oct | 6 | 6 | 11 |
| Little gull | Oct | 19 | 19 | 38 |
| Black-headed gull | Feb-May | 4 | 4 | 8 |
| Black-headed gull | Jul-Nov | 14 | 14 | 28 |
| Common gull | Feb-May | 5 | 5 | 10 |
| Common gull | Jul-Nov | 13 | 14 | 28 |
| Herring gull | Oct-May | 28 | 29 | 58 |
| Arctic tern | May-Sep | 3 | 4 | 7 |

[1] Estimates for Dogger Bank Teesside A and B are rounded so that they reflect whole birds, consequently, the values presented for Dogger Bank Teesside A and B may not necessarily appear to be the sum of the values presented for Dogger Bank Teesside A and Dogger Bank Teesside B.

3.2.4 Population estimates for these species for Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects are derived from the ESAS database are summarised in Tables 3.8 and 3.9 below. The data derived from the ESAS database and presented in Table 3.8 reflect mean annual population sizes. The data derived from Skov *et al.* (1995) and presented in Table 3.9 reflect seasonal variation in bird numbers. For many of these species, the more intensive surveys undertaken in 2010 and 2010/11 and 2010/12 have revealed far greater numbers of birds in the Dogger Bank Zone as a whole, and also within each project area, than suggested by the ESAS data.

**Table 3.8** Population densities of birds within the Dogger Bank Teesside projects using data from the ESAS database collected during boat and aerial surveys carried out between 1979 and 2002.

| **Species**[1] | **Maximum birds/km²** | **Mean birds/km ²** | **Annual population estimate based on mean density** | | |
|---|---|---|---|---|---|
| | | | **Dogger Bank Teesside A** | **Dogger Bank Teesside B** | **Dogger Bank Teesside A+B** |
| Northern fulmar | 39.42 | 1.46 | 817.6 | 865.8 | 1,683.2 |
| Northern gannet | 2.60 | 0.12 | 67.2 | 71.2 | 138.4 |
| Lesser black-backed gull | 0.44 | <0.01 | 5.6 | 5.9 | 11.5 |
| Great black-backed gull | 5.88 | 0.08 | 44.8 | 47.4 | 92.2 |
| Black-legged kittiwake | 50.00 | 0.85 | 476 | 504.1 | 980.1 |
| Common guillemot | 13.08 | 0.88 | 492 | 521.8 | 1,013.8 |
| Razorbill | 3.63 | 0.08 | 44.8 | 47.4 | 92.2 |
| Little auk | 10.47 | 0.28 | 156.8 | 166.0 | 322.8 |
| Atlantic puffin | 5.00 | 0.15 | 84.0 | 89.9 | 173.9 |

[1] No ESAS records for common scoter, white-billed diver, Arctic skua, great skua, black-headed gull, little gull, common gull, herring gull or Arctic tern.

**Table 3.9** Population estimates of birds within the Dogger Bank Teesside A / Dogger Bank Teesside B / Dogger Bank Teesside A and B areas of the Dogger Bank Zone for each month derived from Skov *et al.* (1995).

| Species[1] | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northern fulmar | 1,512/1,601/3,113 | | | 784/830/1,614 | | | | 913/967/ 1,879 | | 840/890/1,730 | | |
| Northern gannet | 302/ 320/ 622 | 179/190/ 269 | | 515/546/1,061 | | | | 560/593/ 1,153 | | 302/320/ 622 | | |
| Lesser black-backed gull | 6/6/12 | | | | | | | | | | | |
| Great black-backed gull | 6/6/12 | | | | | | | | | | | |
| Black-legged kittiwake | 605/640/ 1,245 | | 896/949/1,845 | | | | | 605/640/1,245 | | | | |
| Common guillemot | 202/ 213/ 415 | 2,178/ 2,307/ 4,485 | | 1,355/1,435/2,790 | | | | 1,540/ 1,631/ 3,171 | | 2,173/ 2,301/ 4,474 | | 437/ 463/ 899 |
| Razorbill | 325/ 344/ 669 | 123/130/254 | | | 179/190/369 | | | 162/172/334 | | | | 325/344/ 669 |
| Little auk[2] | | | 230/243/ 473 | | 2,111/2,236/ 4,347 | | | | | | | |
| Atlantic puffin | 6/6/12 | | 101/107/208 | | | | 185/196/ 380 | 157/166/323 | | | | |

[1] No ESAS records for common scoter, white-billed diver, Arctic skua, great skua, black-headed gull, little gull, common gull, herring gull or Arctic tern;

[2] No little auks were recorded within the Dogger Bank Zone by Skov *et al.* between March and September.

**Receptor accounts**

***Common scoter*** **Melanitta nigra**

*SPA/Ramsar/SSSI feature; Wildlife & Countryside Act 1981 Schedule 1 species; UK BAP species; Birds of Conservation Concern Red list (Eaton et al. 2009).*

VALUE OF RECEPTOR-VERY HIGH

3.2.5 Common scoter is a breeding feature of one SPA, a wintering feature of 27 SPAs and a passage feature of six SPAs (Appendices 1 & 2) in the Greater North Sea OSPAR region. Therefore, the value of this receptor is assessed as very high.

3.2.6 Common scoter were present in the Dogger Bank Zone between August and December when an average of 16 birds was estimated to occur in the Dogger Bank Teesside A area, 16 birds in the Dogger Bank Teesside B area and 32 birds in Dogger Bank Teesside A and B areas (Table 3.7). These numbers were not assessed to be nationally or internationally important.

***White-billed diver*** **Gavia adamsii**

VALUE OF RECEPTOR-MEDIUM

3.2.7 White-billed diver is not a feature of any SPA or other protected site in the Greater North Sea OSPAR region, nor included in any UK conservation listings.

3.2.8 White-billed diver were present in the Dogger Bank Zone between November and April, when an average of seven birds was estimated to occur in the Dogger Bank Teesside A area, seven birds in the Dogger Bank Teesside B area and 15 birds in the Dogger Bank Teesside A and B areas (Table 3.7). The populations of this species in the Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B areas were assessed to be of regional importance and consequently the value of this receptor is assessed to be medium (Table 2.6).

***Northern fulmar*** **Fulmarus glacialis**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list (Eaton et al. 2009).*

VALUE OF RECEPTOR-VERY HIGH

3.2.9 Northern fulmar is a breeding feature of 26 SPAs and a wintering feature of two SPAs (Appendices 1 & 2) in the Greater North Sea OSPAR region. Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.10 Numbers in the Dogger Bank Zone as a whole surpassed the 1% threshold for populations of national importance only in the 2010 breeding season (Tables 2.3 and 3.4).

***Dogger Bank Teesside A***

3.2.11 In 2010, the monthly baseline population estimates of northern fulmar within the Dogger Bank Teesside A area peaked during the period of April to July (highest value in May of 569 birds, 90% CIs = 476-676birds). The monthly population estimates decreased and showed temporal differences between 2010/11 and 2011/12 periods. In 2010/11, the species' abundance peaked during July (253 birds, 90% CIs = 204-307). In contrast, in 2011/12, the species' abundance peaked in April and May (highest value in May with 258 birds, 90% CIs = 205-309) (Table 3.10, Figure 3.1). Between January 2010 and June 2012, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A area (Tables 2.3 and 3.10). Mean populations across the two and a half years of survey peaked in May, with a mean of 309 birds (90 % CIs = 254-367) in the project and 423 birds (90% CIs = 348-504) present in the project and buffer.

3.2.12 The monthly baseline population estimates derived for 2010, 2010/11 and 2011/12 were lower than estimates derived from ESAS data for northern fulmar within the Dogger Bank Teesside A area. ESAS population estimates were at their highest over the combined period of August to October (1,512 birds), and at their lowest during the combined period of November to February (784 birds) (Table 3.9).

3.2.13 On a monthly basis, the population densities of northern fulmar within the south-eastern and south south-eastern areas of the Dogger Bank Zone (which contain the Dogger Bank Teesside A and B projects) were generally lower than elsewhere within the Zone (Figures 3.2, 3.3 and 3.4). Within the project areas, the highest densities tended to be seen towards the north-western edge of Dogger Bank Teesside B.

**Table 3.10** Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 29 (20-38) | 39 (27-51) | Jul | 253 (204-307) | 347 (279-420) | 101 (83-124) | 138 (113-169) | Jul | 177 (143-215) | 242 (196-295) |
| Feb | 92 (71-113) | 127 (97-155) | Aug | 107 (85-131) | 146 (116-179) | 110 (91-135) | 151 (124-185) | Aug | 108 (88-133) | 149 (120-182) |
| Mar | 143 (114-177) | 196 (156-242) | Sep | 71 (55-87) | 97 (75-120) | 124 (102-152) | 171 (139-209) | Sep | 97 (78-120) | 134 (107-165) |
| Apr | 317 (261-384) | 434 (357-526) | Oct | 49 (39-59) | 67 (53-81) | 119 (93-149) | 163 (128-205) | Oct | 84 (66-104) | 115 (90-143) |
| May | 569 (476-676) | 781 (653-928) | Nov | 32 (26-40) | 44 (36-55) | 49 (38-61) | 67 (53-84) | Nov | 41 (32-51) | 56 (44-70) |
| Jun | 564 (457-658) | 773 (626-904) | Dec | 45 (36-55) | 62 (50-75) | 37 (28-46) | 50 (38-63) | Dec | 41 (32-50) | 56 (44-69) |
| Jul | 253 (204-307) | 347 (279-420) | Jan | 46 (35-57) | 63 (48-78) | 25 (20-32) | 35 (27-44) | Jan | 33 (25-42) | 46 (34-58) |
| Aug | 107 (85-131) | 146 (116-179) | Feb | 72 (56-90) | 98 (76-123) | 98 (73-125) | 134 (100-172) | Feb | 87 (67-109) | 120 (91-150) |
| Sep | 71 (55-87) | 97 (75-120) | Mar | 89 (71-107) | 122 (97-147) | 124 (98-151) | 170 (135-207) | Mar | 119 (94-145) | 163 (129-199) |
| Oct | 49 (39-59) | 67 (53-81) | Apr | 102 (83-119) | 140 (114-164) | 240 (195-289) | 329 (267-397) | Apr | 220 (179-264) | 301 (246-362) |
| Nov | 32 (26-40) | 44 (36-55) | May | 98 (81-116) | 135 (111-159) | 258 (205-309) | 354 (282-425) | May | 309 (254-367) | 423 (348-504) |
| Dec | 45 (36-55) | 62 (50-75) | Jun | 91 (74-112) | 125 (102-153) | 124 (94-156) | 170 (128-214) | Jun | 260 (208-309) | 356 (286-423) |

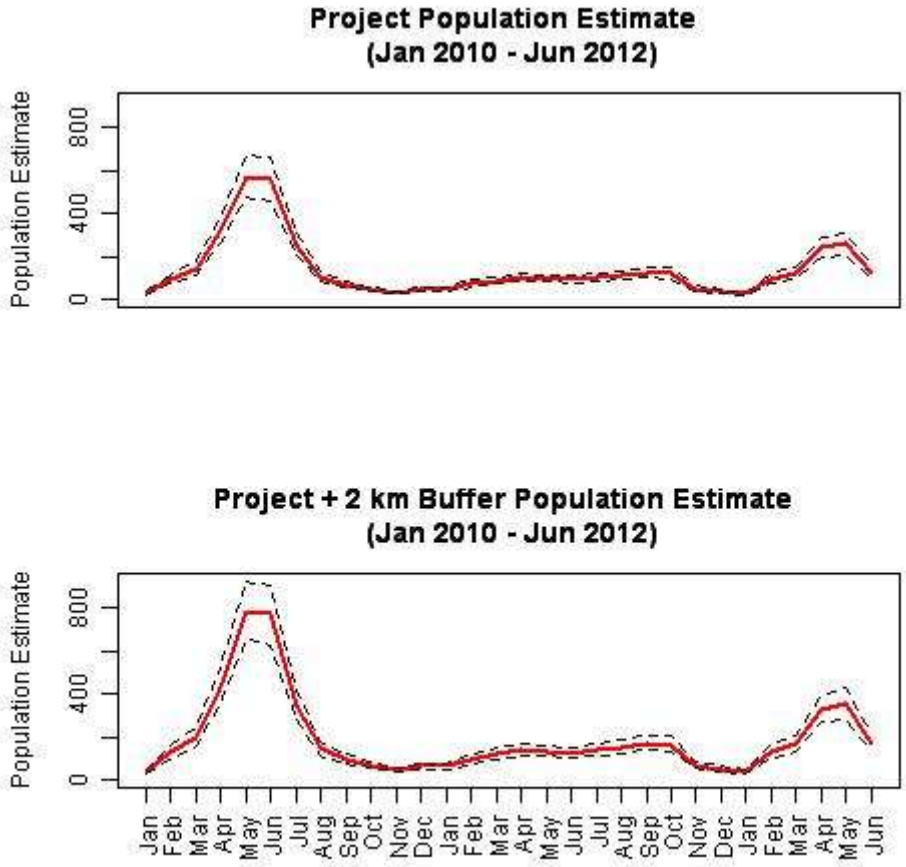



**Figure 3.1** Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

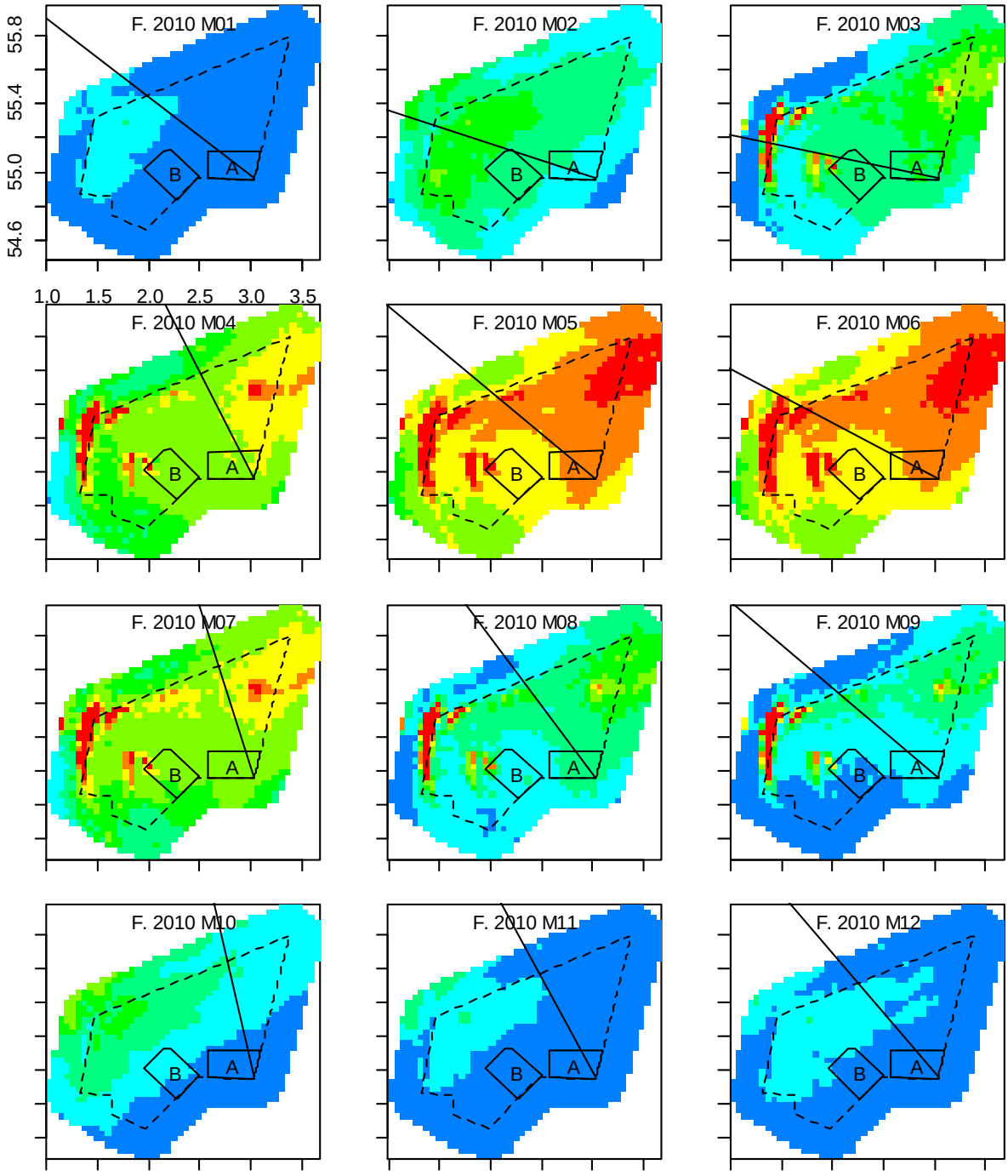



**Figure 3.2** Monthly densities of northern fulmar within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

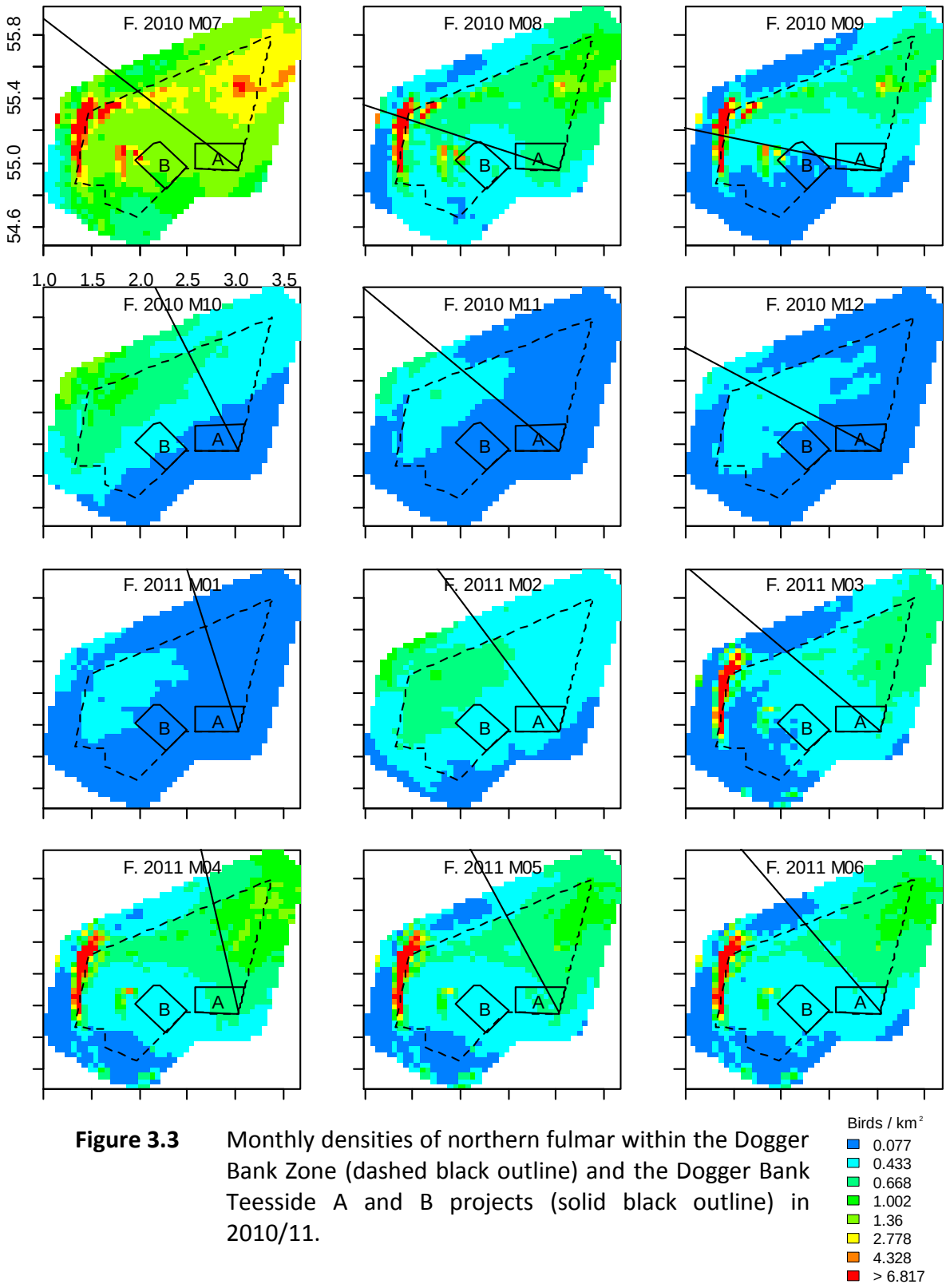



**Figure 3.3** Monthly densities of northern fulmar within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

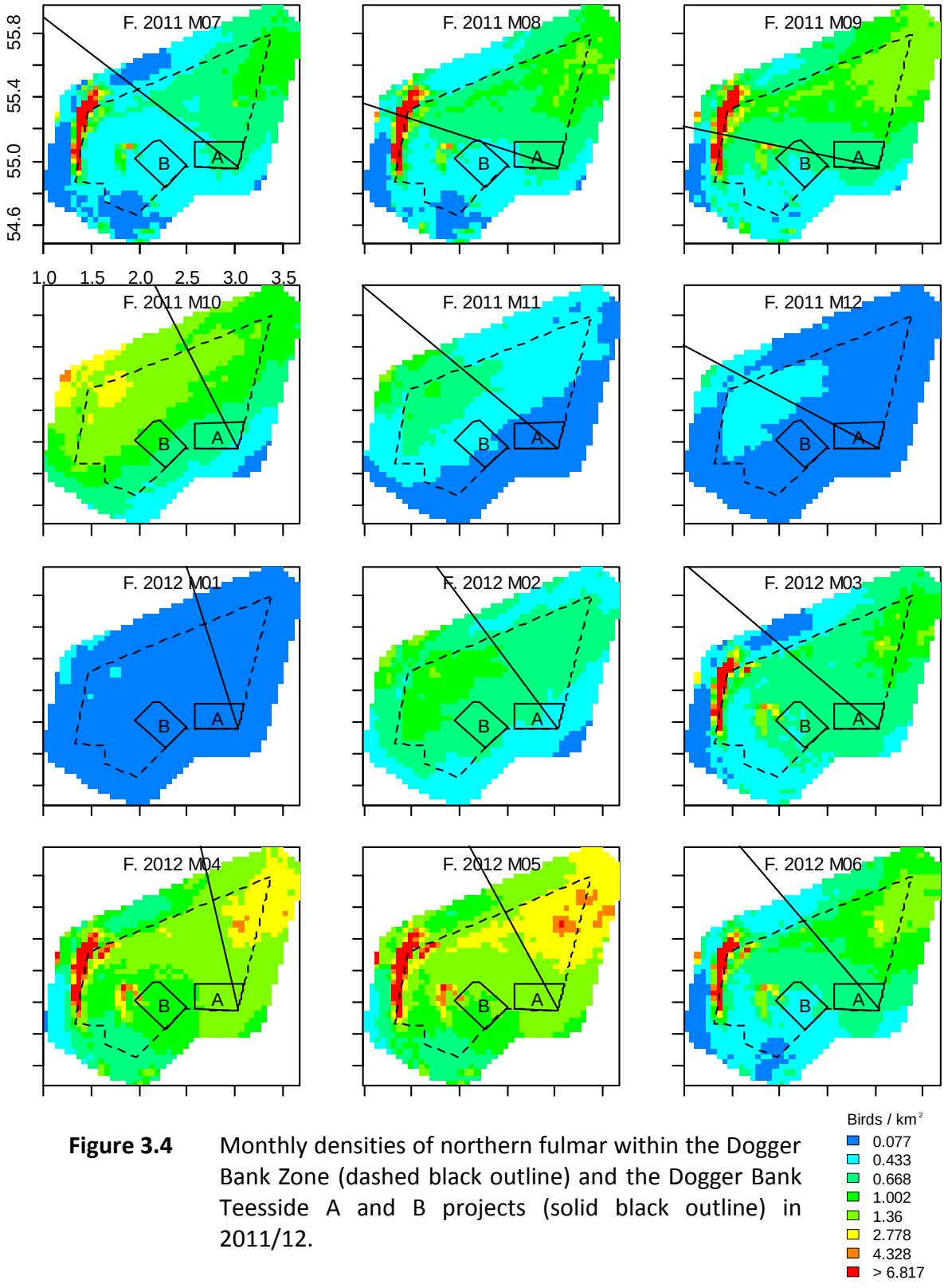



**Figure 3.4** Monthly densities of northern fulmar within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

***Dogger Bank Teesside B***

3.2.14 In 2010, the monthly baseline population estimates of northern fulmar within the Dogger Bank Teesside B area peaked during the period of May and June (highest value in May of 540 birds, 90% CIs = 450-640). The monthly population estimates decreased and showed temporal differences between 2010/11 and 2011/12 periods. In 2010/11, the species' abundance peaked during July (268 birds, 90% CIs = 213-323). In contrast, in 2011/12 the species' abundance peaked in April and May (highest value in May with 223 birds, 90% CIs = 179-264) (Table 3.11, Figure 3.5). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B area (Tables 2.3 and 3.11). Mean populations across the two and a half years of survey peaked in May, with a mean of 281 birds (90 % CIs = 231-332) in the project and 381 birds (90% CIs = 314-450) present in the project and buffer.

3.2.15 The baseline monthly population estimates derived for 2010, 2010/11 and 2011/12 were lower than estimates derived from ESAS data for northern fulmar within the Dogger Bank Teesside B area. ESAS population estimates were at their highest over the combined period of August to October (1,601 birds) and at their lowest during the combined period of November to February (830 birds) (Table 3.9).

**Table 3.11** Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 43 (30-57) | 58 (41-77) | Jul | 268 (213-323) | 364 (290-438) | 85 (71-103) | 115 (96-139) | Jul | 177 (142-213) | 240 (193-288) |
| Feb | 131 (102-159) | 177 (137-214) | Aug | 114 (89-138) | 154 (121-187) | 96 (80-114) | 129 (108-154) | Aug | 105 (85-126) | 142 (114-170) |
| Mar | 148 (118-183) | 200 (160-247) | Sep | 75 (57-95) | 102 (78-130) | 107 (89-128) | 145 (120-173) | Sep | 91 (73-112) | 123 (99-151) |
| Apr | 289 (237-349) | 390 (321-472) | Oct | 69 (56-84) | 93 (76-113) | 165 (134-201) | 224 (182-274) | Oct | 117 (95-142) | 159 (129-194) |
| May | 540 (450-640) | 732 (612-866) | Nov | 44 (36-52) | 59 (49-71) | 68 (55-81) | 92 (74-110) | Nov | 56 (45-67) | 76 (62-91) |
| Jun | 528 (434-626) | 716 (589-846) | Dec | 59 (48-70) | 80 (65-95) | 48 (37-58) | 65 (50-79) | Dec | 53 (42-64) | 72 (57-87) |
| Jul | 268 (213-323) | 364 (290-438) | Jan | 56 (43-68) | 75 (59-92) | 33 (27-41) | 45 (36-56) | Jan | 44 (34-55) | 60 (45-75) |
| Aug | 114 (89-138) | 154 (121-187) | Feb | 87 (69-106) | 117 (93-144) | 123 (95-153) | 167 (128-207) | Feb | 113 (88-139) | 154 (120-188) |
| Sep | 75 (57-95) | 102 (78-130) | Mar | 72 (58-86) | 97 (78-116) | 117 (94-144) | 159 (127-194) | Mar | 112 (90-138) | 152 (122-186) |
| Oct | 69 (56-84) | 93 (76-113) | Apr | 81 (67-93) | 109 (90-126) | 199 (162-237) | 270 (220-321) | Apr | 189 (155-227) | 256 (210-306) |
| Nov | 44 (36-52) | 59 (49-71) | May | 79 (66-92) | 107 (88-125) | 223 (179-264) | 303 (242-359) | May | 281 (231-332) | 381 (314-450) |
| Dec | 59 (48-70) | 80 (65-95) | Jun | 76 (63-91) | 103 (85-123) | 108 (83-133) | 146 (112-180) | Jun | 237 (193-283) | 322 (262-383) |

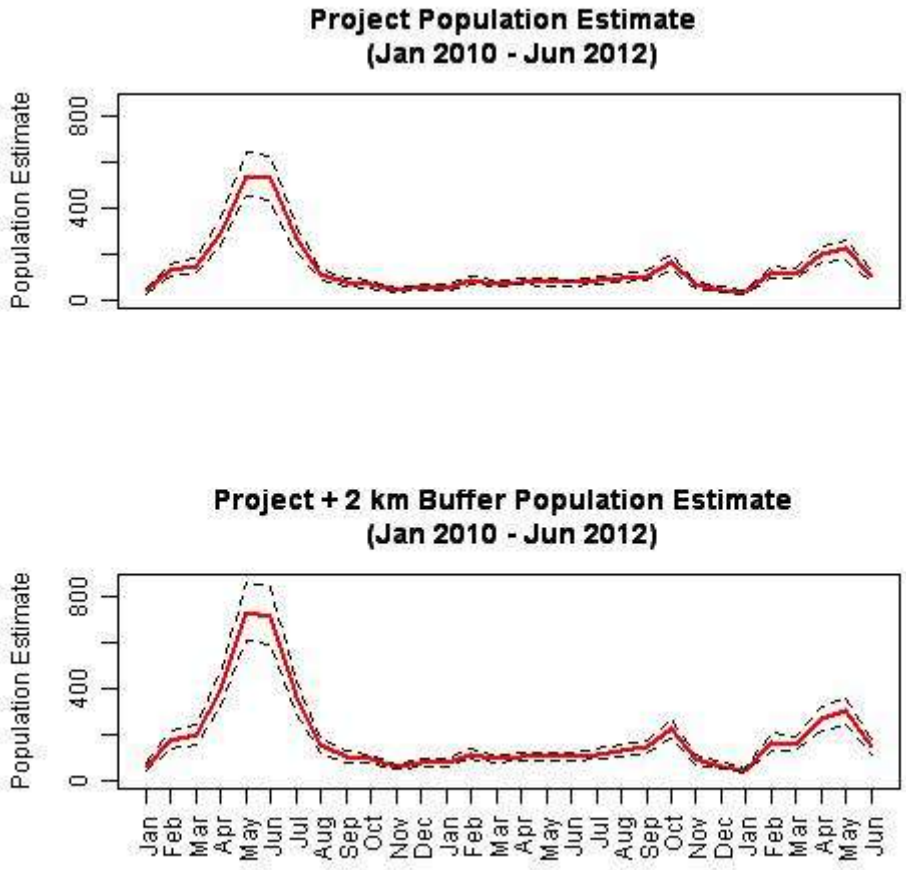



**Figure 3.5** Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Dogger Bank Teesside A and B***

3.2.16 In 2010, the monthly baseline population estimates of northern fulmar within the Dogger Bank Teesside A and B areas peaked during the period of April to July (highest value in May of 1,110 birds, 90% CIs = 926-1,316 birds). The monthly population estimates decreased and showed temporal differences between 2010/11 and 2011/12 periods. In 2010/11, the species' abundance peaked during July (522 birds, 90% CIs = 417-630). In contrast, in 2011/12 the species' abundance peaked in April and May (highest value in May with 481 birds, 90% CIs = 384-574) (Table 3.12, Figure 3.6). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B areas (Tables 2.3 and 3.12). Mean populations across the two and a half years of survey peaked in May, with a mean of 590 birds (90 % CIs = 486-699) in the project and 805 birds (90% CIs = 663-953) present in the project and buffer.

3.2.17 The monthly baseline population estimates derived for 2010, 2010/11 and 2011/12 were lower than estimates derived from ESAS data for northern fulmar within the Dogger Bank Teesside A and B areas. ESAS population estimates were at their highest over the combined period of August to October (3,113 birds) and at their lowest during the combined period of November to February (1,614 birds) (Table 3.9).

**Table 3.12** Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 72 (50-95) | 97 (69-127) | Jul | 522 (417-630) | 711 (568-858) | 186 (154-226) | 253 (209-307) | Jul | 354 (285-428) | 482 (388-583) |
| Feb | 223 (173-271) | 303 (235-368) | Aug | 220 (174-268) | 300 (237-366) | 206 (171-249) | 280 (233-339) | Aug | 213 (173-259) | 290 (235-352) |
| Mar | 292 (233-360) | 397 (317-489) | Sep | 145 (112-183) | 199 (153-250) | 232 (190-280) | 316 (260-383) | Sep | 189 (151-232) | 258 (206-316) |
| Apr | 606 (498-733) | 825 (679-997) | Oct | 118 (95-142) | 161 (129-194) | 283 (227-351) | 388 (311-478) | Oct | 201 (161-246) | 275 (220-336) |
| May | 1,110 (926-1,316) | 1517 (1,264-1,793) | Nov | 76 (62-93) | 103 (85-127) | 117 (93-142) | 160 (127-194) | Nov | 96 (78-118) | 131 (106-160) |
| Jun | 1,091 (891-1,284) | 1492 (1,216-1,749) | Dec | 104 (84-125) | 141 (115-170) | 85 (65-104) | 115 (89-142) | Dec | 94 (75-115) | 128 (102-156) |
| Jul | 522 (417-630) | 711 (568-858) | Jan | 102 (79-125) | 138 (107-170) | 59 (46-74) | 80 (63-100) | Jan | 77 (59-97) | 105 (80-132) |
| Aug | 220 (174-268) | 300 (237-366) | Feb | 158 (125-196) | 217 (168-267) | 221 (168-278) | 301 (229-377) | Feb | 201 (155-248) | 274 (210-337) |
| Sep | 145 (112-183) | 199 (153-250) | Mar | 161 (128-193) | 218 (174-263) | 241 (192-295) | 328 (262-401) | Mar | 231 (185-282) | 314 (251-384) |
| Oct | 118 (95-142) | 161 (129-194) | Apr | 183 (150-213) | 249 (204-290) | 439 (357-526) | 599 (487-718) | Apr | 409 (335-491) | 558 (457-669) |
| Nov | 76 (62-93) | 103 (85-127) | May | 177 (146-208) | 243 (199-283) | 481 (384-574) | 656 (525-784) | May | 590 (486-699) | 805 (663-953) |
| Dec | 104 (84-125) | 141 (115-170) | Jun | 168 (138-203) | 228 (188-277) | 231 (176-289) | 316 (240-394) | Jun | 497 (402-592) | 679 (548-807) |

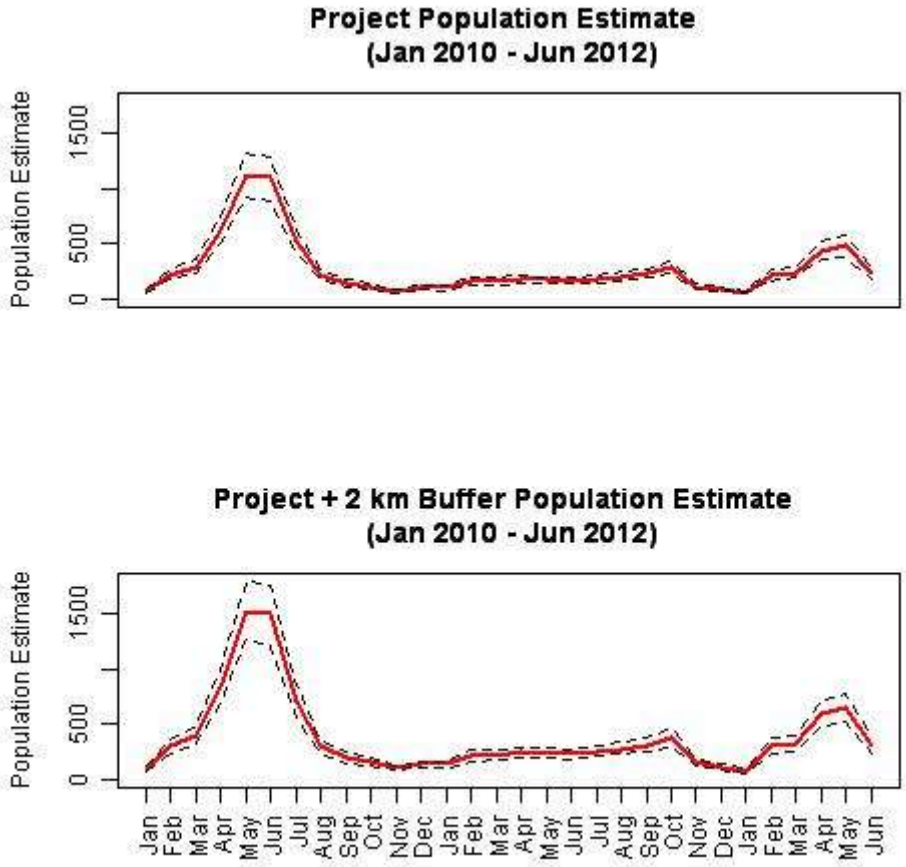



**Figure 3.6** Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

**<u>*Sooty shearwater* Puffinus griseus</u>**

*Birds of Conservation Concern Amber list (Eaton et al. 2009).*

VALUE OF RECEPTOR-MEDIUM

3.2.18 Sooty shearwater is not a feature of any SPA or other protected site in the Greater North Sea OSPAR region.

3.2.19 Sooty shearwater were present in the Dogger Bank Zone between August and October when an average of nine birds was estimated to occur in the Dogger Bank Teesside A area, eight birds in the Dogger Bank Teesside B area and 16 birds in the Dogger Bank Teesside A and B areas (Table 3.7). The populations of this species in each project area were assessed to be of regional importance and consequently the value of this receptor is assessed to be medium (Tables 2.6).

***European storm-petrel* Hydrobates pelagicus**

*SPA/Ramsar/SSSI feature; EU Birds Directive Annex 1 species; Birds of Conservation Concern Amber list (Eaton* et al. *2009).*

VALUE OF RECEPTOR-VERY HIGH

3.2.20 European storm-petrel is a breeding feature of five SPAs in the Greater North Sea OSPAR region and a passage feature of one SPA (Appendix 1). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.21 European storm-petrels were present in the Dogger Bank Zone in September only when an average of 30 birds was estimated to occur in the Dogger Bank Teesside A area, 31 birds in the Dogger Bank Teesside B area and 61 birds in the Dogger Bank Teesside A and B areas (Table 3.7). These numbers were not assessed to be nationally or internationally important (Table 2.3).

***Northern gannet* Morus bassanus**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list (Eaton* et al. *2009).*

VALUE OF RECEPTOR-VERY HIGH

3.2.22 Northern gannet is a breeding feature of nine SPAs, a wintering feature of five SPAs and a passage feature of five SPAs in the Greater North Sea OSPAR region (Appendices 1 & 2). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.23 Numbers in the Dogger Bank Zone as a whole surpassed the 1% threshold for populations of national importance in the 2011 and 2012 breeding seasons. In addition, numbers in the Dogger Bank Zone as a whole surpassed the 1% threshold for populations of international importance in 2011/12 (Tables 2.6, 3.4, 3.5 and 3.6).

***Dogger Bank Teesside A***

3.2.24 In 2010 the monthly baseline population estimates of northern gannet within the Dogger Bank Teesside A area peaked during the months of October and December (highest value in October of 109 birds, 90% CIs = 93-131). The monthly population estimates showed some similarities between periods 2010/11 and 2011/12. Both periods showed a peak in March, with 820 birds (90% CIs = 691-980) in 2010/11 and 1,244 birds (90% CIs = 1,036-1,490) in 2011/12. However, 2011/12 showed a general increase in population estimates including an additional peak in October of 442 birds (90% CIs = 371-533) (Table 3.13, Figure 3.7). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A areas (Tables 2.3 and 3.13). Mean populations across the two and a half years of survey peaked in March, with a mean of 703 birds (90 % CIs = 588-842) in the project and 968 birds (90% CIs = 810-1,158) present in the project and buffer.

3.2.25 The peak population estimates derived from the ESAS data occurred in the combined period of March to April when numbers were given as 560. The lowest population estimate derived from ESAS database was 179 for the combined period of September to October (Table 3.9). Hence there was less variability between the lowest and the highest population estimates derived from the ESAS database compared to the baseline population estimates.

3.2.26 On a monthly basis, the densities of northern gannet within the south-eastern and south south-eastern areas of the Dogger Bank Zone, which contain Dogger Bank Teesside A and B, were often lower than elsewhere in the zone, but increased in importance in March 2011 and March 2012 (Figures 3.8, 3.9 and 3.10).

**Table 3.13** Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 36 (31-44) | 50 (42-61) | Jul | 44 (37-53) | 61 (52-73) | 127 (108-152) | 176 (150-210) | Jul | 86 (73-102) | 119 (101-142) |
| Feb | 32 (27-39) | 44 (37-54) | Aug | 29 (25-35) | 40 (34-49) | 140 (121-165) | 194 (167-228) | Aug | 85 (73-100) | 117 (101-138) |
| Mar | 46 (38-56) | 63 (52-77) | Sep | 38 (32-46) | 53 (44-64) | 163 (140-193) | 226 (194-268) | Sep | 101 (86-120) | 140 (119-166) |
| Apr | 8 (7-10) | 11 (9-14) | Oct | 109 (93-131) | 150 (128-180) | 442 (371-533) | 607 (509-731) | Oct | 276 (232-332) | 378 (318-455) |
| May | 28 (24-34) | 39 (33-47) | Nov | 59 (50-71) | 81 (69-97) | 81 (68-97) | 111 (93-134) | Nov | 70 (59-84) | 96 (81-115) |
| Jun | 63 (54-75) | 88 (75-104) | Dec | 108 (91-128) | 147 (124-175) | 52 (42-64) | 71 (57-88) | Dec | 80 (66-96) | 109 (91-132) |
| Jul | 44 (37-53) | 61 (52-73) | Jan | 80 (67-98) | 109 (92-134) | 22 (18-28) | 31 (25-38) | Jan | 46 (39-57) | 63 (53-78) |
| Aug | 29 (25-35) | 40 (34-49) | Feb | 163 (138-198) | 224 (190-271) | 300 (238-375) | 410 (326-514) | Feb | 165 (135-204) | 226 (185-280) |
| Sep | 38 (32-46) | 53 (44-64) | Mar | 820 (691-980) | 1129 (952-1,348) | 1,244 (1,036-1,490) | 1711 (1,425-2,050) | Mar | 703 (588-842) | 968 (810-1,158) |
| Oct | 109 (93-131) | 150 (128-180) | Apr | 106 (91-127) | 147 (126-177) | 379 (319-460) | 526 (442-637) | Apr | 165 (139-199) | 228 (192-276) |
| Nov | 59 (50-71) | 81 (69-97) | May | 110 (95-131) | 153 (132-182) | 488 (412-585) | 679 (573-813) | May | 209 (177-250) | 290 (246-347) |
| Dec | 108 (91-128) | 147 (124-175) | Jun | 104 (89-125) | 145 (123-173) | 152 (125-188) | 212 (174-261) | Jun | 107 (90-130) | 148 (124-180) |

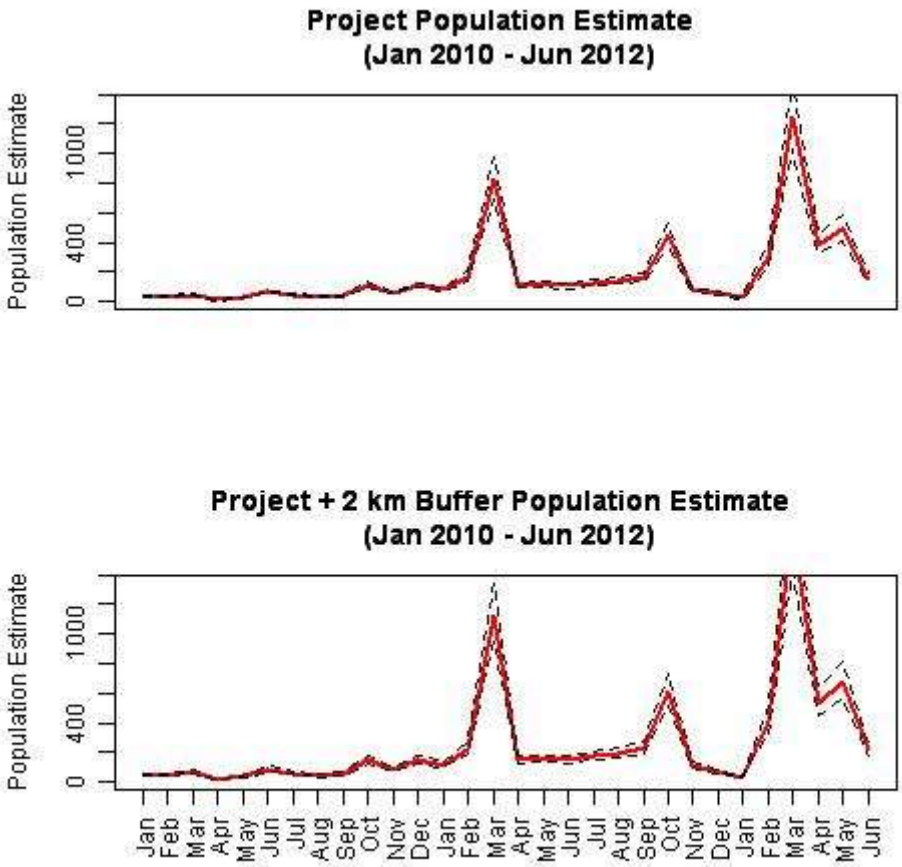



**Figure 3.7** Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

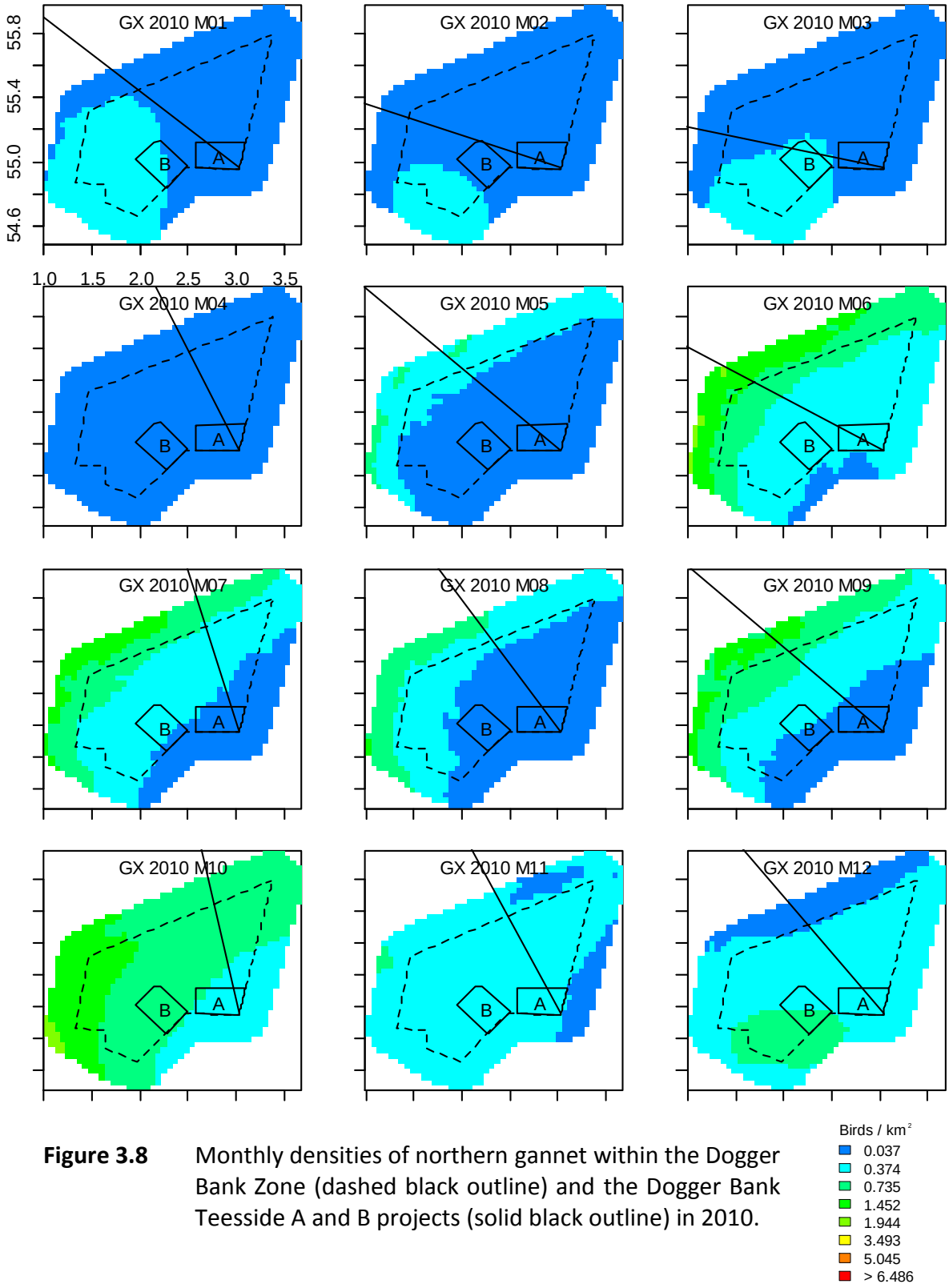



**Figure 3.8** Monthly densities of northern gannet within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

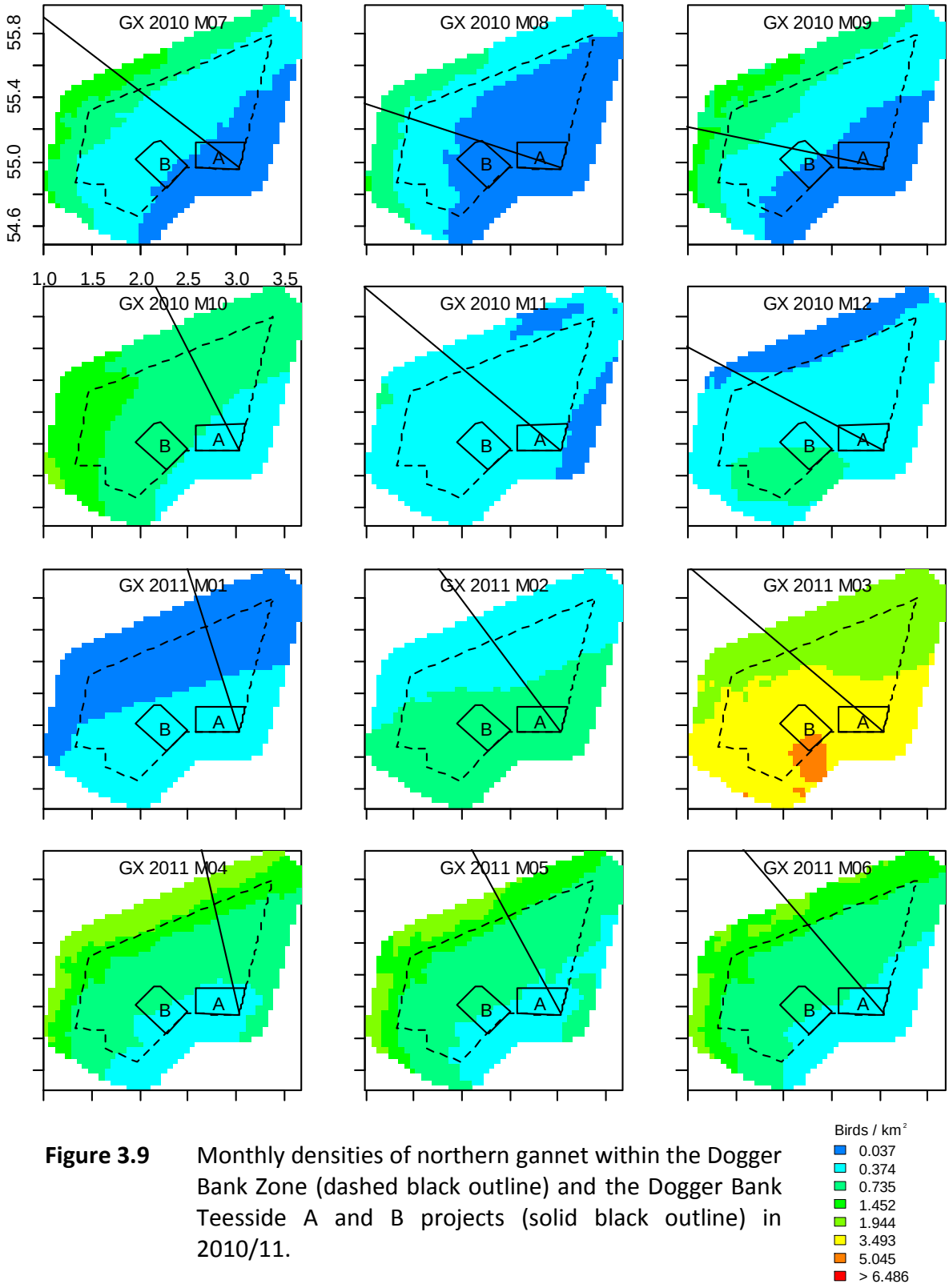



**Figure 3.9** Monthly densities of northern gannet within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

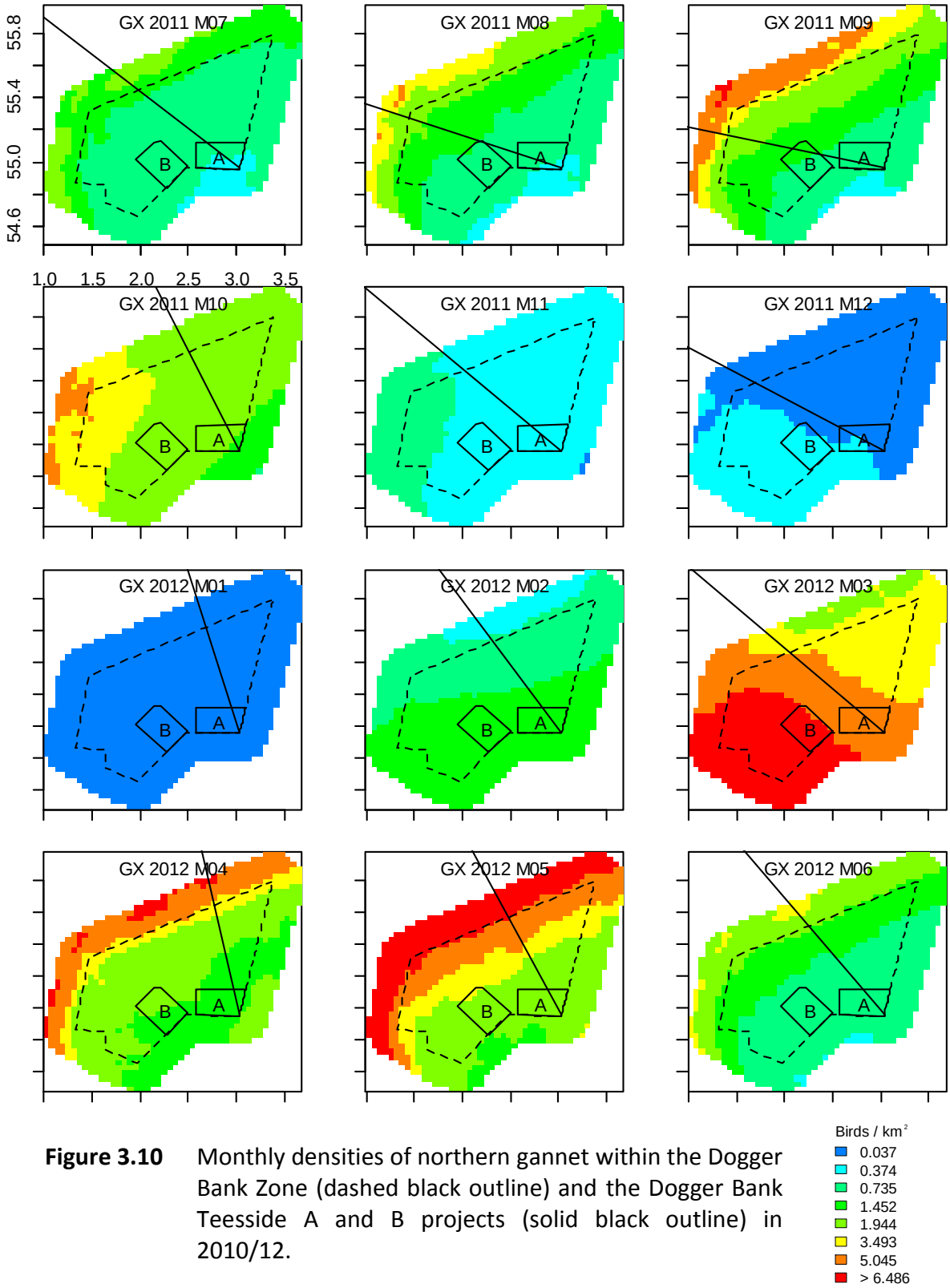



**Figure 3.10** Monthly densities of northern gannet within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/12.

***Dogger Bank Teesside B***

3.2.27 In 2010, the monthly baseline population estimates of northern gannet within the Dogger Bank Teesside B area peaked during the months of October and December (highest value in October of 155 birds, 90% CIs = 133-181). The monthly population estimates showed some similarities between the periods of 2010/11 and 2011/12. Both periods showed a peak in March, with 984 birds (90% Cls = 840-1,151) in 2010/11 and 1,811 birds (90% CIs = 1,506-2,160) in 2011/12. However, 2011/12 showed a general increase in values for population estimates including an additional peak in October with 597 birds (90% CIs = 505-704) (Table 3.14, Figure 3.11). Between January 2010 and June 2012, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B areas (Tables 2.3 and 3.14). Mean populations across the two and a half years of survey peaked in March, with a mean of 953 birds (90 % CIs = 800-1,130) in the project and 1,282 birds (90% CIs = 1,075-1,520) present in the project and buffer.

3.2.28 The peak population estimates derived from the ESAS data occurred in the combined period of March to April, when numbers were given as 593. In contrast, the lowest population estimate derived from ESAS database was 190 for the combined period of September to October (Table 3.9). Hence, there was less variability between the lowest and the highest population estimates derived from the ESAS database compared to the baseline population estimates.

**Table 3.14** Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 59 (50-70) | 80 (68-95) | Jul | 67 (58-78) | 90 (78-105) | 179 (156-209) | 239 (208-280) | Jul | 123 (107-144) | 164 (143-193) |
| Feb | 46 (39-56) | 62 (53-76) | Aug | 44 (38-52) | 60 (51-70) | 205 (180-236) | 275 (241-316) | Aug | 125 (109-144) | 167 (146-193) |
| Mar | 64 (53-78) | 86 (72-105) | Sep | 58 (49-69) | 78 (66-94) | 241 (208-280) | 325 (280-378) | Sep | 150 (128-175) | 201 (173-236) |
| Apr | 9 (8-11) | 12 (10-15) | Oct | 155 (133-181) | 209 (180-245) | 597 (505-704) | 806 (681-951) | Oct | 376 (319-442) | 507 (430-598) |
| May | 34 (30-40) | 46 (40-54) | Nov | 76 (65-90) | 102 (88-121) | 105 (90-125) | 142 (121-169) | Nov | 91 (78-107) | 122 (105-145) |
| Jun | 75 (65-87) | 100 (88-117) | Dec | 128 (109-150) | 172 (147-203) | 59 (48-72) | 80 (65-98) | Dec | 93 (79-111) | 126 (106-150) |
| Jul | 67 (58-78) | 90 (78-105) | Jan | 79 (66-98) | 107 (89-133) | 26 (22-33) | 36 (29-44) | Jan | 55 (46-67) | 74 (62-91) |
| Aug | 44 (38-52) | 60 (51-70) | Feb | 159 (134-194) | 214 (180-262) | 325 (264-399) | 438 (356-538) | Feb | 177 (146-216) | 238 (196-292) |
| Sep | 58 (49-69) | 78 (66-94) | Mar | 984 (840-1,151) | 1322 (1128-1547) | 1,811 (1,506-2,160) | 2437 (2026-2908) | Mar | 953 (800-1,130) | 1,282 (1,075-1,520) |
| Oct | 155 (133-181) | 209 (180-245) | Apr | 129 (112-152) | 174 (151-205) | 434 (371-517) | 583 (498-695) | Apr | 191 (163-227) | 256 (220-305) |
| Nov | 76 (65-90) | 102 (88-121) | May | 141 (124-164) | 189 (165-219) | 611 (523-720) | 821 (702-969) | May | 262 (225-308) | 352 (303-414) |
| Dec | 128 (109-150) | 172 (147-203) | Jun | 142 (124-167) | 191 (166-225) | 191 (159-232) | 257 (213-312) | Jun | 136 (116-162) | 183 (156-218) |

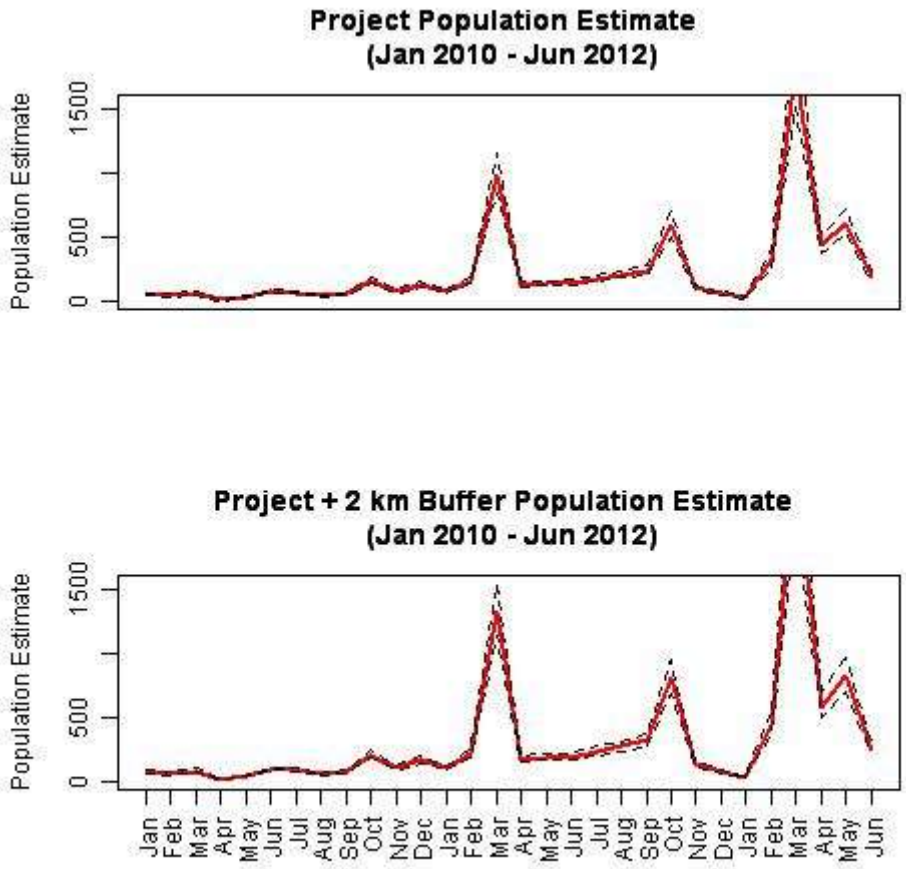



**Figure 3.11** Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11, 2011/12.

***Dogger Bank Teesside A and B***

3.2.29 In 2010, the monthly baseline population estimates of northern gannet within the Dogger Bank Teesside A and B areas peaked during the months of October and December (highest value in October of 264 birds, 90% CIs = 226-312). The monthly population estimates showed some similarities between the periods of 2010/11 and 2011/12. Both periods showed a peak in March, with 1,805 birds (90% CIs = 1,532-2,131) in 2010/11 and 3,054 birds (90% CIs = 2,542-3,650) in 2011/12. However, 2011/12 showed a general increase in values for population estimates including an additional peak in October with 1,039 birds (90% CIs = 875-1,237) (Table 3.15, Figure 3.12). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B areas (Tables 2.3 and 3.15). Mean populations across the two and a half years of survey peaked in March, with a mean of 1,656 birds (90 % CIs = 1,388-1,972) in the project and 2,250 birds (90% CIs = 1,882-2,679) present in the project and buffer.

3.2.30 The peak population estimates derived from the ESAS data occurred in the combined period of March and April, when numbers were given as 1,153. In contrast, the lowest population estimate derived from the ESAS database was 269 for the combined period of September to October (Table 3.9). Hence, there was less variability between the lowest and the highest population estimates derived from the ESAS database compared to the baseline population estimates.

**Table 3.15** Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 95 (81-115) | 130 (110-156) | Jul | 111 (95-131) | 151 (129-178) | 306 (264-361) | 415 (358-490) | Jul | 209 (180-246) | 283 (244-334) |
| Feb | 79 (66-96) | 107 (90-130) | Aug | 74 (63-87) | 100 (85-118) | 345 (301-401) | 469 (408-545) | Aug | 209 (182-244) | 284 (247-332) |
| Mar | 109 (91-134) | 148 (124-182) | Sep | 96 (80-115) | 131 (110-158) | 404 (348-474) | 551 (475-646) | Sep | 250 (214-294) | 341 (292-402) |
| Apr | 17 (14-21) | 23 (20-29) | Oct | 264 (226-312) | 359 (308-425) | 1,039 (875-1,237) | 1,412 (1,190-1,682) | Oct | 651 (551-774) | 886 (749-1,053) |
| May | 62 (54-74) | 85 (74-101) | Nov | 134 (115-160) | 183 (157-218) | 186 (158-222) | 253 (215-302) | Nov | 160 (137-191) | 218 (186-260) |
| Jun | 138 (120-162) | 188 (163-222) | Dec | 235 (200-278) | 319 (271-378) | 111 (90-137) | 151 (122-186) | Dec | 173 (145-207) | 235 (197-282) |
| Jul | 111 (95-131) | 151 (129-178) | Jan | 159 (133-196) | 216 (181-267) | 49 (40-61) | 66 (54-82) | Jan | 101 (84-124) | 137 (115-169) |
| Aug | 74 (63-87) | 100 (85-118) | Feb | 322 (272-392) | 438 (370-534) | 625 (502-774) | 847 (682-1,051) | Feb | 342 (280-421) | 464 (381-572) |
| Sep | 96 (80-115) | 131 (110-158) | Mar | 1,805 (1,532-2,131) | 2,452 (2,076-2,895) | 3,054 (2,542-3,650) | 4,150 (3,447-4,958) | Mar | 1,656 (1,388-1,972) | 2,250 (1,882-2,679) |
| Oct | 264 (226-312) | 359 (308-425) | Apr | 236 (203-280) | 321 (276-382) | 813 (690-977) | 1,111 (940-1,330) | Apr | 355 (302-426) | 485 (412-580) |
| Nov | 134 (115-160) | 183 (157-218) | May | 252 (219-294) | 342 (298-401) | 1,099 (935-1,305) | 1,500 (1,276-1782) | May | 471 (403-558) | 642 (549-761) |
| Dec | 235 (200-278) | 319 (271-378) | Jun | 247 (213-293) | 335 (289-399) | 344 (284-420) | 468 (387-572) | Jun | 243 (205-292) | 331 (280-398) |

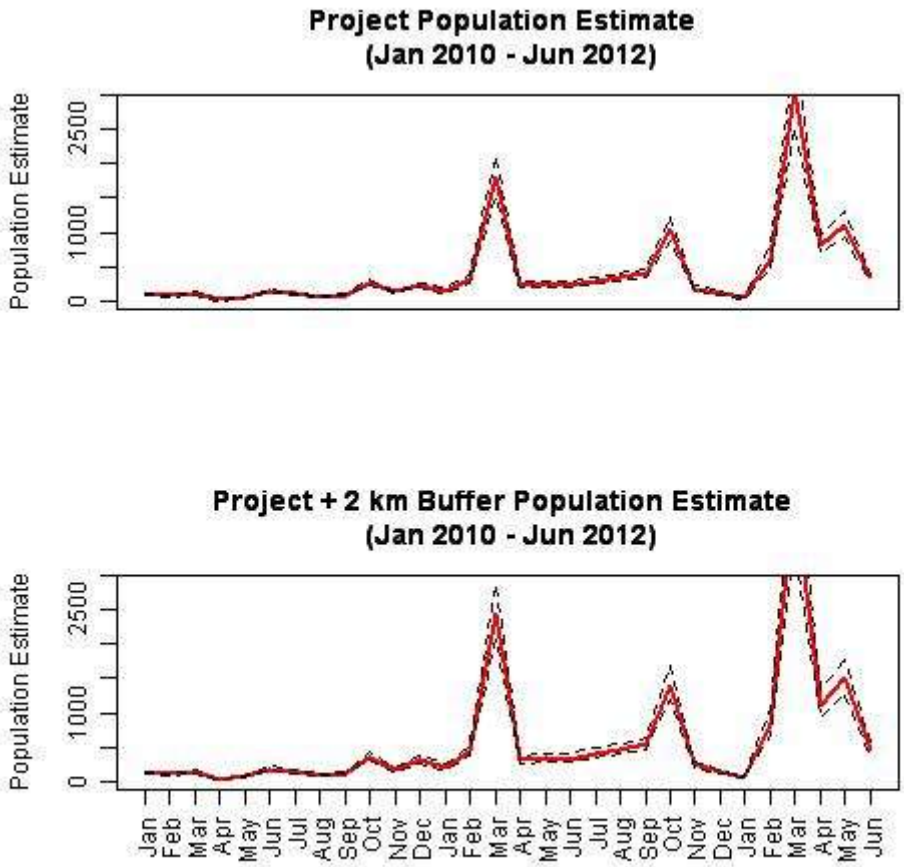



**Figure 3.12** Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Pomarine skua* Stercorarius pomarinus**

VALUE OF RECEPTOR-MEDIUM

3.2.31 Pomarine skua is not a feature of any SPA or other protected site in the Greater North Sea OSPAR region, nor included in any UK conservation listings.

3.2.32 Pomarine skua were present in the Dogger Bank Zone between September and October, when an average of six birds was estimated to occur in the Dogger Bank Teesside A area, six birds in the Dogger Bank Teesside B area and 11 birds in the Dogger Bank Teesside A and B areas (Table 3.7). It should be noted that the numbers of this species in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season. The populations of this species in Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B areas were assessed to be of regional importance and consequently the value of this receptor is assessed to be medium (Table 2.6).

***Arctic skua* Stercorarius parasiticus**

*SPA/Ramsar/SSSI feature; UK BAP species; Birds of Conservation Concern Red list (Eaton* et al. *2009).*

VALUE OF RECEPTOR-VERY HIGH

3.2.33 Arctic skua in the Greater North Sea OSPAR region is a breeding feature of 12 SPAs and a passage feature of two SPAs (Appendix 1). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.34 Numbers in the Dogger Bank Zone as a whole peaked at 49 birds (90% CIs = 13-109) in the post-breeding period in September 2011 (Tables 3.4, 3.5 and 3.6). While it cannot be assumed that all birds at this time come from British colonies, the upper confidence limit on this value surpasses the 1% threshold for populations of national importance (Table 2.3). It should be noted that the numbers of this species in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season, although without knowledge of how long individual birds remain in the area, it is not possible to quantify the extent of this underestimate.

***Dogger Bank Teesside A***

3.2.35 Arctic skua were present in the Dogger Bank Zone in the late summer and autumn. During these months an average of two birds (Figure 3.16; Table 3.13) were estimated to occur in the Dogger Bank Teesside A area per month. Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A area (Tables 2.3 and 3.16). Mean populations across the two and a half years of survey peaked in September, with a mean of 3 birds (90 % CIs = 1-7) in the project and 4 birds (90% CIs = 2-10) present in the project and buffer.

3.2.36 Comparisons of the baseline population estimates with those derived from ESAS data could not be carried out as there were no records from the latter for the Dogger Bank Zone.

3.2.37 On a monthly basis, the densities of Arctic skua within the southern areas of the Dogger Bank Zone, which contains Dogger Bank Teesside A and B, were slightly higher than elsewhere within the Zone (Figures 3.14, 3.15 and 3.16). Caution should be exercised with over interpreting relative differences, however, given the very small numbers involved.

**Table 3.16** Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010 and 2010/11, 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 0 (0-200,837) | 0 (0-272456) | Jul | 0 (0-2) | 0 (0-2) | 1 (0-4) | 2 (0-5) | Jul | 1 (0-3) | 1 (0-4) |
| Feb | 0 (0-2,806) | 0 (0-3807) | Aug | 1 (0-3) | 1 (0-4) | 3 (1-7) | 4 (1-9) | Aug | 2 (0-5) | 3 (1-6) |
| Mar | 0 (0-114) | 0 (0-155) | Sep | 1 (0-5) | 2 (0-7) | 4 (2-10) | 6 (3-13) | Sep | 3 (1-7) | 4 (2-10) |
| Apr | 0 (0-12) | 0 (0-17) | Oct | 1 (0-4) | 2 (0-6) | 3 (0-7) | 4 (1-9) | Oct | 2 (0-5) | 3 (0-8) |
| May | 0 (0-2) | 0 (0-2) | Nov | 1 (0-3) | 1 (0-5) | 1 (0-3) | 1 (0-4) | Nov | 1 (0-3) | 1 (0-4) |
| Jun | 0 (0-2) | 0 (0-2) | Dec | 0 (0-2) | 1 (0-3) | 0 (0-2) | 0 (0-3) | Dec | 0 (0-2) | 0 (0-3) |
| Jul | 0 (0-2) | 0 (0-2) | Jan | 0 (0-1) | 0 (0-2) | 0 (0-1) | 0 (0-2) | Jan | 0 (0-66,947) | 0 (0-90,820) |
| Aug | 1 (0-3) | 1 (0-4) | Feb | 0 (0-1) | 0 (0-2) | 0 (0-2) | 0 (0-3) | Feb | 0 (0-937) | 0 (0-1,271) |
| Sep | 1 (0-5) | 2 (0-7) | Mar | 0 (0-1) | 0 (0-1) | 0 (0-4) | 0 (0-6) | Mar | 0 (0-40) | 0 (0-54) |
| Oct | 1 (0-4) | 2 (0-6) | Apr | 0 (0-1) | 0 (0-1) | 0 (0-72) | 0 (0-98) | Apr | 0 (0-28) | 0 (0-39) |
| Nov | 1 (0-3) | 1 (0-5) | May | 0 (0-1) | 0 (0-2) | 0 (0-750) | 0 (0-1,019) | May | 0 (0-251) | 0 (0-341) |
| Dec | 0 (0-2) | 1 (0-3) | Jun | 1 (0-2) | 1 (0-3) | 0 (0-10769) | 0 (0-14,637) | Jun | 0 (0-3,591) | 0 (0-4,881) |

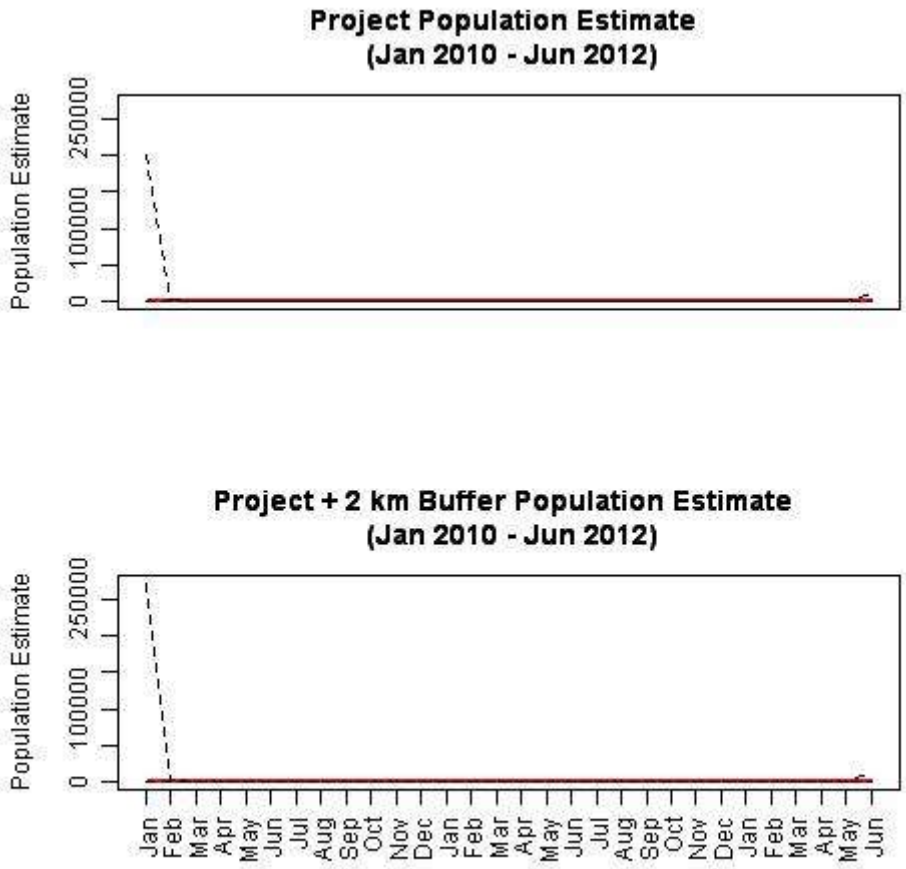



**Figure 3.13** Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

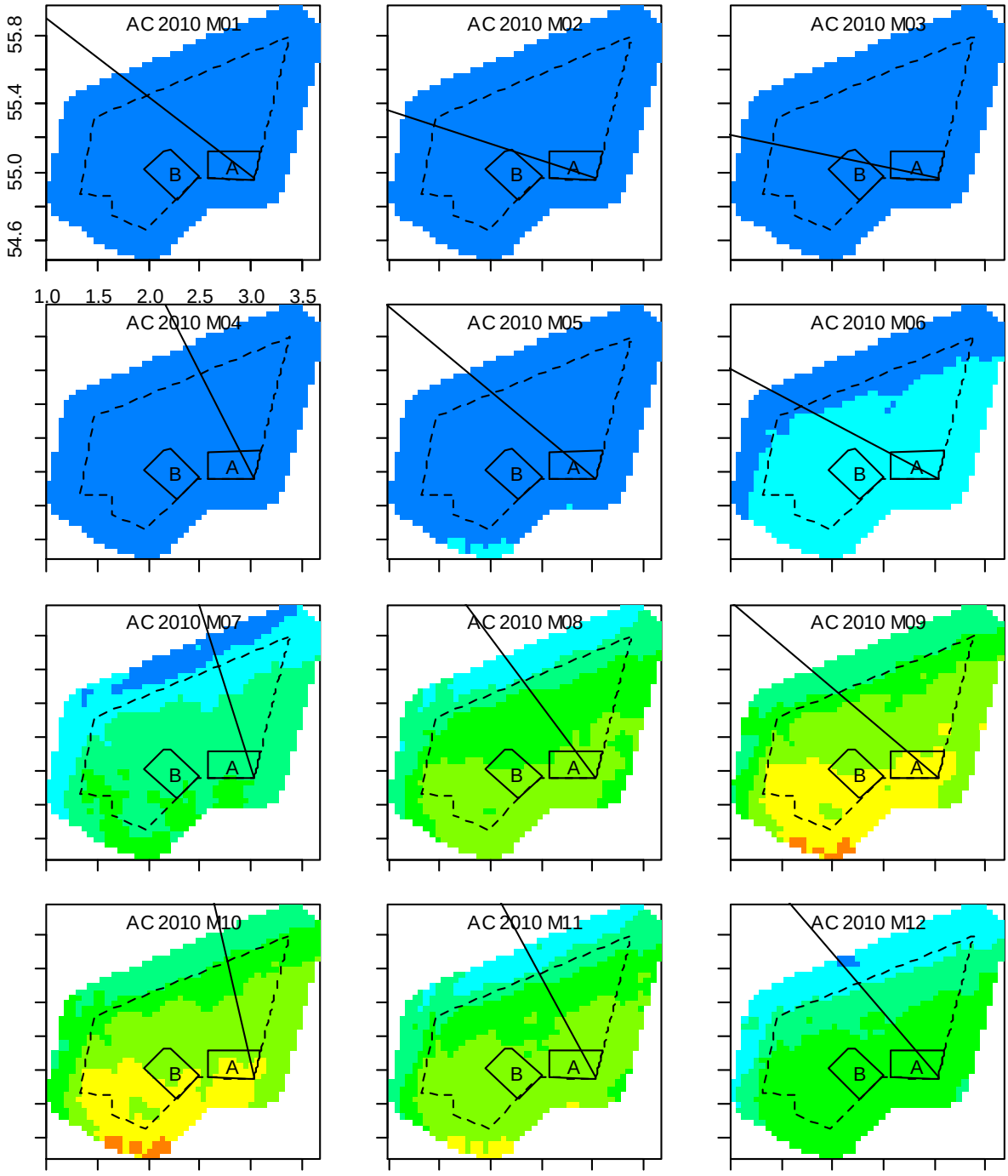



**Figure 3.14** Monthly densities of Arctic Skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

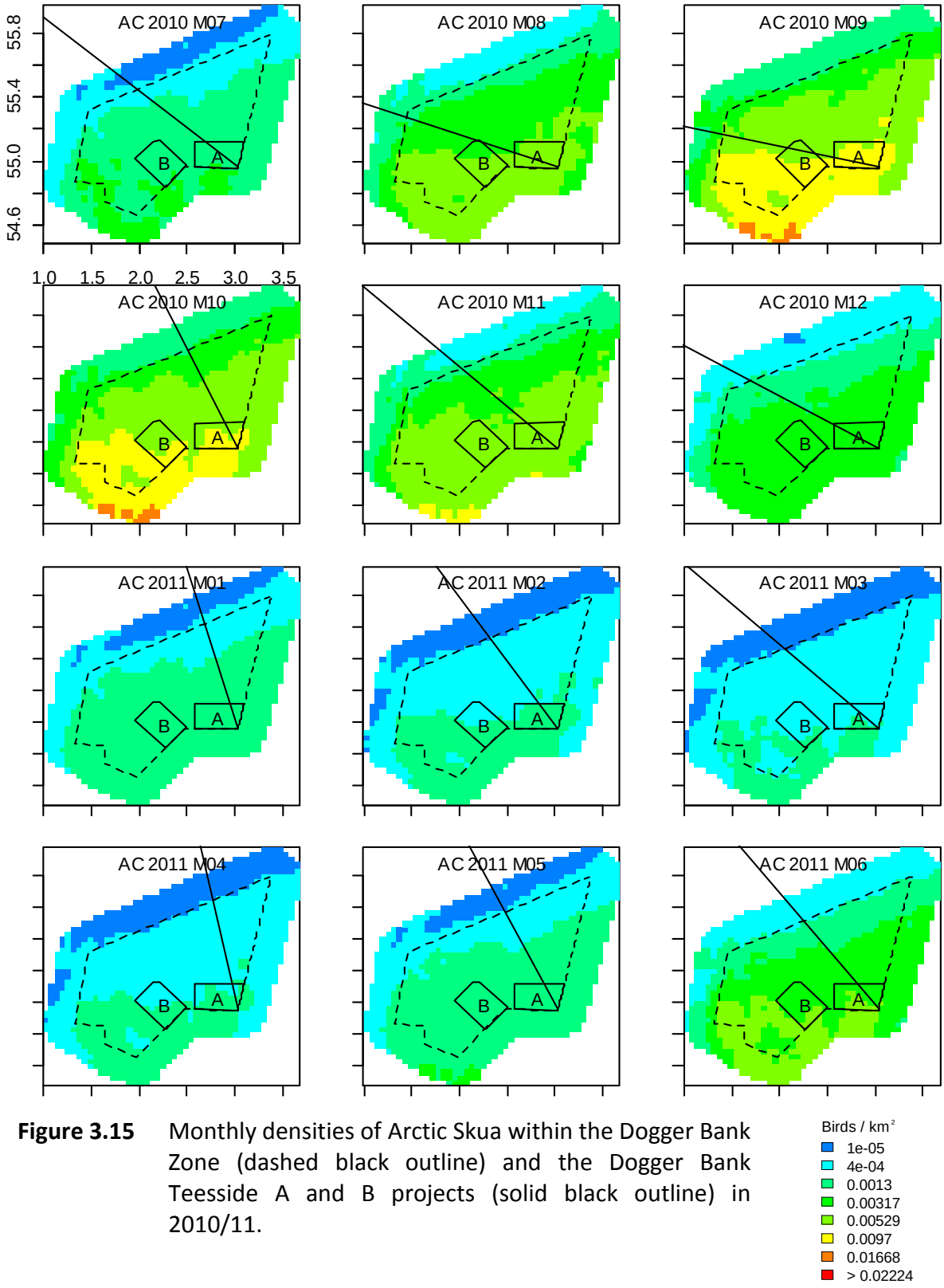



**Figure 3.15** Monthly densities of Arctic Skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

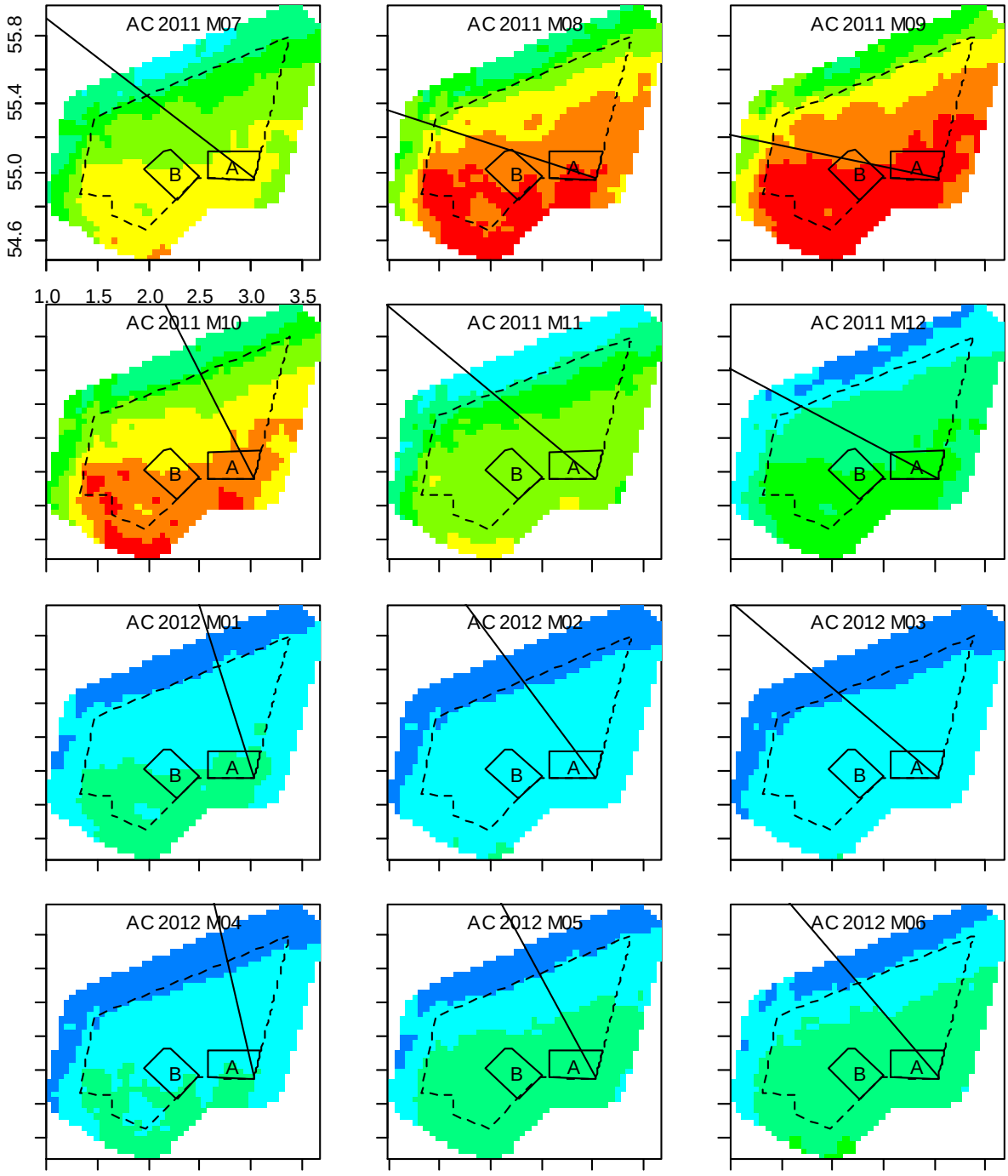



**Figure 3.16** Monthly densities of Arctic Skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

***Dogger Bank Teesside B***

3.2.38 Arctic skua were present in the Dogger Bank Zone in the late summer and autumn. During these months an average of two birds (Figure 3.17, Table 3.17) were estimated to occur in the Dogger Bank Teesside B area per month. Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B area (Tables 2.3 and 3.17). Mean populations across the two and a half years of survey peaked in September, with a mean of 3 birds (90 % CIs = 1-7) in the project and 4 birds (90% CIs = 2-10) present in the project and buffer.

**Table 3.17** Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside B and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2011 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 0 (0-184,190) | 0 (0-254,215) | Jul | 0 (0-2) | 0 (0-2) | 1 (0-2) | 2 (0-5) | Jul | 1 (0-3) | 1 (0-4) |
| Feb | 0 (0-2,573) | 0 (0-3,552) | Aug | 0 (0-2) | 1 (0-3) | 1 (0-4) | 4 (1-9) | Aug | 2 (1-5) | 3 (1-6) |
| Mar | 0 (0-105) | 0 (0-145) | Sep | 1 (0-3) | 2 (0-6) | 3 (1-7) | 5 (3-13) | Sep | 3 (1-7) | 4 (2-10) |
| Apr | 0 (0-12) | 0 (0-16) | Oct | 1 (0-5) | 2 (0-6) | 4 (2-9) | 3 (1-9) | Oct | 2 (0-5) | 3 (0-7) |
| May | 0 (0-2) | 0 (0-2) | Nov | 1 (0-4) | 1 (0-4) | 3 (0-6) | 1 (0-4) | Nov | 1 (0-3) | 1 (0-4) |
| Jun | 0 (0-2) | 0 (0-2) | Dec | 1 (0-3) | 1 (0-3) | 1 (0-3) | 0 (0-3) | Dec | 0 (0-2) | 0 (0-3) |
| Jul | 0 (0-2) | 0 (0-2) | Jan | 0 (0-2) | 0 (0-2) | 0 (0-1) | 0 (0-2) | Jan | 0 (0-61,398) | 0 (0-84,740) |
| Aug | 0 (0-2) | 1 (0-3) | Feb | 0 (0-1) | 0 (0-2) | 0 (0-2) | 0 (0-3) | Feb | 0 (0-859) | 0 (0-1,185) |
| Sep | 1 (0-3) | 2 (0-6) | Mar | 0 (0-1) | 0 (0-1) | 0 (0-6) | 0 (0-8) | Mar | 0 (0-37) | 0 (0-51) |
| Oct | 1 (0-5) | 2 (0-6) | Apr | 0 (0-1) | 0 (0-1) | 0 (0-68) | 0 (0-94) | Apr | 0 (0-27) | 0 (0-37) |
| Nov | 1 (0-4) | 1 (0-4) | May | 0 (0-1) | 0 (0-2) | 0 (0-706) | 0 (0-969) | May | 0 (0-236) | 0 (0-324) |
| Dec | 1 (0-3) | 1 (0-3) | Jun | 0 (0-2) | 1 (0-3) | 0 (0-10,139) | 0 (0-13,914) | Jun | 0 (0-3,381) | 0 (0-4,640) |

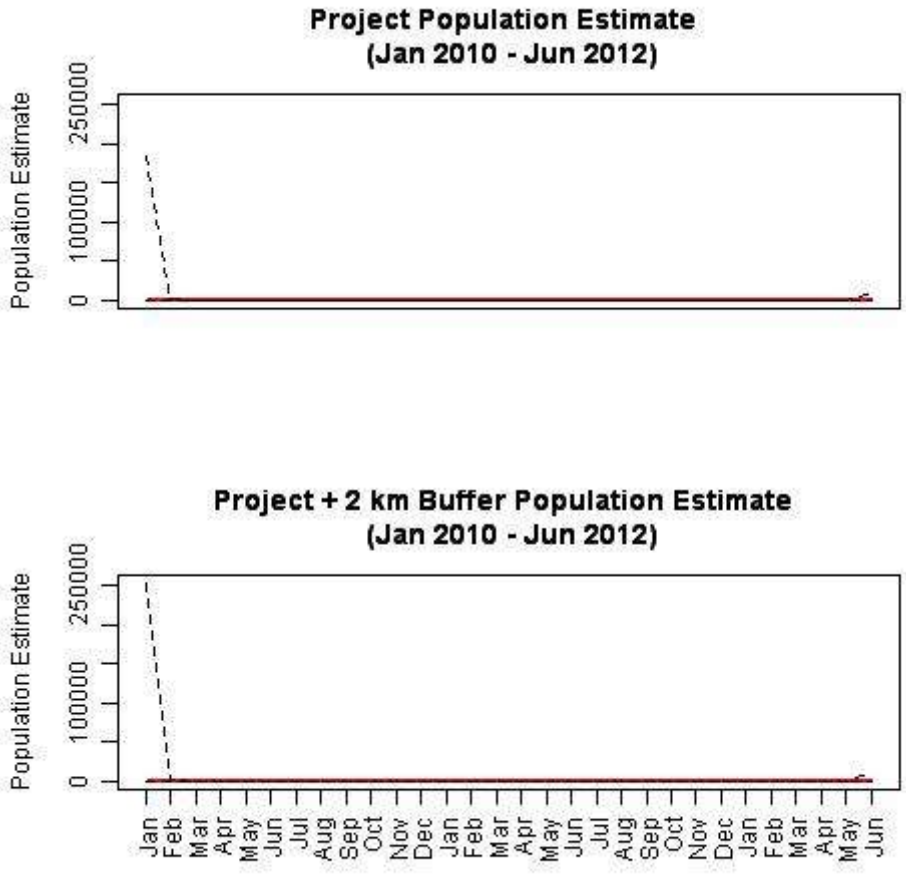



**Figure 3.17** Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Dogger Bank Teesside A and B***

3.2.39 Arctic skua were present in the Dogger Bank Zone in the late summer and autumn. During these months an average of three birds (Figure 3.18; Table 3.18) were estimated to occur in the Dogger Bank Teesside A and B areas per month. Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B areas (Tables 2.3 and 3.18). Mean populations across the two and a half years of survey peaked in September, with a mean of 5 birds (90 % CIs = 2-14) in the project and 7 birds (90% CIs = 3-20) present in the project and buffer.

**Table 3.18** Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 0 (0-385,027) | 0 (0-526,675) | Jul | 0 (0-3) | 1 (0-5) | 3 (0-8) | 4 (0-11) | Jul | 2 (0-6) | 2 (0-8) |
| Feb | 0 (0-5,380) | 0 (0-7,359) | Aug | 1 (0-5) | 2 (0-7) | 6 (2-14) | 9 (3-18) | Aug | 4 (1-9) | 5 (1-13) |
| Mar | 0 (0-219) | 0 (0-300) | Sep | 3 (0-10) | 4 (1-13) | 8 (4-19) | 11 (6-26) | Sep | 5 (2-14) | 7 (3-20) |
| Apr | 0 (0-24) | 0 (0-33) | Oct | 3 (0-9) | 3 (1-12) | 5 (1-13) | 7 (1-18) | Oct | 4 (1-11) | 5 (1-15) |
| May | 0 (0-3) | 0 (0-5) | Nov | 2 (0-7) | 2 (0-9) | 2 (0-6) | 3 (0-9) | Nov | 2 (0-6) | 2 (0-9) |
| Jun | 0 (0-3) | 0 (0-4) | Dec | 1 (0-5) | 1 (0-6) | 1 (0-5) | 1 (0-7) | Dec | 1 (0-5) | 1 (0-6) |
| Jul | 0 (0-3) | 1 (0-5) | Jan | 0 (0-3) | 1 (0-4) | 0 (0-3) | 0 (0-4) | Jan | 0 (0-128,344) | 0 (0-175,560) |
| Aug | 1 (0-5) | 2 (0-7) | Feb | 0 (0-2) | 0 (0-3) | 0 (0-5) | 0 (0-6) | Feb | 0 (0-1795) | 0 (0-2,456) |
| Sep | 3 (0-10) | 4 (1-13) | Mar | 0 (0-2) | 0 (0-3) | 0 (0-11) | 0 (0-15) | Mar | 0 (0-77) | 0 (0-106) |
| Oct | 3 (0-9) | 3 (1-12) | Apr | 0 (0-2) | 0 (0-3) | 0 (0-141) | 0 (0-192) | Apr | 0 (0-55) | 0 (0-76) |
| Nov | 2 (0-7) | 2 (0-9) | May | 0 (0-3) | 1 (0-3) | 0 (0-1,456) | 0 (0-1,988) | May | 0 (0-487) | 0 (0-665) |
| Dec | 1 (0-5) | 1 (0-6) | Jun | 1 (0-4) | 1 (0-6) | 0 (0-20,908) | 1 (0-28,551) | Jun | 1 (0-6,972) | 1 (0-9,520) |

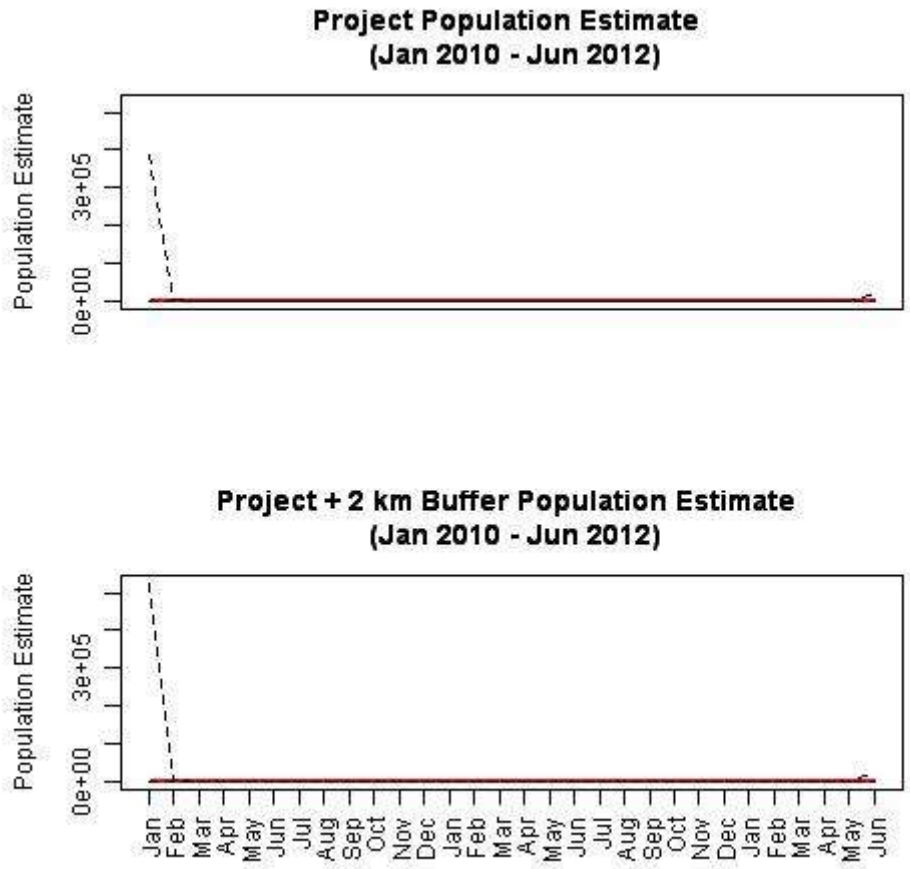



**Figure 3.18** Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Great skua* Stercorarius skua**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list (Eaton* et al. *2009).*

VALUE OF RECEPTOR-VERY HIGH

3.2.40 Great skua is a breeding feature of seven SPAs and a passage feature of two SPAs (Appendix 1) in the Greater North Sea OSPAR region. Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.41 Numbers in the Dogger Bank Zone as a whole peaked at 104 birds (90% CIs = 71-148) in the post-breeding period in September 2011 (Table 3.6). It cannot be assumed that all birds at this time come from British colonies, and this figure does not surpass the 1% threshold for populations of national importance (Table 2.3, 3.4, 3.5 and 3.6). However, it should be noted that the estimated numbers of this species in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season, although without knowledge of how long individual birds remain in the area, it is not possible to quantify the extent of this underestimate. Thus the

total population passing through the Dogger Bank Zone may potentially be of national importance.

***Dogger Bank Teesside A***

3.2.42 The baseline monthly population estimates all years showed low numbers of great skua using Dogger Bank Teesside A (Figure 3.19). The highest values of six birds were estimated for August and September 2011 (90% CIs = 4-9 and 5-11, respectively: Table 3.19). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in this area (Tables 2.3 and 3.19). Mean populations across the two and a half years of survey peaked in September, with a mean of 4 birds (90 % CIs = 3-7) in the project and 6 birds (90% CIs = 4-9) present in the project and buffer.

3.2.43 Comparisons of the baseline population estimates with those derived from ESAS data could not be carried out as there were no records for the latter in the Dogger Bank Zone.

3.2.44 On a monthly basis, the densities of great skua within the south-eastern and south south-eastern areas of the Dogger Bank Zone (which contains Dogger Bank Teesside A and B) appeared to be higher than elsewhere within the Zone (Figures 3.20, 3.21 and 3.22). Caution should be exercised with over interpreting relative differences however given the very small population estimates involved.

**Table 3.19** Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11, 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 0 (0-2) | 0 (0-2) | Jul | 1 (0-2) | 1 (0-2) | 4 (2-6) | 5 (3-8) | Jul | 2 (1-4) | 3 (2-5) |
| Feb | 0 (0-1) | 0 (0-1) | Aug | 1 (1-2) | 2 (1-3) | 6 (4-9) | 8 (6-12) | Aug | 3 (2-6) | 5 (3-8) |
| Mar | 0 (0-1) | 0 (0-1) | Sep | 2 (1-3) | 2 (1-4) | 6 (5-11) | 9 (6-14) | Sep | 4 (3-7) | 6 (4-9) |
| Apr | 0 (0-1) | 0 (0-1) | Oct | 2 (1-3) | 2 (1-4) | 5 (3-8) | 7 (5-12) | Oct | 3 (2-6) | 5 (3-8) |
| May | 0 (0-1) | 0 (0-1) | Nov | 2 (1-3) | 2 (1-4) | 3 (1-5) | 3 (2-6) | Nov | 2 (1-4) | 3 (2-5) |
| Jun | 1 (0-1) | 1 (0-2) | Dec | 1 (1-3) | 2 (1-4) | 1 (0-2) | 1 (1-3) | Dec | 1 (1-3) | 2 (1-3) |
| Jul | 1 (0-2) | 1 (0-2) | Jan | 1 (0-2) | 1 (1-3) | 0 (0-1) | 1 (0-2) | Jan | 1 (0-2) | 1 (0-2) |
| Aug | 1 (1-2) | 2 (1-3) | Feb | 1 (0-2) | 1 (1-3) | 0 (0-1) | 0 (0-1) | Feb | 0 (0-1) | 1 (0-2) |
| Sep | 2 (1-3) | 2 (1-4) | Mar | 1 (0-2) | 1 (0-2) | 0 (0-1) | 0 (0-1) | Mar | 0 (0-1) | 0 (0-2) |
| Oct | 2 (1-3) | 2 (1-4) | Apr | 1 (0-2) | 1 (1-2) | 0 (0-1) | 0 (0-2) | Apr | 0 (0-1) | 1 (0-2) |
| Nov | 2 (1-3) | 2 (1-4) | May | 1 (1-2) | 2 (1-3) | 0 (0-1) | 0 (0-2) | May | 1 (0-2) | 1 (0-2) |
| Dec | 1 (1-3) | 2 (1-4) | Jun | 2 (1-3) | 3 (1-5) | 0 (0-2) | 1 (0-3) | Jun | 1 (0-2) | 1 (1-3) |

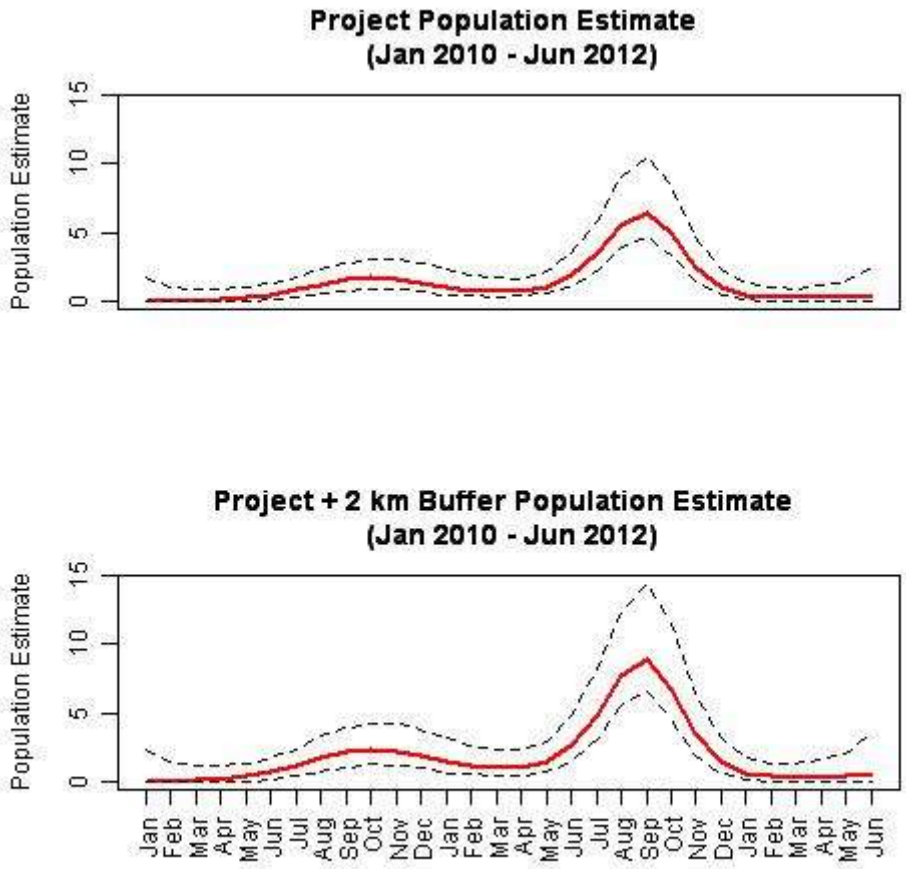



**Figure 3.19** Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11, 2011/12.

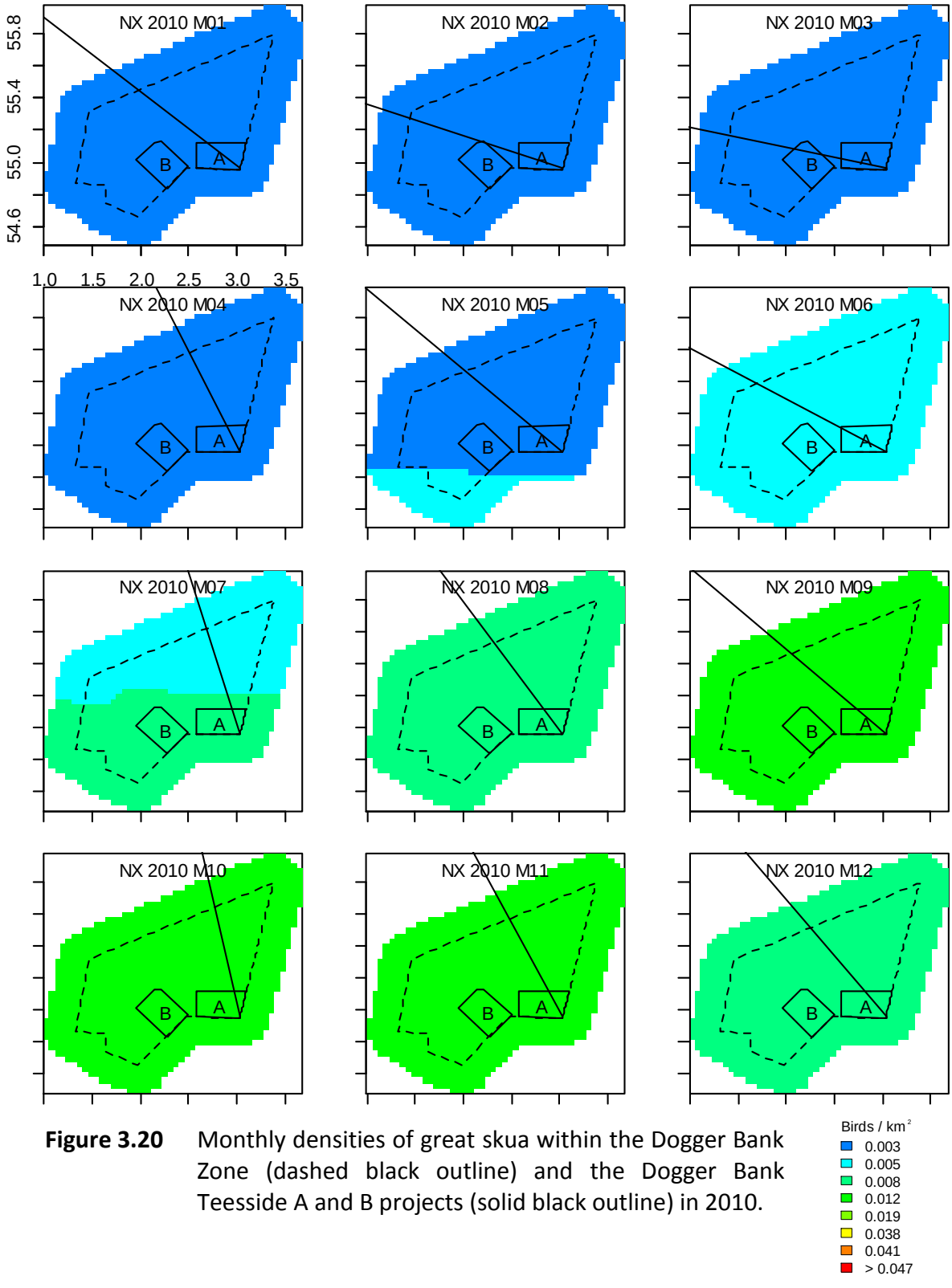



**Figure 3.20** Monthly densities of great skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

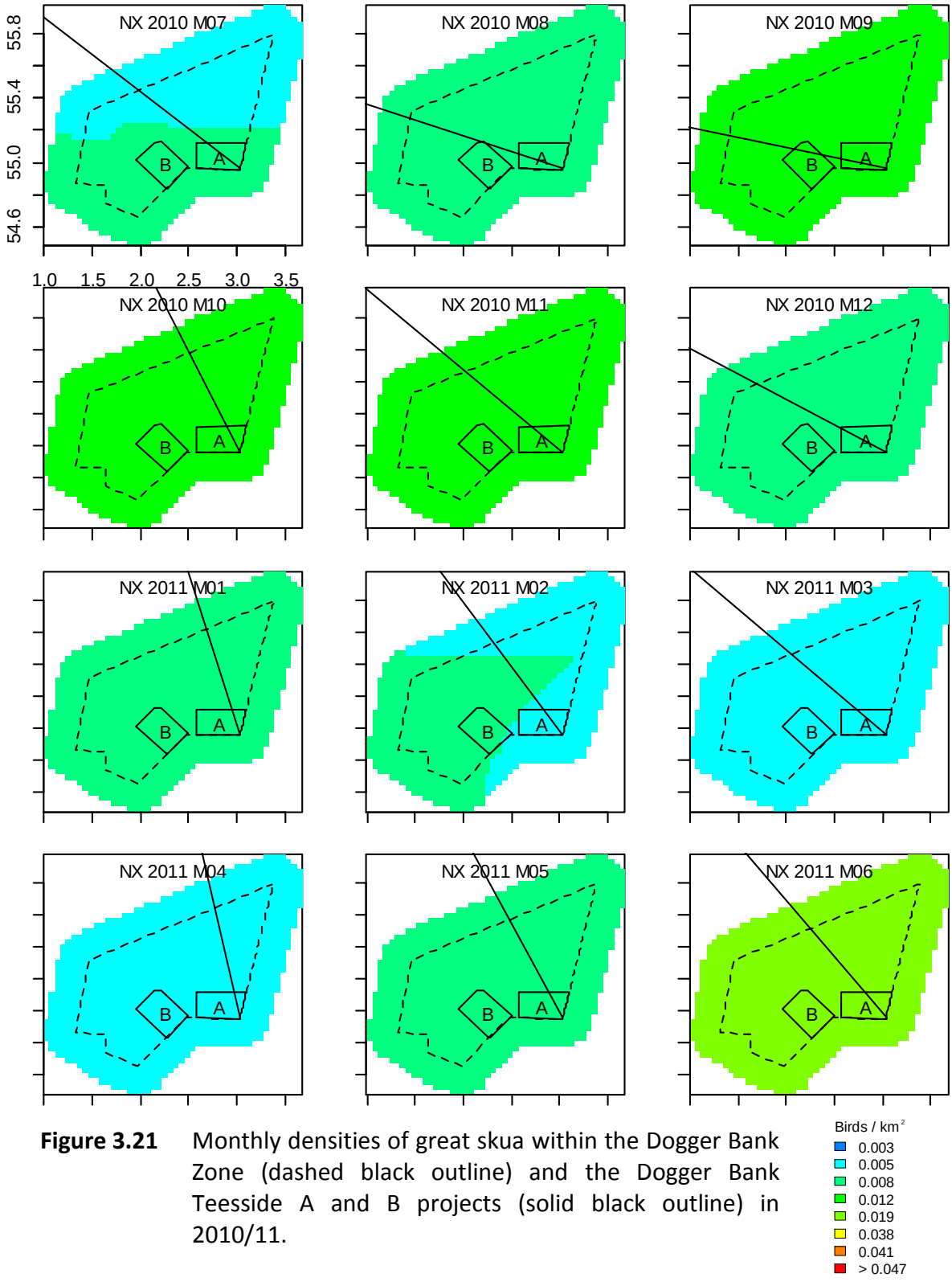



**Figure 3.21** Monthly densities of great skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

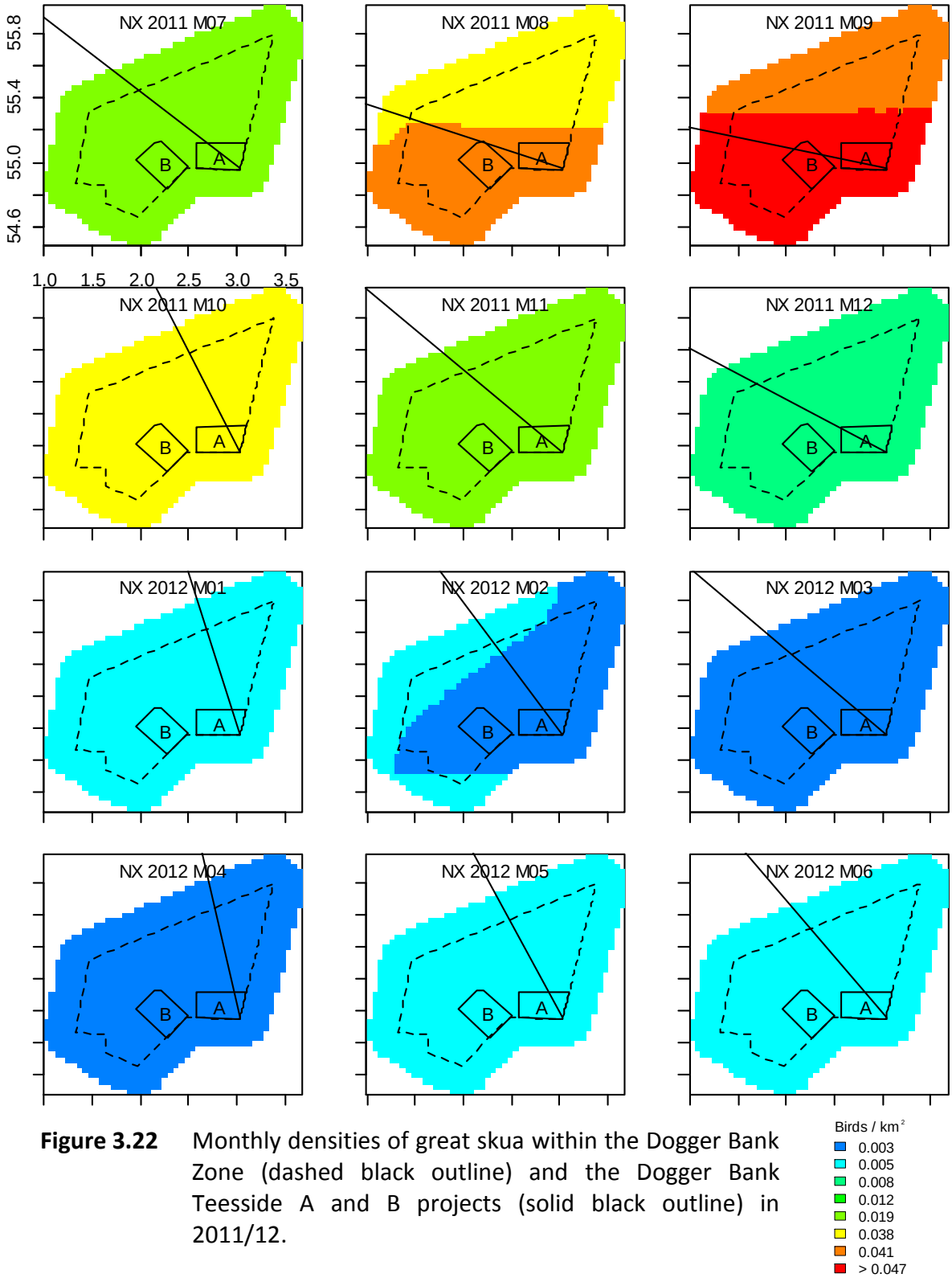



**Figure 3.22** Monthly densities of great skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

***Dogger Bank Teesside B***

3.2.45 The baseline monthly population estimates all years showed low numbers of great skua using Dogger Bank Teesside B (Figure 3.23). The highest number of four birds was estimated for September 2011 (90% CIs = 2-9: Table 3.20). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in this area (Tables 2.3 and 3.20). Mean populations across the two and a half years of survey peaked in August, September, and October with a mean of 4 birds in the project and 6 birds (in September) present in the project and buffer.

**Table 3.20** Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 0 (0-184,190) | 0 (0-2) | Jul | 0 (0-2) | 1 (0-2) | 1 (0-4) | 5 (3-8) | Jul | 2 (1-4) | 3 (2-5) |
| Feb | 0 (0-2,573) | 0 (0-2) | Aug | 1 (0-3) | 2 (1-3) | 3 (1-7) | 8 (6-13) | Aug | 4 (2-6) | 5 (3-8) |
| Mar | 0 (0-105) | 0 (0-1) | Sep | 1 (0-5) | 2 (1-4) | 4 (2-9) | 9 (7-15) | Sep | 4 (3-7) | 6 (4-9) |
| Apr | 0 (0-12) | 0 (0-1) | Oct | 1 (0-4) | 2 (1-4) | 3 (0-6) | 7 (5-12) | Oct | 4 (2-6) | 5 (3-8) |
| May | 0 (0-2) | 0 (0-1) | Nov | 1 (0-3) | 2 (1-4) | 1 (0-3) | 4 (2-7) | Nov | 2 (1-4) | 3 (2-5) |
| Jun | 0 (0-2) | 1 (0-2) | Dec | 0 (0-2) | 2 (1-4) | 0 (0-2) | 1 (1-3) | Dec | 1 (1-3) | 2 (1-4) |
| Jul | 0 (0-2) | 1 (0-2) | Jan | 0 (0-2) | 1 (1-3) | 0 (0-1) | 1 (0-2) | Jan | 1 (0-2) | 1 (0-3) |
| Aug | 1 (0-3) | 2 (1-3) | Feb | 0 (0-1) | 1 (1-3) | 0 (0-2) | 0 (0-1) | Feb | 0 (0-1) | 1 (0-2) |
| Sep | 1 (0-5) | 2 (1-4) | Mar | 0 (0-1) | 1 (0-2) | 0 (0-6) | 0 (0-1) | Mar | 0 (0-1) | 0 (0-2) |
| Oct | 1 (0-4) | 2 (1-4) | Apr | 0 (0-1) | 1 (1-2) | 0 (0-68) | 0 (0-2) | Apr | 0 (0-1) | 1 (0-2) |
| Nov | 1 (0-3) | 2 (1-4) | May | 0 (0-1) | 2 (1-3) | 0 (0-706) | 0 (0-2) | May | 1 (0-2) | 1 (0-2) |
| Dec | 0 (0-2) | 2 (1-4) | Jun | 1 (0-2) | 3 (2-5) | 0 (0-10,139) | 1 (0-4) | Jun | 1 (0-3) | 1 (1-3) |

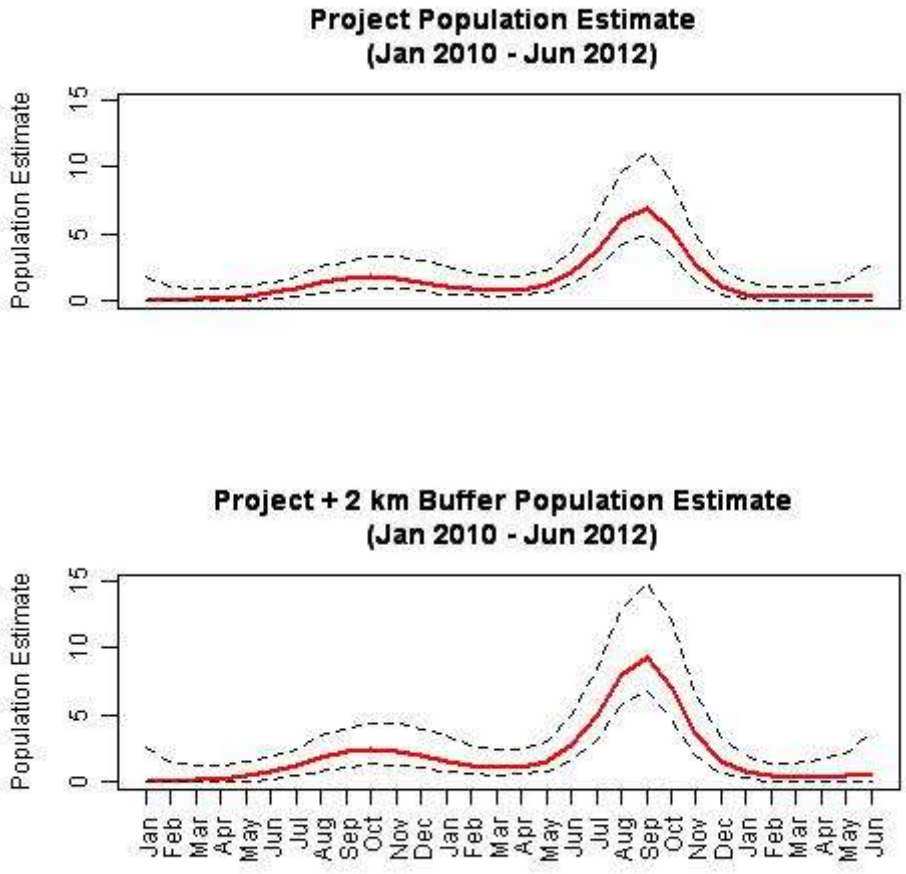



**Figure 3.23** Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Dogger Bank Teesside A and B***

3.2.46 The baseline monthly population estimates all years showed low numbers of great skua using Dogger Bank Teesside A and B areas (Figure 3.24). The highest number of 13 birds was estimated for September 2011 (90% CIs = 10-22) (Table 3.21). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in this area (Tables 2.3 and 3.21). Mean populations across the two and a half years of survey peaked in September, with a mean of 8 birds (90 % CIs = 6-14) in the project and 11 birds (90% CIs = 8-19) present in the project and buffer.

**Table 3.21** Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 0 (0-4) | 0 (0-5) | Jul | 2 (1-4) | 2 (1-5) | 7 (5-12) | 10 (6-16) | Jul | 4 (3-8) | 6 (4-11) |
| Feb | 0 (0-2) | 0 (0-3) | Aug | 3 (1-5) | 3 (2-7) | 12 (8-19) | 16 (11-25) | Aug | 7 (5-12) | 10 (6-16) |
| Mar | 0 (0-2) | 0 (0-2) | Sep | 3 (2-6) | 4 (2-8) | 13 (10-22) | 18 (13-29) | Sep | 8 (6-14) | 11 (8-19) |
| Apr | 0 (0-2) | 0 (0-2) | Oct | 4 (2-6) | 5 (3-9) | 10 (7-17) | 14 (9-24) | Oct | 7 (4-12) | 9 (6-16) |
| May | 1 (0-2) | 1 (0-3) | Nov | 3 (2-6) | 5 (2-9) | 5 (3-10) | 7 (4-13) | Nov | 4 (2-8) | 6 (3-11) |
| Jun | 1 (0-3) | 1 (0-4) | Dec | 3 (1-6) | 4 (2-8) | 2 (1-5) | 3 (1-6) | Dec | 2 (1-5) | 3 (2-7) |
| Jul | 2 (1-4) | 2 (1-5) | Jan | 2 (1-5) | 3 (1-7) | 1 (0-3) | 1 (0-4) | Jan | 1 (0-4) | 1 (1-5) |
| Aug | 3 (1-5) | 3 (2-7) | Feb | 2 (1-4) | 2 (1-5) | 1 (0-2) | 1 (0-3) | Feb | 1 (0-3) | 1 (0-4) |
| Sep | 3 (2-6) | 4 (2-8) | Mar | 1 (1-3) | 2 (1-5) | 1 (0-2) | 1 (0-3) | Mar | 1 (0-2) | 1 (0-3) |
| Oct | 4 (2-6) | 5 (3-9) | Apr | 2 (1-3) | 2 (1-5) | 1 (0-2) | 1 (0-3) | Apr | 1 (0-3) | 1 (0-3) |
| Nov | 3 (2-6) | 5 (2-9) | May | 2 (1-4) | 3 (2-6) | 1 (0-3) | 1 (0-4) | May | 1 (0-3) | 2 (1-4) |
| Dec | 3 (1-6) | 4 (2-8) | Jun | 4 (2-7) | 5 (3-10) | 1 (0-5) | 1 (0-7) | Jun | 2 (1-5) | 3 (1-7) |

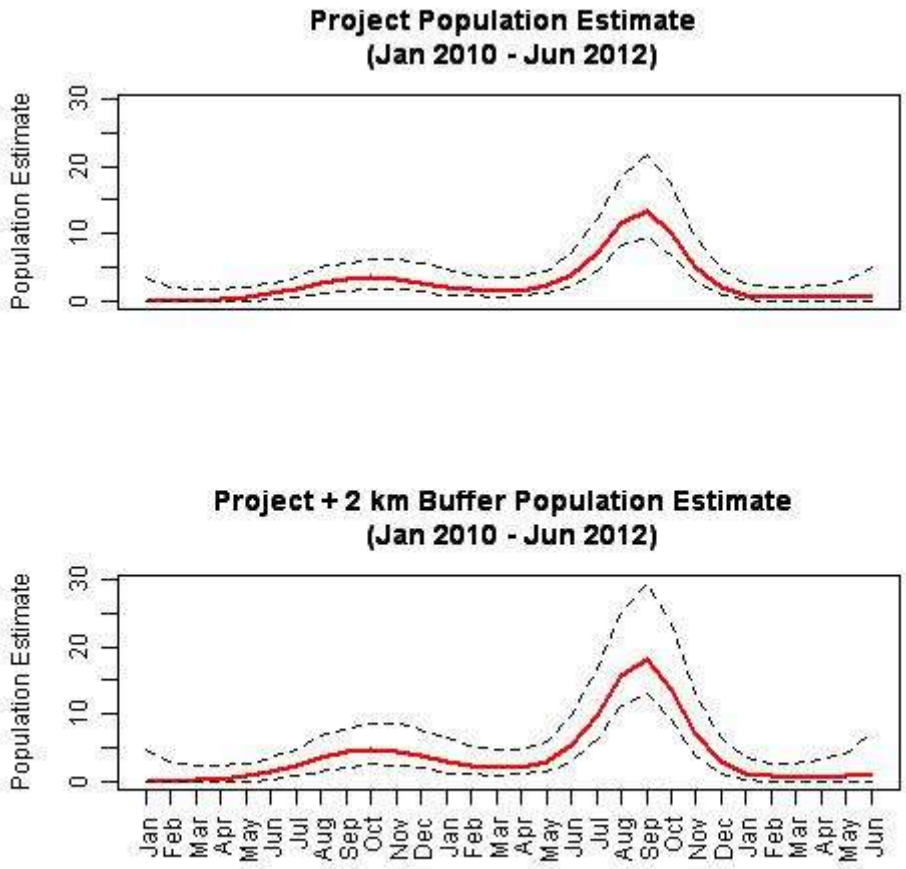



**Figure 3.24** Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Black-legged kittiwake*** **Rissa tridactyla**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list (Eaton* et al. *2009).*

VALUE OF RECEPTOR-VERY HIGH

3.2.47 Black-legged kittiwake is a breeding feature of 24 SPAs, a wintering feature of four SPAs and a passage feature of six SPAs (Appendix 1) in the Greater North Sea OSPAR region. Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.48 Numbers in the Dogger Bank Zone as a whole surpassed the 1% threshold for populations of national importance in the 2010, 2011 and 2012 breeding seasons (Tables 2.3, 3.4, 3.5, and 3.6).

***Dogger Bank Teesside A***

3.2.49 In 2010, the monthly baseline population estimates of black-legged kittiwake within the Dogger Bank Teesside A area peaked between February and March (highest value in March of 2,196 birds, 90% CIs = 1,914-2,467). Population estimates derived from 2010/11 and 2011/12 showed a general increase. Population estimates peaked during March in both 2010/11 (4,889 birds, 90% CIs = 4,332-5,464) and 2011/12 (3,540 birds, 90% CIs = 3,117-3,981) periods (Table 3.22; Figure 3.25). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in this area (Tables 2.3 and 3.25). Mean populations across the two and a half years of survey peaked in March, with a mean of 3,542 birds (90 % CIs = 3,121-3,971) in the project and 4,854 birds (90% CIs = 4,277-5,441) present in the project and buffer.

3.2.50 The monthly baseline population estimates for black-legged kittiwake in 2010, 2010/11 and 2011/12 were higher than those derived from ESAS data. ESAS population estimates were at their highest between October and March period with a value of 896 birds and at their lowest during the combined period of April to September (Table 3.9).

3.2.51 On a monthly basis densities of black-legged kittiwake appeared to be highest in the south-western areas of the zone. Although the western borders of Dogger Bank Teesside B overlaps this area, generally, Dogger Bank Teesside A and B were estimated to have lower densities than elsewhere in the zone. (Figures 3.26, 3.27 and 3.28).

**Table 3.22** Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 731 (629-915) | 996 (856-1,245) | Jul | 421 (369-468) | 580 (509-644) | 575 (504-644) | 791 (694-886) | Jul | 498 (437-556) | 685 (601-765) |
| Feb | 1,386 (1,203-1,572) | 1,897 (1,646-2,151) | Aug | 273 (236-303) | 376 (326-417) | 240 (207-268) | 331 (285-369) | Aug | 257 (222-286) | 353 (306-393) |
| Mar | 2,196 (1,914-2,467) | 3,006 (2,620-3,375) | Sep | 364 (315-410) | 503 (435-566) | 136 (115-155) | 188 (159-214) | Sep | 250 (215-283) | 346 (297-390) |
| Apr | 652 (563-734) | 896 (774-1,007) | Oct | 762 (668-845) | 1,043 (915-1,156) | 223 (191-256) | 305 (261-350) | Oct | 493 (429-550) | 674 (588-753) |
| May | 874 (773-967) | 1,204 (1,065-1,332) | Nov | 618 (542-689) | 846 (741-942) | 150 (131-170) | 205 (179-233) | Nov | 384 (336-429) | 526 (460-587) |
| Jun | 832 (737-923) | 1,145 (1,014-1,269) | Dec | 1,044 (926-1,159) | 1,425 (1,264-1,581) | 315 (274-358) | 431 (374-490) | Dec | 679 (600-759) | 928 (819-1,035) |
| Jul | 421 (369-468) | 580 (509-644) | Jan | 885 (783-988) | 1,210 (1,071-1,351) | 362 (315-409) | 496 (431-560) | Jan | 659 (575-771) | 901 (786-1,052) |
| Aug | 273 (236-303) | 376 (326-417) | Feb | 1,499 (1,340-1,681) | 2,053 (1,835-2,302) | 2,123 (1,853-2,447) | 2,900 (2,533-3,342) | Feb | 1,670 (1,465-1,900) | 2,283 (2,005-2,598) |
| Sep | 364 (315-410) | 503 (435-566) | Mar | 4,889 (4,332-5,464) | 6,702 (5,939-7,489) | 3,540 (3,117-3,981) | 4,853 (4,273-5,458) | Mar | 3,542 (3,121-3,971) | 4,854 (4,277-5,441) |
| Oct | 762 (668-845) | 1,043 (915-1,156) | Apr | 1,648 (1,476-1,851) | 2,271 (2,035-2,550) | 1,193 (1,041-1,345) | 1,644 (1,435-1,854) | Apr | 1,165 (1,027-1,310) | 1,604 (1,414-1804) |
| Nov | 618 (542-689) | 846 (741-942) | May | 1,592 (1,441-1,770) | 2,194 (1,986-2,437) | 1,235 (1,080-1,387) | 1,705 (1,491-1,913) | May | 1,233 (1,098-1,374) | 1,701 (1,514-1,894) |
| Dec | 1,044 (926-1,159) | 1,425 (1,264-1,581) | Jun | 1,058 (933-1,181) | 1,455 (1,284-1,623) | 760 (659-864) | 1,048 (908-1,190) | Jun | 883 (776-989) | 1,216 (1,069-1,361) |

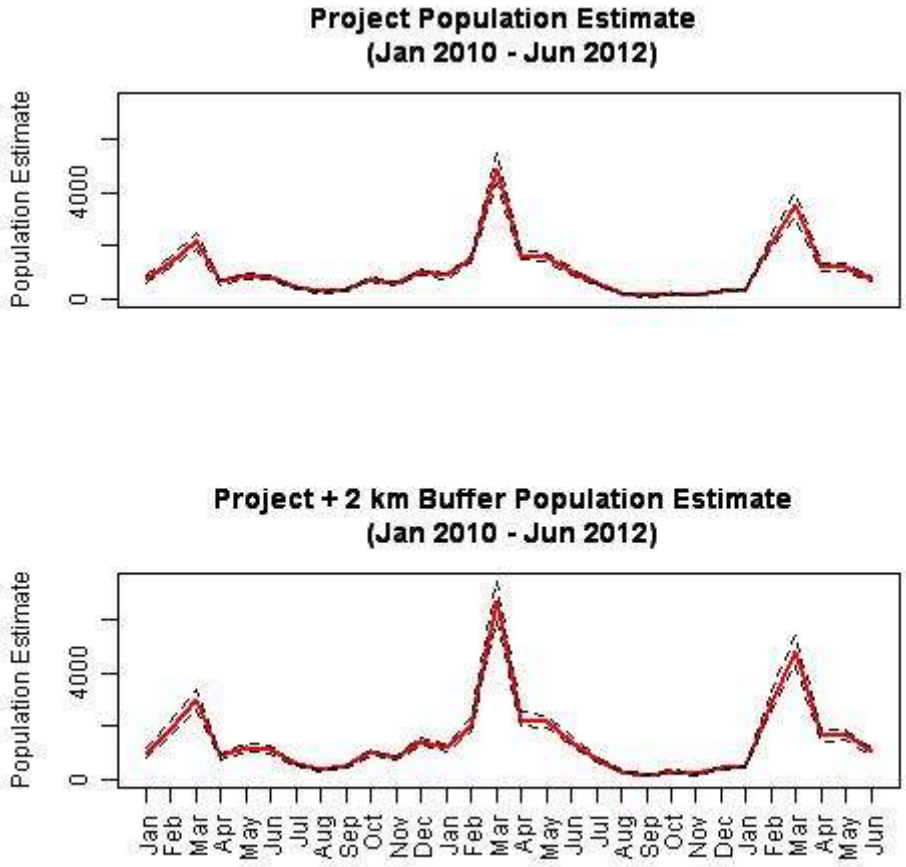



**Figure 3.25** Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

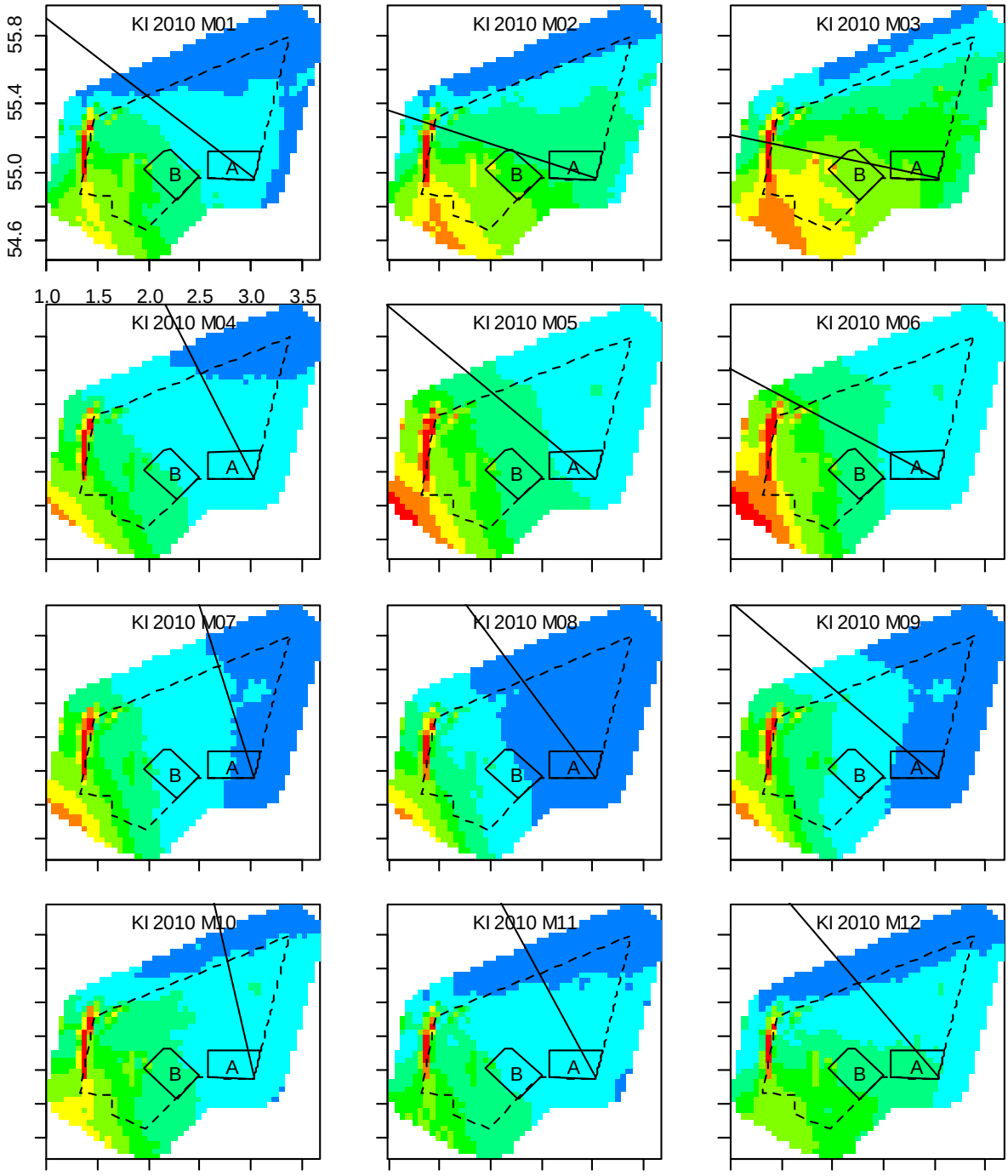



**Figure 3.26** Monthly densities of black-legged kittiwake within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

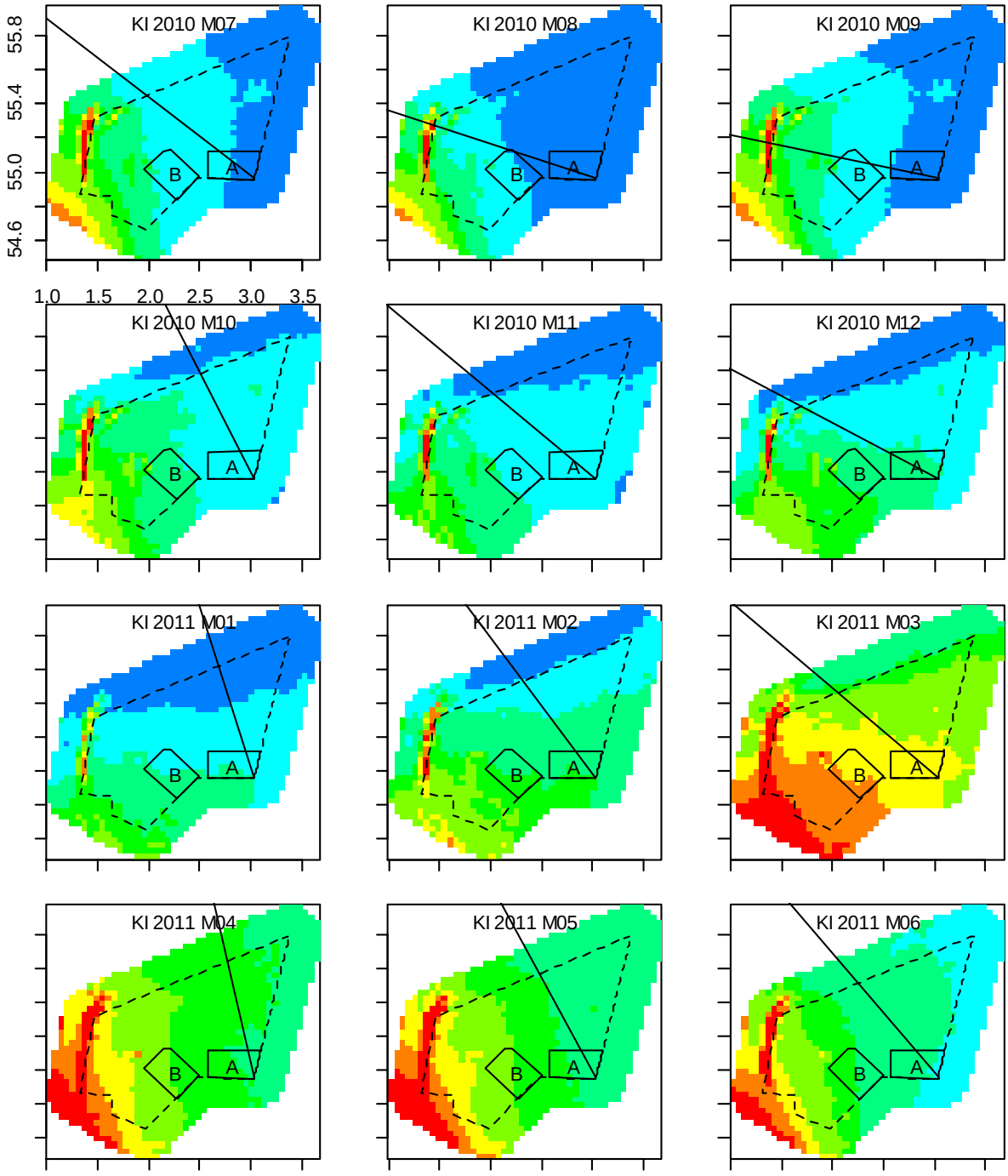



**Figure 3.27** Monthly densities of black-legged kittiwake within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

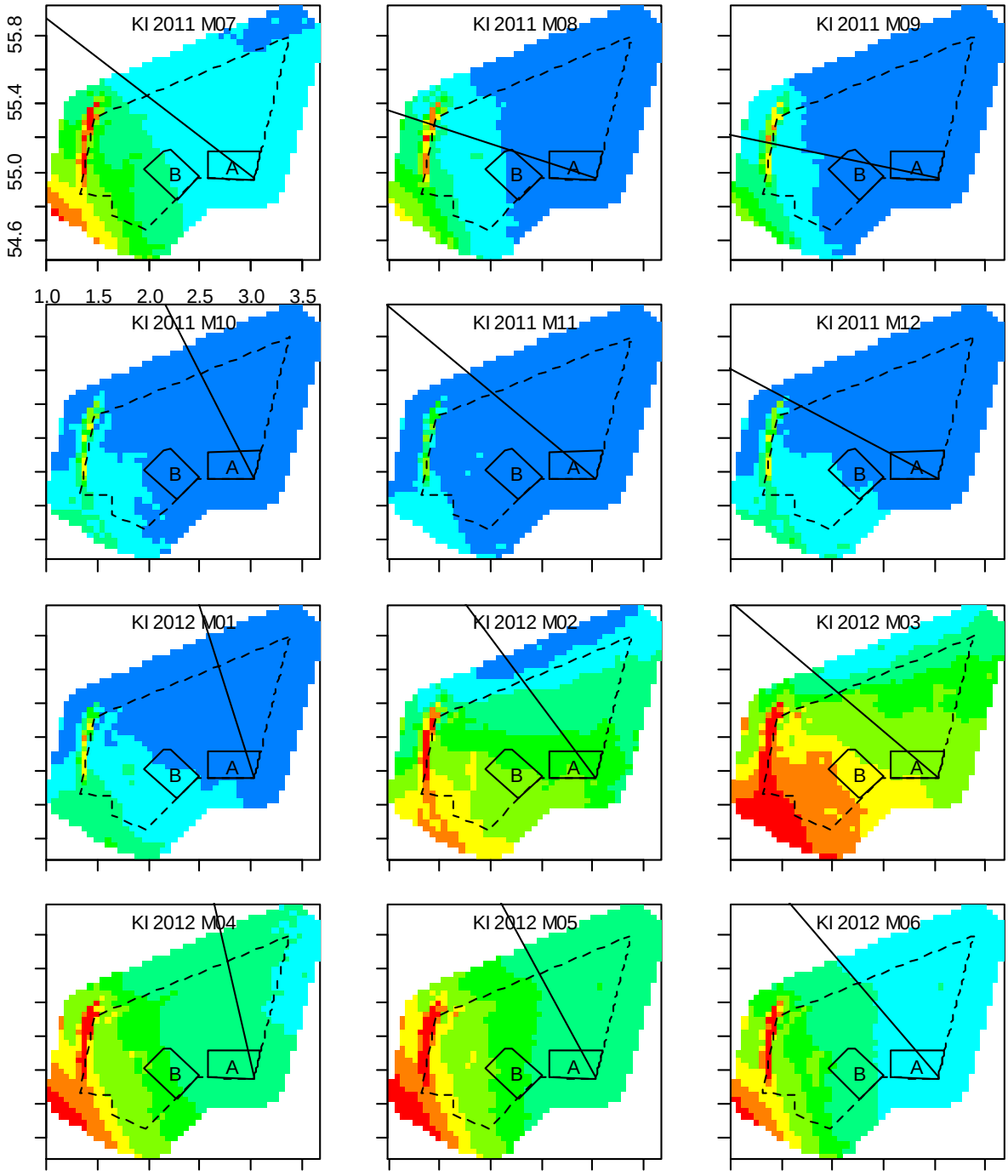



**Figure 3.28** Monthly densities of black-legged kittiwake within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

***Dogger Bank Teesside B***

3.2.52 In 2010, the monthly baseline population estimates of black-legged kittiwake within the Dogger Bank Teesside B area peaked between February and March (highest value in March of 3,398 birds, 90% CIs = 2,985-3,779). Population estimates derived from 2010/11 and 2011/12 showed a general increase. Population estimates peaked during March in both 2010/11 (6,487 birds, 90% CIs = 5,864-7,207) and 2011/12 (5,507 birds, 90% CIs = 4859-6188) periods (Table 3.23; Figure 3.29). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in this area (Tables 2.3 and 3.23). Mean populations across the two and a half years of survey peaked in March, with a mean of 5,131 birds (90 % CIs = 4,570-5,725) in the project and 6,951 birds (90% CIs = 6,188-7,758) present in the project and buffer.

3.2.53 The monthly baseline population estimates for black-legged kittiwake in 2010, 2010/11 and 2011/12 were higher than those derived from ESAS data. ESAS population estimates were at their highest during combined period of October to March at 949 birds and at their lowest during the combined period of April to October at 640 birds (Table 3.9).

**Table 3.23** Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 1,253 (1,088-1,545) | 1,712 (1,485-2,112) | Jul | 799 (711-874) | 1,086 (966-1,189) | 988 (886-1,090) | 1,333 (1,196-1472) | Jul | 894 (799-982) | 1,210 (1,081-1,330) |
| Feb | 2,189 (1,923-2,486) | 2,978 (2,615-3,382) | Aug | 518 (459-570) | 704 (624-775) | 422 (374-464) | 570 (505-628) | Aug | 470 (417-517) | 637 (565-701) |
| Mar | 3,398 (2,985-3,779) | 4,604 (4,044-5,121) | Sep | 690 (602-774) | 941 (821-1,055) | 240 (211-270) | 325 (285-366) | Sep | 465 (406-522) | 633 (553-710) |
| Apr | 1,006 (893-1,121) | 1,362 (1,208-1,518) | Oct | 1186 (1,054-1,308) | 1,617 (1,437-1,784) | 321 (278-363) | 435 (377-492) | Oct | 753 (666-835) | 1,026 (907-1,138) |
| May | 1,422 (1290-1,551) | 1,931 (1,751-2,108) | Nov | 902 (801-993) | 1,230 (1,093-1,355) | 212 (187-236) | 287 (254-320) | Nov | 557 (494-615) | 759 (673-837) |
| Jun | 1,331 (1,203-1,451) | 1,813 (1,638-1,977) | Dec | 1,439 (1,288-1,588) | 1,958 (1,753-2,162) | 406 (357-456) | 550 (484-619) | Dec | 922 (823-1,022) | 1,254 (1,119-1,391) |
| Jul | 799 (711-874) | 1,086 (9,66-1,189) | Jan | 1,037 (923-1,155) | 1,407 (1,251-1,567) | 492 (431-548) | 669 (587-746) | Jan | 927 (814-1,083) | 1,262 (1,108-1,475) |
| Aug | 518 (459-570) | 704 (624-775) | Feb | 1,742 (1,565-1,948) | 2,362 (2,120-2,643) | 2,703 (2,403-3,068) | 3,672 (3,262-4,169) | Feb | 2,212 (1,963-2,501) | 3,004 (2,665-3,398) |
| Sep | 690 (602-774) | 941 (821-1,055) | Mar | 6,487 (5,864-7,207) | 8,773 (7,927-9,749) | 5,507 (4,859-6,188) | 7,476 (6,594-8,403) | Mar | 5,131 (4,570-5,725) | 6,951 (6,188-7,758) |
| Oct | 1,186 (1,054-1,308) | 1,617 (1,437-1784) | Apr | 2,564 (2,363-2,816) | 3,471 (3,198-3,814) | 1,819 (1,619-2,020) | 2,464 (2,193-2,739) | Apr | 1,796 (1,625-1,986) | 2,432 (2,200-2,690) |
| Nov | 902 (801-993) | 1,230 (1,093-1,355) | May | 2,555 (2,348-2,791) | 3,445 (3,164-3,764) | 1,999 (1,783-2,207) | 2,708 (2,415-2,990) | May | 1,992 (1,807-2,183) | 2,695 (2,443-2,954) |
| Dec | 1,439 (1,288-1,588) | 1,958 (1,753-2,162) | Jun | 1,776 (1,606-1,950) | 2,400 (2,170-2,636) | 1,236 (1,088-1,379) | 1,675 (1,475-1,870) | Jun | 1,448 (1,299-1,593) | 1,963 (,1761-2,161) |

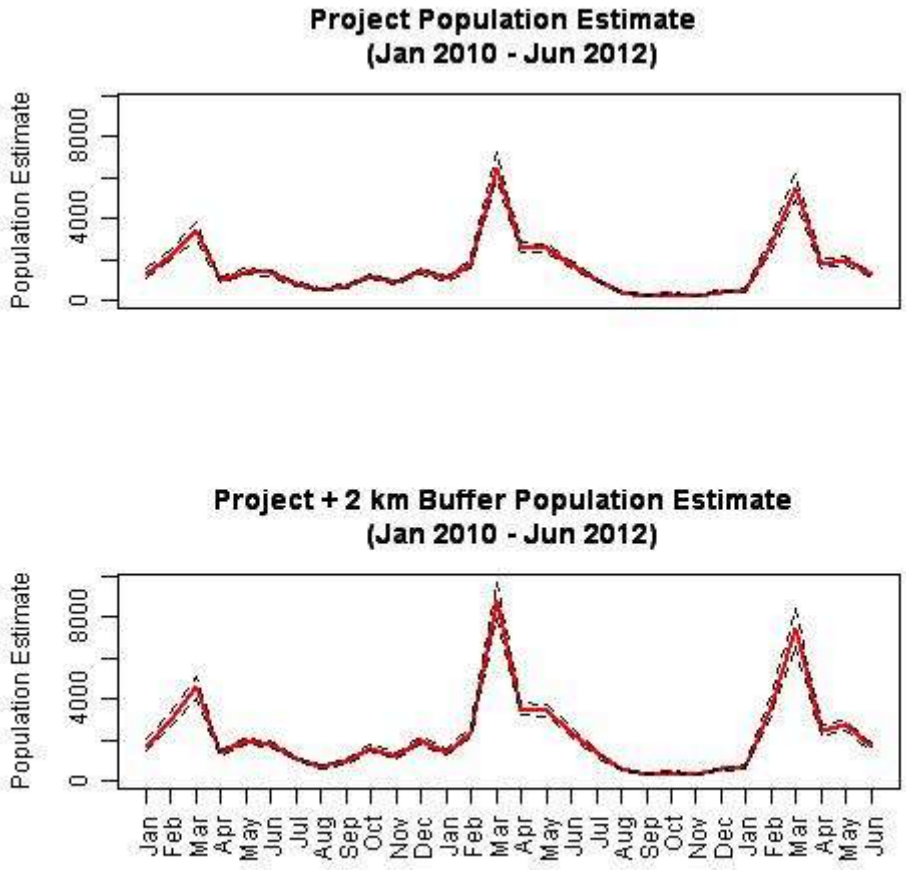



**Figure 3.29** Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Dogger Bank Teesside A and B***

3.2.54 In 2010, the monthly baseline population estimates of black-legged kittiwake within the Dogger Bank Teesside A and B areas peaked between February and March. (highest value in March of 5,594 birds, 90% CIs = 4,899-6,246). Population estimates peaked during March in both 2010/11 (11,376 birds, 90% CIs = 10,196-12,671) and 2011/12 (9,047 birds, 90% CIs = 7,976-10,170) periods (Table 3.24; Figure 3.30). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in this area (Tables 2.3 and 3.24). Mean populations across the two and a half years of survey peaked in March, with a mean of 8,673 birds (90 % CIs = 7,690-9,696) in the project and 11,806 birds (90% CIs = 10,462-13,204) present in the project and buffer.

3.2.55 The baseline population estimates for black-legged kittiwake in 2010, 2010/11 and 2011/12 were higher than those derived from ESAS data. ESAS population estimates were at their highest during the combined period of October to March period, with a value of 1,845 birds and at their lowest during the combined period of April to July (Table 3.9).

**Table 3.24** Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 1,985 (1,716-2,460) | 2,708 (2,341-3,358) | Jul | 1,220 (1,080-1,342) | 1,657 (1,476-1,832) | 1,564 (1,391-1,734) | 2,126 (1,887-2,358) | Jul | 1,392 (1,235-1,538) | 1,892 (1,681-2,095) |
| Feb | 3,576 (3,126-4,059) | 4,876 (4,260-5,533) | Aug | 790 (695-873) | 1,080 (952-1,192) | 663 (581-732) | 902 (787-997) | Aug | 726 (638-803) | 991 (870-1094) |
| Mar | 5,594 (4,899-6,246) | 7,613 (6,664-8,497) | Sep | 1,055 (917-1,184) | 1,442 (1,253-1,621) | 376 (326-426) | 513 (443-580) | Sep | 716 (621-805) | 978 (848-1,101) |
| Apr | 1,659 (1,456-1,855) | 2,257 (1,978-2,525) | Oct | 1,948 (1,723-2,153) | 2,663 (2,352-2,938) | 544 (468-618) | 740 (637-842) | Oct | 1,246 (1,096-1,386) | 1,701 (1,495-1,890) |
| May | 2,295 (2,062-2,518) | 3,130 (2,815-3,438) | Nov | 1,520 (1,343-1,682) | 2,076 (1,835-2,297) | 362 (318-406) | 493 (433-553) | Nov | 941 (831-1,044) | 1,284 (1,134-1,425) |
| Jun | 2,163 (1,940-2,374) | 2,948 (2,659-3,245) | Dec | 2,483 (2,214-2,747) | 3,378 (3,016-3,743) | 720 (631-815) | 980 (859-1,110) | Dec | 1,601 (1,422-1,781) | 2,179 (1,938-2,426) |
| Jul | 1,220 (1,080-1,342) | 1,657 (1,476-1,832) | Jan | 1,922 (1,706-2,143) | 2,619 (2,325-2,914) | 854 (746-957) | 1,166 (1,018-1,307) | Jan | 1,587 (1,389-1,853) | 2,164 (,1895-2,526) |
| Aug | 790 (695-873) | 1,080 (952-1,192) | Feb | 3,242 (2,905-3,630) | 4,412 (3,956-4,956) | 4,826 (4,256-5,515) | 6,571 (5,797-7,511) | Feb | 3,881 (3,429-4,401) | 5,286 (4,671-6,000) |
| Sep | 1,055 (917-1,184) | 1,442 (1,253-1,621) | Mar | 11,376 (10,196-12,671) | 15,465 (13,866-17,229) | 9,047 (7,976-10,170) | 12,341 (10,856-13,887) | Mar | 8,673 (7,690-9,696) | 11,806 (10,462-13,204) |
| Oct | 1,948 (1,723-2,153) | 2,663 (2,352-2,938) | Apr | 4,211 (3,839-4,666) | 5,752 (5,227-6,364) | 3,012 (2,660-3,365) | 4,110 (3,613-4,582) | Apr | 2,961 (2,652-3,296) | 4,040 (3,606-4,491) |
| Nov | 1,520 (1,343-1,682) | 2,076 (1,835-2,297) | May | 4,146 (3,788-4,560) | 5,640 (5,161-6,215) | 3,234 (2,863-3,594) | 4,413 (3,910-4,901) | May | 3,225 (2,905-3,558) | 4,394 (3,962-4,851) |
| Dec | 2,483 (2,214-2,747) | 3,378 (3,016-3,743) | Jun | 2,834 (2,539-3,131) | 3,850 (3,467-4,253) | 1,996 (1,747-2,243) | 2,720 (2,383-3,058) | Jun | 2,331 (2,076-2,583) | 3,172 (2,836-3,519) |

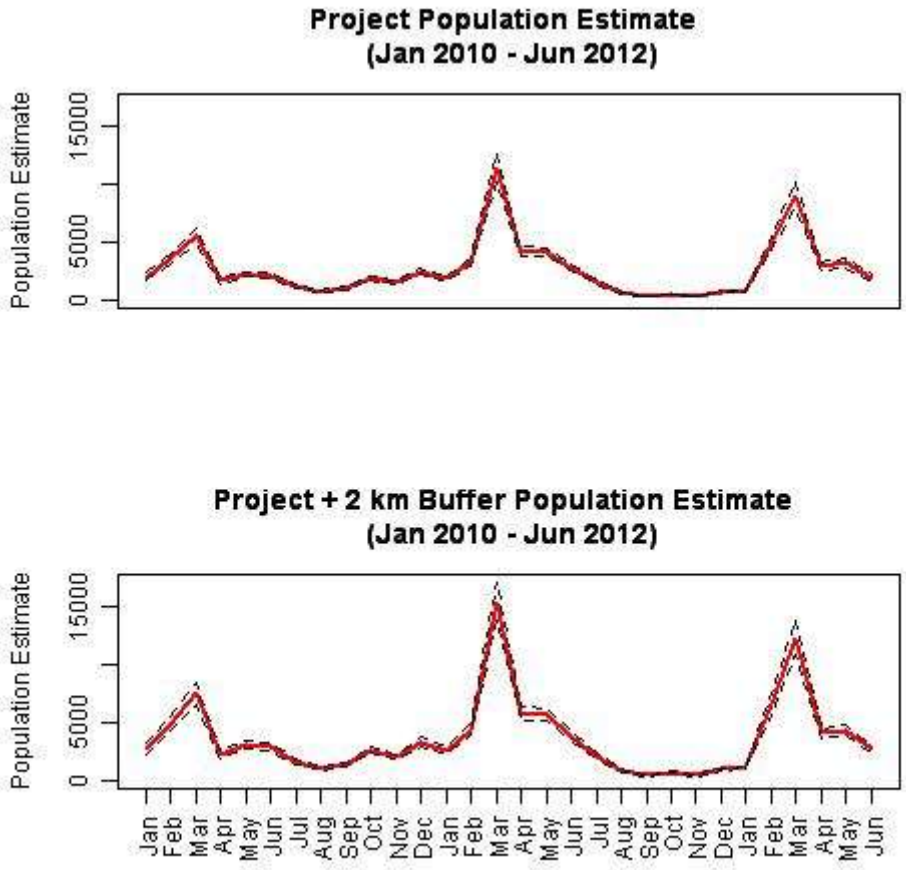



**Figure 3.30** Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Black-headed gull* Chroicocephalus ridibundus**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list (Eaton* et al. *2009).*

VALUE OF RECEPTOR-VERY HIGH

3.2.56 Black-headed gull in the Greater North Sea OSPAR region is a breeding feature of five SPAs, a wintering feature of one SPA and a passage feature of two SPAs (Appendix 1). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.57 Black-headed gulls were present in the Dogger Bank Zone in every month apart from June and December. During the spring, an average of four birds was estimated to occur in the Dogger Bank Teesside A area, four birds in the Dogger Bank Teesside B area and eight birds in the Dogger Bank Teesside A and B areas. During the autumn, an average of 14 birds was estimated to occur in the Dogger Bank Teesside A area, 14 birds in the Dogger Bank Teesside B area and 28 birds in the Dogger Bank Teesside A and B areas (Table 3.7). These numbers were not assessed to be nationally or internationally important (Tables 2.3 and 3.7).

***Little gull* Hydrocoloeus minutus**

*SPA/Ramsar/SSSI feature; EU Birds Directive Annex 1 species; Wildlife & Countryside Act 1981 Schedule 1 species; Birds of Conservation Concern Amber list* (Eaton *et al*. 2009).

VALUE OF RECEPTOR-VERY HIGH

3.2.58 Little gull is a breeding feature of one SPA, a wintering feature of four SPAs and a passage feature of eight SPAs in the Greater North Sea OSPAR region (Appendix 1). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.59 Little gull were present in the Dogger Bank Zone in October only, when an average of 19 birds was estimated to occur in the Dogger Bank Teesside A area, 19 birds in the Dogger Bank Teesside B area and 38 birds in the Dogger Bank Teesside A and B areas (Table 3.7). These numbers were not assessed to nationally or internationally important (Tables 2.3 and 3.7).

***Common gull* Larus canus**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al*. 2009).

VALUE OF RECEPTOR-VERY HIGH

3.2.60 Common gull is a breeding feature of two SPAs, a wintering feature of six SPAs and a passage feature of two SPAs in the Greater North Sea OSPAR region (Appendix 1). Therefore, the value of this receptor is assessed as very high (Table 2.6).

Common gull were present in the Dogger Bank Zone in every month apart from June and December. During the spring, an estimated five birds occurred in the Dogger Bank Teesside A area, five birds in the Dogger Bank Teesside B area, and ten birds in the Dogger Bank Teesside A and B areas. During the autumn, an estimated 13 birds occurred in the Dogger Bank Teesside A area, 14 birds in the Dogger Bank Teesside B area and 28 birds in the Dogger Bank Teesside A and B areas (Table 3.7). These numbers were not assessed to nationally or internationally important (Tables 2.3 and 3.7).

***Lesser black-backed gull* Larus fuscus**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.2.61 Lesser black-backed gull is a breeding feature of 21 SPAs, a wintering feature of two SPAs and a passage feature of three SPAs in the Greater North Sea OSPAR region

(Appendix 1). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.62 Numbers in the Dogger Bank Zone as a whole almost surpassed the 1% threshold for populations of national importance in the 2010 breeding season (Tables 2.3, 3.4, 3.5 and 3.6), though some of those present at this time may be *intermedius* birds from the Scandinavian breeding population, and not part of the British breeding population.

***Dogger Bank Teesside A***

3.2.63 In 2010 the monthly baseline population estimates of lesser black-backed gull within the Dogger Bank Teesside A area peaked between April and July (highest value in June with 201 birds, 90% CIs = 140-286). In 2010/11 and 2011/12 the populations were estimated to peak earlier in May, with 108 birds (90% CIs = 76-154) and 55 birds (90% CIs = 22-148) respectively. Population estimates were generally lower in 2011/12 than 2010/11 (Table 3.25; Figure 3.31). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A area (Tables 2.3 and 3.25). Mean populations across the two and a half years of survey peaked in May, with a mean of 112 birds (90 % CIs = 74-188) in the project and 154 birds (90% CIs = 102-258) present in the project and buffer.

3.2.64 The baseline population estimates for lesser black-backed gull in 2010 and 2010/11 and 2011/12 at their highest values were in the order of a magnitude larger than the value of six birds for the year as a whole derived from the ESAS database (Table 3.9).

3.2.65 On a monthly basis, the densities of lesser black-backed gull within the south-eastern and south south-eastern areas (which contain Dogger Bank Teesside A and B) of the Dogger Bank Zone were higher than elsewhere within the Zone (Figures 3.32, 3.33 and 3.34). Densities were particularly high in the Dogger Bank Teesside A area during the summer months.

**Table 3.25** Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 8 (4-13) | 11 (6-17) | Jul | 82 (51-123) | 113 (70-169) | 32 (20-55) | 43 (27-76) | Jul | 57 (35-89) | 78 (48-122) |
| Feb | 18 (11-27) | 24 (15-37) | Aug | 27 (14-51) | 37 (19-70) | 12 (7-26) | 17 (9-35) | Aug | 20 (10-38) | 27 (14-53) |
| Mar | 41 (25-65) | 56 (35-89) | Sep | 13 (5-29) | 18 (6-40) | 7 (4-16) | 10 (5-22) | Sep | 10 (4-23) | 14 (6-31) |
| Apr | 87 (58-134) | 118 (79-183) | Oct | 3 (1-9) | 4 (1-12) | 4 (2-8) | 5 (3-10) | Oct | 3 (1-8) | 4 (2-11) |
| May | 174 (124-263) | 238 (170-360) | Nov | 1 (0-5) | 1 (0-6) | 3 (2-5) | 4 (2-7) | Nov | 2 (1-5) | 3 (1-7) |
| Jun | 201 (140-286) | 275 (191-391) | Dec | 1 (0-6) | 2 (0-8) | 6 (3-11) | 8 (5-15) | Dec | 4 (2-8) | 5 (2-11) |
| Jul | 82 (51-123) | 113 (70-169) | Jan | 2 (0-6) | 2 (0-9) | 6 (4-11) | 9 (5-15) | Jan | 5 (3-10) | 7 (4-14) |
| Aug | 27 (14-51) | 37 (19-70) | Feb | 5 (1-15) | 7 (2-21) | 27 (14-48) | 36 (19-65) | Feb | 16 (9-30) | 22 (12-41) |
| Sep | 13 (5-29) | 18 (6-40) | Mar | 33 (17-59) | 45 (24-80) | 36 (23-69) | 49 (32-94) | Mar | 36 (22-64) | 50 (30-88) |
| Oct | 3 (1-9) | 4 (1-12) | Apr | 88 (58-121) | 120 (79-166) | 47 (25-114) | 65 (34-156) | Apr | 74 (47-123) | 101 (64-168) |
| Nov | 1 (0-5) | 1 (0-6) | May | 108 (76-154) | 148 (105-211) | 55 (22-148) | 75 (30-203) | May | 112 (74-188) | 154 (102-258) |
| Dec | 1 (0-6) | 2 (0-8) | Jun | 69 (45-102) | 94 (61-139) | 52 (13-139) | 71 (18-190) | Jun | 107 (66-176) | 147 (90-240) |

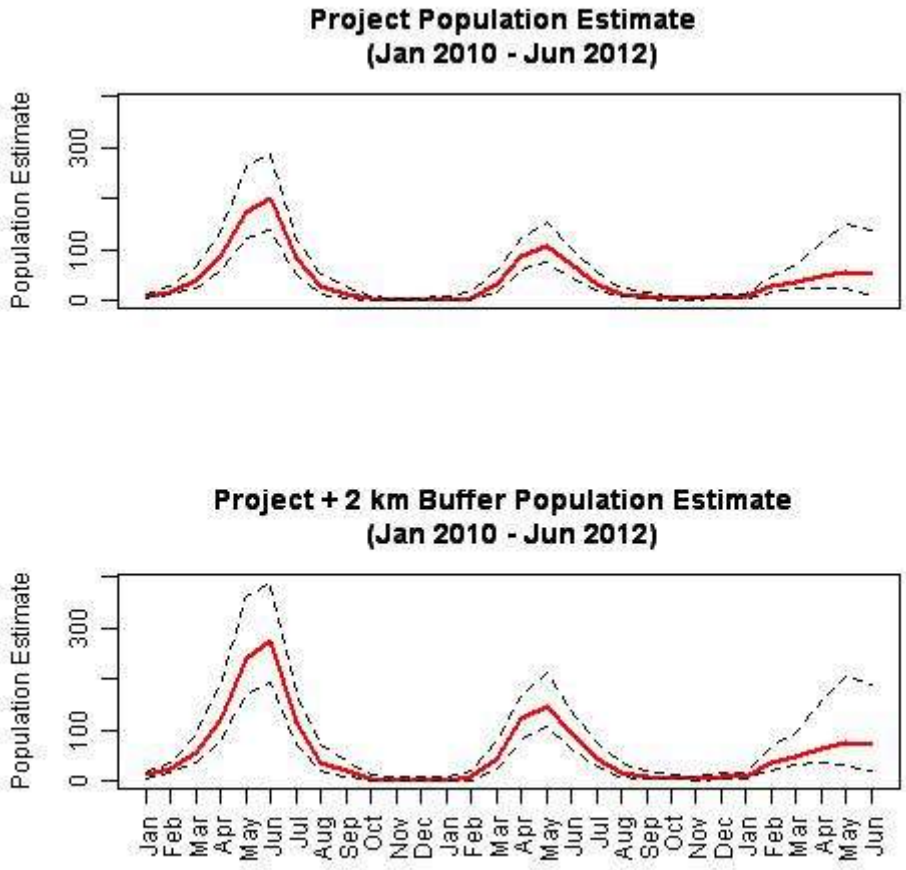



**Figure 3.31** Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

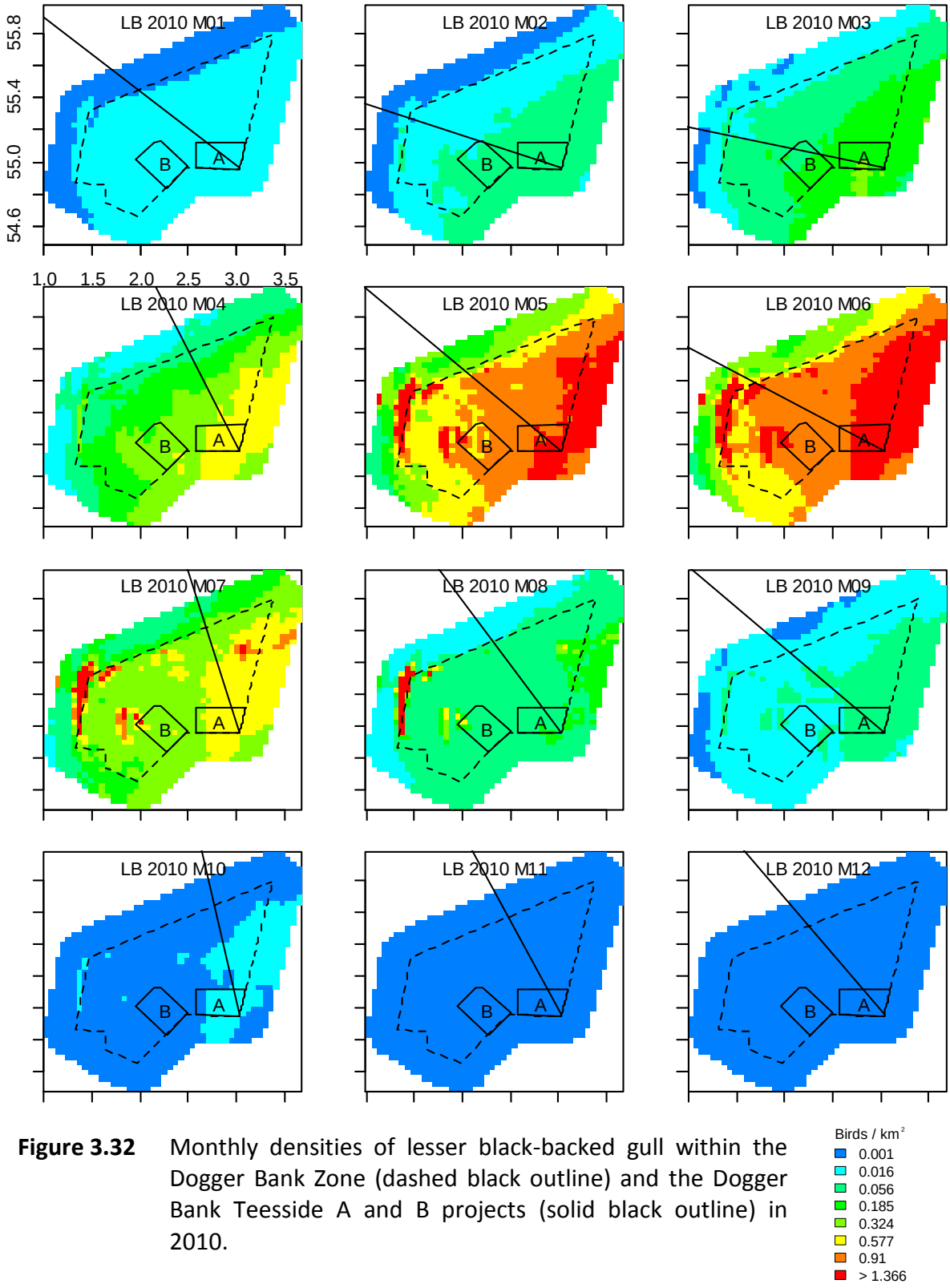



**Figure 3.32** Monthly densities of lesser black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

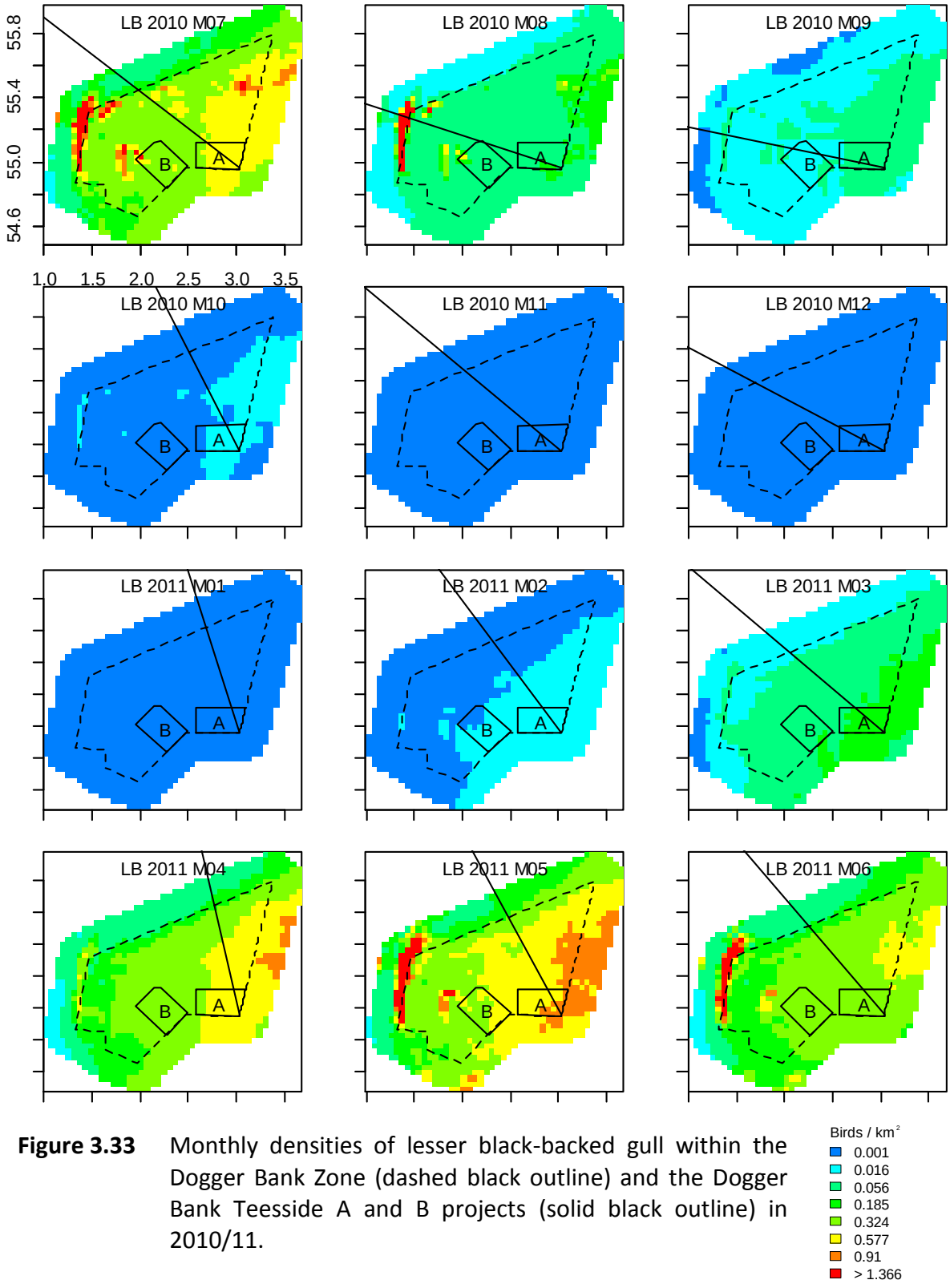



**Figure 3.33** Monthly densities of lesser black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

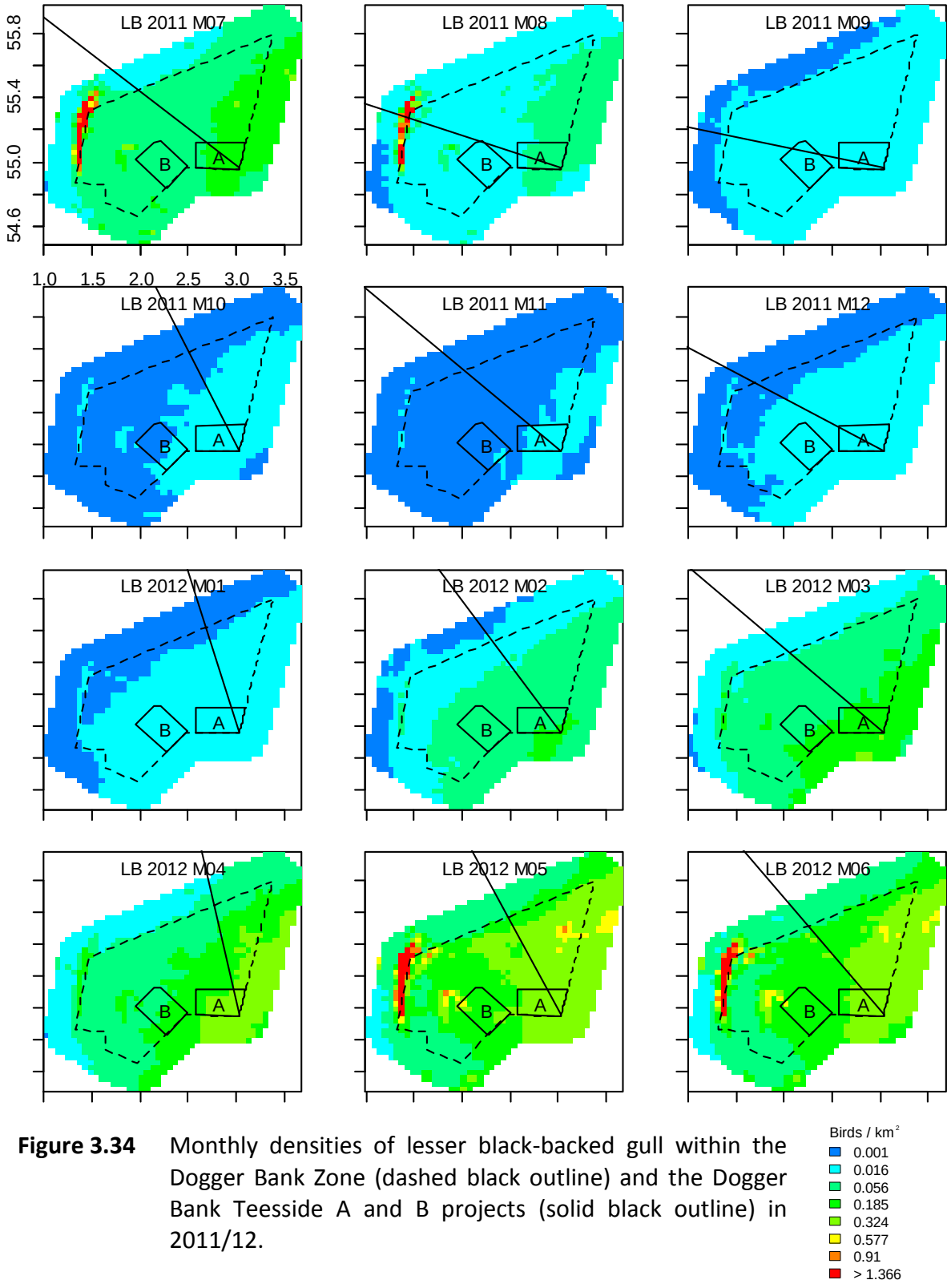



**Figure 3.34** Monthly densities of lesser black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

***Dogger Bank Teesside B***

3.2.66 In 2010, the monthly baseline population estimates of lesser black-backed gull within the Dogger Bank Teesside B area peaked between April and July (highest value in June with 160 birds, 90% CIs = 115-228). In 2010/11 and 2011/12 the populations were estimated to peak earlier, in May with 81 birds (90% CIs = 59-113) and 44 birds (90% CIs = 18-121), respectively. Population estimates were lower in 2011/12 than 2010/11 (Table 3.26; Figure 3.35). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B area (Tables 2.3 and 3.26). Mean populations across the two and a half years of survey peaked in May, with a mean of 89 birds (90 % CIs = 60-150) in the project and 120 birds (90% CIs = 81-204) present in the project and buffer.

3.2.67 The baseline population estimates for lesser black-backed gull in 2010, 2010/11 and 2011/12 at their highest values were an order of magnitude larger than the value of six birds for the year as a whole, derived from the ESAS database (Table 3.9).

**Table 3.26** Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 7 (4-12) | 9 (5-16) | Jul | 77 (50-117) | 104 (68-159) | 26 (16-43) | 35 (22-58) | Jul | 52 (33-80) | 70 (45-109) |
| Feb | 15 (9-23) | 20 (12-31) | Aug | 25 (13-48) | 34 (18-66) | 10 (6-21) | 13 (8-29) | Aug | 17 (9-35) | 24 (13-47) |
| Mar | 34 (21-55) | 46 (28-75) | Sep | 11 (4-25) | 15 (5-34) | 6 (3-13) | 8 (4-18) | Sep | 8 (3-19) | 11 (5-26) |
| Apr | 61 (39-98) | 83 (53-133) | Oct | 2 (1-7) | 3 (1-10) | 3 (1-6) | 4 (2-8) | Oct | 3 (1-7) | 3 (1-9) |
| May | 141 (102-217) | 191 (139-294) | Nov | 1 (0-4) | 1 (0-5) | 2 (1-4) | 3 (2-6) | Nov | 2 (1-4) | 2 (1-6) |
| Jun | 160 (115-228) | 218 (155-309) | Dec | 1 (0-4) | 1 (0-6) | 4 (2-8) | 6 (3-10) | Dec | 3 (1-6) | 4 (2-8) |
| Jul | 77 (50-117) | 104 (68-159) | Jan | 1 (0-5) | 1 (0-6) | 5 (3-9) | 7 (4-12) | Jan | 4 (2-8) | 6 (3-11) |
| Aug | 25 (13-48) | 34 (18-66) | Feb | 3 (1-10) | 4 (1-14) | 19 (11-35) | 25 (14-47) | Feb | 12 (7-23) | 17 (9-31) |
| Sep | 11 (4-25) | 15 (5-34) | Mar | 24 (13-46) | 33 (17-62) | 30 (18-61) | 41 (24-82) | Mar | 29 (17-54) | 40 (23-73) |
| Oct | 2 (1-7) | 3 (1-10) | Apr | 64 (42-86) | 87 (57-117) | 33 (18-77) | 45 (24-105) | Apr | 53 (33-87) | 71 (45-118) |
| Nov | 1 (0-4) | 1 (0-5) | May | 81 (59-113) | 110 (80-152) | 44 (18-121) | 59 (24-164) | May | 89 (60-150) | 120 (81-204) |
| Dec | 1 (0-4) | 1 (0-6) | Jun | 55 (37-79) | 74 (50-107) | 40 (11-107) | 54 (14-145) | Jun | 85 (54-138) | 115 (73-187) |

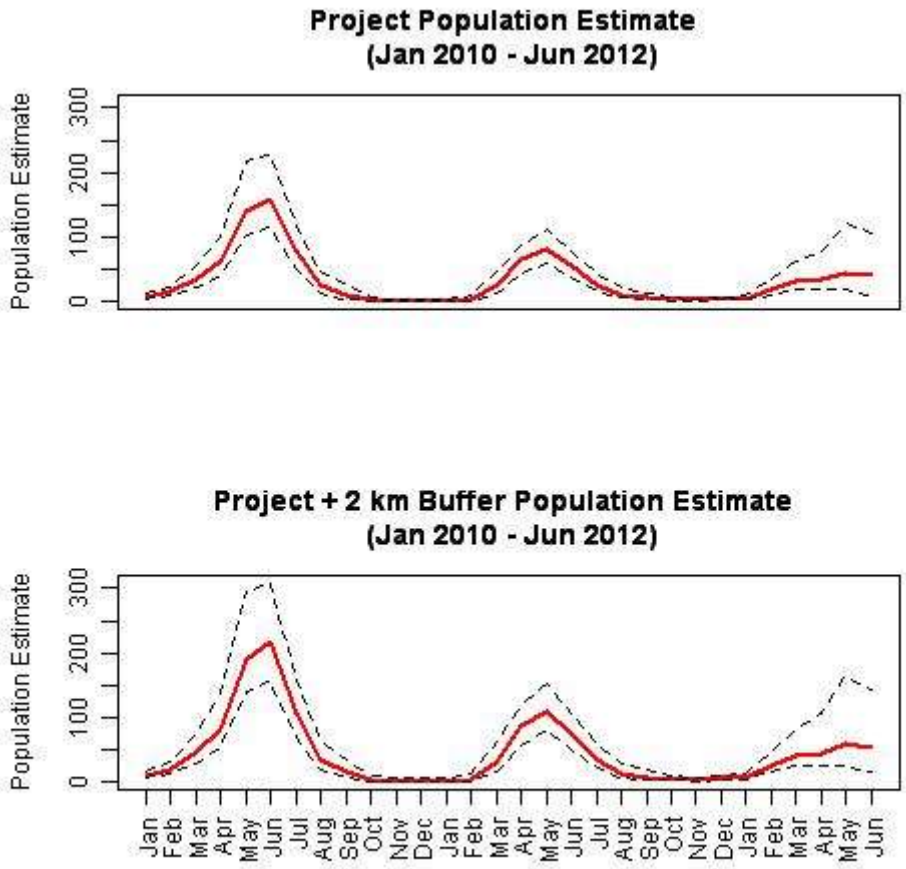



**Figure 3.35** Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Dogger Bank Teesside A and B***

3.2.68 In 2010, the monthly baseline population estimates of lesser black-backed gull within the Dogger Bank Teesside A and B areas peaked between April and July (highest value in June with 361 birds, 90% CIs = 254-514). In 2010/11 and 2011/12 the populations were estimated to peak earlier, in May, with 189 birds (90% CIs = 136-267) and 99 birds (90% CIs = 39-269) respectively. Population estimates were lower in 2011/12 than 2010/11 (Table 3.27; Figure 3.36). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B areas (Tables 2.3 and 3.27). Mean populations across the two and a half years of survey peaked in May, with a mean of 201 birds (90 % CIs = 134-339) in the project and 274 birds (90% CIs = 183-461) present in the project and buffer.

3.2.69 The baseline population estimates for lesser black-backed gull in 2010, 2010/11 and 2011/12 at their highest values were an order of magnitude larger than the value of 12 birds for the year as a whole, derived from the ESAS database (Table 3.9).

**Table 3.27** Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 15 (8-24) | 20 (11-31) | Jul | 159 (101-241) | 216 (138-327) | 58 (36-98) | 79 (49-133) | Jul | 108 (68-170) | 148 (93-230) |
| Feb | 32 (20-50) | 44 (27-69) | Aug | 52 (27-100) | 72 (37-135) | 22 (13-47) | 29 (17-64) | Aug | 37 (20-73) | 51 (27-100) |
| Mar | 75 (47-121) | 101 (63-162) | Sep | 24 (9-54) | 33 (12-73) | 13 (7-29) | 17 (9-40) | Sep | 19 (8-41) | 25 (11-56) |
| Apr | 148 (97-233) | 201 (132-322) | Oct | 5 (1-16) | 7 (2-22) | 6 (3-14) | 9 (5-19) | Oct | 6 (2-15) | 8 (3-20) |
| May | 315 (226-480) | 431 (309-655) | Nov | 2 (0-8) | 3 (0-11) | 5 (3-10) | 7 (4-13) | Nov | 3 (2-9) | 5 (2-12) |
| Jun | 361 (254-514) | 498 (346-701) | Dec | 2 (0-10) | 3 (1-14) | 11 (6-19) | 14 (8-25) | Dec | 6 (3-14) | 9 (4-20) |
| Jul | 159 (101-241) | 216 (138-327) | Jan | 3 (0-11) | 4 (1-15) | 11 (6-20) | 15 (9-27) | Jan | 10 (5-18) | 13 (7-25) |
| Aug | 52 (27-100) | 72 (37-135) | Feb | 8 (2-25) | 11 (3-35) | 45 (25-82) | 61 (34-112) | Feb | 29 (16-53) | 39 (21-72) |
| Sep | 24 (9-54) | 33 (12-73) | Mar | 57 (30-105) | 78 (41-142) | 66 (41-130) | 90 (56-177) | Mar | 66 (39-118) | 90 (53-161) |
| Oct | 5 (1-16) | 7 (2-22) | Apr | 152 (100-208) | 210 (137-284) | 80 (43-191) | 110 (59-261) | Apr | 127 (80-210) | 174 (109-289) |
| Nov | 2 (0-8) | 3 (0-11) | May | 189 (136-267) | 256 (185-361) | 99 (39-269) | 135 (54-367) | May | 201 (134-339) | 274 (183-461) |
| Dec | 2 (0-10) | 3 (1-14) | Jun | 124 (82-181) | 169 (109-247) | 91 (24-245) | 124 (32-333) | Jun | 192 (120-313) | 264 (162-427) |

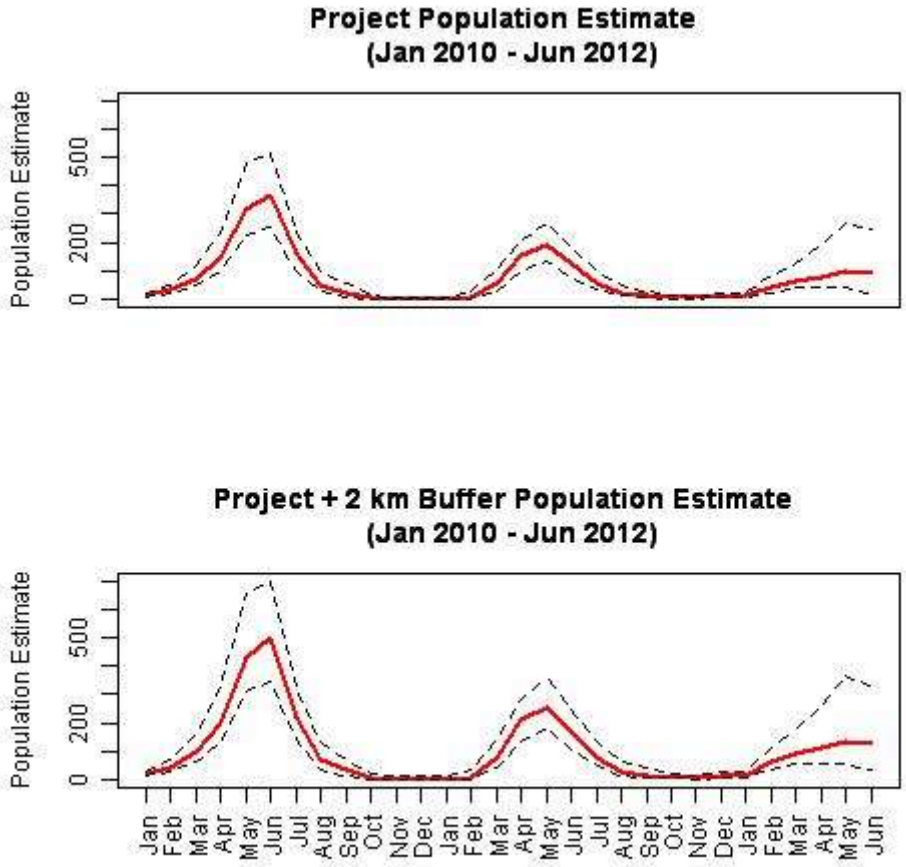



**Figure 3.36** Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Herring gull* Larus argentatus**

*SPA/Ramsar/SSSI feature; UK BAP species; Birds of Conservation Concern Red list* (Eaton *et al*. 2009).

VALUE OF RECEPTOR-VERY HIGH

3.2.70 Herring gull is a breeding feature of 30 SPAs, a wintering feature of two SPAs and a passage feature of two SPAs in the Greater North Sea OSPAR region (Appendix 1). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.71 Herring gull were present in the Dogger Bank Zone between October and May, when an average of 28 birds was estimated to occur in the Dogger Bank Teesside A area, 29 birds in the Dogger Bank Teesside B area, and 58 birds in the Dogger Bank Teesside A and B areas (Table 3.7). These numbers were not assessed to be nationally or internationally important (Table 2.3).

***Great black-backed gull* Larus marinus**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.2.72 Great black-backed gull is a breeding feature of 17 SPAs and a wintering feature of two SPAs in the Greater North Sea OSPAR region (Appendix 1). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.73 Numbers in the Dogger Bank Zone as a whole surpassed the 1% breeding and winter thresholds for populations of national importance (Tables 2.3, 3.4, 3.5 and 3.6). There may have been a high proportion of non-breeders present in the breeding season, as the Dogger Bank Zone is beyond the foraging range of any protected breeding site for the species.

***Dogger Bank Teesside A***

3.2.74 In 2010, the monthly baseline population estimates of great black-backed gull within the Dogger Bank Teesside A area peaked in January, February and December (highest value in January with 155 birds, 90% CIs = 118-188). Similarly, the population estimates peaked in January (113 birds, 90% CIs = 87-146) during the 2010/11 period and peaked in February (81 birds, 90% CIs = 56-110) during the 2011/12 period (Table 3.28; Figure 3.37). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A area (Tables 2.3 and 3.28). Mean populations across the two and a half years of survey peaked in January, with a mean of 107 birds (90 % CIs = 81-133) in the project and 146 birds (90% CIs = 111-182) present in the project and buffer.

3.2.75 The baseline monthly population estimates for great black-backed gull in 2010, 2010/11 and 2011/12 at their highest values were in the order of a magnitude larger than the value of six birds for the year as a whole derived from the ESAS database (Table 3.9).

3.2.76 Highest densities of great black-backed gull occurred in the south-western areas of the Dogger Bank Zone during the winter months. Consequently, the western borders of Dogger Bank Teesside B tended to hold higher densities of this species than Dogger Bank Teesside A during those months (Figures 3.38, 3.39 and 3.40).

**Table 3.28** Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 155 (118-188) | 212 (162-257) | Jul | 9 (5-14) | 13 (7-20) | 18 (9-26) | 25 (12-36) | Jul | 13 (7-20) | 19 (9-28) |
| Feb | 97 (69-127) | 133 (95-174) | Aug | 10 (5-16) | 14 (8-22) | 17 (9-25) | 23 (12-35) | Aug | 13 (7-21) | 19 (10-28) |
| Mar | 54 (36-75) | 75 (49-103) | Sep | 17 (9-29) | 24 (12-40) | 19 (10-28) | 26 (13-39) | Sep | 18 (9-29) | 25 (12-39) |
| Apr | 33 (20-48) | 45 (27-66) | Oct | 27 (16-40) | 37 (22-55) | 23 (14-33) | 32 (19-45) | Oct | 25 (15-37) | 35 (21-50) |
| May | 20 (11-29) | 27 (16-41) | Nov | 50 (34-68) | 69 (47-93) | 30 (20-41) | 42 (28-57) | Nov | 40 (27-55) | 55 (37-75) |
| Jun | 13 (7-21) | 18 (10-29) | Dec | 104 (76-137) | 143 (104-188) | 52 (36-67) | 71 (49-92) | Dec | 78 (56-102) | 107 (77-140) |
| Jul | 9 (5-14) | 13 (7-20) | Jan | 113 (87-146) | 155 (119-201) | 51 (39-65) | 70 (54-90) | Jan | 107 (81-133) | 146 (111-182) |
| Aug | 10 (5-16) | 14 (8-22) | Feb | 111 (89-143) | 153 (122-195) | 81 (56-110) | 111 (77-151) | Feb | 97 (72-127) | 132 (98-173) |
| Sep | 17 (9-29) | 24 (12-40) | Mar | 109 (82-145) | 149 (112-198) | 69 (47-96) | 95 (64-132) | Mar | 77 (55-105) | 106 (75-144) |
| Oct | 27 (16-40) | 37 (22-55) | Apr | 74 (50-101) | 102 (69-139) | 60 (36-85) | 83 (50-117) | Apr | 56 (35-78) | 77 (49-107) |
| Nov | 50 (34-68) | 69 (47-93) | May | 41 (25-55) | 56 (34-76) | 38 (21-56) | 52 (29-78) | May | 33 (19-47) | 45 (26-65) |
| Dec | 104 (76-137) | 143 (104-188) | Jun | 24 (12-34) | 33 (17-46) | 20 (9-34) | 28 (13-47) | Jun | 19 (10-29) | 26 (13-41) |

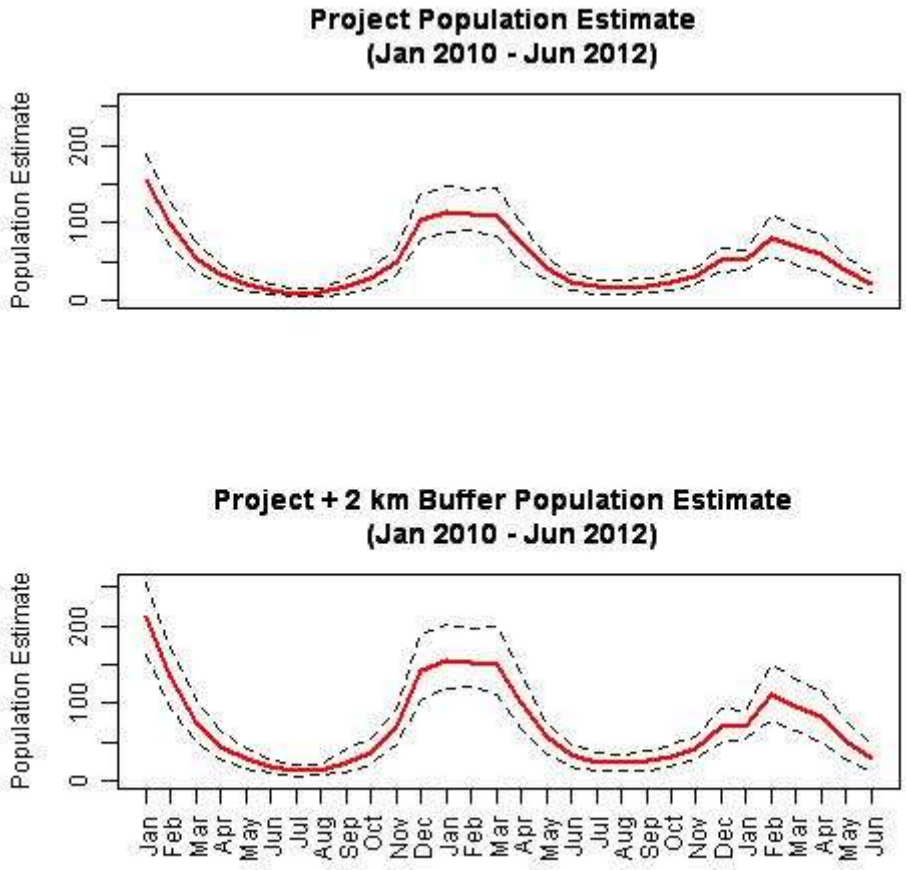



**Figure 3.37** Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11, 2011/12.

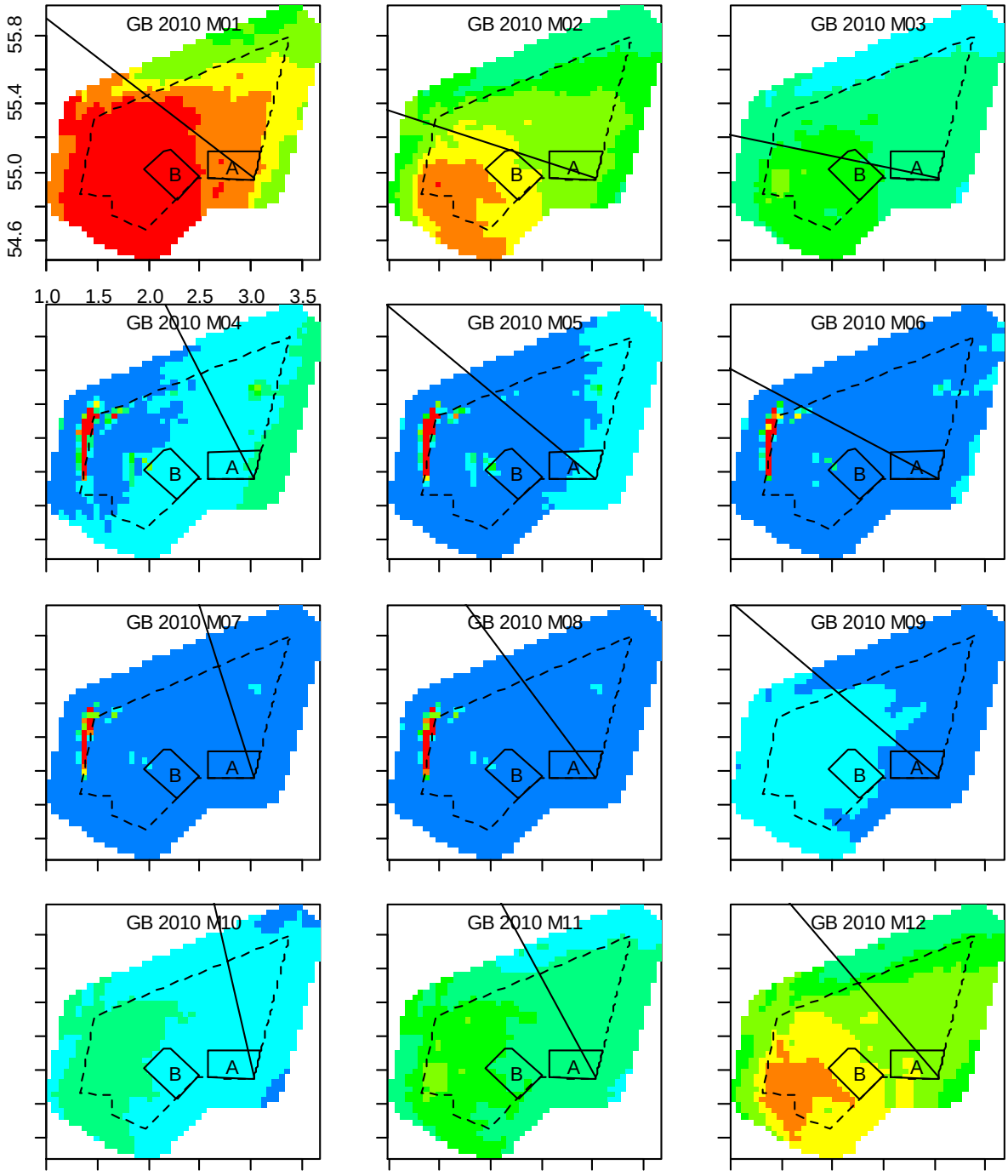



**Figure 3.38** Monthly densities of great black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

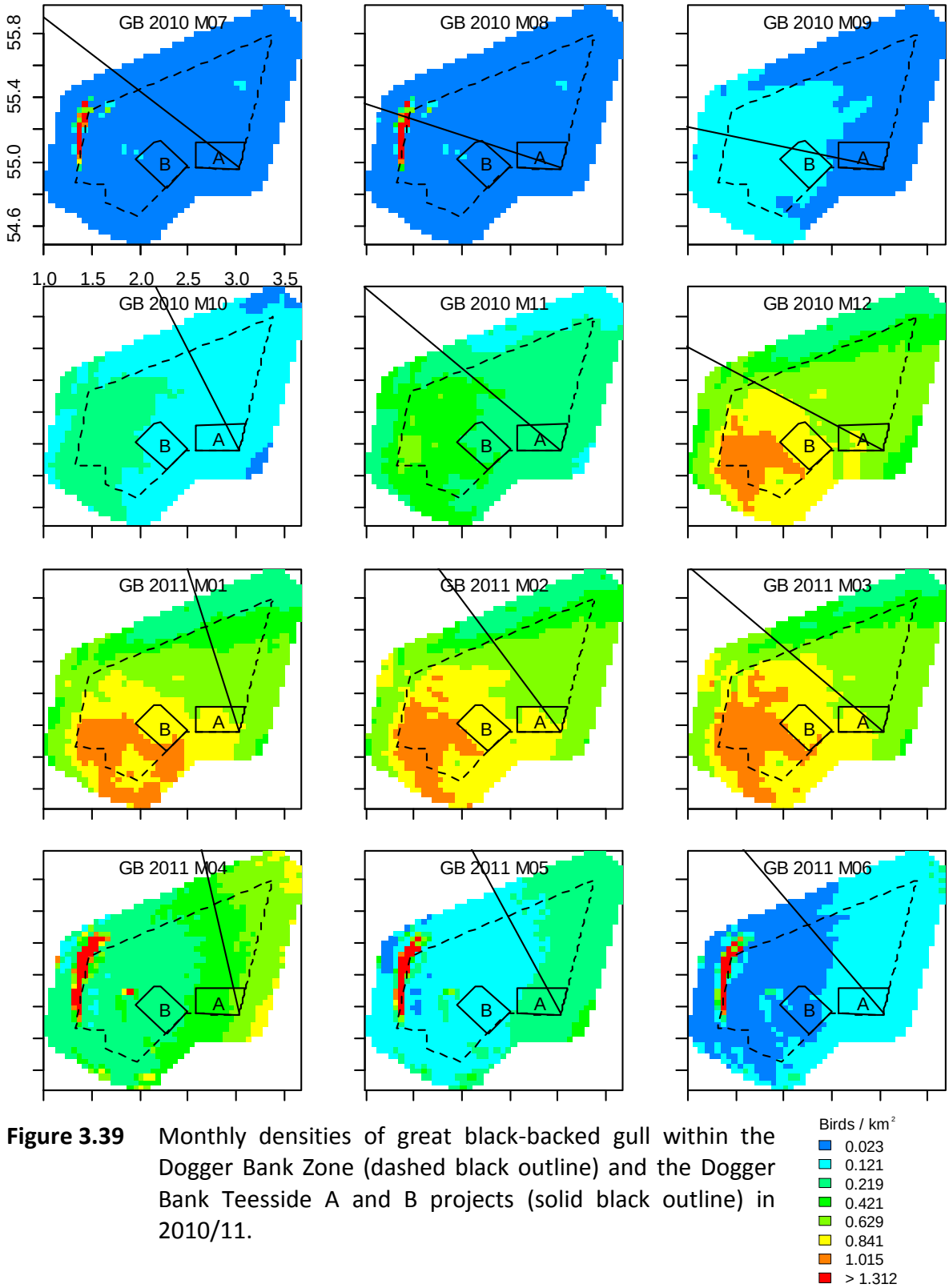



**Figure 3.39** Monthly densities of great black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

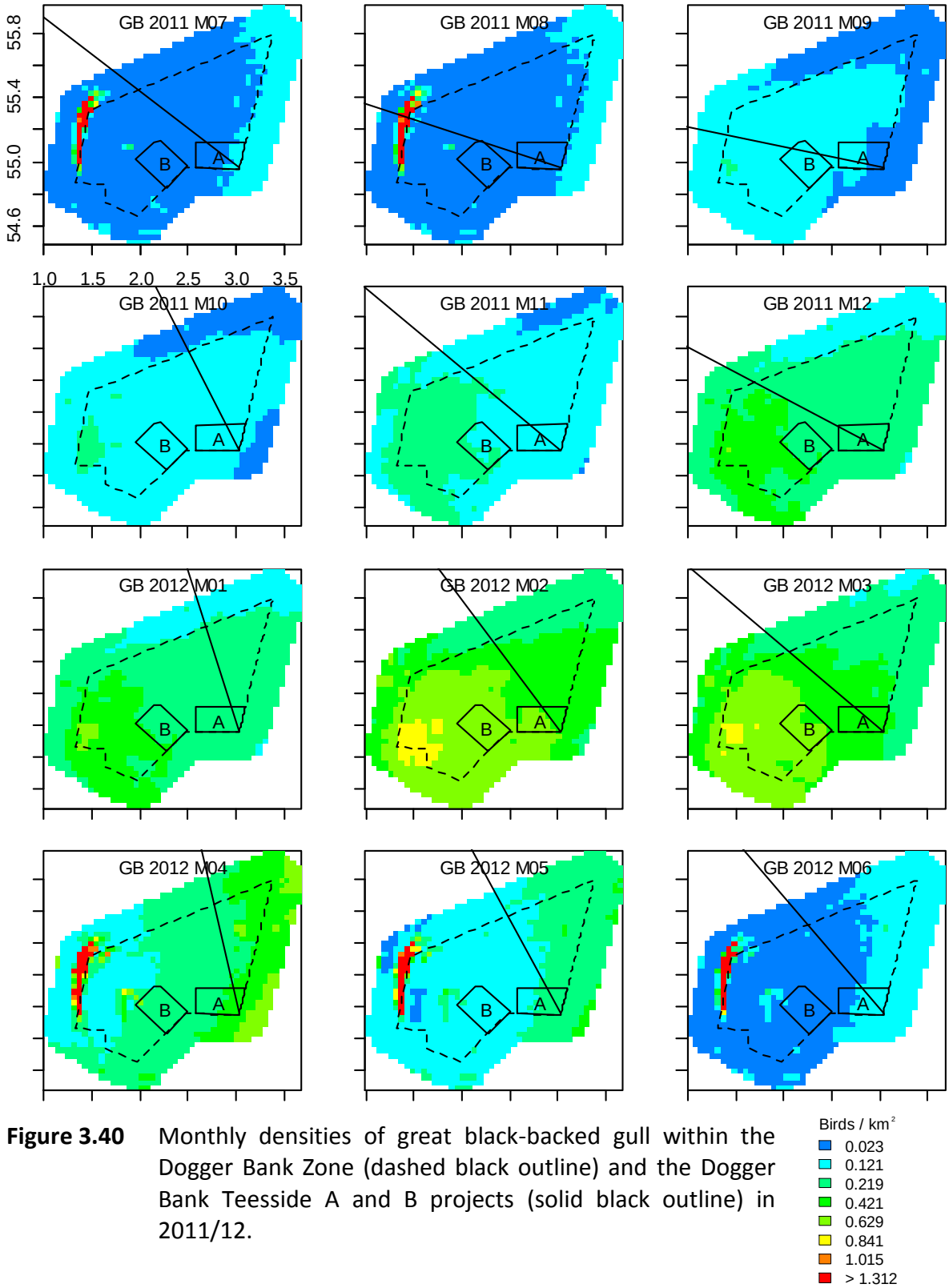



**Figure 3.40** Monthly densities of great black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

***Dogger Bank Teesside B***

3.2.77 In 2010, the monthly baseline population estimates of great black-backed gull within the Dogger Bank Teesside B area peaked in January, February and December (highest value in January with 204 birds, 90% CIs = 161-239). The population estimates followed a similar trend in 2010/11 and 2011/12 periods. Populations peaked in March (132 birds, 90% CIs = 100-172) and February (95 birds, 90% CIs = 70-127), respectively (Table 3.29; Figure 3.41). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B area (Tables 2.3 and 3.29). Mean populations across the two and a half years of survey peaked in January, with a mean of 132 birds (90 % CIs = 104-158) in the project and 178 birds (90% CIs = 140-214) present in the project and buffer.

3.2.78 The baseline monthly population estimates for great black-backed gull in 2010, 2010/11 and 2011/12 at their highest values were an order of magnitude larger than the value of six birds for the year as a whole derived from the ESAS database (Table 3.9).

**Table 3.29** Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 204 (161-239) | 277 (217-324) | Jul | 8 (4-14) | 11 (6-19) | 14 (7-22) | 19 (9-30) | Jul | 11 (6-18) | 15 (8-24) |
| Feb | 124 (87-157) | 167 (118-212) | Aug | 9 (5-15) | 13 (7-20) | 14 (7-21) | 18 (9-28) | Aug | 12 (6-18) | 16 (8-24) |
| Mar | 69 (46-92) | 93 (62-125) | Sep | 22 (12-37) | 30 (16-50) | 24 (13-36) | 32 (17-49) | Sep | 23 (12-37) | 31 (16-50) |
| Apr | 27 (16-39) | 37 (22-52) | Oct | 35 (21-51) | 47 (28-69) | 29 (17-41) | 39 (23-55) | Oct | 32 (19-46) | 43 (26-62) |
| May | 17 (9-27) | 23 (12-36) | Nov | 63 (43-83) | 85 (57-112) | 38 (25-49) | 51 (34-66) | Nov | 50 (34-66) | 68 (46-89) |
| Jun | 11 (6-19) | 15 (8-25) | Dec | 126 (92-164) | 170 (124-221) | 62 (44-79) | 83 (59-108) | Dec | 94 (68-122) | 127 (92-164) |
| Jul | 8 (4-14) | 11 (6-19) | Jan | 130 (103-159) | 175 (138-215) | 62 (47-77) | 83 (64-104) | Jan | 132 (104-158) | 178 (140-214) |
| Aug | 9 (5-15) | 13 (7-20) | Feb | 128 (101-157) | 173 (137-212) | 95 (70-127) | 129 (95-172) | Feb | 116 (86-147) | 156 (117-199) |
| Sep | 22 (12-37) | 30 (16-50) | Mar | 132 (100-172) | 178 (135-233) | 88 (59-118) | 119 (80-160) | Mar | 96 (68-127) | 130 (92-172) |
| Oct | 35 (21-51) | 47 (28-69) | Apr | 57 (39-75) | 77 (52-101) | 48 (26-66) | 64 (36-88) | Apr | 44 (27-60) | 59 (36-81) |
| Nov | 63 (43-83) | 85 (57-112) | May | 32 (18-44) | 43 (24-59) | 32 (15-47) | 43 (21-63) | May | 27 (14-39) | 36 (19-53) |
| Dec | 126 (92-164) | 170 (124-221) | Jun | 19 (10-28) | 25 (13-37) | 17 (7-28) | 22 (9-38) | Jun | 16 (8-25) | 21 (10-33) |

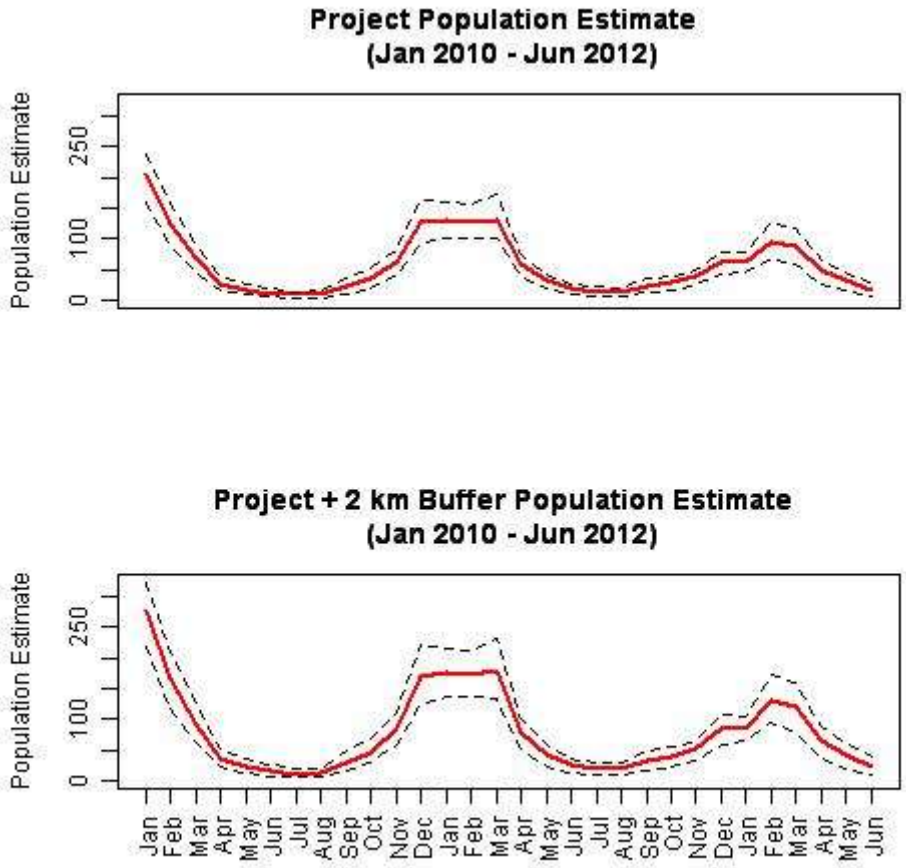



**Figure 3.41** Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Dogger Bank Teesside A and B***

3.2.79 In 2010, the monthly baseline population estimates of great black-backed gull within the Dogger Bank Teesside A and B areas peaked in January, February, March, November and December (highest value in January with 360 birds, 90% CIs = 279-427). The population estimates followed a similar trend in 2010/11 and 2011/12 periods. Populations peaked in January (243 birds, 90% CIs = 189-305) and February (177 birds, 90% CIs = 127-237), respectively (Table 3.30; Figure 3.42). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B areas (Table 2.3 and 3.30). Mean populations across the two and a half years of survey peaked in January, with a mean of 238 birds (90 % CIs = 185-291) in the project and 324 birds (90% CIs = 250-393) present in the project and buffer.

3.2.80 The baseline monthly population estimates for great black-backed gull in 2010, 2010/11 and 2011/12 at their highest values were in the order of a magnitude larger than the value of 12 birds for the year as a whole derived from the ESAS database (Table 3.9).

**Table 3.30** Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 360 (279-427) | 488 (375-571) | Jul | 18 (9-28) | 24 (13-39) | 32 (16-48) | 44 (22-65) | Jul | 25 (12-38) | 34 (17-52) |
| Feb | 221 (157-284) | 301 (213-382) | Aug | 20 (11-31) | 27 (15-43) | 30 (15-46) | 42 (20-62) | Aug | 25 (13-39) | 34 (17-52) |
| Mar | 123 (82-167) | 167 (111-229) | Sep | 40 (20-67) | 54 (27-91) | 43 (22-64) | 59 (30-87) | Sep | 41 (21-65) | 56 (29-89) |
| Apr | 60 (36-86) | 83 (50-115) | Oct | 62 (37-91) | 84 (50-125) | 52 (31-74) | 70 (42-99) | Oct | 57 (34-83) | 77 (46-112) |
| May | 37 (21-56) | 50 (28-76) | Nov | 113 (77-151) | 154 (104-205) | 68 (46-90) | 92 (62-123) | Nov | 91 (61-120) | 123 (83-164) |
| Jun | 24 (13-39) | 34 (18-53) | Dec | 230 (168-301) | 310 (227-409) | 113 (80-147) | 154 (109-200) | Dec | 172 (124-224) | 232 (168-304) |
| Jul | 18 (9-28) | 24 (13-39) | Jan | 243 (189-305) | 330 (257-415) | 113 (86-142) | 154 (117-193) | Jan | 238 (185-291) | 324 (250-393) |
| Aug | 20 (11-31) | 27 (15-43) | Feb | 240 (191-299) | 327 (263-409) | 177 (127-237) | 240 (172-323) | Feb | 212 (158-273) | 289 (216-371) |
| Sep | 40 (20-67) | 54 (27-91) | Mar | 241 (182-317) | 327 (248-431) | 158 (106-214) | 213 (144-294) | Mar | 174 (123-233) | 236 (168-318) |
| Oct | 62 (37-91) | 84 (50-125) | Apr | 131 (89-176) | 179 (126-240) | 108 (62-151) | 144 (85-205) | Apr | 100 (62-138) | 135 (87-187) |
| Nov | 113 (77-151) | 154 (104-205) | May | 73 (43-98) | 99 (58-134) | 69 (36-103) | 94 (51-141) | May | 60 (33-86) | 81 (45-117) |
| Dec | 230 (168-301) | 310 (227-409) | Jun | 43 (22-61) | 58 (29-82) | 37 (16-62) | 50 (22-84) | Jun | 35 (17-54) | 47 (23-73) |

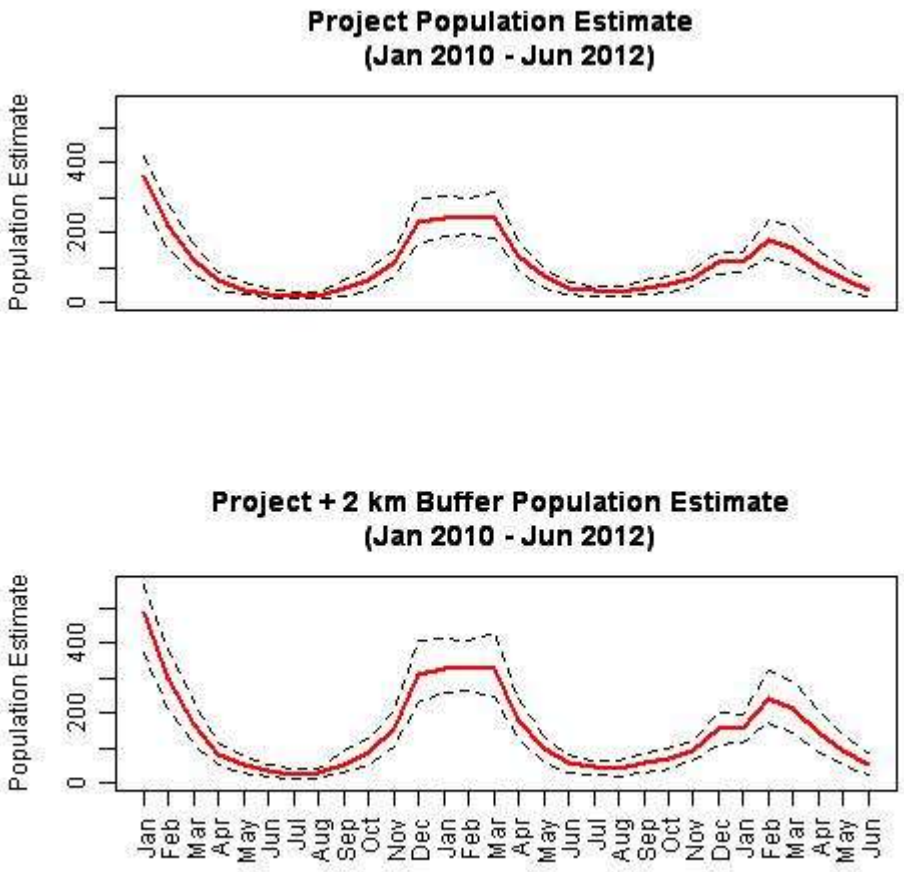



**Figure 3.42** Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Arctic tern* Sterna paradisaea**

*SPA/Ramsar/SSSI feature; EU Birds Directive Annex 1 species; Birds of Conservation Concern Amber list* (Eaton *et al*. 2009).

VALUE OF RECEPTOR-VERY HIGH

3.2.81 Arctic tern is a breeding feature of 56 SPAs and a passage feature of six SPAs in the Greater North Sea OSPAR region (Appendices 1 & 2). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.82 Arctic tern were present in the Dogger Bank Zone between May and September when an average of three birds was estimated to occur in the Dogger Bank Teesside A area, four birds in the Dogger Bank Teesside B area and seven birds in the Dogger Bank Teesside A and B areas (Table 3.7). These numbers were not assessed to be nationally or internationally important (Table 2.3).

***Common guillemot* Uria aalge**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.2.83 Common guillemot is a breeding feature of 26 SPAs, a wintering feature of 11 SPAs and a passage feature of one SPA in the Greater North Sea OSPAR region (Appendices 1 & 2). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.84 Numbers in the Dogger Bank Zone as a whole surpassed the 1% threshold for populations of national importance in the breeding season and the 1% threshold for international importance in the winter months (Tables 2.3, 3.4, 3.5 and 3.6).

***Dogger Bank Teesside A***

3.2.85 In 2010, the monthly baseline population estimates of common guillemot within the Dogger Bank Teesside A area peaked from January to April and October to December (highest value in December with 4,196 birds, 90% Cls = 3,915-4,553). The population estimates also increased during the winter months in 2010/11 and 2011/12. However, for both periods highest values occurred in April (6,546 birds in 2010/11, 90% Cls = 6,074-7,052 and 6,681 birds in 2011/12, 90% Cls = 6,146-7,176) (Table 3.31; Figure 3.43). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A area (Tables 2.3 and 3.31). Mean populations across the two and a half years of survey peaked in April, with a mean of 5,254 birds (90 % CIs = 4,850-5,652) in the project and 7,198 birds (90% CIs = 6,644-7,743) present in the project and buffer.

3.2.86 The baseline monthly population estimates derived for 2010, 2010/11 and 2011/12 were in general higher than estimates derived from ESAS data for common guillemot within the Dogger Bank Teesside A area. ESAS derived population estimates were at their highest over the combined period of September to October, with 2,178 birds, and at their lowest in August with 202 birds (Table 3.9).

3.2.87 Common guillemot density had a marked westerly distribution. On a monthly basis the densities of common guillemot within the south-eastern and south south-eastern areas of the Dogger Bank Zone (which contain Dogger Bank Teesside A and Dogger Bank Teesside B) tended to be lower than the far western boundaries of the Dogger Bank Zone (Figures 3.44, 3.45 and 3.46).

**Table 3.31** Modelled population estimates (and 90% confidence limits) for common guillemot for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/112.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 3,122 (2,874-3,418) | 4,251 (3,914-4,656) | Jul | 201 (184-223) | 276 (253-307) | 362 (331-399) | 497 (455-547) | Jul | 281 (258-311) | 386 (354-427) |
| Feb | 3,619 (3,354-3,940) | 4,949 (4,587-5,389) | Aug | 284 (250-320) | 392 (346-441) | 237 (210-268) | 327 (290-369) | Aug | 260 (230-294) | 359 (318-405) |
| Mar | 3,410 (3,152-3,682) | 4,667 (4,313-5,040) | Sep | 613 (532-682) | 848 (736-943) | 143 (126-160) | 198 (174-221) | Sep | 378 (329-421) | 523 (455-582) |
| Apr | 2,535 (2,331-2,727) | 3,464 (3,185-3,726) | Oct | 2,359 (2,160-2,563) | 3,230 (2,957-3,508) | 307 (274-335) | 419 (375-457) | Oct | 1,333 (1,217-1,449) | 1,825 (1,666-1,983) |
| May | 366 (335-403) | 503 (461-554) | Nov | 2,558 (2,365-2,764) | 3,499 (3,235-3,781) | 252 (228-273) | 344 (312-373) | Nov | 1,405 (1,297-1,519) | 1,922 (1,773-2,077) |
| Jun | 319 (292-352) | 437 (401-483) | Dec | 4,196 (3,915-4,553) | 5,726 (5,341-6,212) | 603 (548-664) | 824 (749-908) | Dec | 2,400 (2,231-2,608) | 3,275 (3,045-3,560) |
| Jul | 201 (184-223) | 276 (253-307) | Jan | 2,852 (2,648-3,111) | 3,898 (3,618-4,252) | 782 (708-851) | 1,070 (969-1,166) | Jan | 2,252 (2,076-2,460) | 3,073 (2,834-3,358) |
| Aug | 284 (250-320) | 392 (346-441) | Feb | 3,207 (2,985-3,482) | 4,386 (4,082-4,764) | 3,922 (3,537-4,281) | 5,356 (4,828-5,845) | Feb | 3,583 (3,292-3,901) | 4,897 (4,499-5,332) |
| Sep | 613 (532-682) | 848 (736-943) | Mar | 6,469 (6,051-6,975) | 8,862 (8,289-9,554) | 5,649 (5,236-6,053) | 7,739 (7,169-8,290) | Mar | 5,176 (4,813-5,570) | 7,089 (6,590-7,628) |
| Oct | 2,359 (2,160-2,563) | 3,230 (2,957-3,508) | Apr | 6,546 (6,074-7,052) | 8,974 (8,326-9,668) | 6,681 (6,146-7,176) | 9,156 (8,422-9,834) | Apr | 5,254 (4,850-5,652) | 7,198 (6,644-7,743) |
| Nov | 2,558 (2,365-2,764) | 3,499 (3,235-3,781) | May | 875 (803-960) | 1,202 (1,104-1,319) | 991 (895-1,114) | 1,364 (1,231-1,533) | May | 744 (678-826) | 1,023 (932-1,135) |
| Dec | 4,196 (3,915-4,553) | 5,726 (5,341-6,212) | Jun | 610 (559-673) | 837 (768-924) | 645 (582-728) | 887 (800-1,001) | Jun | 525 (478-585) | 721 (656-803) |

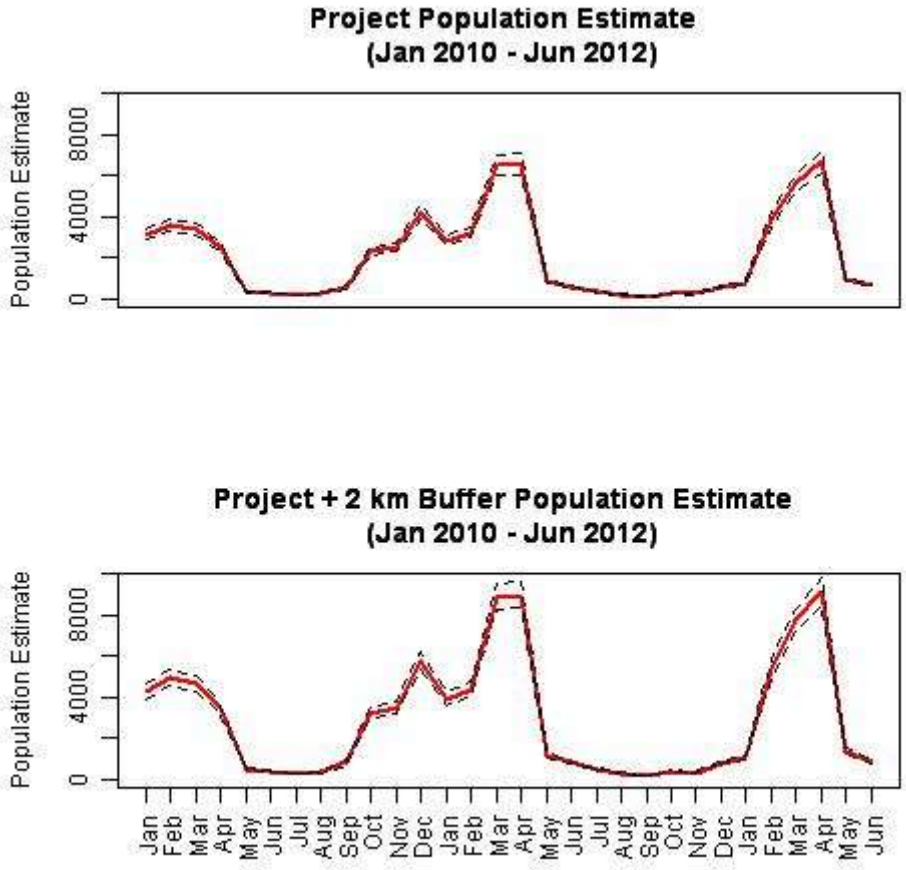



**Figure 3.43** Modelled monthly population estimates (and 90% confidence limits) for common guillemot for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

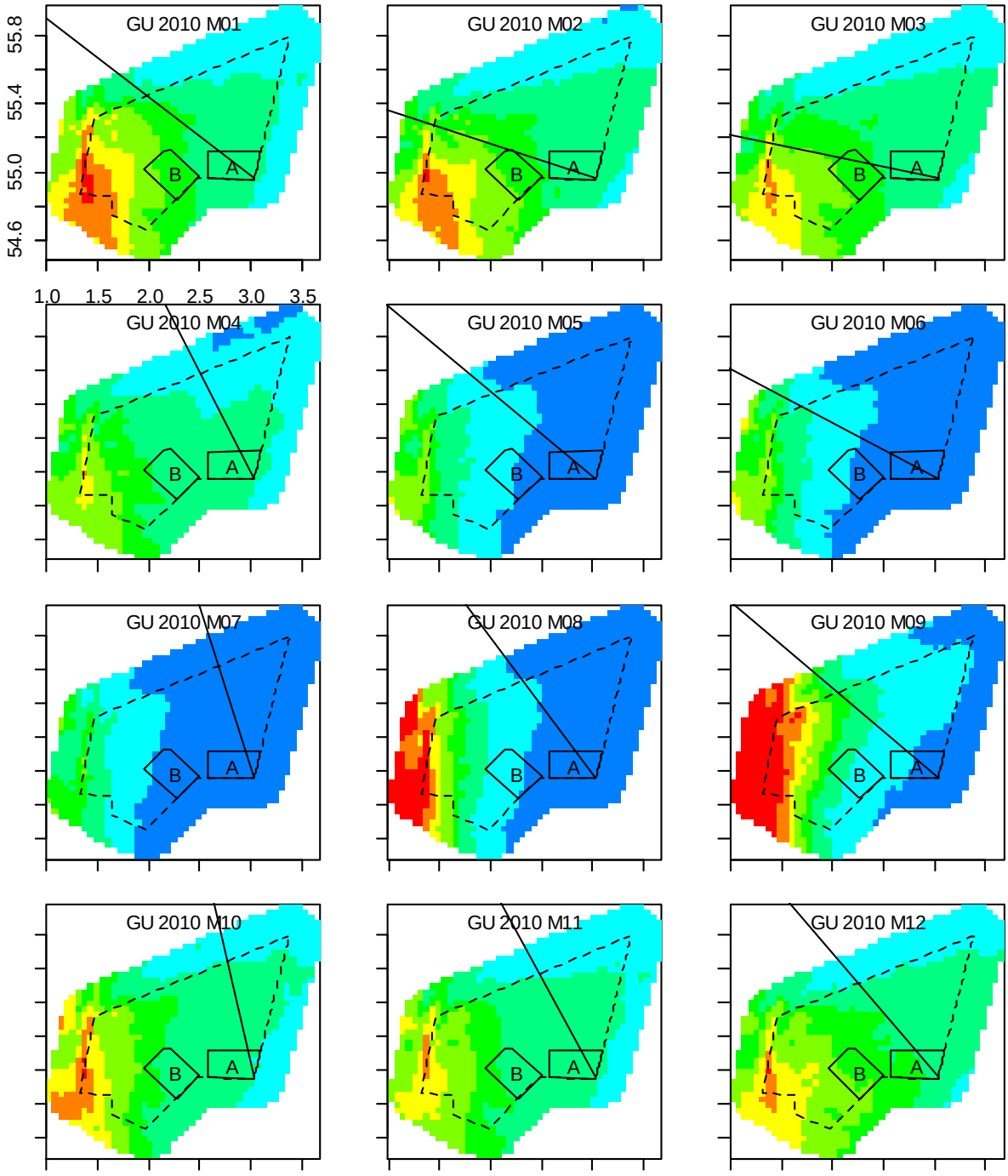



**Figure 3.44** Monthly densities of common guillemot within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

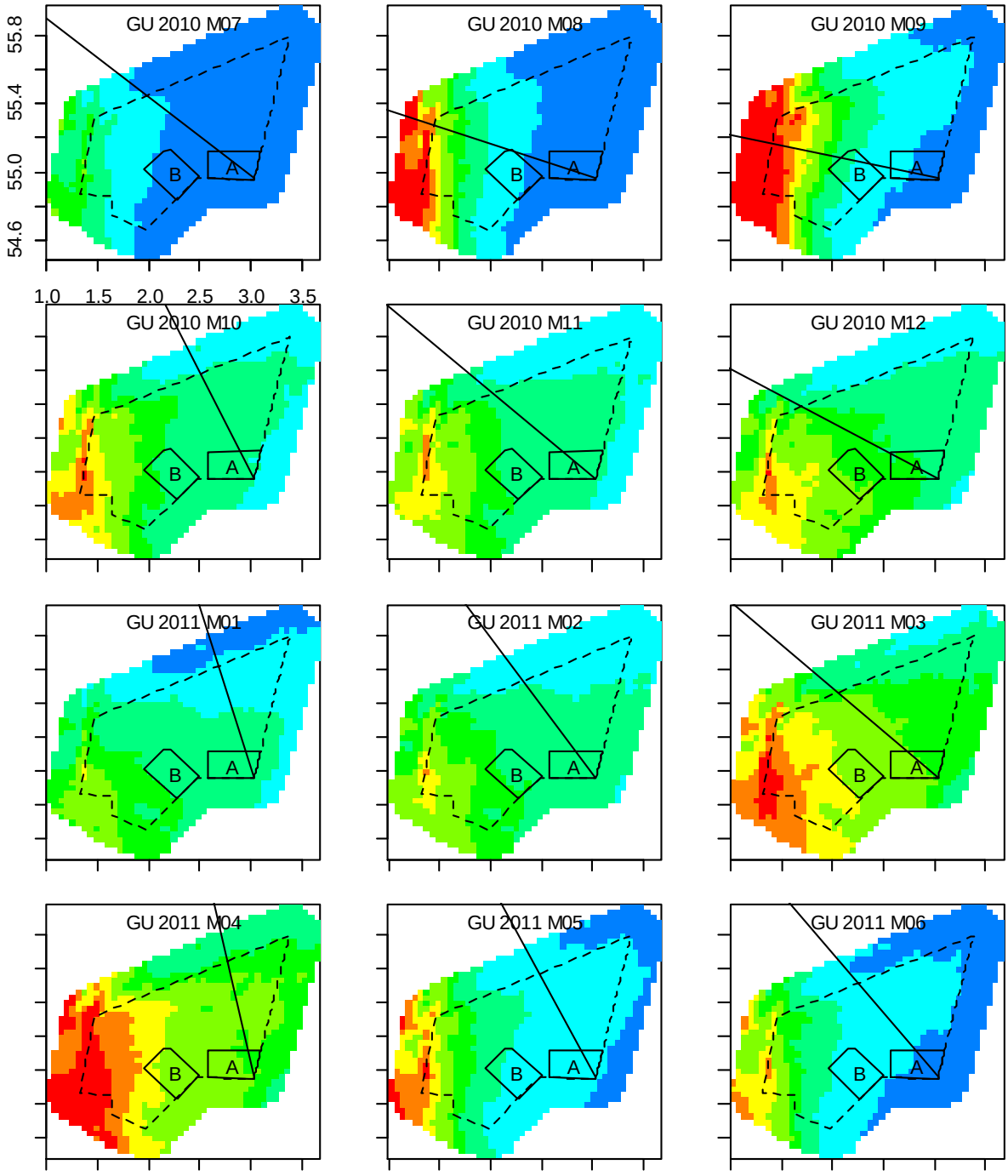



**Figure 3.45** Monthly densities of common guillemot within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

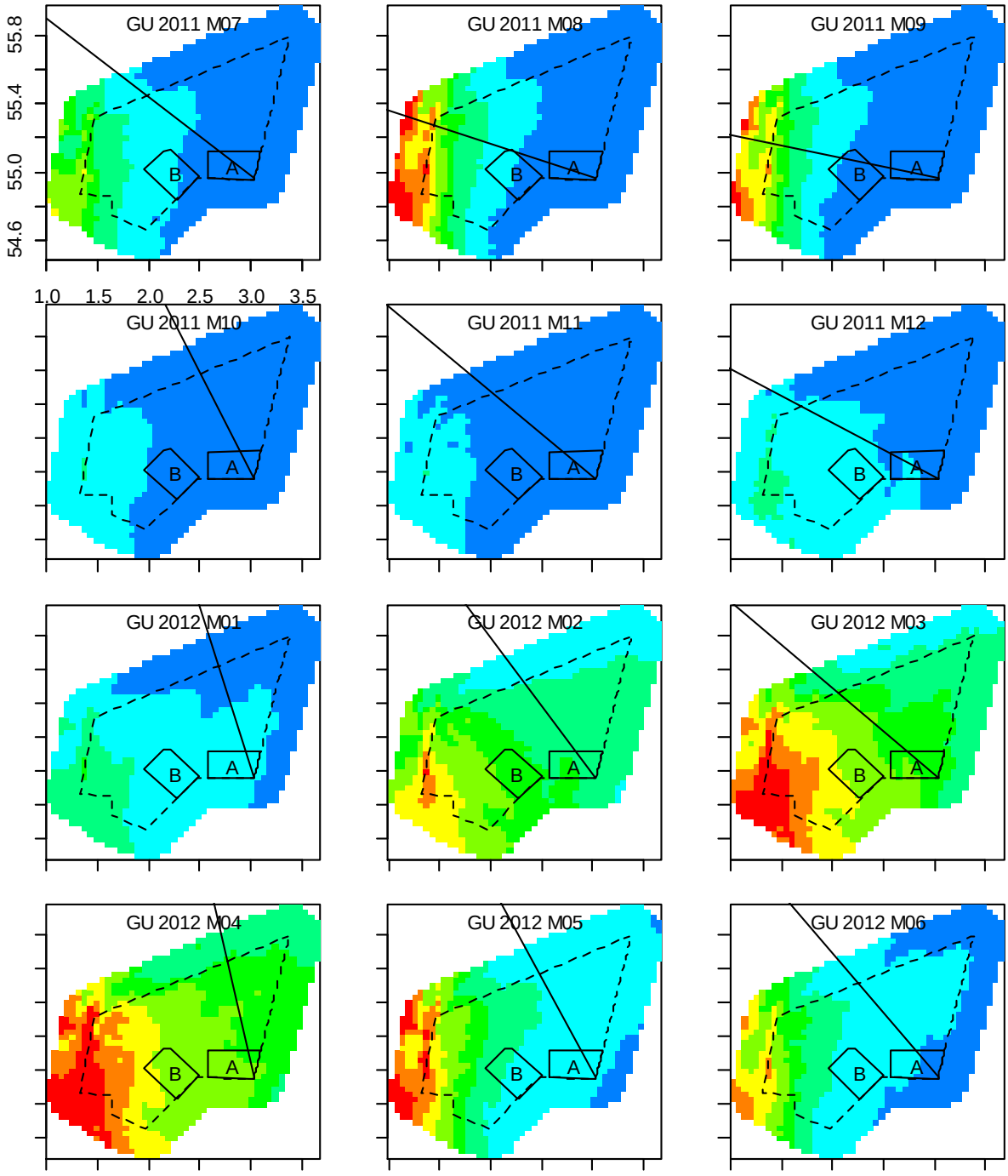



**Figure 3.46** Monthly densities of common guillemot within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

***Dogger Bank Teesside B***

3.2.88 In 2010, the monthly baseline population estimates of common guillemot within the Dogger Bank Teesside B area peaked from January to April and September to December (highest value in December with 6,317 birds, 90% CIs = 5,877-6,806). The population estimates also increased during the winter months in 2010/11 and 2011/12. However, higher population estimates were calculated for these months, peaking at 9,719 birds (90% CIs = 9,108-10,385) in March 2010/11 and 9,645 birds (90% CIs = 8,879-10,389) in March 2011/12 (Table 3.32; Figure 3.47). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B area (Tables 2.3 and 3.32). Mean populations across the two and a half years of survey peaked in March, with a mean of 8,355 birds (90 % CIs = 7,748-8,966) in the project and 11,342 birds (90% CIs = 10,521-12,172) present in the project and buffer.

3.2.89 The baseline monthly population estimates derived for 2010, 2010/11 and 2011/12 were in general higher than estimates derived from ESAS data for common guillemot within the Dogger Bank Teesside B area. ESAS derived population estimates were at their highest over the combined period of September to October at 2,307 birds and at their lowest in August with 213 birds (Table 3.9).

**Table 3.32** Modelled population estimates (and 90% confidence limits) for guillemot for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 5,707 (5,259-6,216) | 7,805 (7,190-8,499) | Jul | 460 (427-505) | 634 (588-696) | 786 (727-852) | 1,077 (996-1,168) | Jul | 623 (577-679) | 855 (792-932) |
| Feb | 6,150 (5,706-6,674) | 8,370 (7,766-9,083) | Aug | 920 (823-1,019) | 1,278 (1,144-1,414) | 733 (667-817) | 1,016 (925-1,131) | Aug | 826 (745-918) | 1,147 (1,034-1,273) |
| Mar | 5,700 (5,259-6,125) | 7,730 (7,134-8,307) | Sep | 1,980 (1,739-2,185) | 2,766 (2,431-3,052) | 448 (401-494) | 623 (558-686) | Sep | 1,214 (1,070-1,339) | 1,694 (1,495-1,869) |
| Apr | 3,569 (3,310-3,853) | 4,853 (4,500-5,238) | Oct | 3,969 (3,647-4,279) | 5,418 (4,980-5,841) | 494 (447-537) | 672 (610-731) | Oct | 2,231 (2,047-2,408) | 3,045 (2,795-3,286) |
| May | 732 (679-799) | 1,006 (934-1,098) | Nov | 4,048 (3,755-4,364) | 5,524 (5,125-5,955) | 399 (363-428) | 543 (494-583) | Nov | 2,223 (2,059-2,396) | 3,034 (2,809-3,269) |
| Jun | 626 (582-683) | 864 (803-942) | Dec | 6,317 (5,877-6,806) | 8,597 (8,001-9,262) | 877 (800-956) | 1193 (1,089-1,301) | Dec | 3,597 (3,339-3,881) | 4,895 (4,545-5,282) |
| Jul | 460 (427-505) | 634 (588-696) | Jan | 3,815 (3,517-4,154) | 5,181 (4,775-5,643) | 1,172 (1,064-1,267) | 1,598 (1,451-1,727) | Jan | 3,565 (3,280-3,879) | 4,861 (4,472-5,290) |
| Aug | 920 (823-1,019) | 1,278 (1,144-1,414) | Feb | 4,238 (3,932-4,602) | 5,759 (5,343-6,255) | 5,568 (5,037-6,016) | 7,571 (6,854-8,182) | Feb | 5,319 (4,892-5,764) | 7,234 (6,654-7,840) |
| Sep | 1,980 (1,739-2,185) | 2,766 (2,431-3,052) | Mar | 9,719 (9,108-10385) | 13,180 (12,353-14,081) | 9,645 (8,879-10389) | 13,117 (12,077-14,128) | Mar | 8,355 (7,748-8,966) | 11,342 (10,521-12,172) |
| Oct | 3,969 (3,647-4,279) | 5,418 (4,980-5,841) | Apr | 9,638 (8,944-10,325) | 13,146 (12,202-14,078) | 9,489 (8,801-10,201) | 12,932 (11,998-13,903) | Apr | 7,565 (7,018-8,126) | 10,310 (9,567-11,073) |
| Nov | 4,048 (3,755-4,364) | 5,524 (5,125-5,955) | May | 1,787 (1,661-1,931) | 2,448 (2,276-2,645) | 2,004 (1,840-2,228) | 2,753 (2,528-3,059) | May | 1,508 (1,393-1,652) | 2,069 (1,913-2,267) |
| Dec | 6,317 (5,877-6,806) | 8,597 (8,001-9,262) | Jun | 1,298 (1,204-1,410) | 1,781 (1,652-1,934) | 1,310 (1,193-1,460) | 1,799 (1,640-2,004) | Jun | 1,078 (993-1,184) | 1,481 (1,365-1,627) |

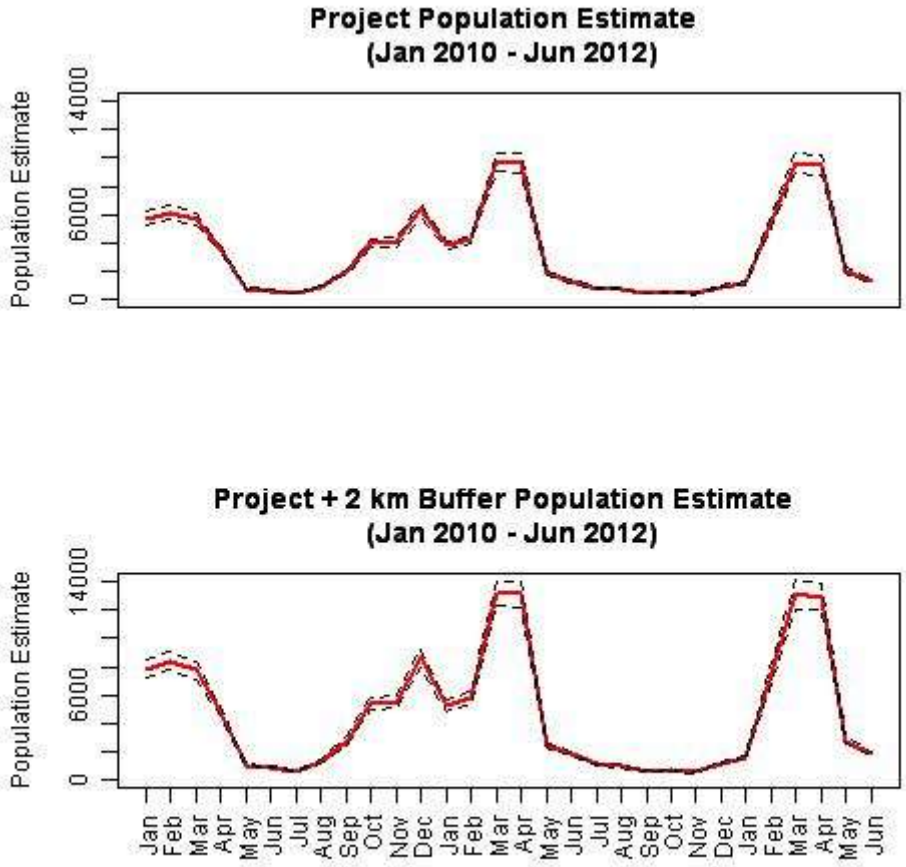



**Figure 3.47** Modelled monthly population estimates (and 90% confidence limits) for common guillemot for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12

***Dogger Bank Teesside A and B***

3.2.90 In 2010, the monthly baseline population estimates of common guillemot within the Dogger Bank Teesside A and B areas peaked from January to April and September to December (highest value in December with 10,513 birds, 90% Cls = 9,792-11,359) (Table 3.30). The population estimates also increased during the winter months in 2010/11 and 2011/12. However, higher population estimates were calculated for these months, peaking at 16,188 birds (90% Cls = 15,159-17,360) in March 2010/11 and 16,170 birds (90% Cls = 14,947-17,377) in April 2011/12 (Table 3.33; Figure 3.48). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B areas (Tables 2.3 and 3.33). Mean populations across the two and a half years of survey peaked in March, with a mean of 13,531 birds (90 % CIs = 12,562-14,536) in the project and 18,428 birds (90% CIs = 17,107-19,807) present in the project and buffer.

3.2.91 The baseline monthly population estimates derived for 2010, 2010/11 and 2011/12 were in general higher than estimates derived from ESAS data for common guillemot within the Dogger Bank Teesside A and B areas. ESAS derived population estimates were at their highest over the combined period of September to October at 4,485 birds and at their lowest in August with 415 birds (Table 3.9).

**Table 3.33** Modelled population estimates (and 90% confidence limits) for common guillemot for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 8,829 (8,133-9,634) | 12,042 (11,105-13,156) | Jul | 661 (611-729) | 910 (841-1,004) | 1,148 (1,059-1,251) | 1,573 (1,453-1,715) | Jul | 905 (835-990) | 1,241 (1,147-1,359) |
| Feb | 9,769 (9,060-10,614) | 13,317 (12,353-14,450) | Aug | 1,204 (1,073-1,339) | 1,670 (1,491-1,856) | 970 (877-1,085) | 1,344 (1,217-1,503) | Aug | 1,087 (975-1,212) | 1,507 (1,354-1,679) |
| Mar | 9,110 (8,411-9,807) | 12,396 (11,431-13,357) | Sep | 2,593 (2,270-2,867) | 3,617 (3,170-3,992) | 591 (527-654) | 820 (732-906) | Sep | 1,592 (1,399-1,760) | 2,218 (1,951-2,449) |
| Apr | 6,105 (5,641-6,580) | 8,320 (7,686-8,964) | Oct | 6,328 (5,806-6,841) | 8,650 (7,937-9,350) | 800 (722-871) | 1,093 (985-1,188) | Oct | 3,564 (3,264-3,856) | 4,872 (4,461-5,269) |
| May | 1,098 (1,015-1,202) | 1,507 (1,395-1,652) | Nov | 6,606 (6,120-7,129) | 9,019 (8,360-9,735) | 651 (591-701) | 887 (806-956) | Nov | 3,628 (3,355-3,915) | 4,953 (4,583-5,345) |
| Jun | 945 (875-1,035) | 1,302 (1,206-1,427) | Dec | 10,513 (9,792-11,359) | 14,323 (13,342-15,478) | 1,480 (1,348-1,620) | 2,017 (1,838-2,209) | Dec | 5,996 (5,570-6,490) | 8,170 (7,590-8,843) |
| Jul | 661 (611-729) | 910 (841-1,004) | Jan | 6,667 (6,165-7,265) | 9,074 (8,393-9,895) | 1,954 (1,772-2,118) | 2,670 (2,420-2,895) | Jan | 5,817 (5,356-6,339) | 7,929 (7,306-8,649) |
| Aug | 1,204 (1,073-1,339) | 1,670 (1,491-1,856) | Feb | 7,445 (6,916-8,084) | 10,157 (9,420-11,010) | 9,490 (8,574-10,297) | 12,930 (11,682-14,027) | Feb | 8,901 (8,183-9,665) | 12,135 (11,152-13,162) |
| Sep | 2,593 (2,270-2,867) | 3,617 (3,170-3,992) | Mar | 16,188 (15,159-17,360) | 22,051 (20,642-23,621) | 15,293 (14,114-16,442) | 20,837 (19,248-22,442) | Mar | 13,531 (12,562-14,536) | 18,428 (17,107-19,807) |
| Oct | 6,328 (5,806-6,841) | 8,650 (7,937-9,350) | Apr | 16,184 (15,018-17,377) | 22,112 (20,523-23,731) | 16,170 (14,947-17,377) | 22,088 (20,417-23,726) | Apr | 12,819 (11,868-13,778) | 17,507 (16,209-18,807) |
| Nov | 6,606 (6,120-7,129) | 9,019 (8,360-9,735) | May | 2,662 (2,464-2,890) | 3,650 (3,382-3,963) | 2,995 (2,734-3,342) | 4,117 (3,765-4,591) | May | 2,252 (2,071-2,478) | 3,091 (2,847-3,402) |
| Dec | 10,513 (9,792-11,359) | 14,323 (13,342-15,478) | Jun | 1,908 (1,763-2,083) | 2,627 (2,422-2,859) | 1,955 (1,775-2,188) | 2,687 (2,441-3,006) | Jun | 1,603 (1,471-1,769) | 2,205 (2,023-2,431) |

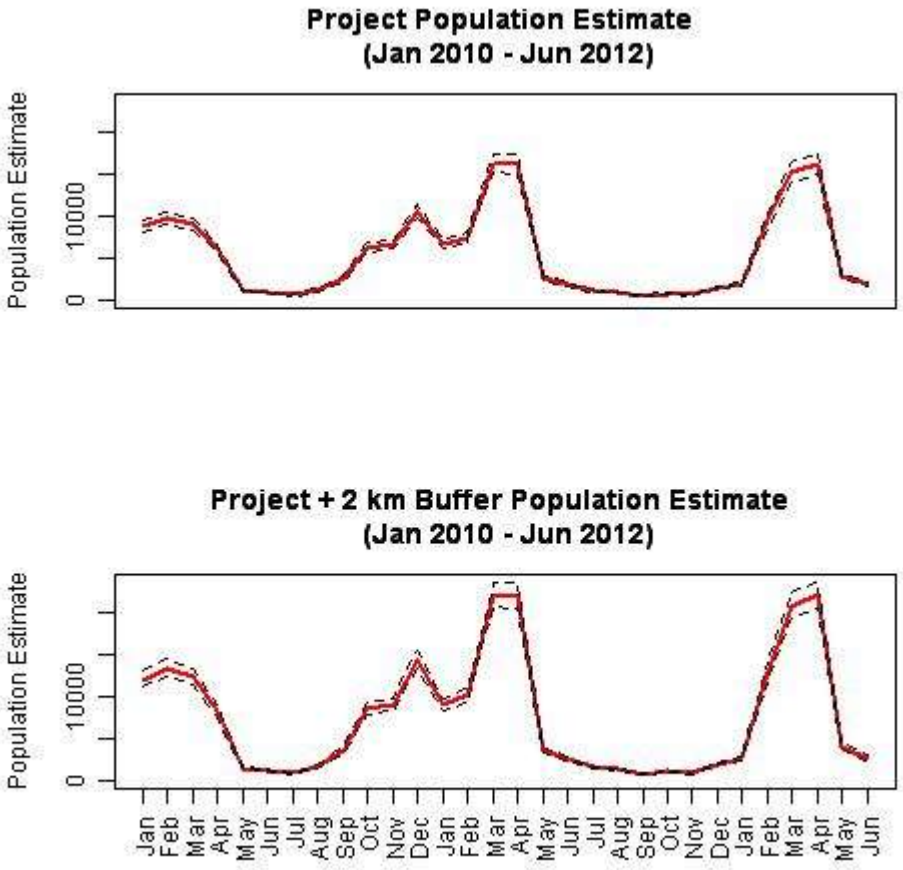



**Figure 3.48** Modelled monthly population estimates (and 90% confidence limits) for common guillemot for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Razorbill* Alca torda**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.2.92 Razorbill is a breeding feature of 18 SPAs, a wintering feature of five SPAs and a passage feature of two SPAs in the Greater North Sea OSPAR region (Appendices 1 & 2). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.93 Numbers in the Dogger Bank Zone as a whole surpassed the 1% threshold for populations of national importance in the breeding season and the 1% threshold for international importance in the winter (Tables 2.3, 3.4, 3.5 and 3.6).

***Dogger Bank Teesside A***

3.2.94 In 2010, there were two main peaks in razorbill population estimates in Dogger Bank Teesside A from January to March (highest value in February of 1,464 birds with 90% CIs = 1,302-1,640) and from October to December (highest value in December of 1,585 birds with 90% CIs = 1,401-1,765). In 2010/11, abundance peaked between October and December, then again between March and April (highest in April with 3,009 birds, 90% CLs = 4,759-6,015). In contrast, population estimates produced for 2011/12 peaked between February and April only (highest in April with 2,464 birds, 90% CLs = 2,150-2,787) (Table 3.34; Figure 3.49). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in this area (Tables 2.3 and 3.33). (Tables 2.3 and 3.34). Mean populations across the two and a half years of survey peaked in April, with a mean of 2,106 birds (90 % CIs = 1,852-2,369) in the project and 2,887 birds (90% CIs = 2,541-3,248) present in the project and buffer.

3.2.95 The baseline monthly population estimates derived for 2010, 2010/11 and 2011/12 were, at their highest values, an order of magnitude larger than the estimates derived from ESAS data for razorbill within Dogger Bank Teesside A. The highest ESAS population estimate was 325 birds in the combined period of July to August. In contrast, the lowest ESAS population estimate occurred in the combined period of September to November with 123 birds (Table 3.9).

3.2.96 Razorbill density had a marked westerly distribution. On a monthly basis the densities of razorbill within the south-eastern and south south-eastern areas of the Dogger Bank Zone (which contain Dogger Bank Teesside A and Dogger Bank Teesside B) tended to be lower than the far western boundaries of the Dogger Bank Zone (Figures 3.50, 3.51 and 3.52).

**Table 3.34** Modelled population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 1,164 (1,005-1,359) | 1,584 (1,367-1,848) | Jul | 28 (21-35) | 38 (29-48) | 23 (17-29) | 32 (24-39) | Jul | 26 (19-32) | 35 (27-44) |
| Feb | 1,464 (1,302-1,640) | 2,004 (1,781-2,244) | Aug | 42 (30-52) | 58 (42-72) | 6 (4-8) | 8 (5-11) | Aug | 24 (17-30) | 33 (24-41) |
| Mar | 1,311 (1,171-1,456) | 1,795 (1,603-1,993) | Sep | 119 (87-151) | 167 (123-211) | 2 (1-3) | 3 (2-4) | Sep | 60 (44-77) | 85 (62-107) |
| Apr | 844 (748-956) | 1,154 (1,022-1,306) | Oct | 1,176 (1,039-1,345) | 1,611 (1,423-1,841) | 11 (7-16) | 15 (10-21) | Oct | 593 (523-680) | 813 (717-931) |
| May | 48 (37-58) | 66 (51-80) | Nov | 1,083 (956-1,205) | 1,481 (1,309-1,649) | 17 (12-24) | 23 (17-32) | Nov | 550 (484-614) | 752 (663-841) |
| Jun | 44 (34-54) | 60 (47-74) | Dec | 1,585 (1,401-1,765) | 2,162 (1,911-2,407) | 124 (96-156) | 169 (132-213) | Dec | 854 (749-960) | 1,165 (1,022-1,310) |
| Jul | 28 (21-35) | 38 (29-48) | Jan | 770 (669-891) | 1,053 (915-1,218) | 280 (238-333) | 383 (326-456) | Jan | 738 (637-861) | 1,007 (870-1,174) |
| Aug | 42 (30-52) | 58 (42-72) | Feb | 867 (757-992) | 1,187 (1,036-1,357) | 2,036 (1,745-2,400) | 2,780 (2,383-3,277) | Feb | 1,456 (,1268-1,677) | 1,990 (1,733-2,293) |
| Sep | 119 (87-151) | 167 (123-211) | Mar | 2,447 (2,179-2,753) | 3,355 (2,988-3,776) | 2,284 (2,040-2,549) | 3,130 (2,797-3,494) | Mar | 2,014 (1,797-2,253) | 2,760 (2,463-3,088) |
| Oct | 1,176 (1,039-1,345) | 1,611 (1,423-1,841) | Apr | 3,009 (2,660-3,364) | 4,129 (3,649-4,614) | 2,464 (2,150-2,787) | 3,379 (2,951-3,824) | Apr | 2,106 (1,852-2,369) | 2,887 (2,541-3,248) |
| Nov | 1,083 (956-1,205) | 1,481 (1,309-1,649) | May | 159 (129-195) | 219 (178-268) | 223 (172-274) | 307 (238-378) | May | 143 (113-176) | 197 (155-242) |
| Dec | 1,585 (1,401-1,765) | 2,162 (1,911-2,407) | Jun | 78 (62-97) | 107 (85-133) | 350 (272-436) | 482 (374-600) | Jun | 157 (123-196) | 216 (169-269) |

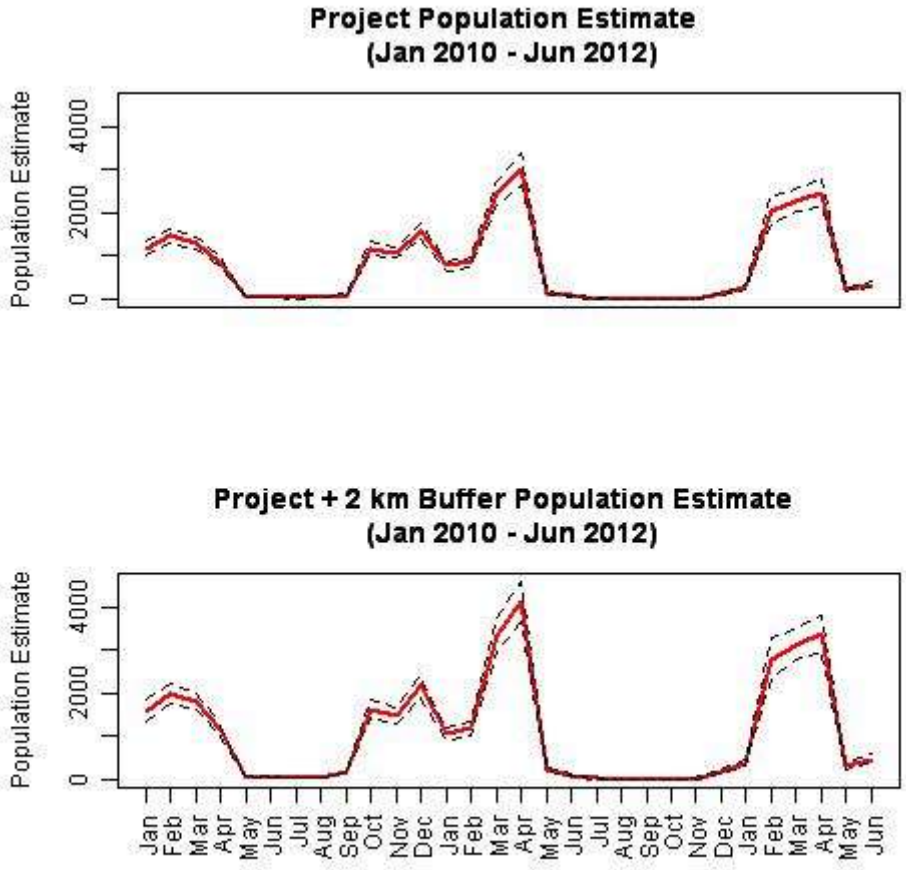



**Figure 3.49** Modelled monthly population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

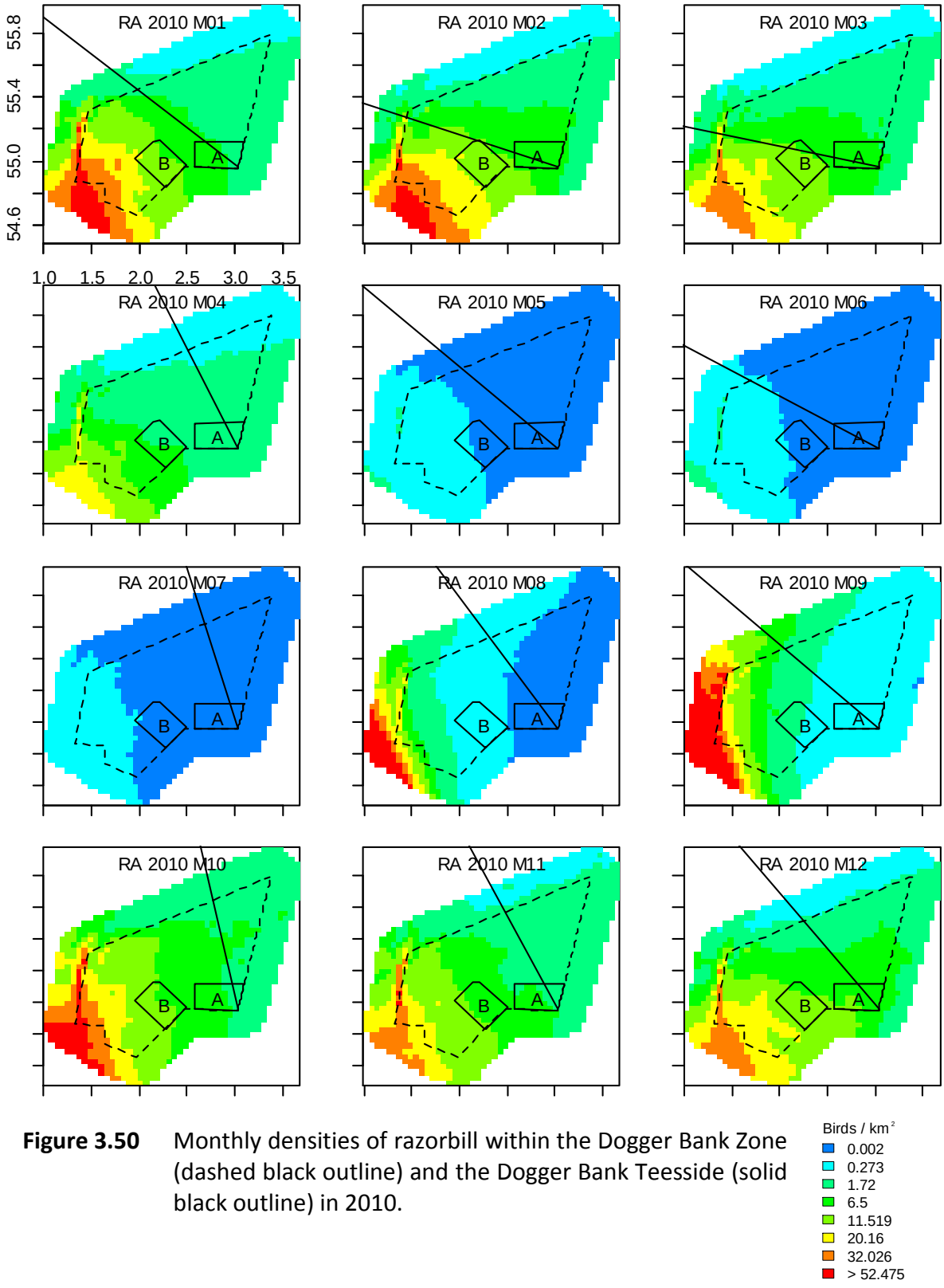



**Figure 3.50** Monthly densities of razorbill within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside (solid black outline) in 2010.

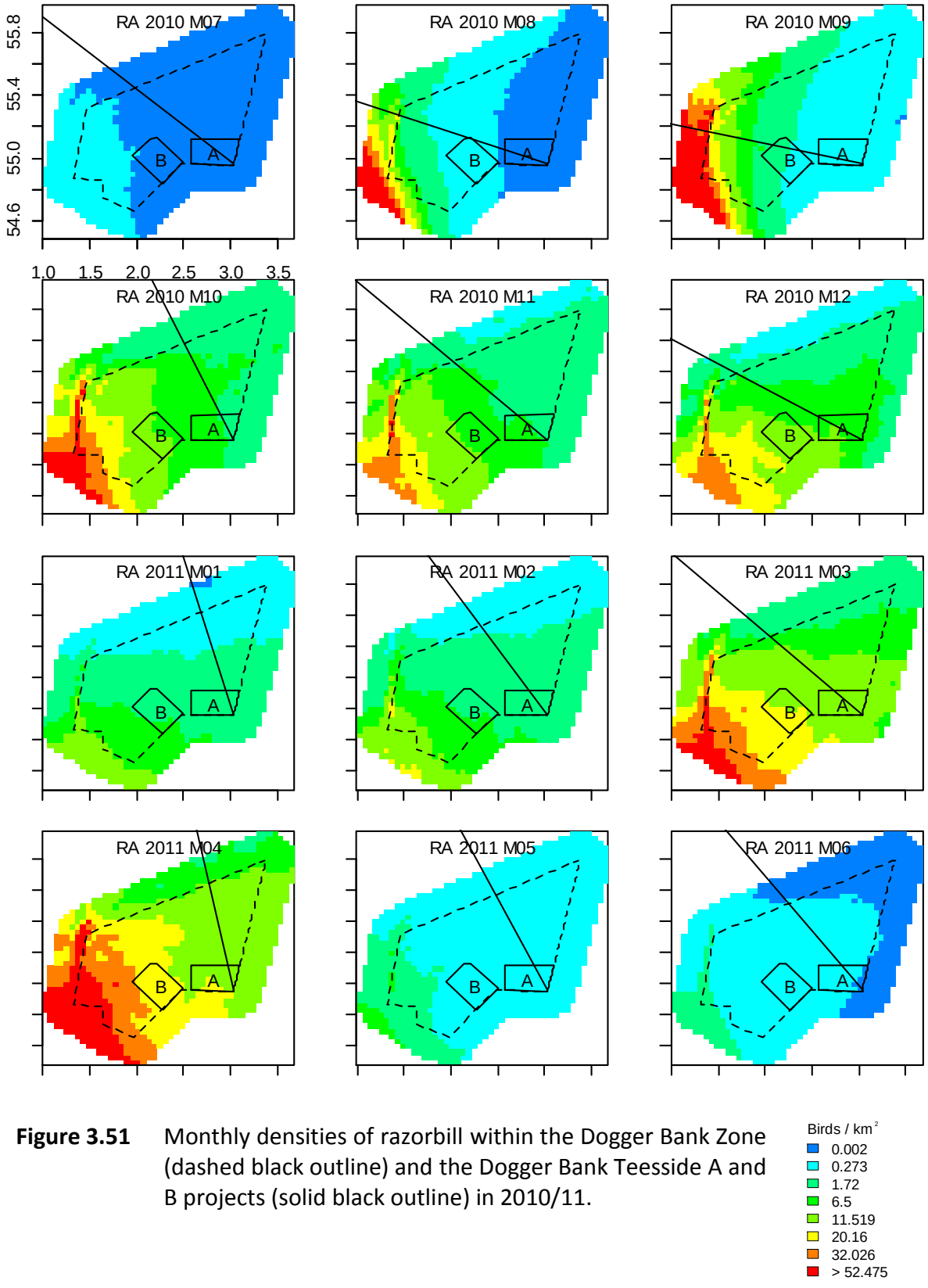



**Figure 3.51** Monthly densities of razorbill within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

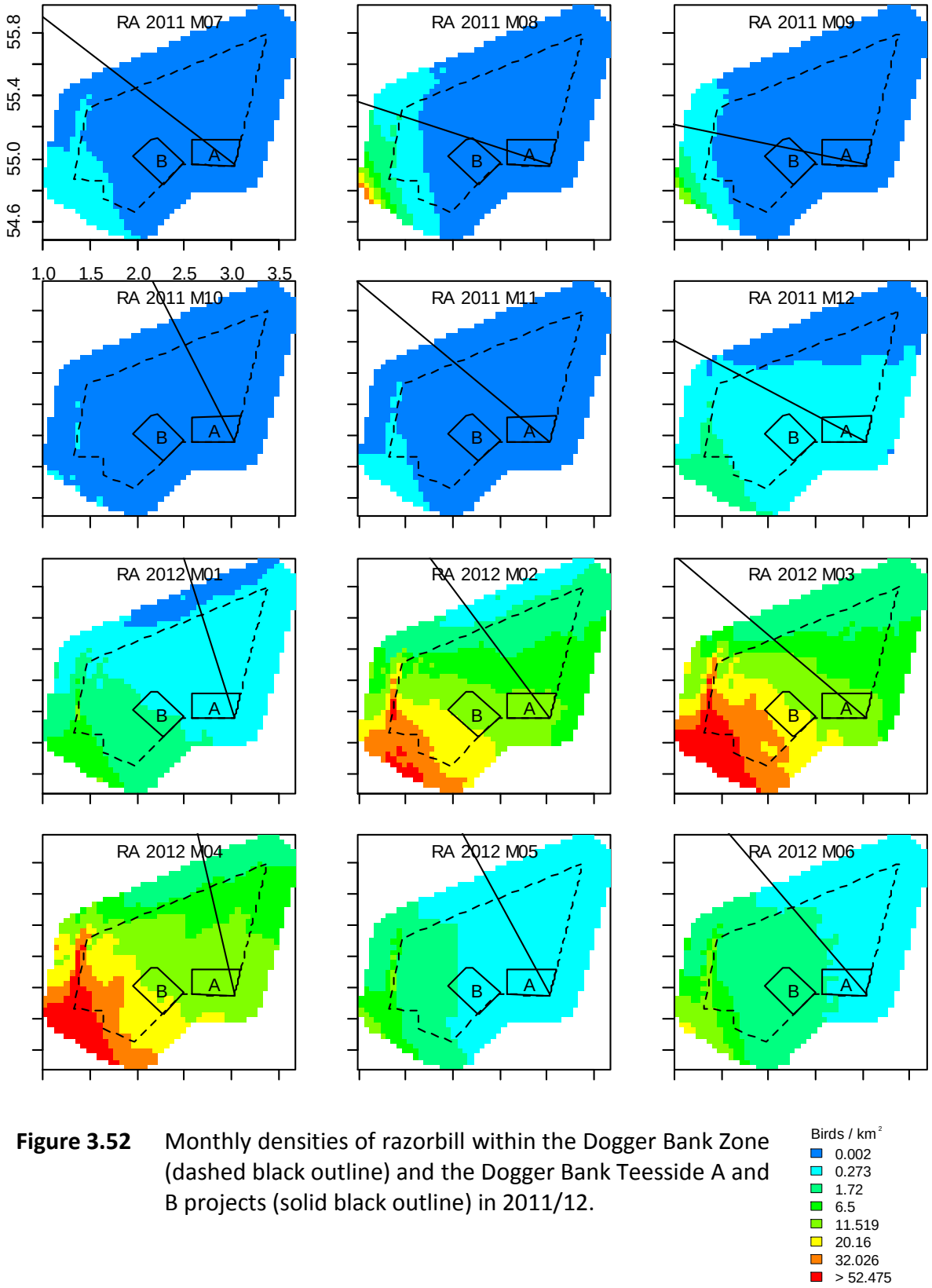



**Figure 3.52** Monthly densities of razorbill within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

***Dogger Bank Teesside B***

3.2.97 In 2010, there were two main peaks in razorbill population estimates in Dogger Bank Teesside B from January to March (highest value in February of 2,514 birds with 90% CIs = 2,235-2,793) and from October to December (highest value in December of 2,304 birds with 90% CIs = 2,047-2,563). In 2010/11, abundance peaked between October and December, then again between March and April (highest in April with 4,245 birds, 90% CLs = 3,800-4,702). In contrast, population estimates produced for 2011/12 only peaked between February and April (highest in March with 3,923 birds, 90% CLs = 3,492-4,386) (Table 3.35; Figure 3.53). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in this area (Tables 2.3 and 3.35). Mean populations across the two and a half years of survey peaked in March, with a mean of 3,220 birds (90 % CIs = 2,875-3,595) in the project and 4,366 birds (90% CIs = 3,896-4,876) present in the project and buffer.

3.2.98 The baseline monthly population estimates derived for 2010, 2010/11 and 2011/12 were, at their highest values, an order of magnitude larger than the estimates derived from ESAS data for razorbill within the Dogger Bank Teesside B area. The highest ESAS population estimate was in the combined period of July to August, with 344 birds. In contrast, the lowest ESAS population estimate occurred in the combined period of September to November, with 130 birds (Table 3.9).

**Table 3.35** Modelled population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 2,187 (1,909-2,517) | 2,991 (2,608-3,443) | Jul | 48 (39-60) | 66 (53-81) | 37 (29-46) | 50 (39-62) | Jul | 43 (34-53) | 58 (46-72) |
| Feb | 2,514 (2,235-2,793) | 3,420 (3,039-3,800) | Aug | 148 (119-174) | 202 (163-238) | 19 (13-24) | 26 (18-33) | Aug | 84 (66-99) | 114 (90-136) |
| Mar | 2,209 (1,956-2,437) | 2,990 (2,647-3,300) | Sep | 429 (346-506) | 588 (473-696) | 6 (4-9) | 9 (6-13) | Sep | 218 (175-258) | 298 (240-354) |
| Apr | 1,138 (1,007-1,284) | 1,546 (1,368-1,744) | Oct | 1,984 (1,758-2,226) | 2,706 (2,397-3,036) | 17 (12-25) | 23 (16-34) | Oct | 1,001 (885-1,125) | 1,365 (1,206-1,535) |
| May | 69 (56-82) | 94 (76-111) | Nov | 1,684 (1,507-1,871) | 2,297 (2,054-2,552) | 26 (19-36) | 36 (26-49) | Nov | 855 (763-953) | 1,167 (1,040-1,301) |
| Jun | 62 (50-74) | 84 (68-101) | Dec | 2,304 (2,047-2,563) | 3137 (2,784-3,488) | 171 (137-219) | 233 (186-297) | Dec | 1,238 (1,092-1,391) | 1,685 (1,485-1,893) |
| Jul | 48 (39-60) | 66 (53-81) | Jan | 968 (838-1,115) | 1,315 (1,138-1,515) | 407 (350-484) | 555 (476-660) | Jan | 1,187 (1,032-1,372) | 1,620 (1,407-1,873) |
| Aug | 148 (119-174) | 202 (163-238) | Feb | 1,069 (932-1,238) | 1,452 (1,265-1,682) | 2,758 (2,396-3,212) | 3,750 (3,259-4,368) | Feb | 2,114 (1,854-2,414) | 2,874 (2,521-3,283) |
| Sep | 429 (346-506) | 588 (473-696) | Mar | 3,527 (3,176-3,963) | 4,777 (4,298-5,368) | 3,923 (3,492-4,386) | 5,330 (4,742-5,959) | Mar | 3,220 (2,875-3,595) | 4,366 (3,896-4,876) |
| Oct | 1,984 (1,758-2,226) | 2,706 (2,397-3,036) | Apr | 4,245 (3,800-4,702) | 5,782 (5,176-6,406) | 3,321 (2,915-3,727) | 4,523 (3,967-5,073) | Apr | 2,901 (2,574-3,237) | 3,950 (3,504-4,408) |
| Nov | 1,684 (1,507-1,871) | 2,297 (2,054-2,552) | May | 236 (198-276) | 319 (268-374) | 328 (264-400) | 444 (358-542) | May | 211 (173-253) | 286 (234-342) |
| Dec | 2,304 (2,047-2,563) | 3,137 (2,784-3,488) | Jun | 123 (102-146) | 166 (137-197) | 518 (425-635) | 703 (576-862) | Jun | 234 (192-285) | 318 (260-387) |

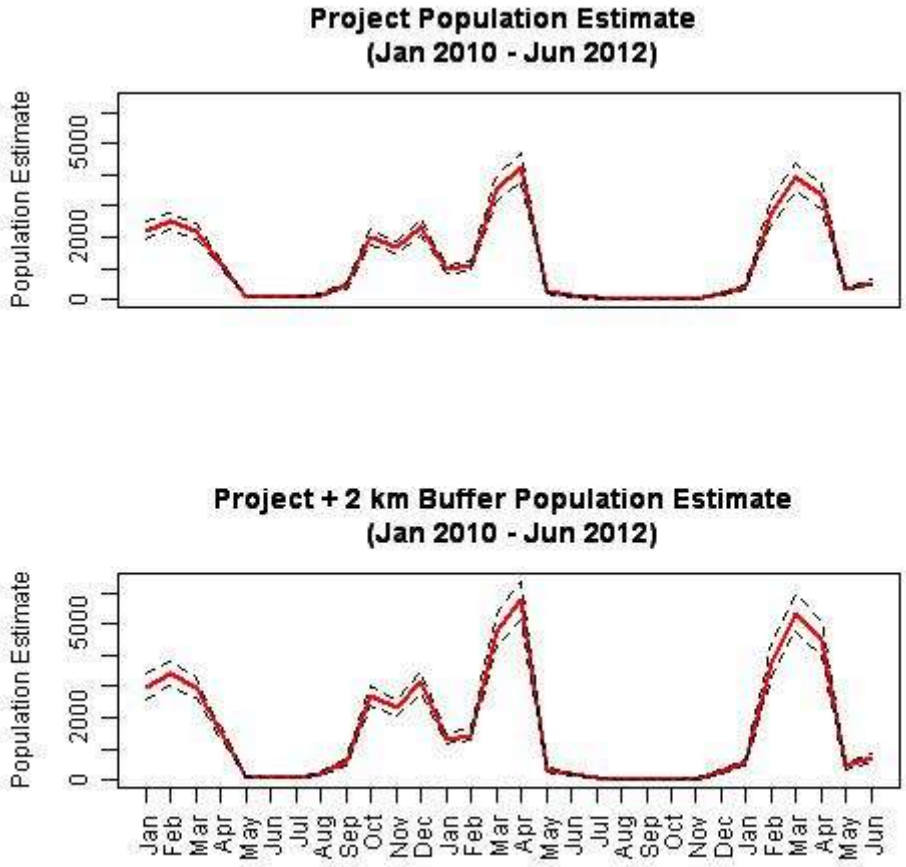



**Figure 3.53** Modelled monthly population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Dogger Bank Teesside A and B***

3.2.99 In 2010, there were two main peaks in razorbill population estimates in the Dogger Bank Teesside A and B areas from January to March (highest value in February of 3,978 birds with 90% CIs = 3,537-4,433) and from October to December (highest value in December of 3,890 birds with 90% CIs = 3,448-4,328). In 2010/11, abundance peaked between October and December, then again between March and April (highest in April with 7,254 birds, 90% CLs = 6,459-8,065). In contrast, population estimates produced for 2011/12 peaked between February and April only (highest in April with 6,207 birds, 90% CLs = 5,533-6,935) (Table 3.36; Figure 3.54). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in this area (Tables 2.3 and 3.36). Mean populations across the two and a half years of survey peaked in March, with a mean of 5,234 birds (90 % CIs = 4,672-5,848) in the project and 7,130 birds (90% CIs = 6,359-7,961) present in the project and buffer.

3.2.100 The baseline monthly population estimates derived for 2010, 2010/11 and 2011/12 were, at their highest values, in the order of magnitude larger than the estimates derived from ESAS data for razorbill within the Dogger Bank Teesside A

and B areas. The highest ESAS population estimate was 669 birds in the combined period of July to August. The lowest ESAS population estimate occurred in the period from September to November with 254 birds (Table 3.9).

**Table 3.36** Modelled population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 3,351 (2,914-3,876) | 4,568 (3,997-5,284) | Jul | 76 (60-95) | 104 (83-129) | 61 (46-75) | 82 (63-100) | Jul | 68 (53-85) | 93 (73-115) |
| Feb | 3,978 (3,537-4,433) | 5,424 (4,809-6,046) | Aug | 190 (149-226) | 261 (205-310) | 24 (17-32) | 33 (23-44) | Aug | 107 (83-129) | 147 (114-177) |
| Mar | 3,520 (3,127-3,893) | 4,778 (4,251-5,278) | Sep | 548 (433-657) | 758 (597-904) | 8 (6-12) | 12 (8-17) | Sep | 278 (219-335) | 385 (303-460) |
| Apr | 1,983 (1,755-2,239) | 2,702 (2,390-3,043) | Oct | 3,161 (2,797-3,570) | 4,326 (3,820-4,892) | 28 (19-40) | 38 (26-55) | Oct | 1,594 (1,408-1,805) | 2,182 (1,923-2,474) |
| May | 117 (93-140) | 160 (127-191) | Nov | 2,767 (2,464-3,076) | 3,782 (3,363-4,201) | 43 (31-60) | 59 (43-81) | Nov | 1,405 (1,247-1,568) | 1,920 (1,703-2,141) |
| Jun | 105 (84-128) | 145 (115-175) | Dec | 3,890 (3,448-4,328) | 5,301 (4,697-5,895) | 295 (233-374) | 403 (319-510) | Dec | 2,092 (1,841-2,351) | 2,852 (2,508-3,203) |
| Jul | 76 (60-95) | 104 (83-129) | Jan | 1,738 (1,507-2,005) | 2,372 (2,057-2,733) | 687 (588-817) | 936 (802-1,115) | Jan | 1,925 (1,669-2,233) | 2,626 (2,285-3,044) |
| Aug | 190 (149-226) | 261 (205-310) | Feb | 1,936 (1,689-2,230) | 2,643 (2,301-3,035) | 4,795 (4,141-5,612) | 6,548 (5,637-7,660) | Feb | 3,569 (3,122-4,092) | 4,871 (4,249-5,580) |
| Sep | 548 (433-657) | 758 (597-904) | Mar | 5,974 (5,355-6,717) | 8,147 (7,301-9,159) | 6,207 (5,533-6,935) | 8,464 (7,524-9,445) | Mar | 5,234 (4,672-5,848) | 7,130 (6,359-7,961) |
| Oct | 3,161 (2,797-3,570) | 4,326 (3,820-4,892) | Apr | 7,254 (6,459-8,065) | 9,915 (8,820-11,014) | 5,785 (5,065-6,513) | 7,894 (6,918-8,900) | Apr | 5,007 (4,426-5,606) | 6,837 (6,043-7,652) |
| Nov | 2,767 (2,464-3,076) | 3,782 (3,363-4,201) | May | 395 (327-471) | 538 (445-641) | 550 (437-674) | 748 (597-920) | May | 354 (286-429) | 482 (390-584) |
| Dec | 3,890 (3,448-4,328) | 5,301 (4,697-5,895) | Jun | 201 (164-243) | 274 (223-331) | 869 (697-1071) | 1,186 (942-1,458) | Jun | 392 (315-481) | 535 (427-655) |

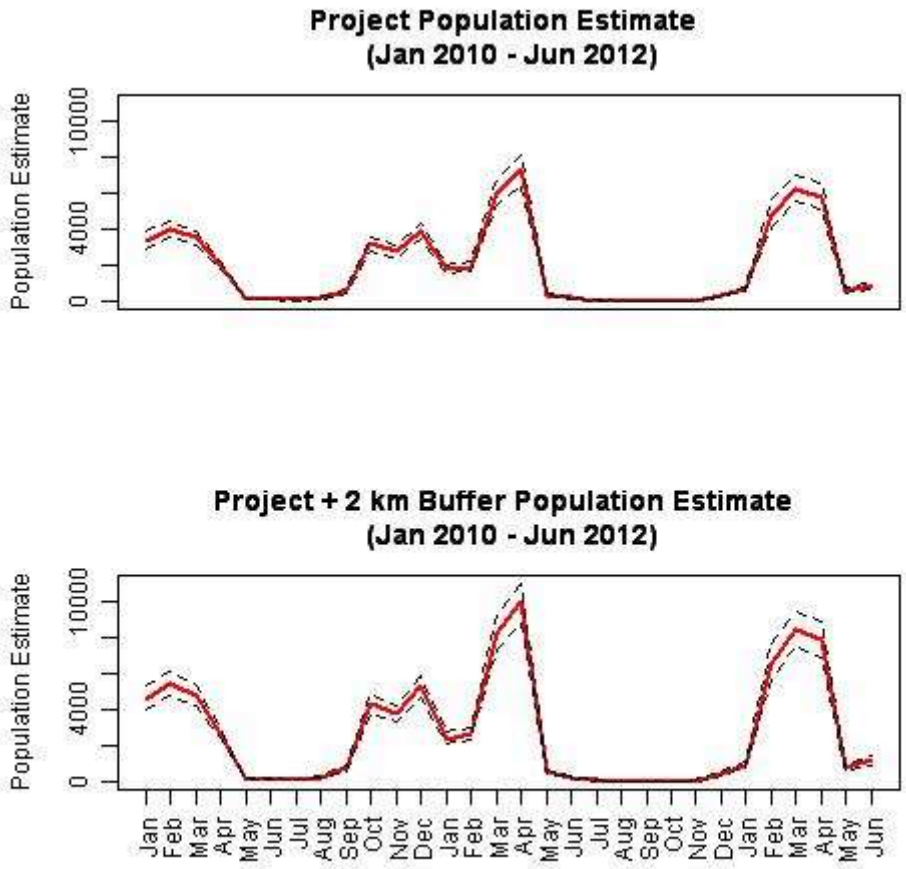



**Figure 3.54** Modelled monthly population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Little auk* Alle alle**

VALUE OF RECEPTOR-HIGH

3.2.101 Little auk is not a feature of any SPA in the Greater North Sea OSPAR region (Appendix 1), nor included in any UK conservation listing.

3.2.102 Although there is no threshold for this species, given the numbers of this species estimated to occur in the Dogger Bank Zone as a whole in winter, little auk are deemed to be of national importance in the Zone. Numbers in the Dogger Bank Zone as a whole did not surpass the 1% threshold for populations of international importance (Tables 2.3, 3.4, 3.5 and 3.6).

***Dogger Bank Teesside A***

3.2.103 In 2010, the little auk population estimates for Dogger Bank Teesside A began with 828 birds (90% CIs = 30-63) in January before decreasing to 41 (90% CIs = 30-63) in March and 0 (90% CIs = 0-1) in June. Little auks came back to the area in September and remained present until December, when the population peaked with

1,809 birds (90% CIs = 1436-2,424). Similar population trends were predicted for the 2010/11 and 2011/12 periods, with population estimates peaking again in December 2011 (600 birds, 90% CIs = 490-816) (Table 3.37; Figure 3.55). There is no British population estimate for little auk. However, given the numbers estimated, this species is deemed to be of national importance in Dogger Bank Teesside A. (Tables 2.6 and 3.37). Mean populations across the two and a half years of survey peaked in December, with a mean of 1,205 birds (90 % CIs = 963-1,620) in the project and 1,661 birds (90% CIs = 1,328-2,231) present in the project and buffer.

3.2.104 The ESAS population estimates for little auk were highest for the combined period of December to January (2,111 birds) and no little auk were recorded in the period of March and September (Table 3.9). Higher winter numbers reflect a similar pattern identified by the baseline monthly population estimates.

3.2.105 Little auk density had a marked northerly distribution during the summer months. On a monthly basis the densities of little auk within the south-eastern and south south-eastern areas of the Dogger Bank Zone (which contain Dogger Bank Teesside A and Dogger Bank Teesside B) tended to be lower than the far northern boundaries of the Dogger Bank Zone (Figures 3.56, 3.57 and 3.58).

**Table 3.37** Baseline monthly population estimates (and 90% confidence limits) for little auk for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 828 (535-1,193) | 1,136 (734-1,637) | Jul | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-1) | Jul | 0 (0-1) | 0 (0-1) |
| Feb | 243 (176-364) | 336 (244-503) | Aug | 0 (0-1) | 0 (0-1) | 1 (0-1) | 1 (0-2) | Aug | 0 (0-1) | 1 (0-1) |
| Mar | 41 (30-63) | 57 (41-87) | Sep | 8 (5-13) | 11 (7-18) | 4 (2-6) | 5 (3-9) | Sep | 6 (4-10) | 8 (5-13) |
| Apr | 4 (3-7) | 6 (4-9) | Oct | 43 (32-62) | 60 (44-86) | 15 (11-22) | 21 (15-30) | Oct | 29 (21-42) | 40 (29-58) |
| May | 1 (1-2) | 1 (1-2) | Nov | 279 (220-374) | 386 (305-518) | 77 (62-100) | 107 (86-138) | Nov | 178 (141-237) | 246 (196-328) |
| Jun | 0 (0-1) | 0 (0-1) | Dec | 1,809 (1,436-2,424) | 2,492 (1,979-3,333) | 600 (490-816) | 830 (677-1,128) | Dec | 1,205 (963-1,620) | 1,661 (1,328-2,231) |
| Jul | 0 (0-0) | 0 (0-0) | Jan | 813 (624-1,076) | 1,122 (861-1,483) | 218 (185-284) | 302 (256-393) | Jan | 620 (448-851) | 854 (617-1,171) |
| Aug | 0 (0-1) | 0 (0-1) | Feb | 308 (244-403) | 426 (338-558) | 253 (172-412) | 348 (237-567) | Feb | 268 (197-393) | 370 (273-543) |
| Sep | 8 (5-13) | 11 (7-18) | Mar | 151 (114-217) | 210 (158-301) | 25 (14-46) | 35 (19-63) | Mar | 73 (53-108) | 101 (73-150) |
| Oct | 43 (32-62) | 60 (44-86) | Apr | 17 (12-25) | 23 (17-35) | 4 (2-9) | 6 (3-13) | Apr | 8 (6-14) | 12 (8-19) |
| Nov | 279 (220-374) | 386 (305-518) | May | 2 (1-4) | 3 (2-6) | 2 (1-5) | 3 (1-7) | May | 2 (1-4) | 2 (1-5) |
| Dec | 1,809 (1,436-2,424) | 2,492 (1,979-3,333) | Jun | 1 (0-1) | 1 (0-2) | 2 (0-5) | 2 (1-7) | Jun | 1 (0-2) | 1 (0-3) |

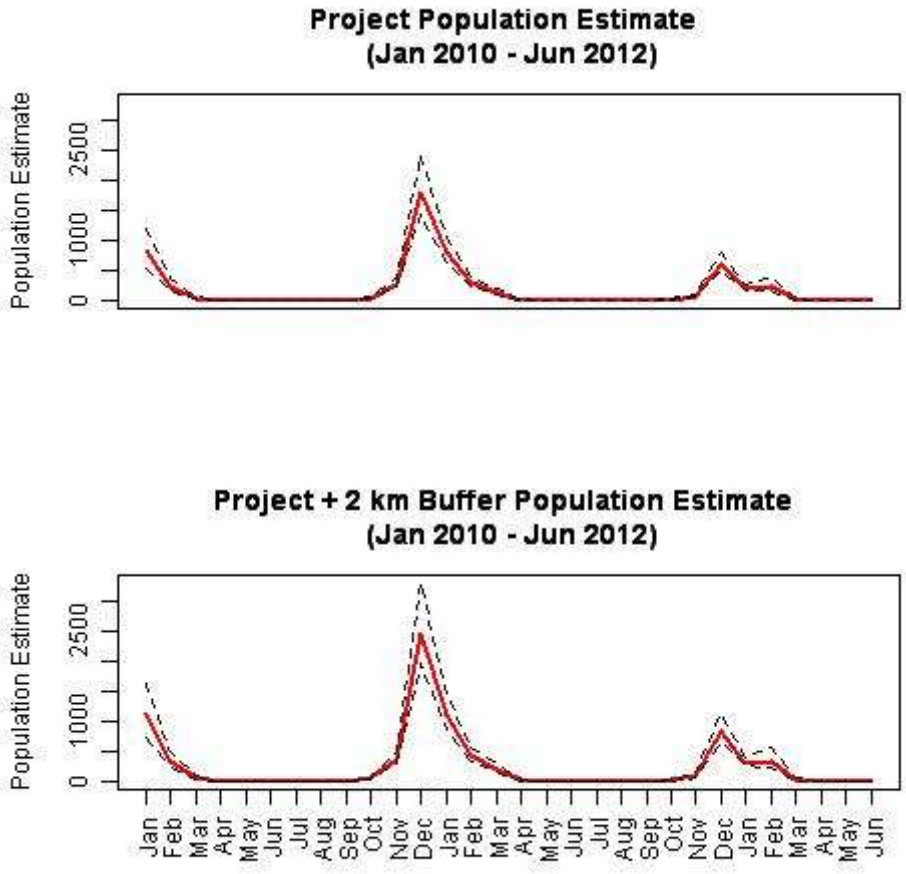



**Figure 3.55** Baseline monthly population estimates (and 90% confidence limits) for little auk for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

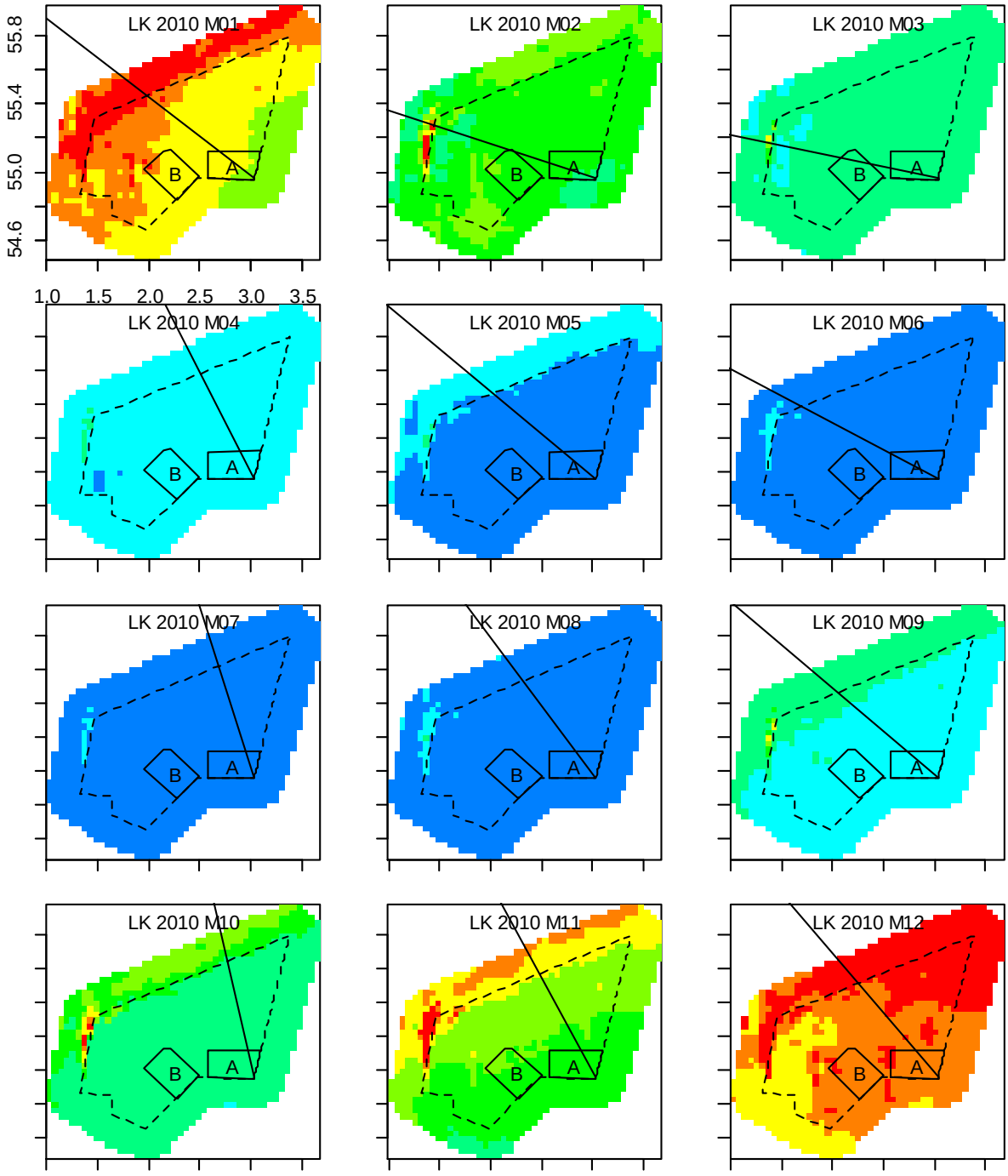



**Figure 3.56** Monthly densities of little auk within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

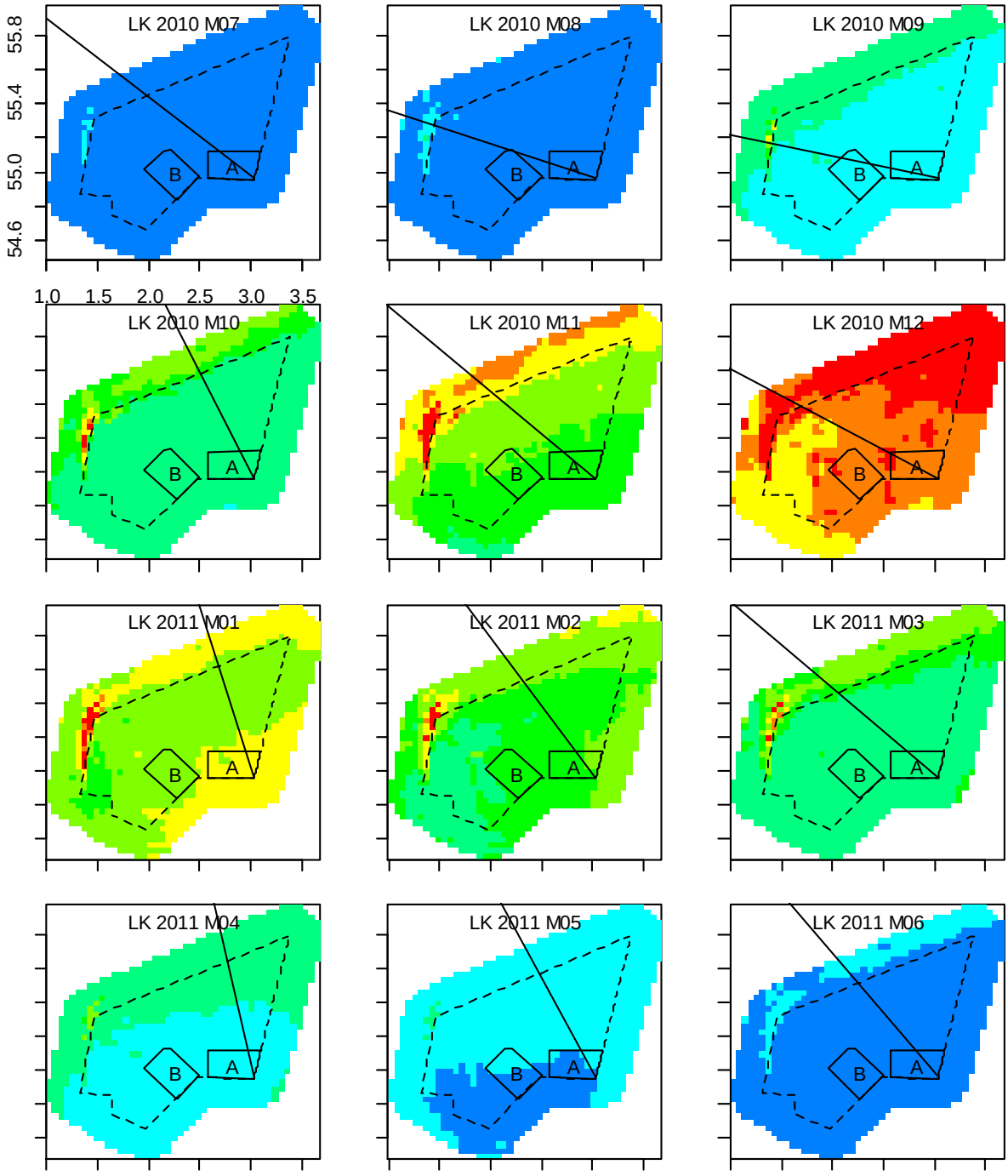



**Figure 3.57** Monthly densities of little auk within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

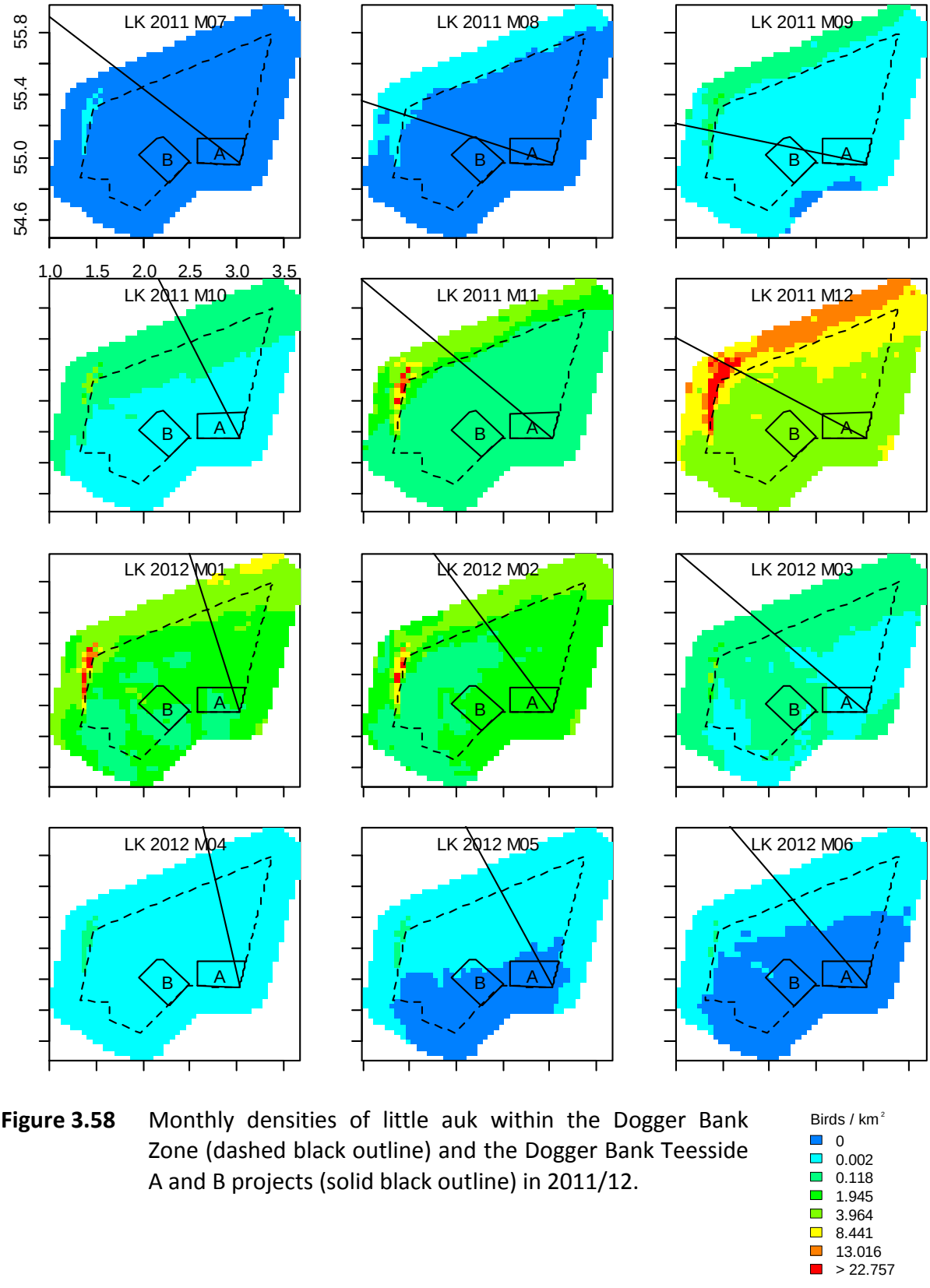



**Figure 3.58** Monthly densities of little auk within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

***Dogger Bank Teesside B***

3.2.106 In 2010, the little auk population estimates for Dogger Bank Teesside B began with 1,281 birds (90% Cls = 843-1,934) in January, before decreasing to 55 (90% CIs = 39-82) in March and 0 (90% CIs = 0-1) in June. Little auks came back to the area in September and remained present until December, when the population peaked with 1,965 birds (90% CIs = 1,582-2,628). Similar population trends were predicted for the 2010/11 and 2011/12 periods, with population estimates peaking again in December 2011 (606 birds, 90% Cls = 502-807) (Table 3.38; Figure 3.59). There is no British population estimate for little auk. However, given the numbers estimated, this species is deemed to be of national importance in Dogger Bank Teesside B. (Tables 2.6 and 3.38). Mean populations across the two and a half years of survey peaked in December, with a mean of 1,285 birds (90 % CIs = 1,042-1,717) in the project and 1,721 birds (90% CIs = 1,395-2,301) present in the project and buffer.

3.2.107 The ESAS population estimates for little auk were highest for the combined period of December to January (2,236 birds) and no little auk were recorded in the period of March to September (Table 3.9). Higher winter numbers reflect a similar pattern identified by the baseline monthly population estimates.

**Table 3.38** Modelled population estimates (and 90% confidence limits) for little auk for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 1,281 (843-1,934) | 1,723 (1,135-2,606) | Jul | 0 (0-0) | 0 (0-1) | 0 (0-1) | 1 (0-1) | Jul | 0 (0-1) | 0 (0-1) |
| Feb | 329 (240-506) | 440 (320-677) | Aug | 0 (0-1) | 1 (0-1) | 1 (0-1) | 1 (0-2) | Aug | 1 (0-1) | 1 (0-2) |
| Mar | 55 (39-82) | 73 (52-110) | Sep | 11 (7-18) | 15 (10-25) | 5 (3-8) | 6 (4-11) | Sep | 8 (5-13) | 11 (7-18) |
| Apr | 4 (3-7) | 5 (4-9) | Oct | 58 (43-83) | 79 (58-112) | 18 (13-26) | 24 (18-35) | Oct | 38 (28-55) | 51 (38-74) |
| May | 1 (1-2) | 1 (1-2) | Nov | 336 (265-451) | 452 (356-607) | 91 (74-117) | 121 (98-156) | Nov | 213 (169-284) | 286 (227-382) |
| Jun | 0 (0-1) | 0 (0-1) | Dec | 1,965 (1,582-2,628) | 2631 (2,119-3,521) | 606 (502-807) | 810 (671-1,080) | Dec | 1,285 (1,042-1,717) | 1,721 (1,395-2,301) |
| Jul | 0 (0-0) | 0 (0-1) | Jan | 696 (523-934) | 931 (697-1,250) | 233 (198-303) | 313 (266-406) | Jan | 737 (521-1,057) | 989 (699-1,420) |
| Aug | 0 (0-1) | 1 (0-1) | Feb | 256 (201-346) | 343 (268-463) | 244 (168-390) | 326 (225-521) | Feb | 276 (203-414) | 370 (271-554) |
| Sep | 11 (7-18) | 15 (10-25) | Mar | 160 (122-227) | 214 (162-303) | 34 (19-61) | 45 (25-82) | Mar | 83 (60-124) | 111 (80-165) |
| Oct | 58 (43-83) | 79 (58-112) | Apr | 17 (12-25) | 23 (16-34) | 4 (2-9) | 5 (3-12) | Apr | 8 (6-14) | 11 (7-18) |
| Nov | 336 (265-451) | 452 (356-607) | May | 2 (1-4) | 3 (2-6) | 2 (1-5) | 3 (1-7) | May | 2 (1-4) | 2 (1-5) |
| Dec | 1,965 (1,582-2,628) | 2,631 (2,119-3,521) | Jun | 1 (0-1) | 1 (0-2) | 2 (0-5) | 2 (1-7) | Jun | 1 (0-2) | 1 (0-3) |

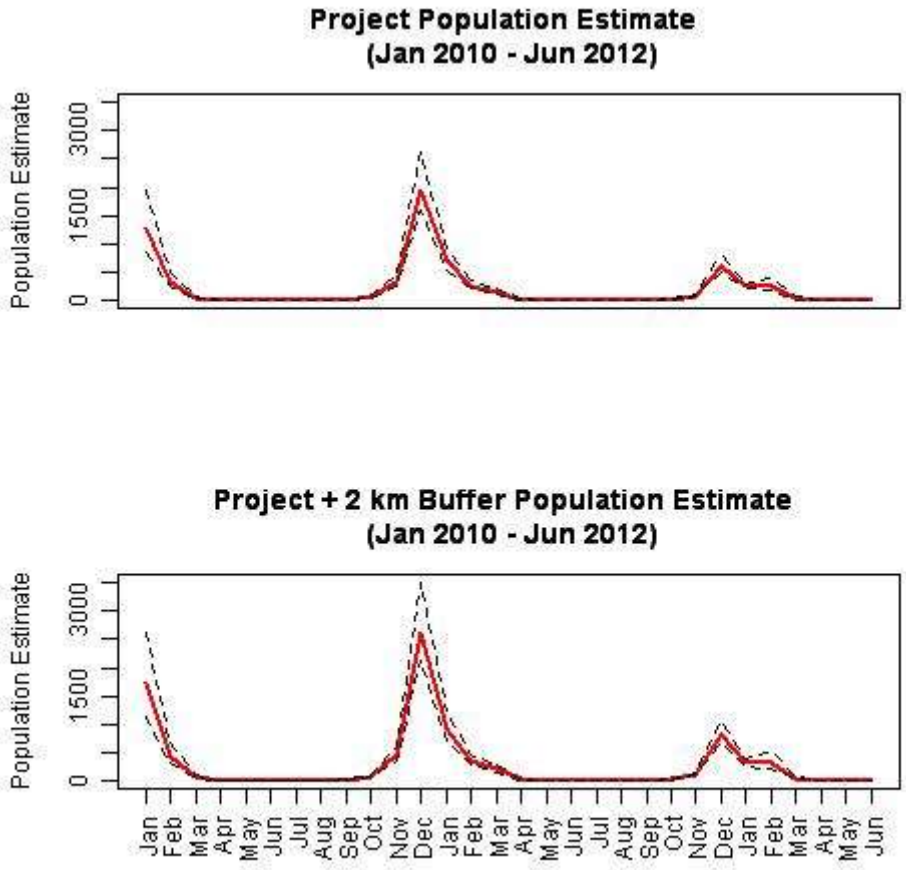



**Figure 3.59** Modelled monthly population estimates (and 90% confidence limits) for little auk for the Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Dogger Bank Teesside A and B***

3.2.108 In 2010, the little auk population estimates for Dogger Bank Teesside B began with 2,108 birds (90% Cls = 1,377-3,127) in January, before decreasing to 96 (90% CIs = 68-145) in March and 0 (90% CIs = 0-1) in July. Little auks came back to the area in August and remained present until December, when the population peaked with 3,774 birds (90% CIs = 3,018-5,052). Similar population trends were predicted for the 2010/11 and 2011/12 periods, with population estimates peaking again in December 2011 (1,206 birds, 90% Cls = 992-1,623) (Table 3.39; Figure 3.60). There is no British population estimate for little auk. However, given the numbers estimated, this species is deemed to be of national importance in Dogger Bank Teesside A and B. (Tables 2.6 and 3.39). Mean populations across the two and a half years of survey peaked in December, with a mean of 2,490 birds (90 % CIs = 2,005-3,337) in the project and 3,379 birds (90% CIs = 2,717-4,531) present in the project and buffer.

3.2.109 The ESAS population estimates for little auk were highest for the combined period of December to January (4,347 birds) and no little auk were recorded in the period of March to September (Table 3.9). Higher winter numbers reflect a similar pattern identified by the baseline monthly population estimates.

**Table 3.39** Baseline monthly population estimates (and 90% confidence limits) for little auk for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 2,108 (1,377-3,127) | 2,860 (1,868-4,243) | Jul | 0 (0-1) | 0 (0-1) | 1 (0-2) | 1 (0-3) | Jul | 1 (0-1) | 1 (0-2) |
| Feb | 572 (416-870) | 773 (565-1,181) | Aug | 1 (0-2) | 1 (1-2) | 1 (1-3) | 2 (1-4) | Aug | 1 (1-2) | 1 (1-3) |
| Mar | 96 (68-145) | 130 (92-196) | Sep | 19 (12-31) | 26 (17-43) | 8 (5-14) | 11 (7-19) | Sep | 14 (9-23) | 19 (12-31) |
| Apr | 8 (6-14) | 11 (8-19) | Oct | 102 (75-145) | 139 (103-198) | 33 (24-48) | 45 (33-65) | Oct | 67 (49-96) | 92 (68-131) |
| May | 2 (1-4) | 3 (1-5) | Nov | 615 (485-826) | 838 (662-1,124) | 168 (136-217) | 228 (184-295) | Nov | 391 (310-521) | 533 (423-709) |
| Jun | 1 (0-1) | 1 (0-2) | Dec | 3,774 (3,018-5,052) | 5,117 (4,085-6,854) | 1,206 (992-1,623) | 1,641 (1,349-2,208) | Dec | 2,490 (2,005-3,337) | 3,379 (2,717-4,531) |
| Jul | 0 (0-1) | 0 (0-1) | Jan | 1,510 (1,146-2,009) | 2,056 (1,556-2,751) | 452 (383-587) | 614 (520-799) | Jan | 1,357 (969-1,908) | 1,843 (1,315-2,598) |
| Aug | 1 (0-2) | 1 (1-2) | Feb | 564 (445-750) | 769 (606-1,030) | 496 (340-801) | 677 (463-1,089) | Feb | 544 (400-807) | 739 (545-1,100) |
| Sep | 19 (12-31) | 26 (17-43) | Mar | 312 (236-444) | 424 (320-603) | 59 (33-107) | 80 (45-145) | Mar | 156 (112-232) | 211 (152-315) |
| Oct | 102 (75-145) | 139 (103-198) | Apr | 34 (24-50) | 47 (33-68) | 8 (4-18) | 11 (5-25) | Apr | 17 (11-27) | 23 (15-37) |
| Nov | 615 (485-826) | 838 (662-1,124) | May | 5 (3-9) | 6 (4-12) | 4 (2-10) | 5 (2-13) | May | 4 (2-7) | 5 (2-10) |
| Dec | 3,774 (3,018-5,052) | 5,117 (4,085-6,854) | Jun | 1 (1-3) | 2 (1-4) | 3 (1-10) | 4 (1-14) | Jun | 2 (1-5) | 2 (1-6) |

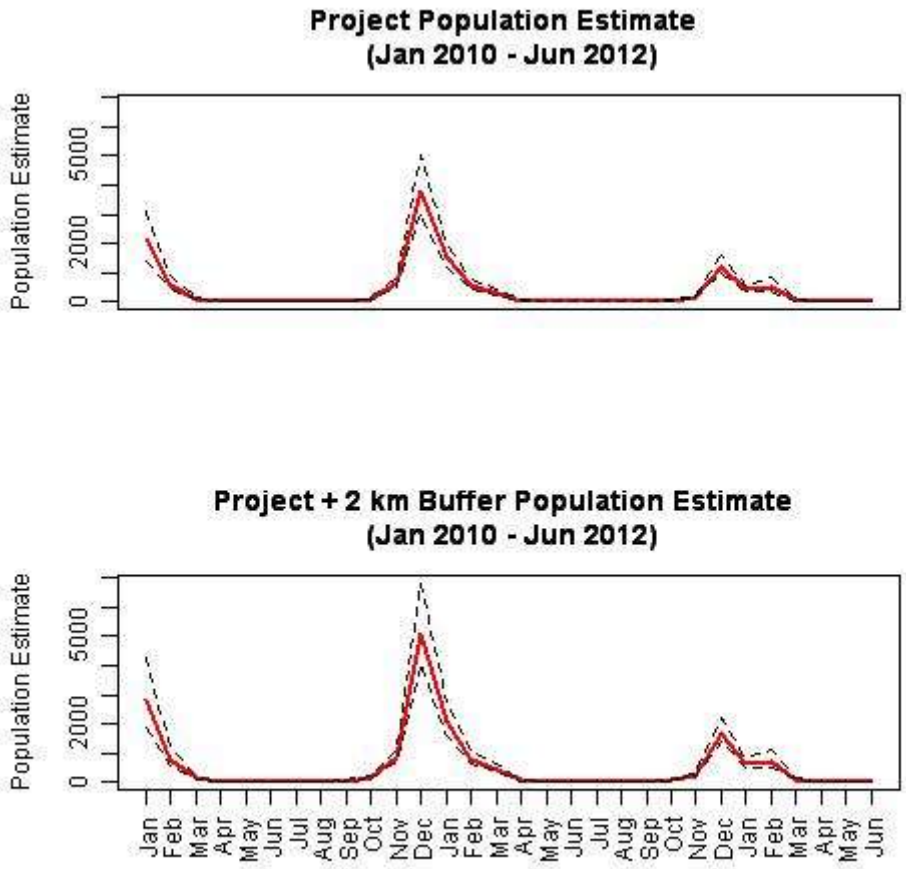



**Figure 3.60** Baseline monthly population estimates (and 90% confidence limits) for little auk for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Atlantic puffin*** **Fratercula arctica**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.2.110 Atlantic puffin is a breeding feature of 16 SPAs in the Greater North Sea OSPAR region (Appendices 1 & 2). Therefore, the value of this receptor is assessed as very high (Table 2.6).

3.2.111 Numbers in the Dogger Bank Zone as a whole did not surpass the 1% threshold for populations of national importance (Tables 2.3, 3.4, 3.5 and 3.6).

***Dogger Bank Teesside A***

3.2.112 In 2010, there were two main peaks in Atlantic puffin population estimates in Dogger Bank Teesside A: from January to March (highest value in March of 219 birds with 90% CIs = 178-268) and from September to December (highest value in December of 422 birds with 90% CIs = 351-497). In 2010/11 abundance peaked between September and May (highest in March with 582 birds, 90% CLs = 509-681). Although a similar trend was observed in 2011/12, smaller population estimates were produced for this period (highest in February with 155 birds, 90% CLs = 126-188) (Table 3.40; Figure 3.61). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A area (Table 2.3 and 3.40). Mean populations across the two and a half years of survey peaked in March, with a mean of 316 birds (90 % CIs = 271-375) in the project and 434 birds (90% CIs = 372-514) present in the project and buffer.

3.2.113 The ESAS population estimates for Atlantic puffin were highest for the combined period of February to March, with 185 birds. The lowest numbers occurred in the combined August to September period with six birds (Table 3.9). Higher winter numbers reflect a similar pattern identified by the baseline monthly population estimates.

3.2.114 Atlantic puffins had a marked westerly distribution within the zone. On a monthly basis the densities of Atlantic puffin within the south-eastern and south south-eastern areas of the Dogger Bank Zone (which contain Dogger Bank Teesside A and Dogger Bank Teesside B) tended to be lower than the far western boundaries of the Dogger Bank Zone (Figures 3.62, 3.63 and 3.64).

**Table 3.40** Baseline monthly population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 124 (83-175) | 169 (114-239) | Jul | 12 (9-15) | 16 (12-21) | 17 (14-22) | 24 (19-31) | Jul | 15 (11-19) | 20 (16-26) |
| Feb | 201 (153-257) | 275 (209-351) | Aug | 12 (9-15) | 16 (12-21) | 9 (7-11) | 12 (10-15) | Aug | 10 (8-13) | 14 (11-18) |
| Mar | 219 (178-268) | 300 (244-367) | Sep | 98 (76-127) | 136 (106-174) | 28 (21-36) | 38 (29-50) | Sep | 63 (49-81) | 87 (67-112) |
| Apr | 49 (40-62) | 68 (55-85) | Oct | 136 (107-172) | 188 (147-237) | 22 (16-28) | 30 (22-39) | Oct | 79 (61-100) | 109 (85-138) |
| May | 34 (28-42) | 47 (38-58) | Nov | 193 (152-227) | 265 (209-311) | 21 (15-27) | 29 (21-36) | Nov | 107 (84-127) | 147 (115-174) |
| Jun | 21 (17-27) | 30 (23-37) | Dec | 422 (351-497) | 577 (481-680) | 50 (37-61) | 68 (50-84) | Dec | 236 (194-279) | 323 (266-382) |
| Jul | 12 (9-15) | 16 (12-21) | Jan | 418 (350-502) | 573 (479-688) | 61 (48-75) | 84 (66-102) | Jan | 201 (161-251) | 275 (220-343) |
| Aug | 12 (9-15) | 16 (12-21) | Feb | 452 (380-533) | 619 (521-731) | 155 (126-188) | 212 (173-257) | Feb | 269 (220-326) | 369 (301-447) |
| Sep | 98 (76-127) | 136 (106-174) | Mar | 582 (509-681) | 799 (699-934) | 148 (125-176) | 203 (172-242) | Mar | 316 (271-375) | 434 (372-514) |
| Oct | 136 (107-172) | 188 (147-237) | Apr | 125 (105-151) | 172 (145-208) | 40 (32-53) | 55 (44-73) | Apr | 71 (59-89) | 98 (81-122) |
| Nov | 193 (152-227) | 265 (209-311) | May | 70 (59-83) | 96 (81-115) | 34 (28-44) | 46 (38-60) | May | 46 (38-56) | 63 (53-78) |
| Dec | 422 (351-497) | 577 (481-680) | Jun | 35 (28-43) | 48 (39-60) | 24 (20-31) | 33 (27-43) | Jun | 27 (22-34) | 37 (30-47) |

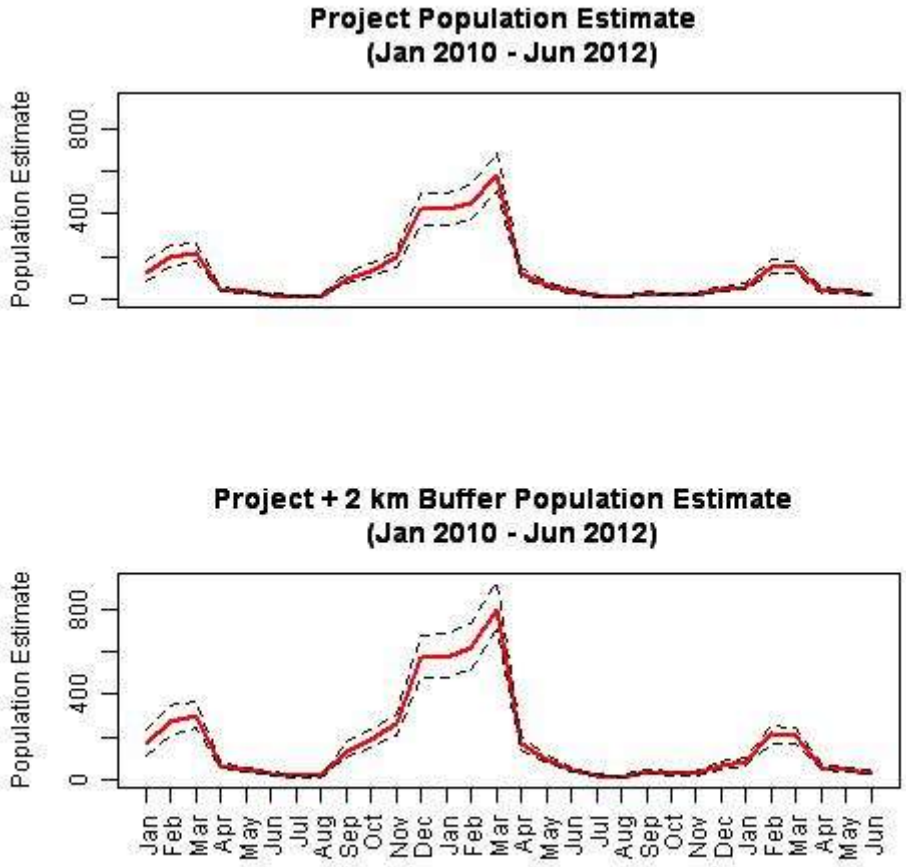



**Figure 3.61** Baseline monthly population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

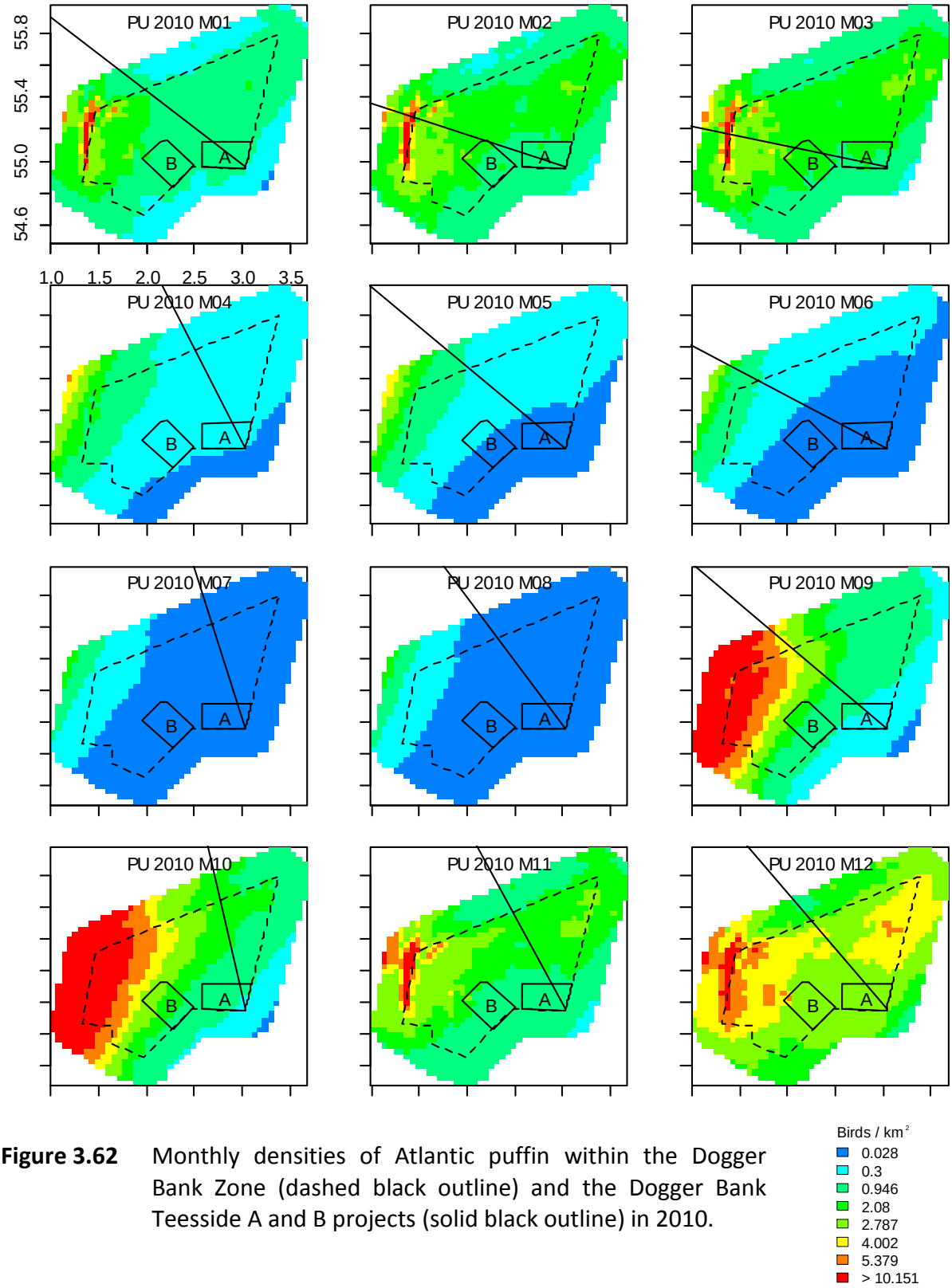



**Figure 3.62** Monthly densities of Atlantic puffin within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

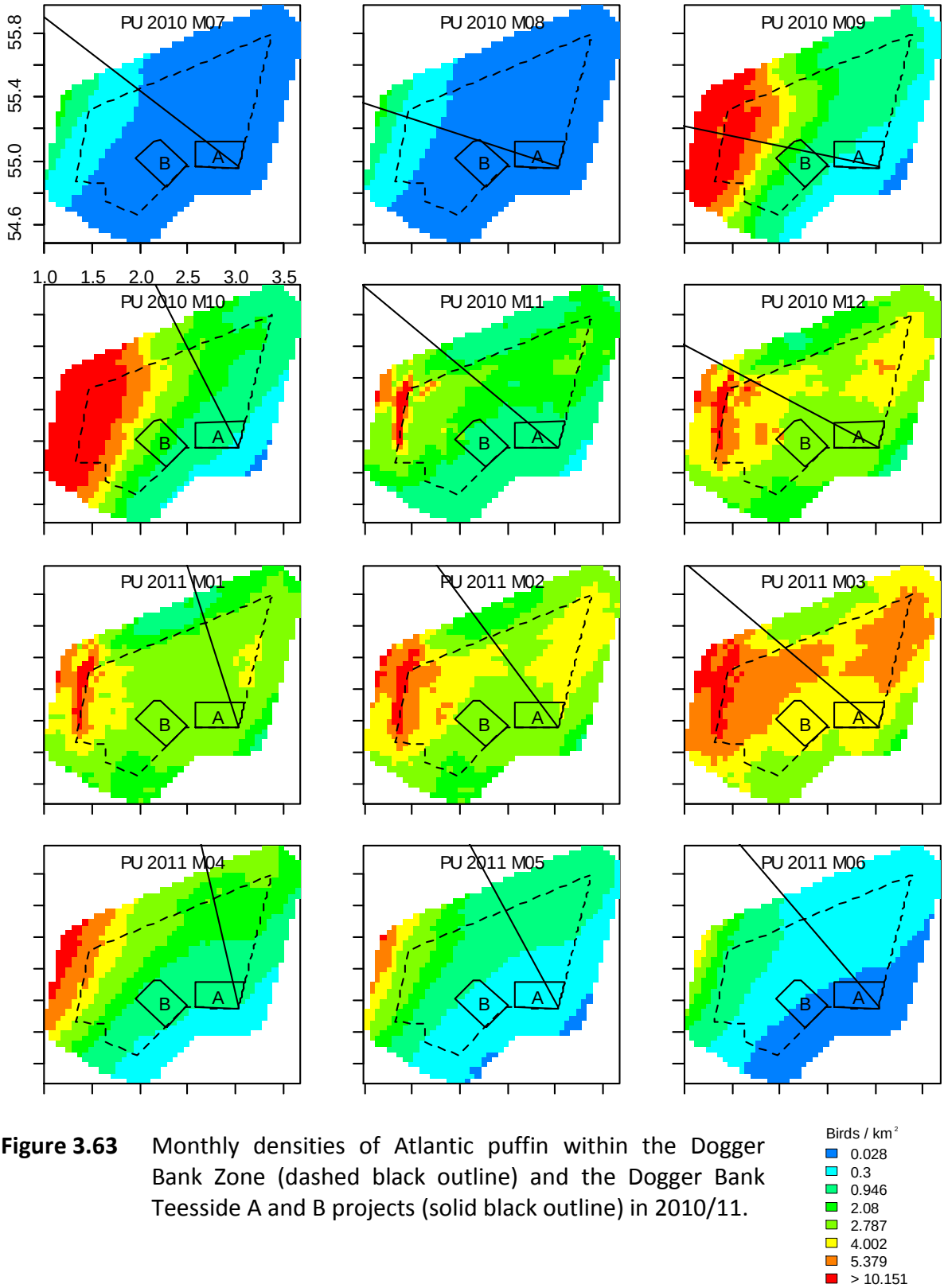



**Figure 3.63** Monthly densities of Atlantic puffin within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

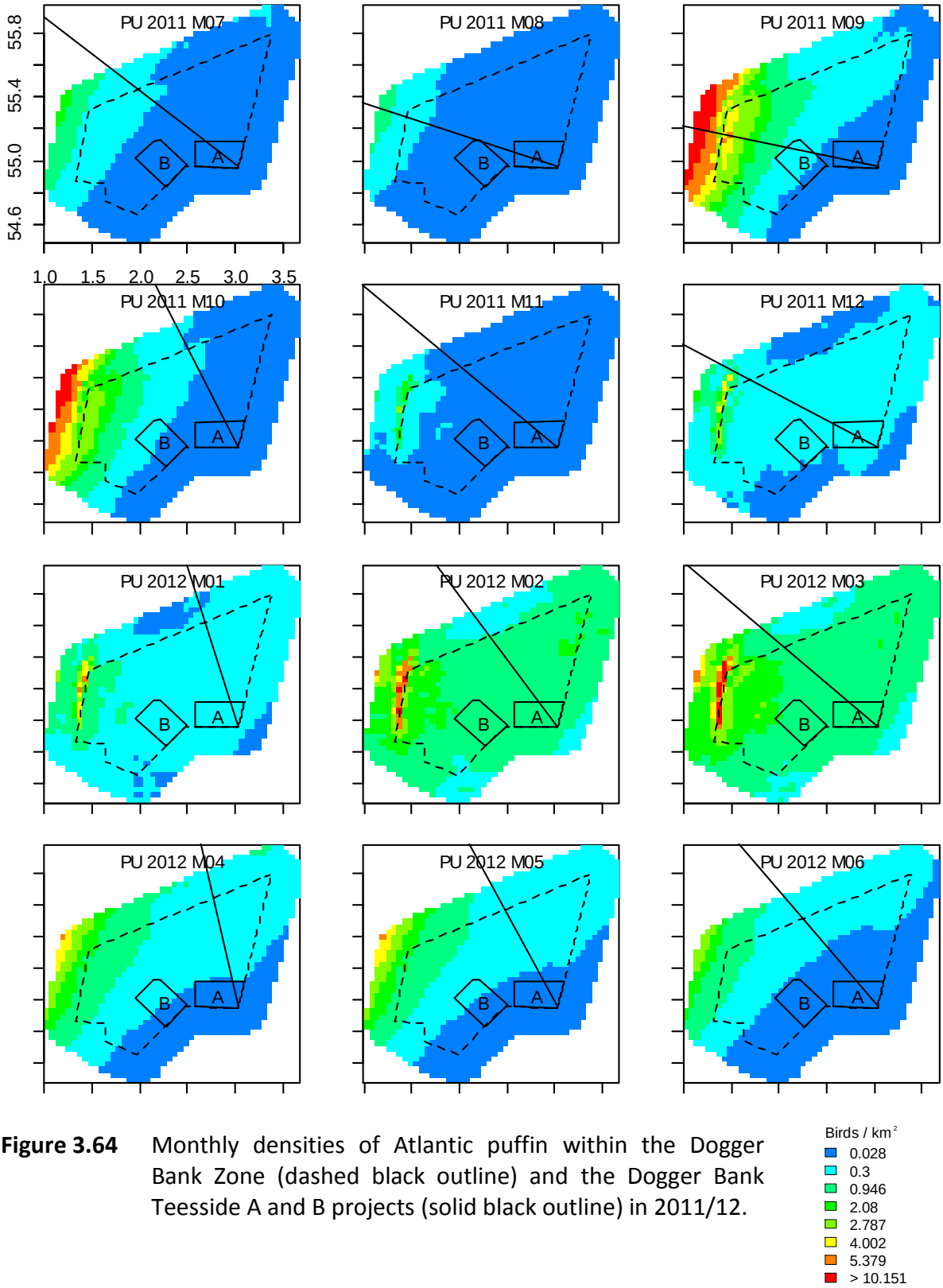



**Figure 3.64** Monthly densities of Atlantic puffin within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

***Dogger Bank Teesside B***

3.2.115 In 2010, there were two main peaks in Atlantic puffin population estimates in Dogger Bank Teesside B: from January to March (highest value in March of 252 birds with 90% CIs = 207-304) and from September to December (highest value in December of 448 birds with 90% CIs = 383-527). In 2010/11, abundance peaked between September and May (highest in March with 608 birds, 90% CLs = 543-698). In contrast, population estimates showed a general decrease in 2011/12, with a peak in abundance between February and March (highest value was in March with 170 birds, 90% CLs = 145-205) (Table 3.41; Figure 3.65). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B area (Tables 2.3 and 3.41). Mean populations across the two and a half years of survey peaked in March, with a mean of 343 birds (90 % CIs = 298-402) in the project and 465 birds (90% CIs = 405-546) present in the project and buffer.

3.2.116 The ESAS population estimates for Atlantic puffin were highest for the combined period of February to March, with 196 birds. The lowest numbers occurred in the combined August to September period with six birds (Table 3.9). Higher winter numbers reflect a similar pattern identified by the baseline monthly population estimates.

**Table 3.41** Modelled population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 150 (104-209) | 205 (142-286) | Jul | 17 (13-22) | 23 (17-30) | 24 (19-29) | 33 (26-40) | Jul | 21 (16-26) | 28 (22-35) |
| Feb | 234 (179-294) | 318 (243-400) | Aug | 17 (12-21) | 22 (16-29) | 12 (10-15) | 17 (13-21) | Aug | 14 (11-18) | 20 (15-25) |
| Mar | 252 (207-304) | 341 (280-413) | Sep | 209 (169-279) | 288 (233-382) | 60 (47-76) | 82 (65-105) | Sep | 134 (108-178) | 185 (149-244) |
| Apr | 62 (51-76) | 83 (69-104) | Oct | 289 (234-379) | 397 (321-519) | 45 (35-57) | 62 (48-79) | Oct | 167 (135-218) | 229 (185-299) |
| May | 44 (37-54) | 60 (50-73) | Nov | 213 (176-249) | 290 (239-339) | 23 (17-28) | 31 (23-38) | Nov | 118 (96-138) | 161 (131-189) |
| Jun | 27 (22-34) | 37 (29-47) | Dec | 448 (383-527) | 609 (521-715) | 51 (38-61) | 70 (52-83) | Dec | 250 (211-294) | 340 (287-399) |
| Jul | 17 (13-22) | 23 (17-30) | Jan | 399 (334-487) | 541 (453-660) | 64 (51-77) | 87 (70-104) | Jan | 204 (163-258) | 277 (221-350) |
| Aug | 17 (12-21) | 22 (16-29) | Feb | 432 (357-524) | 586 (485-710) | 155 (131-186) | 211 (178-252) | Feb | 273 (222-334) | 371 (302-454) |
| Sep | 209 (169-279) | 288 (233-382) | Mar | 608 (543-698) | 823 (737-946) | 170 (145-205) | 231 (197-278) | Mar | 343 (298-402) | 465 (405-546) |
| Oct | 289 (234-379) | 397 (321-519) | Apr | 159 (140-184) | 217 (191-251) | 50 (41-63) | 68 (56-85) | Apr | 90 (77-108) | 123 (105-147) |
| Nov | 213 (176-249) | 290 (239-339) | May | 91 (80-107) | 124 (108-146) | 44 (36-54) | 60 (50-74) | May | 60 (51-72) | 81 (69-98) |
| Dec | 448 (383-527) | 609 (521-715) | Jun | 46 (39-57) | 63 (53-77) | 31 (26-40) | 42 (35-54) | Jun | 35 (29-44) | 48 (39-59) |

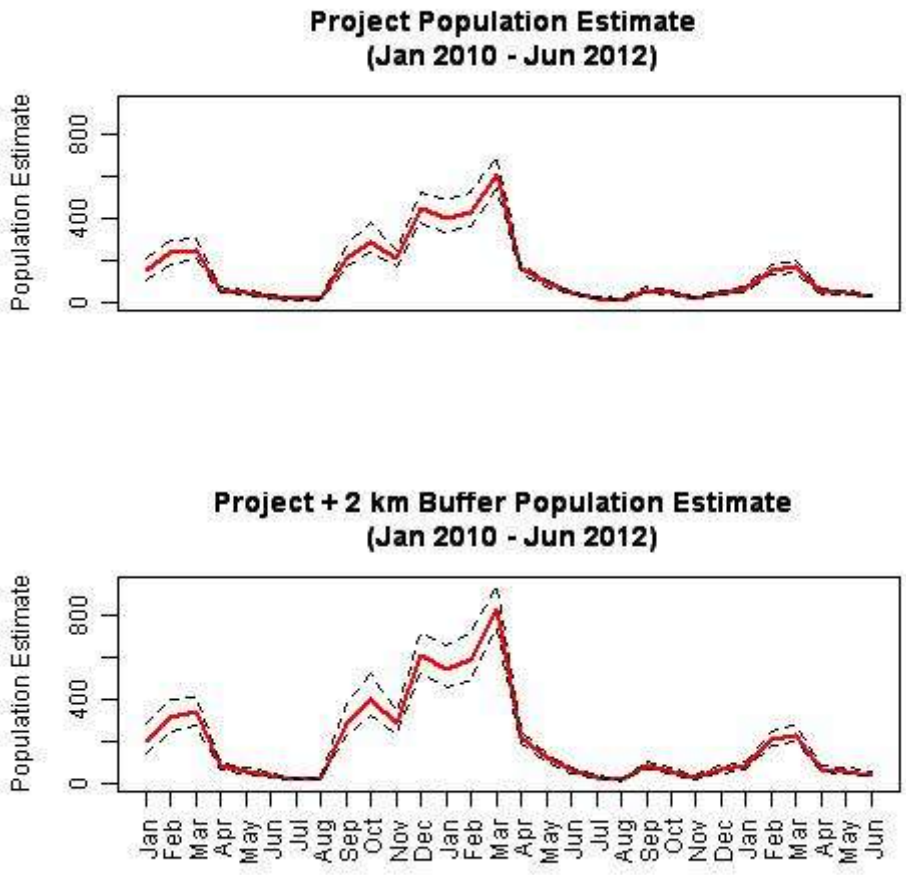



**Figure 3.65** Modelled monthly population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Dogger Bank Teesside A and B***

3.2.117 In 2010, there were two main peaks in Atlantic puffin population estimates in the Dogger Bank Teesside A and B areas: from January to March (highest value in March of 471 birds with 90% CIs = 385-572) and from September to December (highest value in December of 870 birds with 90% CIs = 734-1,024). In 2010/11, abundance peaked between September and April (highest in March with 1,189 birds, 90% CLs = 1,052-1,379). In contrast, population estimates showed a general decrease in 2011/12, with a peak in abundance between February and March (highest value was in March with 318 birds, 90% CLs = 270-381) (Table 3.42; Figure 3.66). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B areas (Tables 2.3 and 3.42). Mean populations across the two and a half years of survey peaked in March, with a mean of 659 birds (90 % CIs = 569-777) in the project and 900 birds (90% CIs = 779-1,059) present in the project and buffer.

3.2.118 The ESAS population estimates for Atlantic puffin were highest for the combined period of February to March, with 380 birds. The lowest numbers occurred in the combined August to September period with 12 birds (Table 3.9). This is similar to the pattern identified by the baseline monthly population estimates.

**Table 3.42** Baseline monthly population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 274 (187-384) | 372 (254-524) | Jul | 29 (22-38) | 40 (30-51) | 42 (33-52) | 57 (45-71) | Jul | 35 (27-45) | 48 (37-61) |
| Feb | 435 (331-550) | 594 (453-749) | Aug | 28 (21-36) | 38 (28-49) | 21 (17-27) | 29 (23-36) | Aug | 25 (19-31) | 34 (26-43) |
| Mar | 471 (385-572) | 642 (522-783) | Sep | 308 (246-406) | 425 (347-547) | 87 (68-112) | 120 (94-156) | Sep | 197 (157-259) | 273 (220-352) |
| Apr | 111 (91-139) | 152 (125-189) | Oct | 425 (341-551) | 586 (469-759) | 67 (51-85) | 92 (71-119) | Oct | 246 (196-318) | 339 (270-439) |
| May | 78 (65-96) | 107 (89-129) | Nov | 406 (328-476) | 553 (448-658) | 44 (32-54) | 60 (44-74) | Nov | 225 (180-265) | 307 (246-366) |
| Jun | 49 (39-61) | 67 (53-83) | Dec | 870 (734-1,024) | 1,185 (1,010-1,397) | 101 (75-123) | 138 (104-167) | Dec | 486 (405-573) | 661 (557-782) |
| Jul | 29 (22-38) | 40 (30-51) | Jan | 817 (684-989) | 1,115 (930-1,352) | 125 (99-151) | 171 (136-206) | Jan | 405 (324-508) | 553 (440-694) |
| Aug | 28 (21-36) | 38 (28-49) | Feb | 883 (737-1,057) | 1,208 (1,008-1,440) | 310 (257-374) | 424 (351-509) | Feb | 543 (442-660) | 742 (604-899) |
| Sep | 308 (246-406) | 425 (347-547) | Mar | 1,189 (1,052-1,379) | 1,624 (1,444-1,873) | 318 (270-381) | 433 (372-521) | Mar | 659 (569-777) | 900 (779-1,059) |
| Oct | 425 (341-551) | 586 (469-759) | Apr | 284 (245-335) | 392 (335-464) | 90 (73-115) | 123 (101-158) | Apr | 162 (136-196) | 222 (187-270) |
| Nov | 406 (328-476) | 553 (448-658) | May | 161 (138-190) | 222 (190-260) | 78 (64-98) | 105 (88-134) | May | 106 (89-128) | 145 (122-174) |
| Dec | 870 (734-1,024) | 1,185 (1,010-1,397) | Jun | 81 (67-100) | 111 (92-136) | 55 (46-71) | 76 (63-97) | Jun | 62 (50-77) | 85 (69-105) |

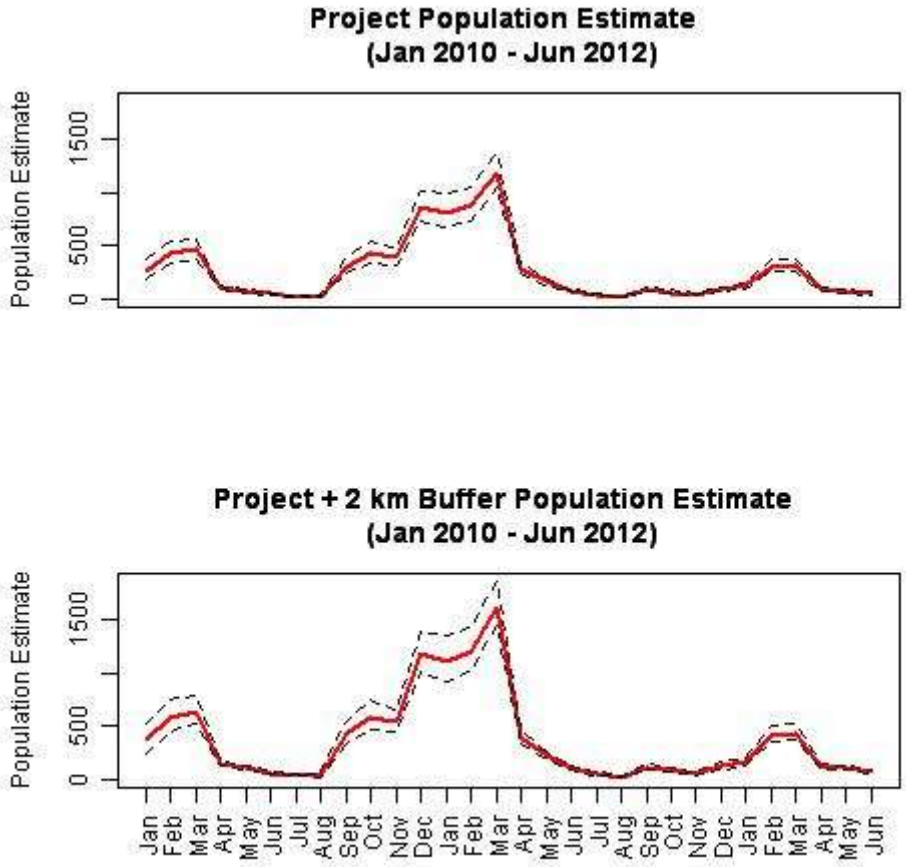



**Figure 3.66** Baseline monthly population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

## 3.3 Export Cable Corridor baseline populations

### Introduction

3.3.1 Mean and maximum population densities of seabirds recorded in the European Seabirds at Sea database for the area of the proposed export cable corridor for the Dogger Bank Teesside A and B projects of the Dogger Bank Offshore Wind Farm Zone are shown in Table 3.43. Note, as the potential export cable corridor covers a much larger area than that which will actually be affected by the operations associated with the laying of cables, these estimates are at least an order of magnitude greater than the numbers that could be impacted by effects associated with cable laying.

3.3.2 The proposed export cable corridor lies within the foraging range of seven species from 27 protected sites (name sites) (see Appendix 1). The Teesmouth and Cleveland Coast is the nearest SPA to the corridor and landfall. This protected area does not contain relevant SPA feature species. However, where records exist, the presence of each receptor species has been reported in the text under each receptor account.

**Table 3.43** Mean and maximum population densities of seabirds recorded in the European Seabirds at Sea database, for the export cable corridor for the Dogger Bank Teesside A and B projects of the Dogger Bank Offshore Wind Farm Zone. Population estimates based on mean densities of seabirds derived from the European Seabirds at Sea database have also been calculated for the export cable corridor area associated with the Dogger Bank Teesside A, Dogger Bank Teesside B, and Dogger Bank Teesside A and B projects.

| | **Dogger Bank Teesside A and B mean density in (birds/km²)** | **Dogger Bank Teesside A and B maximum density (birds/km²)** | **Dogger Bank Teesside A / B / A + B Population estimates** |
|---|---|---|---|
| Common scoter | 0 | 0 | 0 |
| Red-throated diver | 0 | 0 | 0 |
| Northern fulmar | 1.59 | 9.37 | 372 |
| Manx shearwater | 0 | 0 | 0 |
| Northern gannet | 0.20 | 0.68 | 47 |
| European shag | 0 | 0 | 0 |
| Great skua | 0.03 | 0.52 | 7 |
| Common gull | 0 | 0 | 0 |
| Herring gull | 0.14 | 1.81 | 33 |
| Great black-backed gull | 0.08 | 0.88 | 19 |
| Black-legged kittiwake | 2.37 | 15.89 | 555 |
| Common tern | 0 | 0 | 0 |
| Arctic tern | 0 | 0 | 0 |
| Common guillemot | 3.78 | 20.62 | 885 |
| Razorbill | 0.08 | 1.42 | 19 |
| Atlantic puffin | 0.21 | 2.14 | 49 |

**Receptor Accounts**

***Common scoter*** **Melanitta nigra**

*SPA/Ramsar/SSSI feature*

VALUE OF RECEPTOR-VERY HIGH

3.3.3 Between 1979 and 2002, no common scoter were recorded by ESAS within the area around the Dogger Bank Teesside A and B export cable corridor (Table 3.43).

3.3.4 Large numbers of common scoter were recorded during sea-watching activity on the Teesmouth and Cleveland Coast during the autumn and winter, where up to 694 were seen on a daily basis (Teesmouth Bird Club 2011).

3.3.5 Although ESAS derived population estimates for the export cable corridor area were 0, sea-watching data suggests higher numbers are likely to be present in the coastal regions of the area during the autumn and winter.

***Red-throated diver*** **Gavia stellata**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.6 Between 1979 and 2002, no red-throated diver were recorded by ESAS within the area around the Dogger Bank Teesside A and B export cable corridor (Table 3.43).

3.3.7 Low numbers have been recorded on and the Teesmouth and Cleveland Coast in the autumn and winter months, with a maximum daily count of 35 birds in October 2011 (Teesmouth Bird Club 2011).

3.3.8 Although ESAS derived population estimates for the export cable corridor area were 0, sea-watching data suggests low numbers are likely to be present in the coastal regions of the area during the autumn and winter.

***Northern fulmar*** **Fulmarus glacialis**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.9 Between 1979 and 2002, the mean recorded density of northern fulmar was 1.59 birds/km$^2$ within the area around the Dogger Bank Teesside A and B export cable corridor. These densities reflect a population of 372 birds within the export cable

corridor area associated with the Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects (Table 3.43).

3.3.10 The Teesmouth and Cleveland Coast is also a known breeding site for northern fulmars with 150 pairs recorded in 2011 (Teesmouth Bird Club 2011).

3.3.11 These data suggest that northern fulmar are likely to be present within the export cable corridor area and that over summer a small number may be associated with breeding colonies on the Teesmouth and Cleveland Coast.

***Manx shearwater* Puffinus puffinus**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.12 Between 1979 and 2002, no Manx shearwater were recorded by ESAS within the area around the Dogger Bank Teesside A and B export cable corridor (Table 3.43).

3.3.13 Low sea-watching trends were recorded in the spring and autumn of 2011 on the Teesmouth and Cleveland Coast. The highest daily count was 57 in late August (Teesmouth Bird Club 2011).

3.3.14 These data suggest that whilst Manx shearwater may be recorded in the export cable corridor area during the spring and autumn migration periods, they are likely to be largely absent from the area for the rest of the year.

***Northern gannet* Morus bassanus**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.15 Between 1979 and 2002, the mean recorded density of northern gannet was 0.20 birds/km$^2$ within the area around the Dogger Bank Teesside A and B export cable corridor. These densities reflect a population of 47 birds within the export cable corridor area associated with the Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects (Table 3.43).

3.3.16 On the Teesmouth and Cleveland Coast, the northern gannet is considered a common summer visitor. The largest record in 2011 was 500 off Redcar in mid-Jul (Teesmouth Bird Club 2011).

3.3.17 These data suggest that northern gannet are likely to be present within the export cable corridor area, particularly in the summer.

***European shag* Phalacrocorax aristotelis**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.18 Between 1979 and 2002, no European shag were recorded by ESAS within the area around the Dogger Bank Teesside A and B export cable corridor (Table 3.43).

3.3.19 The Teesmouth and Cleveland Coast has no breeding population, however, individuals are typically recorded in low numbers mainly during the autumn and winter. The highest daily count in 2011 was 39 individuals in December (Teesmouth Bird Club 2011).

3.3.20 These data suggest that European shag may be present in low numbers within the export cable corridor area in the autumn and winter.

***Great skua* Stercorarius skua**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.21 Between 1979 and 2002, the mean recorded density of great skua was 0.03 birds/km$^2$ within the area around the Dogger Bank Teesside A and B export cable corridor. These densities reflect a population of seven birds within the export cable corridor area associated with the Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects (Table 3.43).

3.3.22 Low numbers of great skua (usually single figures, daily) were recorded passing the Teesmouth and Cleveland Coast in the summer and autumn (Teesmouth Bird Club 2011).

3.3.23 These data suggest that the occurrence of great skua in both export cable corridor area is likely to be restricted to the autumn, when high numbers of birds may pass through on migration.

***Common gull* Larus canus**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.24 Between 1979 and 2002, no common gulls were recorded by ESAS within the area around the Dogger Bank Teesside A and B export cable corridor (Table 3.43).

3.3.25 WeBS counts showed common gull to be present on the coast year round, with higher numbers in the winter. The highest count in 2011 was 371 at South Tees in March (Teesmouth Bird Club 2011).

3.3.26 These data suggest that few common gull are likely to be found within the export cable corridor area.

***Herring gull*** **Larus argentatus**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Red list* (Eaton *et al*. 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.27 Between 1979 and 2002, the mean recorded density of herring gull was 0.14 birds/km$^2$ within the area around the Dogger Bank Teesside A and B export cable corridor. These densities reflect a population of 33 birds within the export cable corridor area associated with the Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects (Table 3.43).

3.3.28 Some birds may be associated with the small breeding colonies present on the Teesmouth and Cleveland Coast, with 75 pairs at Hunt Cliff and *ca*. 460 pairs between Skenningrove and Cowbar (Teesmouth Bird Club 2011).

3.3.29 These data suggest that low numbers of herring gull are likely to be found within the export cable corridor area.

***Great black-backed gull*** **Larus marinus**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.30 Between 1979 and 2002, the mean recorded density of great black-backed gull was 0.08 birds/km$^2$ within the area around the Dogger Bank Teesside A and B export cable corridor. These densities reflect a population of 19 birds within the export cable corridor area associated with the Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects (Table 3.43).

3.3.31 WeBS counts showed great black-backed gull to be present on the coast year round, with higher numbers in the winter. The highest count in 2011 was 531 at North Tees in December (Teesmouth Bird Club 2011).

3.3.32 These data suggest great black-backed gull may be present in the export cable corridor area.

***Black-legged kittiwake* Rissa tridactyla**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.33 Between 1979 and 2002, the mean recorded density of black-legged kittiwake was 2.37 birds/km$^2$ within the area around the Dogger Bank Teesside A and B export cable corridor. These densities reflect a population of 555 birds within the export cable corridor area associated with the Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects (Table 3.43).

3.3.34 On the Teesmouth and Cleveland Coast, the black-legged kittiwake is considered an abundant breeder with 4,074 apparently occupied nests counted in 2011 (Teesmouth Bird Club 2011).

3.3.35 These data suggest that high densities of black-legged kittiwake may be present within the export cable corridor area, with noticeable peaks during the breeding season, when some may be associated with the small breeding colonies on the Teesmouth and Cleveland Coast.

***Common tern* Sterna hirundo**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.36 Between 1979 and 2002, no common terns were recorded by ESAS within the area around the Dogger Bank Teesside A and B export cable corridor (Table 3.43).

3.3.37 Large numbers were recorded on the Teesmouth and Cleveland Coast in 2011 due to a breeding colony at RSPB Saltholme reserve (Highest WeBS count = 251 in July) (Teesmouth Bird Club 2011).

3.3.38 These data suggest that common tern may be observed within the export cable corridor areas. However, these may be restricted to passage periods or in the breeding season on the Teesmouth and Cleveland Coast.

***Arctic tern* Sterna paradisaea**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.39 Between 1979 and 2002, no Arctic terns were recorded by ESAS within the area around the Dogger Bank Teesside A and B export cable corridor (Table 3.43).

3.3.40 During passage periods, very few birds were recorded during sea-watching activity on the Teesmouth and Cleveland Coast (Yorkshire Naturalists Union 2010; Teesmouth Bird Club 2011).

3.3.41 These data suggest that few Arctic terns are likely to be observed within the export cable corridor areas, and that these may be restricted to passage periods.

***Common guillemot* Uria aalge**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.42 Between 1979 and 2002, the mean recorded density of common guillemot was 3.78 birds/km$^2$ within the area around the Dogger Bank Teesside A and B export cable corridor. These densities reflect a population of 885 birds within the export cable corridor area associated with the Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects (Table 3.43).

3.3.43 Records from the Teesmouth and Cleveland Coast show low daily sea-watching counts with occasional peaks (600 on 18$^{th}$ June) (Teesmouth Bird Club 2011).

3.3.44 These data suggest common guillemots are likely to be observed within the export cable corridor area.

***Razorbill* Alca torda**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.45 Between 1979 and 2002, the mean recorded density of razorbill was 0.08 birds/km$^2$ within the area around the Dogger Bank Teesside A and B export cable corridor. These densities reflect a population of 19 birds within the export cable corridor area associated with the Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects (Table 3.43).

3.3.46 Razorbill breed in small numbers on the Teesmouth and Cleveland Coast (20 pairs in 2011). Data from sea-watching effort carried out within the SPA suggests a small presence in the winter and a larger presence in the summer (highest record in 2011 = 152 birds in mid-August) (Teesmouth Bird Club 2011).

3.3.47 These data suggest razorbill are likely to be observed within the export cable corridor area, particularly in the breeding season and the summer.

***Atlantic puffin*** **Fratercula arctica**

*SPA/Ramsar/SSSI feature; Birds of Conservation Concern Amber list* (Eaton *et al.* 2009).

VALUE OF RECEPTOR-VERY HIGH

3.3.48 Between 1979 and 2002, the mean recorded density of Atlantic puffin was 0.21 birds/$km^2$ within the area around the Dogger Bank Teesside A and B export cable corridor. These densities reflect a population of 49 birds within the export cable corridor area associated with the Dogger Bank Teesside A, Dogger Bank Teesside B and Dogger Bank Teesside A and B projects (Table 3.43).

3.3.49 Sea-watching records show large numbers passing the coast in June. The highest day count in 2011 was 277 in June (Teesmouth Bird Club 2011).

3.3.50 These data suggest Atlantic puffin are likely to be observed within the export cable corridor area, particularly in the late breeding season.

## 3.4 Ornithology of the Intertidal Zone at the Export Cable Corridor Landfall

**Wetland Bird Survey (WeBS)**

3.4.1 There were no available WeBS data for the study area. Although there appears to be a core count section set up for the area of Redcar to Marske, no data has ever been submitted and the closest WeBS core counts are carried out at three sites in the Tees estuary as follows (shortest distances, as the crow flies, given in parentheses): Tees South (<9km), Teesmouth (<9km), Tees Estuary opposite Smiths Dock and Hargreaves Quarry (<10km).

**Non-estuarine Coastal Waterbird Survey (NEWS)**

3.4.2 Relevant NEWS data were available for the coastline area defined as Redcar to Saltburn. There were two NEWS sections which overlapped with the study area and were approximately 2.4km and 4.15km in length (see Figure A). Data were available for the winters of 1984/85, 1997/98 and 2006/07 but only data from the latter survey year was considered to be of relevance. Corrections were applied to count data which represented the degree of spatial overlap of the NEWS counts with the study area (0.5km and 1.6km respectively). Counts for these two sections were then combined to provide a peak count for NEWS data.

3.4.3 The following bird species were recorded by NEWS in the study area: Eurasian oystercatcher, northern lapwing, sanderling and ruddy turnstone (Table I).

**Field survey based study**

***Wintering Bird Survey 2011/12***

3.4.4 No bird species recorded during the winter bird surveys were relevant to the intertidal study (see 2.6.13).

***Inshore sea-watch survey 2011/12***

3.4.5 The following relevant bird species were recorded during the inshore sea-watches: Eurasian oystercatcher, ringed plover, grey plover, sanderling, dunlin, bar-tailed godwit, ruddy turnstone, black-headed gull, common gull, carrion crow (Table I).

***Autumn passage and wintering bird surveys and inshore sea-watch survey 2012/13***

3.4.6 The following bird species were recorded by the autumn passage, winter bird and inshore sea-watch surveys (see section 2.6.15 for explanation) relevant to the intertidal study: great cormorant, Eurasian oystercatcher, ringed plover, Eurasian curlew, bar-tailed godwit, ruddy turnstone, sanderling, black-headed gull, Mediterranean gull, great black-backed gull, common gull, herring gull, jackdaw, carrion crow, meadow pipit, goldfinch, linnet (see Table I).

**Table 3.44** Summary of population counts for all species for the study area (for Dogger Bank Teesside A and B and Dogger Bank Teesside C and D) derived from survey schemes (WeBS and NEWS) and commissioned surveys (autumn and winter bird surveys and inshore sea-watches).

| Species | Dogger Bank Teesside A+B | | | Dogger Bank Teesside C+D | |
|---|---|---|---|---|---|
| | NEWS combined[1] | Inland sea-watch surveys 2011/12[2] | Autumn/winter sea-watch surveys 2012/13[2] | NEWS[3] | Autumn/winter sea-watch surveys 2012/13[2] |
| Great cormorant | 0 | 0 | 1 | 0 | 0 |
| Eurasian oystercatcher | 65 | 21 | 12 | 53 (74) | 4 |
| Grey plover | 0 | 1 | 0 | 0 | 0 |
| Northern lapwing | 121 | 0 | 0 | 429 (600) | 9 |
| Ringed plover | 0 | 18 | 2 | 0 | 0 |
| Eurasian curlew | 0 | 0 | 1 | 0 | 0 |
| Bar-tailed godwit | 0 | 1 | 1 | 0 | 1 |
| Ruddy turnstone | 5 | 5 | 22 | 19 (27) | 120 |
| Sanderling | 3 | 104 | 3 | 0 | 0 |
| Dunlin | 0 | 47 | 0 | 0 | 2 |
| Black-headed gull | 0 | 175 | 318 | 0 | 103 |
| Mediterranean gull | 0 | 0 | 2 | 0 | 0 |
| Great black-backed gull | 0 | 0 | 2 | 0 | 2 |
| Common gull | 0 | 2 | 4 | 0 | 0 |
| Lesser black-backed gull | 0 | 0 | 3 | 0 | 0 |
| Herring gull | 0 | 0 | 115 | 0 | 13 |
| Jackdaw | 0 | 0 | 2 | 0 | 0 |
| Carrion crow | 0 | 12 | 10 | 0 | 26 |
| Common starling | 0 | 0 | 0 | 0 | 300 |
| Meadow pipit | 0 | 0 | 2 | 0 | 0 |
| Goldfinch | 0 | 0 | 12 | 0 | 30 |
| Linnet | 0 | 0 | 37 | 0 | 0 |

[1] Values given in brackets are the uncorrected counts for two NEWS sections summed together;

[2] Maximum numbers of individuals recorded;

[3] Only was section of NEWS was relevant.

**Receptor accounts**

3.4.7 Receptor accounts are provided for all species recorded or estimated to occur in the defined study area in numbers of 10 or more.

***Eurasian oystercatcher*** **Haematopus ostralegus**

VALUE OF RECEPTOR-LOW

*Birds of Conservation Concern Amber list* (Eaton *et al*. 2009)

3.4.8 Eurasian oystercatcher is not a feature of any SPA or any other protected site within 2km of the study area. As it is an amber listed species, the value of this receptor in relation to the intertidal zone is assessed as low.

3.4.9 The highest estimated count of 65 individuals occurred in the winter of 2006/07.

***Northern Lapwing*** **Vanellus vanellus**

VALUE OF RECEPTOR-VERY HIGH

*UKBAP species*

*Birds of Conservation Concern Red list* (Eaton *et al.* 2009)

3.4.10 Northern lapwing is listed as feature of Teesmouth and Cleveland Coast SPA (less than 2km from the study area) as part of the wintering assemblage. The value of this receptor in relation to the intertidal zone is assessed as very high.

3.4.11 The highest estimated count of 121 individuals occurred in the winter of 2006/07.

***Ringed Plover*** **Charadrius hiaticula**

VALUE OF RECEPTOR-VERY HIGH

*Birds of Conservation Concern Amber list* (Eaton *et al*. 2009)

3.4.12 Ringed plover is listed as feature of Teesmouth and Cleveland Coast SPA (less than 2km from the study area) during the passage season. The value of this receptor in relation to the intertidal zone is assessed as very high.

3.4.13 The highest estimated count of 18 individuals occurred in the winter of 2011/12.

***Ruddy turnstone* Arenaria interpres**

VALUE OF RECEPTOR-LOW

*Birds of Conservation Concern Amber list* (Eaton *et al*. 2009)

3.4.14 Ruddy turnstone is not a feature of any SPA or any other protected site within 2km of the study area. As it is an amber listed species, the value of this receptor in relation to the intertidal zone is assessed as low.

3.4.15 The highest estimated count of 22 individuals occurred in the winter of 2012/13.

***Sanderling* Calidris alba**

VALUE OF RECEPTOR-VERY HIGH

3.4.16 Sanderling is listed as feature of Teesmouth and Cleveland Coast SPA (less than 2km from the study area) as part of the wintering assemblage. The value of this receptor in relation to the intertidal zone is assessed as very high.

3.4.17 The highest estimated count of 104 individuals occurred in the winter of 2011/12.

***Dunlin* Calidris alpina**

VALUE OF RECEPTOR-LOW

*Birds of Conservation Concern Red list* (Eaton *et al.* 2009)

3.4.18 Dunlin is not a feature of any SPA or any other protected site within 2km of the study area. As it is a red listed species, the value of this receptor in relation to the intertidal zone is assessed as low.

3.4.19 The highest estimated count of 47 individuals occurred in the winter of 2011/12.

***Black-headed gull* Chroicocephalus ridibundus**

*Birds of Conservation Concern Amber list* (Eaton *et al*. 2009)

VALUE OF RECEPTOR-LOW

3.4.20 Black-headed gull is not a feature of any SPA or any other protected site within 2km of the study area. As it is an amber listed species, the value of this receptor in relation to the intertidal zone is assessed as low.

3.4.21 The highest estimated count of 318 individuals occurred in the winter of 2012/13.

***Herring gull* Larus argentatus**

VALUE OF RECEPTOR-MEDIUM

*UKBAP species*

*Birds of Conservation Concern Red list* (Eaton *et al.* 2009)

3.4.22 Herring gull is not a feature of any SPA or any other protected site within 2km of the study area. As it is a red listed species and a UK BAP species, the value of this receptor in relation to the intertidal zone is assessed as medium.

3.4.23 The highest estimated count of 115 individuals occurred in the winter of 2012/13.

***Carrion Crow* Corvus corone**

VALUE OF RECEPTOR-NONE

3.4.24 Black-headed gull is not a feature of any SPA or any other protected site within 2km of the study area. Since it is a common widespread species in the UK, it is not recognised as a species of conservation interest and as a receptor has no value.

3.4.25 The highest estimated count of 12 individuals occurred in the winter of 2012/13.

***Goldfinch* Carduelis carduelis**

VALUE OF RECEPTOR-NONE

3.4.26 Goldfinch is not a feature of any SPA or any other protected site within 2km of the study area. Since it is a common widespread species in the UK, it is not recognised as a species of conservation interest and as a receptor has no value.

3.4.27 The highest estimated count of 12 individuals occurred in the winter of 2012/13.

***Linnet* Carduelis cannabina**

VALUE OF RECEPTOR-LOW

*Birds of Conservation Concern Red list* (Eaton *et al*. 2009)

3.4.28 Linnet is not a feature of any SPA or any other protected site within 2km of the study area. As it is a red listed species, the value of this receptor in relation to the intertidal zone is assessed as low.

3.4.29 The highest estimated count of 37 individuals occurred in the winter of 2012/13.

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# 4. ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

## 4.1 Basis of Impact Assessment Methodology

4.1.1 The EIA methodology used is based on current guidance, and has been shaped by expert judgement and results from other offshore wind farm EIAs and stakeholder consultation. Impacts are assessed in the context of the predicted baseline conditions and over the lifetime of the development. Following Maclean *et al.* (2009), the methodology combines the guidance provided by the Institute of Ecology and Environmental Management (IEEM 2006) and a matrix approach, this also ensures that results are compatible with those throughout the Environmental Statement. The IEEM approach provides a detailed characterisation of ecological effects and their potential impacts, such that it can clearly be determined whether or not impacts are likely to be ecologically significant and at what scale. Further marine guidance is supplied in a more recent IEEM document, together with a worked example (IEEM 2010).

4.1.2 As in the baseline, impact assessment is provided for the two Dogger Bank Teesside projects separately and also for Dogger Bank Teesside A and B together. Cumulative impact assessment – see section 4.6 – covers two geographic scales.

**The magnitude of an impact**

4.1.3 The matrix approach developed by Percival *et al.* (1999) considers the potential magnitude, or size, of any impact associated with an effect together with the sensitivity of the receptor. Definitions of magnitude are summarised below:

**Table 4.1** Definitions of terms relating to the magnitude, or size, of an effect upon the ornithological receptors of the proposed site (after Percival *et al.* 1999).

| Magnitude | Definition |
|---|---|
| **Very High** | Total loss or very major alteration to key elements/features of the baseline conditions such that post- development character/composition/attributes will be fundamentally changed and may be lost from the site altogether.<br>Guide: >80% of population/habitat lost |
| **High** | Major alteration to key elements/features of the baseline (pre-development) conditions such that post -development character/composition/attributes will be fundamentally changed.<br>Guide: 20-80% of population/habitat lost |
| **Medium** | Loss or alteration to one or more key elements/features of the baseline conditions such that post- development character/composition/attributes of baseline will be partially changed.<br>Guide: 5-20% of population/habitat lost |
| **Low** | Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline condition will be similar to pre-development circumstances/patterns.<br>Guide: 1-5% of population/habitat lost |
| **Negligible** | Very slight change from baseline condition. Change barely distinguishable, approximating to the 'no change' situation.<br>Guide: <1% of population/habitat lost |

4.1.4 Here, the magnitudes of impacts are assessed first in relation to national and biogeographic populations and second in relation to the populations supported by individual protected sites (see section 4.2 below).

4.1.5 Following the IEEM (2006, 2010) guidance, effects and their potential magnitudes are further characterised as follows:

- Description of effect;
- The spatial extent of the effect;
- The timing and frequency of the effect;
- The duration of the effect;
- Whether the effect would be direct or indirect[1];
- The reversibility of the impact;
- Whether the impact is positive or negative; and
- The confidence in predictions (High, Medium, Low and Very Low).

4.1.6 IEEM (2006) suggests a terminology of Certain/near-Certain, Probable, Unlikely and Very Unlikely. However, for the purposes of this assessment, High, Medium, Low and Very Low are used to better capture the confidence in predictions as opposed to its likelihood.

[1] Not specifically suggested by IEEM (2006, 2010).

4.1.7 For marine bird species, separate estimations of the magnitudes of impacts associated with the effects of disturbance/displacement, barrier effects and collision risk in the project areas – see section 4.3 below – are provided based on the means of the monthly population estimates (and confidence limits) produced across the study period from January 2010 to June 12. Means are used to provide an assessment of the average impacts to bird populations that might result from the proposed projects, accounting for year on year variability. The use of means rather than peaks is necessary with respect to cumulative assessment as, if peaks were used, there would be potential for considerably over-estimating cumulative effects, due to double-counting of the same birds moving between sites.

**The sensitivity of a receptor**

4.1.8 Following the IEEM (2006) guidance, an ecologically significant impact is defined as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or receptors within a given geographical area. Therefore, the assessment of the significance of an effect will reflect the receptor's sensitivity which, as outlined in Maclean *et al.* (2009), has two aspects – the non-impact sensitivity, or value, of the receptor and the specific sensitivity of the receptor to the effect.

4.1.9 Value – a measure of the receptor's importance, rarity and worth in particular based on existing designations and its wider conservation status – is categorised following Percival *et al.* (1999) as follows (see also Sections 2 and 3):

**Table 4.2** Definitions of terms relating to the value of a receptor (after Percival *et al.* 1999).

| Value | Definition |
|---|---|
| **Very High** | Feature species of SPAs, Ramsar sites and SSSIs |
| **High** | Other bird species that contribute to the integrity of an SPA, Ramsar site or SSSI<br>Species of international or national importance, i.e. those whose numbers surpass 1% of international or national populations<br>Ecologically sensitive species, e.g. large birds of prey or nationally rare species (< 300 breeding pairs in the UK) |
| **Medium** | Species of regional importance (either because of population size or distributional context)<br>EU Birds Directive Annex 1 species, EU Habitats Directive priority habitat/species and Wildlife and Countryside Act Schedule 1 species (if not covered above)<br>UK BAP species (if not covered above) |
| **Low** | Any other species of conservation interest, such as those on the Birds of Conservation Concern lists (if not covered above) |

4.1.10 The geographic scope of the assessment is outlined below in section 4.2, but it is important to note here that the projects being considered have the potential to affect not just breeding seabirds, but also non-breeding seabirds and migrants and

hence might affect sites across a wide geographical area. Thus, both seabird species that might forage within the area of the projects being considered from breeding colony SPAs, Ramsar sites and SSSIs and also other seabird and migrant species that are features of SPAs, Ramsar sites and SSSIs and that may occur within the area of the projects being considered at other times of year are considered to be of Very High value.

4.1.11 Other species that occur in the project areas in internationally or nationally important numbers (i.e. surpassing respectively 1% of the species' biogeographic or national population estimates) are considered to be of at least High value.

4.1.12 Species are considered to be of regional importance, and of at least Medium value, if their numbers in the project areas are at least 1% of those that occur in the Dogger Bank Zone as a whole. This definition of region is arbitrary, but reflects data availability and the absence of alternate definitions.

4.1.13 Species-specific sensitivities to effects may reflect three potential factors:

- Adaptability – the degree to which a receptor can avoid or adapt to an effect;
- Tolerance – the ability of a receptor to accommodate temporary or permanent change without a significant adverse impact; and
- Recoverability – the temporal scale over and extent to which a receptor will recover following an effect.

4.1.14 For effects other than disturbance/displacement and barrier effects, species-specific sensitivities are combined with the receptor's value following Maclean *et al.* (2009) to determine the overall sensitivity of species to effects – see section 4.3:

**Table 4.3** Overall sensitivity of species

| **Value** | **Species-specific sensitivity** | | | | |
|---|---|---|---|---|---|
| | **Very High** | **High** | **Medium** | **Low** | **Very Low** |
| **Very High** | Very High | Very High | Very High | High | Medium |
| **High** | Very High | High | High | Medium | Low |
| **Medium** | Very High | High | Medium | Low | Very Low |
| **Low** | High | Medium | Low | Low | Very Low |

4.1.15 A bespoke approach is taken in the assessments of both disturbance/displacement and barrier effects, as aspects of sensitivity are incorporated within the determination of magnitude. For these effects, the significance of the impact is thus determined by combining the potential magnitude of the effect directly with the species' value – see section 4.3 for more details.

**Determining significance**

4.1.16 Following the detailed characterisation (based on the IEEM 2006, 2010 guidance), magnitudes of effects and the sensitivity of receptors are combined using a matrix

approach to determine the overall significance of the impact of an effect (e.g. as outlined in Percival *et al.* 1999 and as recommended by Maclean *et al.* 2009, and to ensure that results are compatible with those throughout the Environmental Statement).

**Table 4.4** Categorisation of the significance of an impact (following Percival *et al.* 1999, with an additional category of Very Low Sensitivity for compatibility with the Sensitivity classifications used by Maclean *et al.* 2009)

| Magnitude | Sensitivity | | | | |
|---|---|---|---|---|---|
| | Very High | High | Medium | Low | Very Low |
| Very High | Major | Major | Major | Moderate | Minor |
| High | Major | Major | Moderate | Minor | Negligible |
| Medium | Major | Moderate | Minor | Minor | Negligible |
| Low | Moderate | Minor | Minor | Negligible | Negligible |
| Negligible | Minor | Negligible | Negligible | Negligible | Negligible |

4.1.17 The assessment considers the proportion of birds potentially impacted by an effect at broader national and biogeographic scales, and additionally in relation to suites of protected sites within the North Sea (defined by the OSPAR Greater North Sea region) and at the scale of individual protected sites, with an associated assessment of the level of confidence of the effect at this scale. Methods for defining suites of sites and apportioning the magnitude of each impact determined for each wind farm project (or in-combination across the Dogger Bank Zone as a whole) to individual protected sites are outlined below.

**Interpretation of significance**

4.1.18 Mitigation measures associated with project designs are outlined in section 4.5 of this report and here the assessment process considers the residual impact after consideration of these measures.

4.1.19 Impacts assessed as being Negligible or Minor adverse are considered to be of relatively limited concern and not 'significant' in terms of the EIA regulations, whereas Moderate or Major impacts are considered 'significant' in terms of EIA regulations. Where Moderate or Major residual impacts are determined following the use of realistic worst case scenarios, the potential for other defined scenarios (e.g. for collision risk) to mitigate impacts is discussed.

4.1.20 It should also be noted that the conclusions of the assessment are based on currently available evidence and that the significance of impacts derived from the processes outlined for this assessment (and, in relation to protected sites, drawn upon by the associated Habitats Regulations Assessment) should only be considered a guide.

## 4.2 Assessment Methodology and the Geographical Scope of the Assessment – Export Cable Corridor and Project Areas

4.2.1 The assessment considers the proportion of birds potentially impacted by an effect at broader national and biogeographic scales, and additionally in relation to suites of protected sites (to provide North Sea-scale context) and at the scale of individual protected sites, with an associated assessment of the level of confidence of the effect at this scale. Methods for defining suites of sites and apportioning the magnitude of each impact determined for each wind farm project (or in-combination across the Dogger Bank Zone as a whole) to individual protected sites are outlined below. Definitions of breeding seasons for key seabird species considered in the assessment are provided in section 2.6.

**Breeding seabirds**

4.2.2 The apportioning of impacts for non-breeding seabirds draws from recent NE/JNCC (2013a) guidance. For breeding seabirds, information on foraging ranges (Thaxter *et al.* 2012) has been used to determine a suite of protected sites that might potentially be impacted by the effects associated with each wind farm project during the breeding season. The mean maximum foraging ranges across all studies reviewed by Thaxter *et al.* (2012) have been used, unless other evidence, e.g. from tracking studies, suggests that use of the these values may exclude birds from more distant protected sites that might also utilise feeding areas within the Dogger Bank Zone.

4.2.3 Recent tracking projects reviewed to demonstrate where there is known connectivity between the specific protected site breeding colonies of some species and the Dogger Bank Zone are summarised in Table 4.5. Tracking data for four species – northern gannet, great skua, black-legged kittiwake and Atlantic puffin – reveals overlap with Dogger Bank during the winter and/or breeding season. In these instances, for which data exist to attribute some of the birds recorded in the Dogger Bank Zone to specific protected sites (e.g. UK SPAs, Ramsar sites or other Natura 2000 sites in Europe), the confidence in predicting an effect on the site, as indicated above, will be higher than for all other sites for which the wind farm project is identified to be within the species' foraging range. Note that there is greater certainty in connectivity for breeding season studies than for overwinter studies on account of the greater accuracy of devices used to study species during the breeding season.

**Table 4.5** Potential connectivity between species breeding colonies and the Dogger Bank Zone during the breeding season and over winter, assessed using tracking data.

| Species | Breeding Colony | Breeding Season | Over Winter |
|---|---|---|---|
| Northern gannet | Flamborough & Bempton Cliffs SPA, UK | Yes[1,3] | Yes[5] |
| | Forth Islands SPA (Bass Rock) UK | Yes[2,3] | |
| | Storstappen, Norway | | Yes[5] |
| | Ulvoyholmen, Norway | | Yes[5] |
| Great skua | Iceland | | Yes[6] |
| | Norway | | Yes[6] |
| Black-legged kittiwake | Fair Isle, UK | | Yes[7] |
| | Flamborough & Bempton Cliffs SPA, UK | Yes[4] | |
| | Forth Islands SPA (Isle of May) UK | | Yes[7] |
| | Bear Island, Norway | | Yes[7] |
| | Bulbjerg, Norway | | Yes[7] |
| | Hornoya, Norway | | Yes[7] |
| | Hjelmsoya, Norway | | Yes[7] |
| | Cape Krutik | | Yes[7] |
| Atlantic Puffin | Forth Islands SPA (Isle of May) UK | | Yes[8] |

[1]Langston & Boggio 2011, Langston & Teuten 2012; [2]Hamer *et al.* 2000, 2001; [3] Wakefield *et al.* 2013; [4] RSPB 2011, FAME 2012; [5]Fort *et al.* 2012; [6]Magnusdottir *et al.* 2012; [7]Frederiksen *et al.* 2011; [8]Harris *et al.* 2009.

4.2.4 For common guillemot and razorbill, more recent tracking studies (FAME 2012) have shown that these species may forage considerably further from their colonies than suggested by Thaxter *et al.* (2012) and this, together with the continuing use and concentration of birds in the western part of the Dogger Bank Zone during the breeding season, suggests that birds from breeding colonies do forage at least in this area. A maximum foraging range is thus used for these species, together with black-legged kittiwake, to determine the suite of protected sites that might potentially be impacted by the effects associated with each wind farm project during the breeding season (Table 4.6). With respect to northern gannet, more specific information is available for British, Irish and French breeding colonies (Wakefield *et al.* 2013). This indicates that northern gannets may forage in the zone from both the Flamborough & Bempton Cliffs SPA and Forth Islands SPA, but not from 10 other colonies considered by this study. Thus the Dogger Bank Zone is considered to be within foraging range of birds from these two sites, while (given the foraging range of these birds) it cannot be discounted that birds from the Seevogelschutzgebiet Helgoland SPA in Germany might also forage within the zone.

**Table 4.6** Relevant foraging ranges during the breeding season for key seabird species for the Dogger Bank Zone that occur in the North Sea during the breeding season (after Thaxter *et al.* 2012 unless stated).

| Species | Scientific name | Foraging range |
|---|---|---|
| Northern fulmar | *Fulmarus glacialis* | 400km (mean max) |
| Northern gannet | *Morus bassanus* | 590km (max) |
| Arctic skua | *Stercorarius parasiticus* | 24km (mean max) |
| Great skua | *Stercorarius skua* | 86km (mean max) |
| Black-legged kittiwake | *Rissa tridactyla* | 231km[b] (max) |
| Lesser black-backed gull | *Larus fuscus* | 141km (mean max) |
| Great black-backed gull | *Larus marinus* | 60km[a] (max) |
| Common guillemot | *Uria aalge* | 340km[b] (max) |
| Razorbill | *Alca torda* | 312km[b] (max) |
| Atlantic puffin | *Fratercula arctica* | 105km (mean max) |

[a] Single maximum value taken from Seys *et al.* (2001);
[b] FAME (2012).

4.2.5 Appendix 1 provides an overview, by species, of protected sites (SPAs, Ramsar sites, SSSIs in the UK) within the wider North Sea 'region' considered in the ornithology technical report at which breeding seabirds are a feature. This appendix does not consider protected sites for which seabirds or waterbirds are specified as either a passage or winter feature. It makes an assessment of whether, during the breeding season, species identified as features of breeding colonies should be screened in or out of the EIA process, by considering whether the foraging ranges of the species concerned are likely to overlap with the Dogger Bank Teesside A, Dogger Bank Teesside B, Dogger Bank Teesside C, Dogger Bank Teesside D, Dogger Bank Creyke Beck A or Dogger Bank Creyke Beck B projects within the Dogger Bank Zone, as outlined above.

4.2.6 Appendix 1 also provides details of population estimates used in the apportioning of impacts to protected sites. Analyses aimed to use up-to-date population estimates for sites, in order that impacts based on the population estimates produced for the Dogger Bank Teesside projects from the 2010, 2010/11 and 2011/12 survey data were appropriately apportioned. For Scottish SPAs, recent population estimates were provided by JNCC. Where available, data for English sites and Scottish SSSIs were taken from the JNCC Seabird Monitoring Programme Online Database (JNCC 2012b) for the most recent year between 2007 and 2011. If no data were available for these sites from this source for these years, data were obtained from the Seabird 2000 survey (which ran from 1998-2002) and numbers adjusted using country (Scotland, England) Seabird Monitoring Programme trends (JNCC 2012a) to provide a value for 2011. Population estimates used for the Flamborough Head and Bempton Cliffs SPA and its proposed extension were based on data for 2007 to 2011 and follow guidance provided by Natural England (see Appendix 3). For non-UK sites, data were taken from citation information available through Europa (2012) and Ramsar (2012). While up-to-date population estimates were used to best apportion

effects, the proportion of the site population estimated to be impacted was also applied to the citation population for information.

4.2.7 The assessment then aims to determine the significance of impacts, across the year, both at the level of the suite of protected sites in the wider North Sea 'region' and for each individual site. For the suite of protected sites, the assessment relates the magnitude of each impact determined for each wind farm project to the combined species' population for the suite as a whole. For individual protected sites, the magnitude of each impact determined for each wind farm project for the breeding season is apportioned to each protected site based on its population size and its distance from the project area (using an inverse distance squared weighting). For example, the magnitude of an impact at the first site A (m *A*) of i to n sites would be calculated from the overall magnitude of the impact for the project (m *P*) as follows:

$$\mathrm{m}\,A = \mathrm{m}\,P * (\mathrm{pop}\,A * \left(\frac{1}{\mathrm{dist}\,A * \mathrm{dist}\,A}\right)) / \sum_{i=A}^{n} \left(\mathrm{pop}\,i * \left(\frac{1}{\mathrm{dist}\,i * \mathrm{dist}\,i}\right)\right)$$

where pop is the population at a site and dist the distance from the site to the project.

4.2.8 Note, even for those species for which the wind farm project is within foraging range of birds from breeding colony protected sites, a proportion of the birds present will be non-breeding/immature birds that may not originate from these sites. For gulls and northern gannet, it was possible to derive estimates of this proportion from boat-survey observations of birds in breeding and juvenile plumages. For other species, it is assumed that, for species for which the wind farm project is within foraging range of birds from breeding colony protected sites, one third of the total number of birds (Stroud *et al.* 2004; Kober *et al.* 2010, 2012) present during the breeding season will be non-breeders. These are apportioned to protected sites surrounding the North Sea in the same manner as for seabirds outside the breeding season (see below).

4.2.9 The calculated magnitude of impact at the site-level is then related to the species' population size at the site. Note this is precautionary in that it assumes that all the birds come from protected sites. While it is possible to collate data for other colonies in the UK from Seabird 2000 (Mitchell *et al.* 2004) census data, for other countries within species' potential foraging ranges data are typically only available for protected sites. Consideration is thus provided as to whether the estimation of effects at the site level might be over-precautionary.

**Seabirds outside the breeding season/non-breeders and migrants**

4.2.10 The seabirds that are present in the Dogger Bank Zone outside the defined breeding seasons or during the breeding season as non-breeders, and migrants that pass through the area in autumn and spring, are not constrained to particular protected sites and could potentially originate from sites in a wider geographical area. Consequently, while it is possible to demonstrate or suggest breeding season

connectivity between some specific seabird colonies and the Dogger Bank Zone, in these other instances it is unlikely to be possible to directly link the birds observed in the Dogger Bank Zone to specific sites.

***Migrants***

4.2.11 A recent review (Wright *et al.* 2012) defined migration zones for those migratory birds designated as features of British SPAs (and other Annex 1 species) that are at potential risk from offshore wind farm developments. This review has been used to scope which species might migrate through the project areas. It is difficult to link the birds that might occur in the Dogger Bank Zone on migration to specific sites for three key reasons:

- Due to the distance of the zone offshore and thus the potential coastal and inland sites that birds may originate from;
- Birds may not migrate directly to or from the sites at which they are features; and
- Several sites might be used by the same individuals at different periods of the year (see comments in Appendix 3).

Therefore, no attempt has been made to apportion impacts to individual protected sites. Thus, for migrants, the assessment aims to determine the significance of impacts at the level of the species' national populations.

***Non-breeding seabirds***

4.2.12 The apportioning of impacts for non-breeding seabirds draws from recent NE/JNCC (2013b) guidance.

4.2.13 Seabirds that are present in the project areas outside the defined breeding seasons or during the breeding season as non-breeders may potentially originate from protected sites throughout the species' biogeographic ranges. However, apportioning the effects determined for each wind farm project to each protected site on the basis of the size of its population relative to the species' overall biogeographic population may lead to an underestimation of the magnitudes of impacts at some sites, particularly those closest to the Dogger Bank Zone. Therefore, greater weighting should be placed on those protected sites closer to the Dogger Bank Zone. For those species that breed around the North Sea, it is assumed that the birds that are present in the project areas outside the defined breeding seasons or during the breeding season as non-breeders originate from this wider 'region'. These results are qualified with new information on the dispersive and wintering areas from tracking studies. For instance, a recent study has shown that kittiwakes from North Sea colonies, such as the Isle of May, may also winter in the North Sea, but that it is unlikely that birds from westerly UK colonies would winter in the North Sea (Frederiksen *et al.* 2012). New information also exists on the non-breeding movements and distributions of the northern gannet (e.g. Kubetzki *et al.* 2009, Fort *et al.* 2012).

4.2.14 The magnitude of each impact determined for each wind farm project is thus apportioned to each protected site surrounding the North Sea, according to the size of the species' population at the site relative to that in this wider region as a whole. For example, the magnitude of an impact at the first site A (m *A*) of i to n sites would be calculated from the overall magnitude of the impact for the project (m *P*) as follows:

$$m\,A\ = m\,P * \ (\text{pop}\ A)/\sum_{i=A}^{n}(\text{pop}\ i)$$

4.2.15 During the non-breeding season, a number of protected sites may be connected with the Dogger Bank Zone (Table 4.6); however, studies providing information for this time of year are typically less accurate given the types of devices (geolocators) used to study species in this period. Greater certainty is available for breeding season movements from protected sites where GPS and satellite devices have been used. Given the difficulty of directly linking non-breeding birds observed in the Dogger Bank Zone to specific sites, confidence in predictions at the site-level will be lower than in the attribution of impacts during the breeding season to sites within foraging range (though this will also vary depending on whether species are dependent on relatively few or many sites).

## 4.3 Effects and Definitions of Worst Case Scenarios – Export Cable Corridor and Project Areas

4.3.1 Impacts are assessed assuming realistic 'worst case scenarios' developed according to the Rochdale Envelope approach. The Planning Inspectorate recognises the need for offshore wind farm developers to use this approach, which allows for flexibility in parameters (e.g. the number and size of wind turbines, wind turbine design and overall configuration). Worst case scenarios are discussed below in relation to specific effects and summarised at the end of this section.

4.3.2 Effects for birds may occur through the construction, operational and decommissioning phases and potentially impact on marine birds in the area of the projects themselves, along the export cable corridor and in the intertidal area at the cable landfall (for latter see section 4.4).

4.3.3 With respect to construction and decommissioning, two effects are considered:

- Disturbance/displacement;
- Effects associated with habitat loss and change.

4.3.4 With respect to operation, the potential effects of an offshore wind farm on birds are likely to arise through three main mechanisms (Langston and Pullan 2003; Peterson *et al.* 2006): behavioural responses, mortality associated with collision and

indirect effects associated with habitat loss or change. Four effects are thus considered:

- Disturbance and the displacement of birds from favoured habitats which could result in increased mortality and/or impacts on breeding productivity, thereby impacting the size of the population in the long-term;
- Barrier effects to migratory birds or those commuting between breeding sites and offshore feeding areas, which could potentially result in elevated energetic costs and thus increased mortality and/or impacts on breeding productivity;
- Collision risk (assumed mortality) with above surface structures, especially wind turbine blades; and
- Effects associated with habitat loss and change, e.g. changes in the seabed which may affect birds through their prey.

4.3.5 The text below describes each of these effects in turn, outlines realistic worst case scenarios and describes the methodology used to estimate the size or magnitude of impacts and the assessment of species-specific sensitivities and thus overall sensitivity to the effect.

**Displacement – operation**

***Description***

4.3.6 The assessment considers both the potential impacts of disturbance and displacement, though the two are interlinked and, in essence, reflect different levels of severity. "Disturbance" refers to an effect that causes a direct reaction in the behaviour of a bird, e.g. increased vigilance or flight/dive responses. However, prolonged disturbance could result in more long-term displacement from favoured habitat, which may become permanent if birds are unable to habituate to the cause of the effect. The sensitivity to these effects varies between species (Maclean *et al.* 2009).

4.3.7 Once operational, the wind farms will require regular maintenance throughout their lifetimes. This will require a team of dedicated Operations and Maintenance (O&M) technicians, technical specialists, and associated support staff, and transport to and from the locations using a variety of different types of vessel.

4.3.8 During the operations and maintenance period the maintenance crew will ensure that the wind turbines and platforms are operated in a safe and reliable manner, compliant with regulatory duties and in accordance with commercial objectives. In addition to the maintenance crew, specialists may be brought in to conduct specific activities, for example borescope inspection of components. Further maintenance activities will include maintenance of foundations, subsea cables, landfall, and offshore substation platforms.

4.3.9 During operation there is potential for a more long-term "displacement" of birds to occur due to the long-term presence of moving wind turbines and the associated

maintenance boat traffic. This displacement constitutes an effective loss of habitat (Desholm & Kalhert 2005). Only a regular, non-intermittent, low decibel level of noise is predicted for wind turbines in this project. Consequently, the main effect is likely to be associated with the presence of the wind turbines.

4.3.10 Behavioural displacement is commonly equated to macro-avoidance, though in the context of collision-risk modelling this refers to the far-field evasive action taken by a flying bird to avoid the wind farm as a whole (Band 2012). 'Micro' or 'near-field' avoidance refers to the evasive action taken by a bird in the vicinity of a wind turbine within the wind farm to avoid collision. Displacement, in contrast, reflects the long-term loss of all birds from an area of habitat. Although different, the macro-avoidance rates recorded in studies of birds flight paths can inform the potential displacement rates of different species.

***Methodology used to estimate the size or magnitude of impacts and determine significance***

4.3.11 For the worst-case scenario, displacement is assumed to be an on-going, non-reversible effect through the operational life of the wind farm, affecting birds both within the project area and a buffer area around this. As such, the assessment of displacement considers how many birds will be lost to the population in the long-term (based on the methodology outlined below), due to the effective loss of habitat associated with this effect.

4.3.12 At present, there is only a relatively limited evidence base on the effects of displacement at offshore wind farms (Appendix 4) and thus while some studies suggested there may be the potential for species to habituate to this effect, data are nonetheless lacking for most species. For the purposes of this assessment a precautionary worst case scenario assumed that displacement will occur at the same level throughout the lifetime of the projects. The size or magnitude of the impact associated with displacement reflects the real extent of the wind farm project and buffer considered and the proportion of birds assumed to be displaced.

*Population estimates*

4.3.13 Population estimates for the Dogger Bank Teesside A and B projects considered and buffer areas are provided in the baseline section of this report (section 3). For each of 2010, 2010/11 and 2011/12, mean population estimates for these areas were generated separately for the breeding season and other months of the year and the potential impacts of displacement assessed separately for these periods. Mean rather than peak population estimates for each season are used to better reflect overall usage of the project areas and buffers and in order that the impacts associated with displacement can be properly considered cumulatively. If peaks were used, there would be potential for considerably over-estimating cumulative effects, due to double-counting of the same birds moving between sites. Thus, while peak values from Wetland Bird Survey counts, for example, may be used to inform on site importance, these values should never be summed. It is considered unlikely

that the same proportion of birds would be displaced from the buffer as from the footprint of the wind farm project itself – details of different proportions chosen for the buffer are discussed below.

*Displacement rates from operational wind farms*

4.3.14 The determination of appropriate displacement rates draws from a review of the literature and recent monitoring studies (Appendix 4) and recent guidance from NE/JNCC (2012).

4.3.15 There is some evidence of displacement effects for species including seaducks, divers and auks (Zucco *et al.* 2006). Radar and visual scan studies for some seaducks, including scoter and long-tailed duck, and divers have recorded displacement effects and also strong avoidance of wind farms post-construction, where changes in flight paths have been noted up to 4km (APEM 2011, Krijgsveld *et al.* 2011, Petersen *et al.* 2006, 2011, (Petersen & Fox, 2007). Comparison of pre- and post-construction surveys at Horns Rev and Nysted has demonstrated displacement of divers and auks from sites (Peterson *et al.* 2006). Northern gannets may also avoid wind farms (Krijgsveld *et al.* 2011). Black-legged kittiwakes show much less avoidance of wind farms, even showing attraction (Krijgsveld *et al.* 2011). Other gull species have also been recorded within wind farms or even attracted to them post-construction (Krijgsveld *et al.* 2011, Petersen *et al.* 2006). However, there is limited information on displacement or macro-avoidance for northern fulmars and skuas (Petersen *et al.* 2006; Krijgsveld *et al.* 2011). For a full review, see Appendix 4.

4.3.16 The evidence provided by the review suggests differences do exist in rates of displacement, or attraction, between different species. The relative apparent displacement / attraction rates for different species suggested by the review are also not inconsistent with previous assessments of the relative sensitivities of species to disturbance.

4.3.17 The classification determined by Maclean *et al.* (2009), which incorporates information on species-specific behavioural responses using indications of sensitivity suggested by Garthe & Hüppop (2004), Petersen *et al.* (2004) and Petersen & Fox (2007), is presented in Table 4.7 below.

**Table 4.7** Species-sensitivity to disturbance after Maclean *et al.* (2009).

| **Sensitivity due to disturbance** | **Species/species group** |
|---|---|
| **Very High** | Scoters, divers |
| **High** | Long-tailed duck, cormorant |
| **Medium** | Eider, grebes, common guillemot, razorbill |
| **Low** | Northern gannet, most gulls including black-legged kittiwake, terns, Atlantic puffin |
| **Very Low** | Northern fulmar, skuas, little gull |

4.3.18 Scores derived from more recent assessment of marine birds in Scottish waters by Furness and Wade (2012) and Furness *et al.* (2012, 2013) are assigned to a similar classification in Table 4.8. The classifications presented by/derived from these studies are similar, though those from the more recent review of Furness and Wade (2012) are followed here due to its UK context.

4.3.19 The recent NE/JNCC (2012) advice note on assessing displacement quotes the scores of Furness & Wade (2012). The NE/JNCC advice note differs from Furness and Wade (2012) in their assessment of the sensitivity of northern gannet as, whilst the species might not be highly sensitive to disturbance in general (e.g. ship and helicopter traffic), there are indications of a strong macro-avoidance of offshore wind farms (Krijgsveld et al. 2010, 2011). The guidance also notes that these sensitivity scores give an initial indication of potential displacement levels that may be exhibited by each species, and where in the full range of displacement each species might lie.

4.3.20 Given the variability in apparent displacement / attraction rates noted by the review provided in Appendix 4, we draw from these sensitivity scores in deriving rates of displacement to take forward in this assessment, unless there is sufficient evidence to suggest that an alternative displacement rate might be appropriate. The displacement rates for different species taken forward are derived by applying the scores for sensitivity to disturbance (as given by Furness & Wade 2012) across a range of potential displacement rates from 0 to 100% – see Table 4.8.

**Table 4.8** Species-sensitivity to disturbance from boats (derived from Furness & Wade 2012, Furness *et al.* 2012, 2013[1]) and rates of displacement for seabirds in relation to an operational wind farm taken forward in this assessment.

| Sensitivity to disturbance | Species/species group | Displacement rate |
|---|---|---|
| **Very High** | Common scoter, velvet scoter, red-throated diver, great northern diver, black-throated diver | 100% |
| **High** | Common goldeneye, great cormorant, greater scaup | 75% |
| **Medium** | Common eider, long-tailed duck, great-crested grebe, Slavonian grebe, shag, razorbill, black guillemot, common guillemot | 50% |
| **Low** | Northern gannet[2], herring gull[2], great black-backed gull[2], little tern, little auk, black-headed gull[2], common gull[2], lesser black-backed gull[2], black-legged kittiwake[2], Sandwich tern, common tern, roseate tern, Arctic tern, Atlantic puffin | 25% |
| **Very Low** | Great skua, northern fulmar, sooty shearwater, Manx shearwater, European storm-petrel, Leach's storm-petrel, Arctic skua, little gull | 0% |

[1] Scores presented in Furness & Wade (2012)/Furness *et al.* (2012, 2013) were translated into the same categories as presented in Maclean *et al.* (2009) as follows: 1 = very low, 2 = low, 3 = medium, 4 = high, and 5 = very high;
[2] See discussion in paragraph 4.3.22 below.

4.3.21 For northern gannet, evidence suggests that although the species might not be highly sensitive to disturbance in general (e.g. ship and helicopter traffic) the species may show strong macro-avoidance of offshore wind farms (Krijgsveld *et al.* 2010, 2011). Hence, following recent NE/JNCC (2012) guidance, we apply a 75% displacement rate for this species.

4.3.22 With respect to gulls, while some studies suggest that avoidance may occur, the relative evidence for either displacement or attraction is weak, and there is considerable variability in the apparent displacement / attraction rates reported in the studies reviewed in Appendix 4. Hence, following discussion with stakeholders, a 0% displacement rate is considered appropriate for these species (See Appendix 3).

4.3.23 Accounts of the potential impacts of the effects of displacement are provided in section 5 (the results of the impact assessments for the Dogger Bank Teesside A and Dogger Bank Teesside Beck B projects, together with an assessment of the combined effects of both) and section 6 (cumulative impacts) only for those species for which displacement is expected to occur. Thus, with respect to the key receptors considered in this assessment, no accounts are provided for northern fulmar, skuas or gulls.

*Buffer distances*

4.3.24 The review of recent displacement studies provided in Appendix 4 was used to inform appropriate species-specific buffer distances for use in the assessment. For divers (and seaducks), studies have indicated that numbers of birds may be reduced up to 4km from wind farms (Petersen *et al.* 2005, Krijgsveld *et al.* 2011, NE/JNCC 2012). Consequently, buffers of 4km around the wind farm projects are used for these species.

4.3.25 While there is some evidence that numbers of auks may also be reduced up to 4km from wind farms (Petersen *et al.* 2005, Krijgsveld *et al.* 2011, NE/JNCC 2012), an average scenario is for a 2km buffer (this reflecting the sensitivities of these species to displacement and recent guidance: NE/JNCC 2012). A 2km buffer is also used for gulls, including black-legged kittiwake, for which studies have suggested that displacement rates are likely to be much lower, and also for fulmar and skuas for which information is limited. This also follows guidance from NE/JNCC (2012).

4.3.26 Displacement rates within buffers are unlikely to be 100% of those in the wind farm and are likely to decline with increasing distance from the wind farm, as is evident from studies in Denmark (Petersen 2005, Petersen et al. 2004, 2006). As a simple mathematical way to apply a gradient to reflect decreasing avoidance with increasing distance from the wind farm, different displacement rates are thus

applied for two bands around the wind farm projects: 0-1km, 75% of the displacement rate for the wind farm; 1-2km, 25% of the displacement rate for the wind farm (average rate of 50% of the displacement rate for the wind farm over 0-2km).

*Species-specific sensitivities – mortality*

4.3.27 Studies of the impacts of habitat loss on the fitness, i.e. fecundity or survival of individuals, and on populations as a whole are few. Burton *et al.* (2006) reported how the body condition and survival rates of redshank were impacted following their displacement by a loss of intertidal habitat. However, similar studies of the impacts of habitat loss in the marine environment are lacking. In actuality, the survival of birds displaced through loss of habitat will depend on whether alternative areas are close to carrying capacity or, are able to support increased densities. If areas elsewhere do exist but are limited in quality or extent, and/or already occupied, then increasing pressure on those areas could lead to increased competition for resources (Goss-Custard 1985; Goss-Custard *et al.* 2002). Such competition will increase as the availability of alternate habitat below carrying capacity decreases with cumulative development.

4.3.28 Following Maclean *et al.* (2009) and Langston (2010), the sensitivity of species to displacement is taken to reflect their ability to tolerate the effect through their flexibility in using alternate habitats. This accords with previous assessments of habitat flexibility (Garthe & Hüppop 2004) and flexibility in foraging behaviour (Furness & Tasker 2000) in determining the sensitivities of species to this effect. The classification determined by Maclean *et al.* (2009) is presented in Table 4.9 below.

**Table 4.9** Species-sensitivity to habitat loss (Maclean *et al.* 2009).

| **Sensitivity due to habitat loss** | **Species/species group** |
|---|---|
| **Very High** | Red-necked grebe |
| **High** | Scoters, divers, great-crested grebe, great cormorant |
| **Medium** | Common eider, little gull, common tern, Arctic tern |
| **Low** | Great skua, black-legged kittiwake, black-headed gull, great black-backed gull, Sandwich tern, auks |
| **Very Low** | Northern fulmar, northern gannet, lesser black-backed gull, herring gull |

4.3.29 Scores provided in a more recent assessment of marine birds in Scottish water by Furness and Wade (2012) and Furness *et al.* (2012, 2013), assigned to a similar classification, are provided in Table 4.10. The classifications presented by/derived from these studies are similar, though those from the more recent review of Furness and Wade (2012) and Furness *et al.* (2012, 2013) are followed here due to its UK context.

4.3.30 In essence, these scores reflect the ability of a species to cope with habitat loss following displacement, and may be viewed as a proxy for the proportion of the species' population that might be expected to be lost due to displacement.

**Table 4.10** Species-sensitivity to habitat loss (derived from Furness & Wade 2012, Furness *et al.* 2012, 2013) and mortality rates for displaced marine birds taken forward in this assessment.

| Sensitivity due to habitat loss[1] | Species/species group |
|---|---|
| **Very High** | Red-necked grebe |
| **High** | Greater scaup, common eider, long-tailed duck, common scoter, common goldeneye, red-throated diver, black-throated diver, great-crested grebe, Slavonian grebe, little tern, black guillemot |
| **Medium** | Velvet scoter, great northern diver, great cormorant, shag, Sandwich tern, common tern, roseate tern, Arctic tern, common guillemot, razorbill, Atlantic puffin |
| **Low** | Arctic skua, great skua, black-headed gull, common gull, great black-backed gull, black-legged kittiwake, little auk |
| **Very Low** | Northern fulmar, sooty shearwater, Manx shearwater, European storm-petrel, Leach's storm-petrel, northern gannet, lesser black-backed gull, herring gull |

[1] Scores presented in Furness & Wade (2012) were translated into the same categories as presented in Maclean *et al.* (2009) as follows: 1 = very low, 2 = low, 3 = medium, 4 = high, and 5 = very high;

4.3.31 These sensitivity scores are drawn from in deriving rates of displacement to take forward in this assessment. Unless there is sufficient evidence to suggest that an alternative displacement rate might be appropriate, mortality rates for different species taken forward are derived by applying the scores for sensitivity to habitat loss (as given by Furness & Wade 2012) across a range of potential mortality rates from 0 to 50% (see Appendix 3).

4.3.32 Thus for, white-billed diver, a potential mortality rate of 37.5% is derived (based on the sensitivities to habitat loss of red-throated diver and black-throated diver).

4.3.33 As outlined above, the potential impacts of habitat loss to species' populations may occur both through impacts on productivity and on survival (both of young birds that might be recruited into the breeding population and breeding adults) and will reflect both the sensitivity of species to habitat loss and the availability of alternate habitat below carrying capacity. Drawing from the review provided in Furness (2013) (see Appendix 11C of the ES), for auks (common guillemot, razorbill, Atlantic puffin, little auk), it is probable that impacts in the breeding season are most likely to occur through impacts on breeding productivity. The Dogger Bank projects are only within foraging range of five of the key species considered in this assessment. However, even for these species, impacts on productivity might be expected to be small given

the distance of the projects offshore and that individual seabirds repeatedly commuting unusually long distances to find food tend to be unsuccessful in their breeding attempts because they are unable to provision chicks as frequently as necessary (Furness 2013). Furthermore, using 2007-2011 Danish Vessel Monitoring System (VMS) data as a proxy for sandeel and thus habitat availability, only 1.0% of the habitat within the foraging range of, for example, common guillemot lies within the Dogger Bank Teesside A and B projects (0.8% by area alone). The impact of food availability on adult survival is potentially the most influential factor affecting seabird population trend (Mitchell *et al.* 2004). Displacement by individual OWF projects is unlikely to reduce survival of breeding seabirds because they tend to buffer their survival by abandoning breeding when conditions are unfavourable (Furness 2013). However, displacement of non-breeders may impact survival rates, and thus populations, if the habitat lost is of high quality and other areas are at carrying capacity. Outside the breeding season, auks are distributed across much of the North Sea, favouring areas along the east coast of Britain from the Moray Firth to the Dogger Bank, the German Bight, and in the Skagerrak and Kattegat. While areas of high quality habitat exist in the north and west of the Dogger Bank zone and other parts of the wider Dogger Bank, the sediments in the project areas are on the whole not of the preferred sand grain size selected by sandeels. Given this and the larger areas of quality habitat available elsewhere within North Sea wintering areas, displacement of auks from the projects in the Dogger Bank might be expected to result in only a negligible increase in mortality. Furthermore, while the proportion of available sandeel habitat across Dogger Bank Teesside A and B is slightly lower than Dogger Bank Creyke Beck A and B projects (equivalent proportional value of 1.5% of habitat availability), the use of project-specific rates introduces additional complexity, especially when combining projects for cumulative assessment. Thus, for all Dogger Bank projects for auks, a potential mortality rate of 5% is considered for the assessment of displacement.

4.3.34 In the case of northern gannet, both breeding season foraging ranges and the species' wintering range are considerably greater than for auk species. Thus for this species, impacts on reference populations of the loss of habitat associated with any one project in the Dogger Bank zone are expected to be minimal (Furness 2013). However, while relative to foraging ranges and the species' wintering range the amount of habitat from which birds may be displaced by a single project might be considered minimal for this species, the impacts of cumulative developments may be significant if many are in high quality habitat. Thus, for this species, a potential mortality rate of 0% is considered in the assessment of displacement for the Dogger Bank Teesside A and B projects alone and 5% for the assessment of the cumulative impacts from the Dogger Bank Teesside A, Dogger Bank Teesside B, Dogger Bank Teesside C, Dogger Bank Teesside D, Dogger Bank Creyke Beck A and Dogger Bank Creyke Beck B projects combined and for these projects in combination with others in the North Sea.

4.3.35 As indicated above, with respect to the assessment of displacement, no accounts are provided for northern fulmar, skuas or gulls for which displacement rates are considered to be zero.

*Bespoke assessment of magnitude and significance*

4.3.36 As indicated in paragraph 4.1.15, rather than considering the species-specific sensitivities described above in conjunction with value to determine an overall sensitivity to this effect, a bespoke assessment is used, modifying the approach of Maclean *et al.* (2009).

4.3.37 In this assessment, the magnitude associated with displacement encapsulates consideration of both the numbers of birds estimated to be displaced (as determined by the population estimates for project areas and buffers and the displacement rates outlined in Table 4.8) – the 'displacement magnitude' – and the proportion of these that might be expected to then be lost to the species' overall population in the long-term (as determined by the species-specific sensitivities and mortality rates outlined above).

4.3.38 The overall estimated magnitude associated with displacement is then assessed in relation to national and biogeographic populations and the populations supported by individual protected sites.

4.3.39 As the consideration of species-specific sensitivities is encapsulated here within the evaluation of magnitude, the significance of the impact associated with displacement is determined by combining this magnitude directly with the species' value (following Table 4.4).

4.3.40 It should be re-iterated that the mortality rates considered here represent the proportion of those birds predicted to be displaced that might be expected to be lost to the population in the long-term. No attempt is made to assess this effect in relation to changes in background annual mortality that would be required to bring the population to the new lower equilibrium, as how long this will take to happen will depend on a number of factors (where displaced birds move to and the carrying capacity of those areas) and thus the changes in annual mortality required.

4.3.41 As noted above, there was a large degree of variability in the apparent displacement/attraction rates reviewed in Appendix 4. Furthermore, as highlighted in this review, there is a lack of empirical evidence regarding the mortality consequences of the displacement of marine birds from offshore wind farms. Given this uncertainty and as proposed by NE/JNCC (2012), therefore, we also present tabulated summaries for each species of the numbers of birds estimated to be displaced that are then estimated to die based on a range of alternative displacement and mortality rates from 0 to 100%.

***Consideration of diving species for displacement***

4.3.42 As with the assessment of other effects, the assessment of displacement was based on population estimates derived from aerial and boat-based surveys (see sections 2 and 3). However, white-billed diver, northern gannet, common guillemot, razorbill,

little auk, and Atlantic puffin can dive underwater and, consequently, may, potentially, be missed by aerial surveys leading to possible underestimates of populations that may be disturbed or displaced. Consideration of this issue is given in Appendix 5 and correction factors provided so that it may be determined whether the assessment of significance might change taking these into account. The number of northern gannets missed was considered negligible and no correction was applied. The correction factors applied (and associated confidence in these values) were as follows: white-billed divers 71.3% (very low confidence), common guillemot 18.0% (high confidence), razorbill 16.4% (high confidence), little auk 26.1% (high confidence), and Atlantic puffin 20.2% (low confidence).

***Confidence***

4.3.43 There is considerable uncertainty regarding the assessment of disturbance and displacement effects for marine birds at offshore wind farms. In particular, there is only a relatively limited evidence base on the effects of displacement at offshore wind farms (Appendix 4), and the determination of appropriate displacement rates needs to draw both on the avoidance of flying birds, rather than displacement per se, and expert judgement. Studies of the impacts of displacement (effective habitat loss) on the survival of individuals, and on populations as a whole, are even fewer and wholly lacking in the marine environment. Hence, it is necessary to draw on qualitative assessments of the ability to tolerate this effect through their flexibility in using alternate habitats in assessing the sensitivity of species to displacement. While the baseline surveys have provided robust estimates of the populations of birds using the project areas that have informed the assessment of this effect, given these uncertainties, the confidence in predictions in the assessment of displacement effects (and disturbance) is considered (at its most precautionary) to be low.

**Displacement – construction/decommissioning of the wind farm**

***Description***

4.3.44 Disturbance will be an on-going effect through the construction and decommissioning phases of the project, varying in frequency through the year according to the species' population size, and has the potential to impact birds throughout the range of the species' biogeographic population.

4.3.45 During construction and decommissioning, the main disturbance effects are likely to be from the construction of the wind turbines themselves, the laying of cables and the boat/helicopter traffic and noise and vibration associated with these activities. The duration of these effects will vary between activities.

4.3.46 For the Dogger Bank Teesside A and B projects up to 200 6MW turbines and 120 10MW turbines would be installed, which could take up to 11.5 years to construct after the consent award. This is assuming that each project is built in six years (foundations in years 1 and 2, turbines in 2 and 3, maximum pilings are based on multi-leg foundations, and assumes that construction of all six projects begins at the

same time), and that if built sequentially there would be a six month overlap between projects. For the purpose of this assessment, it is assumed that construction is continuous over this period. For cumulative across the entire zone, the total duration of construction activities is 20 years assuming overlapping construction of six projects.

4.3.47 During offshore construction and decommissioning, a wide range of vessels will be required, including helicopters. The maximum piling operations per year per project are 600 and 360 for 6 and 10 MW turbines, respectively with two simultaneous piling operations per project for both. In a single year, for offshore platforms up to 168 piling operations per foundation would take place per project, plus an extra 20 piling operations for other foundations. For both turbines sizes, up to 20 vessels will be engaged in construction of foundations per project, and 15 for WTG installation. In addition, up to 25 extra vessels will be associated with works including accommodation and commissioning vessels. The total vessels for six concurrent projects would be 396 but for individual projects would be 66. A total of 5,150 and 4,360 round trips to port will be required for 6MW and 10MW turbines respectively (including export cable vessels), constituting 730 and 660 round trips to port per project year – the same numbers are also assumed for decommissioning. The number of trips required per turbine will be the same and thus it is probable that the boat traffic associated with construction will be relatively even across the period. Temporary work areas around projects would be 1,000m, and individual turbine construction and decommissioning would include up to six jack-up operations.

4.3.48 Construction methodology will be dependent upon the technical solutions selected for the project. Key techniques which may be required include:

- Seabed preparation (based on dredging and/or rock placement);
- Scour & subsea damage protection;
- Installation of piles, through driving and drilling of piles;
- Installation of helical screw piles;
- Installation of self-installing and self-buoyant platforms and foundation structures (including jack-up foundations – potentially onto pre-installed plinths);
- Installation of Suction footings (as in suction bucket foundations, or suction anchors);
- Lowering into place (as in gravity foundations) using cranes, buoyancy or a combination of both;
- Grouting (many operations can include use of grout, for instance: connecting piles to foundation or transition piece structures, and under gravity bases and suction buckets);
- Assembly of components (as in the assembly of wind turbines or substations on top of installed foundations, and including the bolting, swaging, or grouting of joints and connections);
- Cable installation and protection (potentially via techniques such as ploughing, jetting, cutting, etc, as described in the cable installation sections along with the use of rock dumping or proprietary cable protection systems; and

- The use of all or a combination of the above techniques constitute the drivers behind the effect of disturbance and displacement (direct effect on birds), through vessel presence and gradual creation of above surface structures, and the effect of habitat loss or change – for instance release of suspended sediments, underwater noise, and Electro-magnetic fields as a result of construction activities.

4.3.49 Disturbance from inter-array and inter-platform activities is considered as part of wind farm construction/decommissioning overall activities. Inter-array and inter-platform cables will be installed from a cable laying vessel or barge, using either a multi-point anchoring or dynamic positioning system. The cable burial methodologies and decommissioning activites are similar to those discussed for the export cable activities in paragraph 4.3.59 and 4.3.60.

4.3.50 For each of Dogger Bank Teesside A and B, the maximum duration of inter-array cable installation is up to six years, i.e. half the project area for three years, then the other half in the subsequent three years. For inter-platform cables, up to six will be laid per project (consent for inter-link between Dogger Bank Teesside A and B only), using similar techniques to the export cable construction (including for inter-array cables). Thus, the duration of activities is short-lived but still has potential to impact birds throughout the range of the species' biogeographic population.

***Methodology used to estimate the size or magnitude of impacts and determine significance***

4.3.51 Maclean *et al.* (2009) recommend that assessment of the effect of disturbance during construction and decommissioning is also undertaken by assuming a worst case scenario that some or all birds are displaced from the area.

4.3.52 The same bespoke approach, used above for estimating the magnitude of impacts and determining significance for displacement during operation, was also used to assess displacement for construction and decommissioning periods. The same buffer distances, population estimates and displacement rates are also utilised. However, this maximal scenario will not be realised over the entire construction or decommissioning phase. The numbers of birds displaced will increase during construction and decrease during decommissioning in relation to the spatial extent of the wind farm. Assuming a linear progression of activities, the average spatial extent of the wind farm over the course of construction and decommissioning is thus taken to be half that during operation and the numbers of birds displaced consequently also 50% of those during operation. Mortality rates following displacement during construction and decommissioning are assumed to be the same as those during operation.

4.3.53 As the assessment of displacement considers how many birds will be lost to the population in the long-term, due to the effective loss of habitat associated with this effect, the impacts predicted during construction and decommissioning are encompassed by those predicted for the operational period and are not additive.

4.3.54 A number of scenarios exist regarding the scheduling of construction activities for the Dogger Bank Teesside A and Dogger Bank Teesside B projects, together with the Dogger Bank Teesside C, Dogger Bank Teesside D, Dogger Bank Creyke Beck A and Dogger Bank Creyke Beck B considered in the cumulative assessment for the Dogger Bank Zone. For the purpose of assessing the impacts from disturbance during construction, a worst case scenario is also assumed here that construction will occur across all these projects at the same time.

4.3.55 Disturbance will be an on-going effect through construction and decommissioning phases of the project, varying in frequency through the year according to the species' population size, and hence the opportunity for birds to recover from particular disturbance events may be limited. There is also a limited evidence base on the adaptability of species to disturbance, especially in a marine environment, and thus while there may be the potential for species to habituate to this effect, for the purposes of this assessment a worst case scenario assumed that the activities associated with construction and decommissioning will pose a displacement effect to birds throughout these phases.

**Disturbance – export cable corridor activities**

***Description***

4.3.56 Disturbance will be an on-going effect through the laying of export cables. For the Rochdale envelope, it is assumed that the projects will either be installed in parallel (maximum intensity) or separated (maximum separation time up to five years), the former of which is considered unlikely due to inevitable bottlenecks in the supply chain.

4.3.57 Up to six vessels will be engaged in installation of export cables per project. A total of 220 and 140 round trips will be required, for 6MW and 10MW turbines respectively, for export cable corridors – the same numbers are also assumed for decommissioning. Temporary work areas around offshore cable corridors would be 750m. Offshore cables will be left in situ or removed depending on the available information at the time of decommissioning.

4.3.58 HVDC export cables will be up to 550kV, but are expected to be between 300-400kV. The maximum cable length from landfall to offshore converter will be 261km and 220km for Dogger Bank Teesside A and Dogger Bank Teesside B, respectively, and the maximum cable length will be up to 573km and 484km for each project respectively. The expected duration of HVDC export cable-laying activities is 687 days for Dogger Bank Teesside A and 595 days for Dogger Bank Teesside B, based on a progress rate of 100m/hr and 60% total time based on weather conditions. This calculation assumes up to four campaigns per project and 30 days between each campaign. Thus, the duration of activities is short-lived but still has potential to impact birds throughout the range of the species' biogeographic population.

4.3.59 Offshore export cables will be installed from a cable laying vessel or barge, using either a multi-point anchoring or dynamic positioning system. The cable burial methodologies include: direct burial during the laying campaign pre-trenching, and post-lay burial. Methodologies for cable burial are likely to include: jetting, ploughing, trenching, rock cutting, mass flow excavation, and dredging, for which the maximum width affected is up to 10m from these activities (local disturbance only). These activities are typical of those that may cause direct disturbance to birds, or habitat loss or change in the vicinity of the export cable corridor.

4.3.60 For decommissioning the removal of structures is expected to involve the approximate reverse of the installation process. The following steps are anticipated:

- Disconnecting wind turbines and mobilisation of decommissioning vessels;
- Removal of any potentially hazardous or polluting materials from the wind turbine. With the use of appropriate vessels, remove rotor blades, then nacelle, then tower sections; and
- Offshore cables will be removed or left in situ based on the requirements at the time

***Methodology used to assess the magnitude of impacts and significance***

*Population estimates*

4.3.61 Population estimates for the export cable corridor were derived using ESAS data (see section 3 for more information).

4.3.62 Some species were not recorded by ESAS data as occurring within the export cable corridor area – namely for white-billed diver, Arctic skua, lesser black-backed gull and little auk. However, ESAS data are more than 20 years old. Hence, while these data are used for the export cable route assessment, they cannot be used to rule out potential occurrence in the area. .

*Assessment*

As indicated above, Maclean *et al.* (2009) recommend that assessment of the effect of disturbance during construction and decommissioning is also undertaken by assuming a worst case scenario that some or all birds are displaced from the area considered. However, it is noted that only a small proportion of the Dogger Bank Teesside A and B export cable route would be affected at any one time. A total of four separate campaigns are expected at any one time along the Dogger Bank Teesside A and B export cable route. For any individual campaign, assuming a 1.5km radius along the route, this would amount to 3km distance, covering an area of 4.5km$^2$, thus for four campaigns, amounting to a maximum of 12km distance, over 18km$^2$. Taking the proportion of the total cable route works area (233km$^2$), the total area affected at any one time is considered to be up to 7.7% of the total cable route population. Similar consideration is given to the cable route for Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, incorporated into the cumulative assessment in section 6.2 (see Creyke Beck assessment and table below).

4.3.63 To assess the potential impacts of disturbance in the export cable corridor, the same bespoke approach used to estimate the magnitude of impacts and determine significance as described above for displacement during operation was applicable.

4.3.64 However, given the relative small numbers of birds occurring in cable route areas (both absolute and with respect to reference biogeographic, national or protected site populations), the numbers of birds that might be displaced by disturbance in these areas are considered negligible for all receptors (Table 4.11). Furthermore, the exposure of birds to the effect of disturbance from cable-laying activities would be very limited temporally. Hence, the effect of disturbance in the export cable corridor is considered to be of negligible significance for all receptors.

**Table 4.11** The numbers of birds predicted to be displaced due to cable-laying activities in Dogger Bank Teesside A and B, and together with all three cable routes including Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D

| | Cable route Population | | Number displaced | | Final number impacted | |
|---|---|---|---|---|---|---|
| Species | Dogger Bank Teesside A and B | Dogger Bank Teesside A and B, Dogger Bank Creke Beck A and B and Dogger Bank Teesside C and D | Dogger Bank Teesside A and B | Dogger Bank Teesside A and B, Dogger Bank Creke Beck A and B and Dogger Bank Teesside C and D | Dogger Bank Teesside A and B | Dogger Bank Teesside A and B, Dogger Bank Creke Beck A and B and Dogger Bank Teesside C and D |
| Northern fulmar | 372 | | 0 | | 0 | |
| Northern gannet | 47 | | <1 | | 0 | |
| Great skua | 7 | | 0 | | 0 | |
| Great black-backed gull | 19 | | <1 | | 0 | |
| Black-legged kittiwake | 555 | | 11 | | 0 | |
| Common guillemot | 885 | | 34 | | 2 | |
| Razorbill | 19 | | <1 | | <1 | |
| Atlantic puffin | 49 | | 1 | | <1 | |

**Barrier effects – operation**

***Description***

4.3.65 Wind farms may pose a barrier effect to migratory birds or those commuting between breeding sites and offshore feeding areas, which could result in elevated energetic costs (Speakman *et al.* 2009) and potentially increased mortality or impacts on productivity at colonies. Increases in the energetic costs of the daily movements of seabirds or of the movements of migratory birds have been shown in a number of studies (Tulp *et al.* 1999, Pettersson & Stalin 2003; Masden *et al.* 2009, 2010), although Masden *et al.* (2009), in reporting changes in the migratory trajectories of common eiders at a Danish offshore wind farm, post-construction, suggested that this had minimal likely effect on energetics. However, it was noted that cumulative effects could be significant, for instance, if other wind farms or human developments worked in combination to disrupt routes of birds. Desholm & Kalhert (2005) also reported that migrant wildfowl diverted around the Nysted wind farm, and Tulp *et al.* (1999), found that common eiders did not fly between wind turbines that were placed 200m apart in the Kattegat.

***Methodology used to estimate the size or magnitude of impacts and determine significance***

4.3.66 The assessment of barrier effects for the Dogger Bank Teesside projects concerns both breeding seabirds whose foraging ranges extend to the projects (see Table 4.5 and Appendix 1) and migrating birds.

4.3.67 The list of migrant species for which barrier effects are considered a potential effect is determined by the migration zones summarised in Wright *et al.* (2012), and put into context using the relevant biogeographic populations following that report. In Wright *et al.* (2012) biogeographic population estimates for waterbirds were taken from Wetlands International (2012), while for other receptors biogeographic population estimates are from BirdLife International (2004). The sizes of the British or Irish populations that use the migration zones described are derived from Musgrove *et al.* (2011) for wintering waterbirds in Great Britain, Crowe *et al.* (2008) for wintering waterbirds in Ireland, and from Baker *et al.* (2006) for other receptors, unless stated otherwise. The confidence that these species may occur in the Dogger Bank Zone is qualified by observations from boat surveys reported in the baseline of this report.

4.3.68 Assessing the magnitude of the potential impacts associated with barrier effects is particularly problematic. Two approaches have previously been used in assessing the magnitude of the potential impacts associated with barrier effects. The approach outlined by Maclean *et al.* (2009) is described in Table 4.12 below:

**Table 4.12** The magnitude of the potential impacts associated with barrier effects (following Maclean *et al.* 2009).

| Magnitude | Definition |
|---|---|
| **Very High** | (i) Wind farm is located between breeding site and key foraging area of a species flying through the site in nationally or internationally important numbers; and/or (ii) is located close to key stopover, breeding or wintering site of species flying through the site in internationally important numbers; and/or (iii) is located along the migration route of a species flying through the site in internationally important numbers. |
| **High** | (i) Wind farm is located close to key stopover, breeding or wintering site of species flying through the site in nationally important numbers; and/or (ii) is located along the migration route of a species flying through the site in nationally important numbers. |
| **Medium** | (i) Wind farm is located between breeding site and key foraging area of a species flying through the site in regionally important numbers; and/or (ii) is located close to key stopover, breeding or wintering site of a species flying through the site in regionally important numbers; and/or (iii) is located along the migration route of a species flying through the site in regionally important numbers. |
| **Low** | (i) Wind farm is located between breeding site and key foraging area of any other breeding species; and/or (ii) is located close to a key stopover, breeding or wintering site of any other species; and/or (iii) is likely to be located on a migration route of any other species. |
| **Negligible** | None of the above, hence negligible impact. |

4.3.69 Alternatively, magnitude may be assessed using the standard classification based on the percentages of a reference population potentially impacted that is outlined in Table 4.1. This approach may result in lower levels of magnitude being assigned than that of Maclean *et al.* (2009).

4.3.70 In each of these cases, however, the approach effectively provides an assessment of the number of birds 'exposed' to the barrier effect presented by the wind farm, rather than the population-level consequence, i.e. the actual magnitude of the impact. The actual magnitude of the effect will be determined not only by the number of birds 'exposed' to the effect, but also whether the increase in the energetic costs associated with the barrier results in increased mortality.

4.3.71 As indicated by Maclean *et al.* (2009), the impact on survival of a given barrier and associated deviation in flight will differ between species – large, bulky species with small wing areas (i.e. those which have high wing-loadings) are likely to be more adversely affected than those that do not. Based on this assumption, Maclean *et al.* (2009), used body mass and wing-length ratios derived from information presented in the BTO BirdFacts website (Robinson 2005) to devise species-specific sensitivities to barrier effects (Table 4.13 below) to use in combination with a species' value to determine a species overall sensitivity (following Table 4.3).

**Table 4.13** Species-specific sensitivities to barrier effects (following Maclean *et al.* 2009).

| Species-specific sensitivity | Species |
|---|---|
| **Very High** | Black-throated diver |
| **High** | Red-throated diver, great cormorant, geese, auks |
| **Medium** | Ducks |
| **Low** | Northern fulmar, skuas, gulls |
| **Negligible** | Northern gannet, terns, passerines |

4.3.72 The consideration of species-specific sensitivities provided by Maclean *et al.* (2009) is essentially an attempt to better quantify magnitude following the initial consideration of exposure. While this approach does indicate the relative likelihood of impacts between species, it retains an inherent limitation, however, as there remains no quantification of the percentage of the population of birds that might actually be lost, either directly through impacts of survival on those exposed to the effect or indirectly, through impacts on productivity.

4.3.73 Due to these limitations, an alternative approach is required and this is outlined below.

4.3.74 Here, for both breeding seabird and migrant species, the numbers of flying birds used in estimating collision risk (see below) are taken to represent the populations of birds exposed to the potential barrier effects associated with each wind farm

project. For breeding seabirds, the average of the mean numbers of birds recorded during each month of the 2010, 2011 and 2012 breeding seasons covered by the baseline surveys is used.

4.3.75 We also provide an indication of the increase in flight distance posed by the wind farm projects for both migrants crossing the North Sea and breeding seabirds commuting from their colonies to foraging sites. For breeding seabirds, we further indicate whether the increase in flight distance posed by barrier effects might prevent birds from any individual protected site from reaching foraging areas beyond the project areas considered, based on information on the species' maximum foraging range. (Note, there is a broad negative correlation between a species' foraging range and its sensitivity, sensu Maclean *et al.* 2009.)

4.3.76 The increase in flight distance posed by the potential barrier effects associated with wind farm projects provides a proxy for the increase in energetic cost and, together with information on the number of birds exposed, is considered in evaluating the potential magnitude. As it is not possible to fully quantify the number of birds that might potentially be impacted by barrier effects, this is by necessity a qualitative judgement and it should be noted that there is presently little understanding of the thresholds above which such increases might impact survival or productivity (Masden *et al.* 2009, Speakman *et al.* 2009).

4.3.77 As indicated in paragraph 4.1.15, as the consideration of species-specific sensitivities is encapsulated here within the evaluation of magnitude, the significance of the impact associated with barrier effects is determined by combining the potential magnitude of the effect directly with the species' value (following Table 4.4).

4.3.78 Barrier effects will be an on-going effect through the operational lifetime of the project for all species, and thus there is no potential for species to recover from this effect. As indicated above, there is a limited evidence base on barrier effects at present and thus while there may be the potential for species to habituate to this effect, for the purposes of this assessment a worst case scenario assumed that the projects will pose a barrier to 100% of flying birds throughout their lifetime.

***Confidence***

4.3.79 There is considerable uncertainty regarding the assessment of barrier effects posed by offshore wind farms for both breeding seabirds and migrants. While the baseline surveys have provided robust estimates of the populations of marine birds using the project areas, there is uncertainty as to the proportion of these birds that might be associated with breeding sites and for which the projects pose a barrier effect to their foraging flights. For migrants, there is even greater uncertainty, both in regard to the determination of the numbers of birds passing through each project area and the proportions of these flying at heights which pose a risk of collision. Coupled with this, two different approaches are used to categorise magnitude, while species' sensitivities to this effect are determined through the proxy of wing-loading. Given these uncertainties, the confidence in predictions in the assessment of barrier

effects is considered to be very low, although it should be noted that the approach used is precautionary.

**Collision – operation**

***Description***

4.3.80 The possibility of collisions between birds and wind turbines is one of the key ornithological effects associated with offshore wind farms. Consequently, in impact assessments for offshore wind farms it is necessary to present estimates of collision risk associated with the development.

4.3.81 Collision will be an on-going effect through the operational lifetime of the project, varying in frequency through the year according to the species' population size. The size or magnitude of the risk for each receptor depends on a number of factors including its population in the area of the proposed development, the species own characteristics and their behaviour, notably the proportion of time that they spend flying and the heights at which they fly, and their avoidance of wind turbines. The latter may include macro-, or far-field avoidance of the wind farm as a whole, and micro-avoidance of individual wind turbines (see review by Cook *et al.* 2012). Other aspects such as the weather and differences between diurnal and nocturnal behaviour between species may also affect the magnitude of impacts. Following guidance from SNH, Natural England and a recent review (SNH 2010, Cook *et al.* 2012) an avoidance rate of 98% was assumed for all species, with the exception of northern gannet, for which a rate of 99% was used. This accords with the studies of Krijgsveld *et al.* (2010, 2011) which indicated that northern gannets may show strong macro-avoidance of offshore wind farms. This rate was also used in the assessment and confirmed as accepted in the decision for the recently consented Triton Knoll OWF.

4.3.82 Collision may potentially impact a number of species groups, including those seabirds that use the area of the proposed development for feeding during the breeding season and other times of year, and waterbirds and terrestrial species that pass through the area on migration in spring and autumn.

***Methodology used to estimate the size or magnitude of impacts and worst case scenarios***

4.3.83 Estimates of the probability of any individual bird colliding with a wind turbine can be obtained from models which incorporate information on the species of concern (flight height data, flight speeds and morphology) and wind turbine design. For the purposes of assessment, the Band model is used to provide information on collision impacts. While other models are in existence, at the time of writing the Band model is considered as the standard approach. From these probabilities and information on the numbers or densities of birds using the area of the wind farm, the potential collision mortality associated with offshore wind farms can be estimated.

***Seabirds***

4.3.84 Collision risk analyses were run using the Band model, updated for the offshore environment (Band 2012). The updated Band model differs from the original (developed for onshore wind farms: Band *et al.* 2007) in two key ways. Firstly, bird numbers are input as densities rather than raw counts, better reflecting the way in which data are collected in the offshore environment. Secondly, the updated Band model is capable of incorporating three options for considering flight heights:

- Option 1 - using the basic model, i.e. assuming that a uniform distribution of flight heights between lowest and highest levels of the rotors; and using the proportion of birds at risk height as derived from site survey;
- Option 2 - again using the basic model, but using the proportion of birds at risk height as derived from the generic flight height information;
- Option 3 - using the extended model, using the generic flight height information.

4.3.85 Option 3 which uses modelled flight height distributions for each of the study species allows comparison of the impact of varying the height of wind turbines, and to account for the fact that collision risk is not distributed evenly within the rotor swept area.

4.3.86 In each project, collision risk modelling was undertaken for all seabird species for which sufficient population data were available – northern gannet, northern fulmar, Arctic skua, great skua, lesser black-backed gull, great black-backed gull, black-legged kittiwake, common guillemot, razorbill, little auk and Atlantic puffin. Monthly population estimates for 2010, 2010/11 and 2011/12 for each of these species, in each project area, were derived following the methodology outlined in section 2 of this report, but considering only flying birds, a key assumption of the Band model (Tables 4.14a, 4.14b, 4.14c, 4.15a, 4.15b, 4.15c). Data on species morphology and flight behaviour used in analyses are shown in Table 4.16.

4.3.87 A total of eight scenarios were considered within the collision risk modelling framework, covering a range of wind turbine sizes and heights (Table 4.17). Differences between these scenarios were initially assessed assuming a 98% avoidance rate (99% for northern gannet) across all three Band model options. The worst case scenario from these eight scenarios was then considered in greater detail in relation to a range of different avoidance rates.

4.3.88 It was considered that Option 3 of the updated Band model offered the most realistic assessment of collision risk within the Dogger Bank Zone. Firstly, it offers the opportunity to input the actual dimensions of the turbines to be used within each project. This means that the proportion of birds flying within the rotor-swept area can be accurately estimated, rather than being constrained to the proportion estimated to be flying above 20m during the boat surveys. More importantly, collision risk is variable within the rotor-swept area. Collision risk is greatest towards the centre of the turbine, where the area of the rotor sweep is greatest. Under Option 1, birds are assumed to be distributed evenly within the rotor-swept area.

However, as they are most likely to be clustered towards the lower reaches of the rotor-swept area, this results in an over-estimate of the number of collisions. By using Option 3, it is possible to account for this variable distribution. Therefore, we considered each of the eight model scenarios using Option 3 of the Band model.

4.3.89 Whilst data from the Dogger Bank Zone contributed to development of modelled flight height bands, the zone itself is considerably further offshore than the other projects considered in Cook *et al.* (2012). However, detailed examination of modelled outputs by Cook *et al.* (2012) suggested that there was no relationship between the distance to shore and the accuracy with which the proportion of birds flying within each flight height band could be predicted. This suggests that differences between the inshore and offshore environments were not having a significant impact on observed flight heights. Additionally, for each species, the proportion of birds observed flying above 20m during the survey programme on Dogger Bank were within the 95% confidence intervals of those predicted to be above this height by the modelled distribution of Cook *et al*. (2012) (Table 4.16). This provides support for the suggestion that the modelled distribution provides a reasonable reflection of flight heights of birds within the Dogger Bank Zone. However, as recommended by Band (2012) results from the alternative model options are also considered in order to qualify the results of the assessment. For further details of the modelled distributions, see Cook *et al*. (2012).

4.3.90 The number of wind turbines was adjusted accordingly to a target to generate 1200MW of electricity. The proportion of time wind turbines were operational varied throughout the year (Table 4.18), but averaged 94.5% of the time.

**Table 4.14a** Monthly density estimates of flying birds (birds km$^{-2}$) within the area of the proposed Dogger Bank Teesside A project of the Dogger Bank Zone in 2010 (with 90% confidence limits).

| Species | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northern fulmar | 0.05 (0.04-0.07) | 0.12 (0.1-0.15) | 0.12 (0.1-0.15) | 0.18 (0.16-0.22) | 0.27 (0.24-0.33) | 0.26 (0.23-0.32) | 0.13 (0.11-0.16) | 0.07 (0.06-0.09) | 0.07 (0.06-0.09) | 0.07 (0.06-0.09) | 0.05 (0.04-0.07) | 0.08 (0.06-0.1) |
| Northern gannet | 0.03 (0.02-0.03) | 0.02 (0.02-0.03) | 0.03 (0.02-0.04) | 0.01 (0.01-0.01) | 0.03 (0.03-0.04) | 0.07 (0.05-0.08) | 0.05 (0.04-0.06) | 0.04 (0.03-0.05) | 0.05 (0.04-0.06) | 0.08 (0.07-0.1) | 0.05 (0.04-0.06) | 0.08 (0.07-0.09) |
| Arctic skua | 0 (0-358.64) | 0 (0-5.01) | 0 (0-0.2) | 0 (0-0.02) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) |
| Great skua | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) |
| Black-legged kittiwake | 0.66 (0.59-0.73) | 0.8 (0.72-0.89) | 0.87 (0.78-0.99) | 0.18 (0.16-0.2) | 0.21 (0.19-0.24) | 0.21 (0.19-0.24) | 0.14 (0.12-0.16) | 0.12 (0.11-0.14) | 0.21 (0.18-0.24) | 0.62 (0.55-0.7) | 0.56 (0.5-0.63) | 0.89 (0.79-1) |
| Lesser black-backed gull | 0.01 (0-0.02) | 0.01 (0.01-0.02) | 0.03 (0.02-0.04) | 0.06 (0.04-0.1) | 0.09 (0.06-0.14) | 0.09 (0.06-0.13) | 0.04 (0.03-0.07) | 0.01 (0.01-0.02) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Great black-backed gull | 0.08 (0.06-0.1) | 0.05 (0.04-0.08) | 0.03 (0.02-0.05) | 0.04 (0.03-0.06) | 0.03 (0.02-0.04) | 0.02 (0.01-0.03) | 0.01 (0.01-0.02) | 0.01 (0.01-0.02) | 0.02 (0.01-0.03) | 0.02 (0.01-0.03) | 0.03 (0.03-0.05) | 0.08 (0.06-0.12) |
| Common guillemot | 0.02 (0.02-0.04) | 0.03 (0.02-0.04) | 0.03 (0.02-0.04) | 0.02 (0.01-0.03) | 0.01 (0.01-0.01) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.01 (0.01-0.02) | 0.03 (0.02-0.04) | 0.07 (0.05-0.09) | 0.13 (0.1-0.17) |
| Razorbill | 0.04 (0.03-0.05) | 0.02 (0.02-0.04) | 0.02 (0.01-0.03) | 0.01 (0.01-0.03) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.02) | 0.03 (0.02-0.07) | 0.05 (0.03-0.06) | 0.06 (0.03-0.1) |
| Little auk | 0.01 (0-0.03) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0.01 (0-0.01) | 0.02 (0.01-0.03) | 0.04 (0.03-0.06) | 0.06 (0.04-0.09) |
| Atlantic puffin | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.02) | 0 (0-0.01) | 0 (0-0.01) |

**Table 4.14b** Monthly density estimates of flying birds (birds $km^{-2}$) within the area of the proposed Dogger Bank Teesside A project of the Dogger Bank Zone based on population estimates from July 2010 to June 2011 (with 90% confidence limits).

| Species | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northern fulmar | 0.06 (0.05-0.08) | 0.09 (0.07-0.12) | 0.1 (0.08-0.12) | 0.11 (0.09-0.13) | 0.11 (0.09-0.13) | 0.1 (0.08-0.12) | 0.13 (0.11-0.16) | 0.07 (0.06-0.09) | 0.07 (0.06-0.09) | 0.07 (0.06-0.09) | 0.05 (0.04-0.07) | 0.08 (0.06-0.1) |
| Northern gannet | 0.06 (0.05-0.07) | 0.09 (0.07-0.11) | 0.27 (0.22-0.32) | 0.06 (0.05-0.07) | 0.06 (0.05-0.07) | 0.06 (0.05-0.07) | 0.05 (0.04-0.06) | 0.04 (0.03-0.05) | 0.05 (0.04-0.06) | 0.08 (0.07-0.1) | 0.05 (0.04-0.06) | 0.08 (0.07-0.09) |
| Arctic skua | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) |
| Great skua | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) |
| Black-legged kittiwake | 0.68 (0.6-0.77) | 1 (0.88-1.13) | 2.85 (2.53-3.22) | 0.86 (0.76-0.99) | 0.93 (0.83-1.05) | 0.71 (0.62-0.81) | 0.14 (0.12-0.16) | 0.12 (0.11-0.14) | 0.21 (0.18-0.24) | 0.62 (0.55-0.7) | 0.56 (0.5-0.63) | 0.89 (0.79-1) |
| Lesser black-backed gull | 0 (0-0.01) | 0.01 (0-0.02) | 0.03 (0.02-0.05) | 0.06 (0.04-0.09) | 0.04 (0.03-0.07) | 0.02 (0.01-0.04) | 0.04 (0.03-0.07) | 0.01 (0.01-0.02) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Great black-backed gull | 0.07 (0.05-0.1) | 0.06 (0.05-0.09) | 0.08 (0.06-0.11) | 0.07 (0.05-0.1) | 0.03 (0.02-0.04) | 0.01 (0.01-0.02) | 0.01 (0.01-0.02) | 0.01 (0.01-0.02) | 0.02 (0.01-0.03) | 0.02 (0.01-0.03) | 0.03 (0.03-0.05) | 0.08 (0.06-0.12) |
| Common guillemot | 0.17 (0.13-0.22) | 0.16 (0.12-0.21) | 0.12 (0.1-0.16) | 0.08 (0.06-0.11) | 0.05 (0.03-0.06) | 0.03 (0.02-0.04) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.01 (0.01-0.02) | 0.03 (0.02-0.04) | 0.07 (0.05-0.09) | 0.13 (0.1-0.17) |
| Razorbill | 0.08 (0.04-0.13) | 0.1 (0.06-0.14) | 0.11 (0.08-0.14) | 0.08 (0.05-0.2) | 0.02 (0-0.04) | 0 (0-0.01) | 0 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.02) | 0.03 (0.02-0.07) | 0.05 (0.03-0.06) | 0.06 (0.03-0.1) |
| Little auk | 0.05 (0.03-0.08) | 0.02 (0.01-0.04) | 0.01 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0.01 (0-0.01) | 0.02 (0.01-0.03) | 0.04 (0.03-0.06) | 0.06 (0.04-0.09) |
| Atlantic puffin | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.02) | 0 (0-0.01) | 0 (0-0.01) |

**Table 4.14c** Monthly density estimates of flying birds (birds $km^{-2}$) within the area of the proposed Dogger Bank Teesside A project of the Dogger Bank Zone based on population estimates from July 2011 to June 2012 (with 90% confidence limits).

| Species | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northern fulmar | 0.05 (0.04-0.06) | 0.19 (0.15-0.26) | 0.17 (0.14-0.21) | 0.26 (0.22-0.33) | 0.27 (0.22-0.33) | 0.14 (0.12-0.18) | 0.11 (0.09-0.13) | 0.11 (0.09-0.13) | 0.12 (0.1-0.15) | 0.14 (0.11-0.17) | 0.07 (0.06-0.08) | 0.07 (0.06-0.09) |
| Northern gannet | 0.02 (0.01-0.02) | 0.15 (0.11-0.19) | 0.51 (0.43-0.6) | 0.31 (0.25-0.37) | 0.41 (0.33-0.49) | 0.16 (0.12-0.2) | 0.09 (0.07-0.11) | 0.14 (0.11-0.16) | 0.2 (0.17-0.24) | 0.35 (0.29-0.42) | 0.08 (0.07-0.1) | 0.04 (0.03-0.06) |
| Arctic skua | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.13) | 0 (0-1.34) | 0 (0-19.23) | 0 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.02) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) |
| Great skua | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0.01 (0-0.01) | 0.01 (0.01-0.02) | 0.01 (0.01-0.02) | 0.01 (0.01-0.02) | 0 (0-0.01) | 0 (0-0) |
| Black-legged kittiwake | 0.46 (0.4-0.52) | 2.32 (2.03-2.7) | 3.34 (2.95-3.81) | 0.84 (0.73-0.98) | 0.76 (0.67-0.87) | 0.44 (0.38-0.51) | 0.43 (0.38-0.49) | 0.19 (0.17-0.22) | 0.11 (0.09-0.13) | 0.22 (0.19-0.25) | 0.16 (0.14-0.19) | 0.37 (0.33-0.43) |
| Lesser black-backed gull | 0.01 (0-0.01) | 0.01 (0.01-0.02) | 0.02 (0.01-0.03) | 0.03 (0.02-0.05) | 0.03 (0.01-0.05) | 0.02 (0.01-0.04) | 0.01 (0.01-0.02) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.01) |
| Great black-backed gull | 0.03 (0.02-0.04) | 0.07 (0.05-0.11) | 0.05 (0.03-0.08) | 0.07 (0.05-0.11) | 0.05 (0.03-0.09) | 0.03 (0.01-0.06) | 0.01 (0.01-0.02) | 0.01 (0.01-0.02) | 0.01 (0.01-0.01) | 0.01 (0.01-0.02) | 0.02 (0.01-0.03) | 0.04 (0.03-0.06) |
| Common guillemot | 0.04 (0.03-0.05) | 0.09 (0.07-0.12) | 0.16 (0.12-0.2) | 0.15 (0.11-0.2) | 0.08 (0.06-0.1) | 0.03 (0.02-0.04) | 0.02 (0.01-0.02) | 0.01 (0.01-0.01) | 0.01 (0-0.01) | 0 (0-0.01) | 0.01 (0-0.01) | 0.01 (0.01-0.02) |
| Razorbill | 0.02 (0.01-0.03) | 0.09 (0.06-0.13) | 0.18 (0.14-0.24) | 0.11 (0.07-0.21) | 0.01 (0-0.04) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) |
| Little auk | 0.01 (0.01-0.02) | 0.01 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0.01 (0-0.01) | 0.02 (0.01-0.03) | 0.02 (0.02-0.04) |
| Atlantic puffin | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Table 4.15a** Monthly density estimates of flying birds (birds km$^{-2}$) within the area of the proposed Dogger Bank Teesside B project of the Dogger Bank Zone in 2010 (with 90% confidence limits).

| Species | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northern fulmar | 0.07 (0.05-0.1) | 0.15 (0.13-0.2) | 0.13 (0.1-0.16) | 0.17 (0.14-0.2) | 0.27 (0.23-0.32) | 0.25 (0.22-0.31) | 0.14 (0.12-0.17) | 0.08 (0.06-0.1) | 0.08 (0.06-0.1) | 0.09 (0.07-0.11) | 0.06 (0.05-0.08) | 0.09 (0.08-0.11) |
| Northern gannet | 0.04 (0.04-0.05) | 0.03 (0.03-0.04) | 0.05 (0.03-0.06) | 0.01 (0.01-0.01) | 0.03 (0.03-0.04) | 0.07 (0.06-0.08) | 0.06 (0.05-0.08) | 0.05 (0.04-0.06) | 0.06 (0.05-0.07) | 0.12 (0.1-0.14) | 0.07 (0.06-0.08) | 0.1 (0.08-0.12) |
| Arctic skua | 0 (0-310.61) | 0 (0-4.34) | 0 (0-0.18) | 0 (0-0.02) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) |
| Great skua | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) |
| Black-legged kittiwake | 1.09 (0.98-1.21) | 1.24 (1.12-1.37) | 1.32 (1.18-1.48) | 0.31 (0.28-0.36) | 0.39 (0.36-0.44) | 0.39 (0.35-0.44) | 0.29 (0.26-0.33) | 0.26 (0.23-0.29) | 0.44 (0.39-0.5) | 0.94 (0.84-1.05) | 0.8 (0.72-0.89) | 1.2 (1.08-1.34) |
| Lesser black-backed gull | 0.01 (0-0.01) | 0.01 (0.01-0.02) | 0.02 (0.02-0.04) | 0.05 (0.04-0.08) | 0.1 (0.08-0.15) | 0.1 (0.08-0.13) | 0.05 (0.03-0.07) | 0.01 (0.01-0.02) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Great black-backed gull | 0.11 (0.09-0.15) | 0.07 (0.05-0.1) | 0.05 (0.03-0.06) | 0.03 (0.02-0.04) | 0.02 (0.01-0.03) | 0.01 (0.01-0.02) | 0.01 (0.01-0.01) | 0.01 (0.01-0.02) | 0.02 (0.01-0.04) | 0.03 (0.02-0.04) | 0.04 (0.03-0.06) | 0.1 (0.07-0.14) |
| Common guillemot | 0.03 (0.02-0.05) | 0.04 (0.03-0.06) | 0.04 (0.03-0.05) | 0.03 (0.02-0.04) | 0.01 (0.01-0.02) | 0.01 (0.01-0.01) | 0.01 (0.01-0.01) | 0.01 (0.01-0.01) | 0.02 (0.01-0.02) | 0.04 (0.03-0.06) | 0.1 (0.07-0.12) | 0.18 (0.13-0.23) |
| Razorbill | 0.05 (0.04-0.07) | 0.03 (0.02-0.05) | 0.02 (0.01-0.04) | 0.01 (0.01-0.04) | 0 (0-0.01) | 0 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.02 (0-0.02) | 0.04 (0.03-0.09) | 0.06 (0.05-0.08) | 0.08 (0.05-0.13) |
| Little auk | 0.01 (0-0.03) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0.01 (0-0.01) | 0.02 (0.01-0.03) | 0.04 (0.03-0.06) | 0.06 (0.04-0.09) |
| Atlantic puffin | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.02) | 0 (0-0.04) | 0 (0-0.02) | 0 (0-0.02) |

**Table 4.15b** Monthly density estimates of flying birds (birds $km^{-2}$) within the area of the proposed Dogger Bank Teesside B project of the Dogger Bank Zone based on population estimates from July 2010 to June 2011 (with 90% confidence limits).

| Species | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northern fulmar | 0.07 (0.06-0.09) | 0.09 (0.08-0.12) | 0.08 (0.07-0.1) | 0.09 (0.08-0.11) | 0.09 (0.08-0.11) | 0.09 (0.08-0.11) | 0.14 (0.12-0.17) | 0.08 (0.06-0.1) | 0.08 (0.06-0.1) | 0.09 (0.07-0.11) | 0.06 (0.05-0.08) | 0.09 (0.08-0.11) |
| Northern gannet | 0.06 (0.05-0.08) | 0.1 (0.08-0.11) | 0.34 (0.29-0.4) | 0.06 (0.05-0.08) | 0.06 (0.05-0.07) | 0.07 (0.06-0.08) | 0.06 (0.05-0.08) | 0.05 (0.04-0.06) | 0.06 (0.05-0.07) | 0.12 (0.1-0.14) | 0.07 (0.06-0.08) | 0.1 (0.08-0.12) |
| Arctic skua | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) |
| Great skua | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) |
| Black-legged kittiwake | 0.78 (0.69-0.89) | 1.13 (1-1.28) | 3.67 (3.31-4.09) | 1.57 (1.41-1.74) | 1.72 (1.56-1.9) | 1.38 (1.23-1.53) | 0.29 (0.26-0.33) | 0.26 (0.23-0.29) | 0.44 (0.39-0.5) | 0.94 (0.84-1.05) | 0.8 (0.72-0.89) | 1.2 (1.08-1.34) |
| Lesser black-backed gull | 0 (0-0.01) | 0.01 (0-0.02) | 0.02 (0.01-0.04) | 0.05 (0.03-0.07) | 0.05 (0.03-0.07) | 0.02 (0.02-0.04) | 0.05 (0.03-0.07) | 0.01 (0.01-0.02) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Great black-backed gull | 0.07 (0.05-0.1) | 0.07 (0.05-0.09) | 0.09 (0.07-0.13) | 0.05 (0.04-0.06) | 0.02 (0.01-0.03) | 0.01 (0.01-0.02) | 0.01 (0.01-0.01) | 0.01 (0.01-0.02) | 0.02 (0.01-0.04) | 0.03 (0.02-0.04) | 0.04 (0.03-0.06) | 0.1 (0.07-0.14) |
| Common guillemot | 0.24 (0.18-0.31) | 0.23 (0.17-0.29) | 0.17 (0.14-0.21) | 0.11 (0.09-0.14) | 0.07 (0.05-0.09) | 0.04 (0.03-0.05) | 0.01 (0.01-0.01) | 0.01 (0.01-0.01) | 0.02 (0.01-0.02) | 0.04 (0.03-0.06) | 0.1 (0.07-0.12) | 0.18 (0.13-0.23) |
| Razorbill | 0.11 (0.05-0.17) | 0.13 (0.08-0.19) | 0.15 (0.12-0.19) | 0.1 (0.07-0.26) | 0.02 (0-0.05) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.02 (0-0.02) | 0.04 (0.03-0.09) | 0.06 (0.05-0.08) | 0.08 (0.05-0.13) |
| Little auk | 0.05 (0.03-0.08) | 0.02 (0.01-0.04) | 0.01 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0.01 (0-0.01) | 0.02 (0.01-0.03) | 0.04 (0.03-0.06) | 0.06 (0.04-0.09) |
| Atlantic puffin | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.02) | 0 (0-0.04) | 0 (0-0.02) | 0 (0-0.02) |

**Table 4.15c** Monthly density estimates of flying birds (birds km$^{-2}$) within the area of the proposed Dogger Bank Teesside B project of the Dogger Bank Zone based on population estimates from July 2011 to June 2012 (with 90% confidence limits).

| Species | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northern fulmar | 0.06 (0.05-0.07) | 0.21 (0.17-0.28) | 0.17 (0.14-0.21) | 0.22 (0.18-0.27) | 0.24 (0.2-0.3) | 0.13 (0.11-0.16) | 0.1 (0.08-0.12) | 0.1 (0.09-0.12) | 0.11 (0.09-0.14) | 0.17 (0.15-0.21) | 0.08 (0.07-0.1) | 0.08 (0.07-0.1) |
| Northern gannet | 0.02 (0.02-0.03) | 0.18 (0.14-0.22) | 0.76 (0.62-0.9) | 0.31 (0.25-0.36) | 0.43 (0.36-0.5) | 0.17 (0.13-0.2) | 0.11 (0.09-0.12) | 0.16 (0.14-0.19) | 0.25 (0.21-0.28) | 0.5 (0.42-0.58) | 0.11 (0.09-0.13) | 0.05 (0.04-0.07) |
| Arctic skua | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0.11) | 0 (0-1.19) | 0 (0-17.1) | 0 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.02) | 0 (0-0.01) | 0 (0-0.01) | 0 (0-0) |
| Great skua | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0.01 (0-0.01) | 0.01 (0.01-0.02) | 0.01 (0.01-0.02) | 0.01 (0.01-0.02) | 0 (0-0.01) | 0 (0-0) |
| Black-legged kittiwake | 0.6 (0.54-0.68) | 2.89 (2.57-3.32) | 5.01 (4.46-5.72) | 1.48 (1.31-1.68) | 1.41 (1.26-1.59) | 0.83 (0.73-0.93) | 0.85 (0.76-0.95) | 0.39 (0.35-0.43) | 0.22 (0.2-0.25) | 0.3 (0.26-0.34) | 0.22 (0.2-0.25) | 0.46 (0.42-0.53) |
| Lesser black-backed gull | 0.01 (0-0.01) | 0.01 (0.01-0.02) | 0.02 (0.01-0.03) | 0.02 (0.01-0.04) | 0.03 (0.02-0.05) | 0.03 (0.01-0.04) | 0.01 (0.01-0.02) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.01 (0-0.01) |
| Great black-backed gull | 0.04 (0.03-0.05) | 0.08 (0.05-0.12) | 0.07 (0.04-0.1) | 0.05 (0.03-0.07) | 0.04 (0.02-0.06) | 0.02 (0.01-0.04) | 0.01 (0.01-0.01) | 0.01 (0.01-0.01) | 0.01 (0.01-0.02) | 0.02 (0.01-0.02) | 0.02 (0.02-0.03) | 0.05 (0.03-0.07) |
| Common guillemot | 0.05 (0.04-0.07) | 0.13 (0.1-0.17) | 0.22 (0.17-0.28) | 0.21 (0.16-0.28) | 0.11 (0.08-0.13) | 0.04 (0.03-0.05) | 0.02 (0.01-0.03) | 0.01 (0.01-0.02) | 0.01 (0-0.01) | 0.01 (0-0.01) | 0.01 (0.01-0.01) | 0.02 (0.01-0.03) |
| Razorbill | 0.02 (0.01-0.04) | 0.12 (0.08-0.18) | 0.25 (0.19-0.31) | 0.15 (0.09-0.28) | 0.02 (0-0.06) | 0 (0-0.02) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) |
| Little auk | 0.01 (0.01-0.02) | 0.01 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0.01) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0.01 (0-0.01) | 0.02 (0.01-0.03) | 0.02 (0.02-0.04) |
| Atlantic puffin | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Table 4.16** Species biometric data used in collision risk models.

| Species | Body Length[1] | Wingspan[1] | Flight Speed[2] | Nocturnal Activity[3] | Flight | Prop. At CRH (Observed)[4] | Prop. Above 20m (Modelled)[5] | Prop. At CRH (Modelled)[6] |
|---|---|---|---|---|---|---|---|---|
| Northern fulmar | 0.48 | 1.07 | 13.00 | 0.75 | Glide | 0.01 | <0.01 (0-0.26) | <0.01 (0-0.23) |
| Northern gannet | 0.94 | 1.72 | 14.90 | 0.25 | Flap | 0.16 | 0.10 (0-0.21) | 0.03 (0-0.12) |
| Arctic skua | 0.44 | 1.18 | 13.30 | 0 | Flap | 0.01 | 0.04 (0-0.96) | 0.02 (0-0.16) |
| Great skua | 0.56 | 1.36 | 14.90 | 0 | Flap | 0.08 | 0.04 (0-1) | 0.03 (0.01-0.27) |
| Black-legged kittiwake | 0.39 | 1.08 | 13.10 | 0.50 | Flap | 0.20 | 0.16 (0.08-0.24) | 0.08 (0.03-0.13) |
| Lesser black-backed gull | 0.58 | 1.42 | 9.95 | 0.50 | Flap | 0.36 | 0.28 (0-0.58) | 0.18 (0.04-0.42) |
| Great black-backed gull | 0.71 | 1.58 | 13.00 | 0.50 | Flap | 0.32 | 0.34 (0.19-0.63) | 0.24 (0.11-0.45) |
| Common guillemot | 0.40 | 0.67 | 19.10 | 0.25 | Flap | 0.04 | <0.01 (0-0.06) | <0.01 (0-0.03) |
| Razorbill | 0.38 | 0.66 | 16.00 | 0 | Flap | 0.07 | 0.04 (0-0.80) | <0.01 (0-0.27) |
| Little auk | 0.18 | 0.44 | 17.66 | 0 | Flap | 0.02 | <0.01 (0-0.99) | <0.01 (0-1.00) |
| Atlantic puffin | 0.28 | 0.55 | 17.60 | 1 | Flap | <0.01 | <0.01 (0-0.08) | <0.01 (0-0.04) |

[1]Taken from BTO BirdFacts website (Robinson 2005);
[2]Taken from Pennycuik (1997);
[3]Taken from Garthe & Hüppop (2006) following Band (2012);
[4]Proportion recorded by boat surveys as flying above 20m;
[5]Proportion of birds from modelled height bands flying above a height of 20m from Cook *et al.* (2012);
[6]Modelled proportion of birds flying between 26m and 193m above highest astronomic tide from Cook *et al*. (2012).

**Table 4.17** Wind turbine designs considered within the collision risk modelling process.

| Wind Turbine Capacity (MW) | Number of Wind Turbines Required | Wind Turbine Hub Height[1] | Blades | Rotation Speed | Rotor Radius | Blade Width | Pitch |
|---|---|---|---|---|---|---|---|
| 6 | 200 | 109.5 | 3 | 8.84 | 83.5 | 5.5 | 10 |
| 6 | 200 | 113.5 | 3 | 8.84 | 83.5 | 5.5 | 10 |
| 6 | 200 | 133.5 | 3 | 8.84 | 83.5 | 5.5 | 10 |
| 6 | 200 | 183.5 | 3 | 8.84 | 83.5 | 5.5 | 10 |
| 10 | 120 | 138.5 | 3 | 6.85 | 112.5 | 6.7 | 10 |
| 10 | 120 | 142.5 | 3 | 6.85 | 112.5 | 6.7 | 10 |
| 10 | 120 | 162.5 | 3 | 6.85 | 112.5 | 6.7 | 10 |
| 6 | 200 | 182.5 | 3 | 8.84 | 83.5 | 5.5 | 10 |

[1] Meters above highest astronomical tide

**Table 4.18** Monthly proportion of time wind turbines are operational.

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 97 | 97 | 97 | 94 | 93 | 92 | 92 | 92 | 95 | 96 | 97 | 96 |

4.3.91 Results of the collision risk analyses for the Dogger Bank Teesside A and Dogger Bank Teesside B projects and the combined results for the two projects are presented in sections 5.2, 5.3 and 5.4 of this report respectively. In each case, results are presented separately for each month in 2010, 2010/11 and 2011/12, based on the median population estimates and lower and upper confidence limits around these values. Collision estimates based on the means of the monthly values, and thus for the breeding and non-breeding seasons, are also presented.

4.3.92 For the purposes of the impact assessment and the apportioning of impacts to protected sites (see section 4.2), collision risk estimates are summed for breeding months and non-breeding months in each of the three years. The magnitude of the impact associated with collision risk is assessed using the mean monthly estimates across the years (and based on the upper confidence limit)..

***Migrants***

4.3.93 Collision risk analyses for migrant birds were run using the Band model, following the guidance specifically for migrants at offshore sites (Annex 6 of Band 2012). As there are limited data available on the flight heights of birds during migration, only Option 1 (described under *marine birds* above) for consideration of flight heights was used; i.e. the basic model using the proportion of birds at risk height, with proportions taken from Wright *et al.* (2012). Three scenarios were run, using the lower, central and upper limits of the range of the proportion of birds at risk height, as described in Wright *et al.* (2012).

4.3.94 The species whose migration routes would potentially cross each project area were determined using the maps provided in Wright *et al.* (2012). For each of these species, the proportion of the total number of birds crossing the North Sea that would cross the footprint of the wind farm (at any height) during each migration season was calculated using the methods described in Wright *et al.* (2012). The methods described in Wright *et al.* (2012) were also used to determine the reference population relevant to the assessment (i.e. the total number of birds crossing the North Sea during each migration), and details of the derivation of each population estimate is given in Table 4.19.

4.3.95 A single scenario for wind turbine size and height was considered in collision risk models for migrating birds, using the worst case scenario described for marine birds above. Collision risk was modelled with a precautionary avoidance rate of 98%. The value used in collision risk models for the proportion of time wind turbines were operational was taken as the average across the year (94.6%) as migration occurs in many months, but the distribution of migrating bird numbers across the months during which migration occurs is not known.

4.3.96 Biometric data and flight speeds of each species, for use in collision risk models, were taken from published information as detailed in the footnotes to Table 4.19.

**Table 4.19** Species biometric data and derivation of population estimates used in collision risk models for migrating birds.

| Species | Body Length (m)[1] | Wingspan (m)[1] | Flight Speed ($ms^{-1}$)[2] | Flight Type | Prop. At CRH[3] (Lower Limit) | Prop. At CRH[3] (Best Estimate) | Prop. At CRH[3] (Upper Limit) | Reference Population Size[4] | Population Size Correction Factor[5] | Derivation of Population Size[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| Bean goose *Anser fabalis* | 0.75 | 1.58 | 21.08 | Flap | 0.05 | 0.30 | 0.75 | 730 | 1 | Musgrove W (*fabalis* + *rossicus*) |
| Barnacle goose (Svalbard population) *Branta leucopsis* | 0.64 | 1.38 | 21.08 | Flap | 0.05 | 0.30 | 0.75 | 33,000 | 1 | Musgrove W |
| Light-bellied brent goose (Svalbard population) *Branta bernicla hrota* | 0.58 | 1.15 | 21.08 | Flap | 0.05 | 0.30 | 0.75 | 3,400 | 1 | Musgrove W |
| Common shelduck *Tadorna tadorna* | 0.62 | 1.12 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 75,610 | 1 | Musgrove W + Crowe |
| Eurasian wigeon *Anas penelope* | 0.48 | 0.80 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 522,370 | 0.95 | Musgrove W + Crowe |
| Gadwall *Anas strepera* | 0.51 | 0.90 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 21,975 | 0.6 | Musgrove W – Musgrove B |
| Eurasian teal *Anas crecca* | 0.36 | 0.61 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 249,510 | 0.5 | Musgrove W + Crowe – Musgrove B |
| Mallard *Anas platyrhynchos* | 0.58 | 0.90 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 459,500 | 0.7 | Musgrove W + Crowe – Musgrove B |
| Northern pintail *Anas acuta* | 0.58 | 0.88 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 30,235 | 0.5 | Musgrove W + Crowe |
| Northern shoveler *Anas clypeata* | 0.48 | 0.77 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 18,800 | 0.75 | Musgrove W + Crowe – Musgrove B |
| Common pochard *Aythya ferina* | 0.46 | 0.77 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 74,555 | 0.75 | Musgrove W + Crowe – Musgrove B |
| Tufted duck *Aythya fuligula* | 0.44 | 0.70 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 102,860 | 0.9 | Musgrove W + Crowe – Musgrove B |
| Greater scaup *Aythya marila* | 0.46 | 0.78 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 9,360 | 0.05 | Musgrove W + Crowe |

| Species | Body Length (m)[1] | Wingspan (m)[1] | Flight Speed ($ms^{-1}$)[2] | Flight Type | Prop. At CRH[3] (Lower Limit) | Prop. At CRH[3] (Best Estimate) | Prop. At CRH[3] (Upper Limit) | Reference Population Size[4] | Population Size Correction Factor[5] | Derivation of Population Size[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| Common scoter *Melanitta nigra* | 0.49 | 0.84 | 18.65 | Flap | 0.001 | 0.01 | 0.17 | 123,060 | 0.5 | Musgrove W + Crowe – Musgrove B |
| Velvet scoter *Melanitta fusca* | 0.54 | 0.94 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 2,500 | 0.9 | Musgrove W |
| Common goldeneye *Bucephala clangula* | 0.46 | 0.72 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 29,165 | 1 | Musgrove W + Crowe – Musgrove B |
| Red-breasted merganser *Mergus serrator* | 0.55 | 0.78 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 2,900 | 0.1 | Musgrove W - Musgrove B |
| Goosander (breeding males) *Mergus merganser* | 0.62 | 0.90 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 3,500 | 1 | Musgrove B (males only) |
| Goosander (non-breeding) *Mergus merganser* | 0.62 | 0.90 | 18.65 | Flap | 0.001 | 0.15 | 0.60 | 3,250 | 1 | Musgrove W – Musgrove B |
| Great bittern *Botaurus stellaris* | 0.75 | 1.30 | 11.00 | Flap | 0.05 | 0.50 | 0.95 | 400 | 0.7 | Musgrove W - Musgrove B |
| Great crested grebe *Podiceps cristatus* | 0.48 | 0.88 | 18.65 | Flap | 0.01 | 0.10 | 0.40 | 24,385 | 1 | Musgrove W + Crowe |
| Slavonian grebe *Podiceps auritus* | 0.34 | 0.62 | 18.65 | Flap | 0.01 | 0.10 | 0.40 | 1,100 | 0.5 | Musgrove W |
| Hen harrier (breeding) *Circus cyaneus* | 0.48 | 1.10 | 8.64 | Flap | 0.25 | 0.50 | 1.00 | 285 | 0.1 | 25% of Musgrove B adults only (GB) |
| Hen harrier (non-breeding) *Circus cyaneus* | 0.48 | 1.10 | 8.64 | Flap | 0.25 | 0.50 | 1.00 | 375 | 0.8 | SOSS (0.5*Baker W) |
| Eurasian coot *Fulica atra* | 0.37 | 0.75 | 18.65 | Flap | 0.05 | 0.25 | 0.95 | 105,000 | 0.5 | Musgrove W - Musgrove B |
| Eurasian oystercatcher (non-breeding) *Haematopus ostralegus* | 0.42 | 0.83 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 200,000 | 0.35 | SOSS |

| Species | Body Length (m)[1] | Wingspan (m)[1] | Flight Speed ($ms^{-1}$)[2] | Flight Type | Prop. At CRH[3] (Lower Limit) | Prop. At CRH[3] (Best Estimate) | Prop. At CRH[3] (Upper Limit) | Reference Population Size[4] | Population Size Correction Factor[5] | Derivation of Population Size[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| Common ringed plover (non-breeding) *Charadrius hiaticula* | 0.19 | 0.52 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 73,000 | 0.5 | SOSS (autumn only/exclude spring for carry forward) |
| Golden plover (non-breeding) *Pluvialis apricaria* | 0.28 | 0.72 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 400,000 | 0.5 | Musgrove W |
| Grey plover *Pluvialis squatarola* | 0.28 | 0.77 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 49,315 | 1 | Musgrove W + Crowe |
| Northern lapwing *Vanellus vanellus* | 0.30 | 0.84 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 448,950 | 1 | Musgrove W + Crowe – Musgrove B - Gibbons_Ire |
| Red knot *Calidris canutus* | 0.24 | 0.59 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 338,970 | 0.5 | Musgrove W + Crowe |
| Sanderling *Calidris alba* | 0.20 | 0.42 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 60,000 | 0.75 | WPE5 (x50%) (MusgroveW+CroweW)x2.5 Logic of 2.5 from Holt W + (turnover(P-W)) where turnover@x3 [both methods come up with similar figure - turnover needed because there are SPAs for passage birds] |
| Dunlin (passage) *Calidris alpina schinzii* | 0.18 | 0.40 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 3,700 | 1 | WPE5 Baltic breeders only |
| Dunlin (non-breeding) *Calidris alpina alpina* | 0.18 | 0.40 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 438,480 | 1 | Musgrove W + Crowe |
| Ruff *Philomachus pugnax* | 0.25 | 0.53 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 2,400 | 1 | Musgrove W x turnover @x3 |
| Common snipe *Gallinago gallinago* | 0.26 | 0.46 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 1,000,000 | 0.5 | Musgrove W |
| Black-tailed godwit *Limosa limosa islandica* | 0.42 | 0.76 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 5,620 | 1 | WPE5 - Musgrove W - Crowe (spring passage only via North Sea) |

| Species | Body Length (m)[1] | Wingspan (m)[1] | Flight Speed ($ms^{-1}$)[2] | Flight Type | Prop. At CRH[3] (Lower Limit) | Prop. At CRH[3] (Best Estimate) | Prop. At CRH[3] (Upper Limit) | Reference Population Size[4] | Population Size Correction Factor[5] | Derivation of Population Size[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| Bar-tailed godwit *Limosa lapponica* | 0.38 | 0.75 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 54,280 | 1 | Musgrove W + Crowe (does not allow for passage = different race) |
| Whimbrel *Numenius phaeopus* | 0.41 | 0.82 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 23,040 | 0.5 | Baker P x turnover x underestimate adjustment (3840x3x2=23040) Wernham (on migration) |
| Eurasian curlew *Numenius arquata* | 0.55 | 0.90 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 81,850 | 1 | Musgrove W + Crowe - 0.9*Gibbons(B&I) 0.95=estimate of those not going south from Wernham |
| Greenshank *Tringa nebularia* | 0.32 | 0.69 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 275 | 0.1 | Musgrove B 10% of British breeders assumed to winter south. North sea crossings concentrated south 'southern north sea'. Passage not considered (no SPAs). |
| Common redshank (breeding) *Tringa totanus britannica* | 0.28 | 0.62 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 30,000 | 0.1 | Musgrove B North sea crossings concentrated south 'southern north sea'. Irish birds assumed to cross channel if leaving B&I. Assume 50% stay in B&I (SOSS). |
| Common redshank (Icelandic population) *Tringa totanus robusta* | 0.28 | 0.62 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 275,000 | 0.5 | WPE5/SOSS |
| Common redshank (mainland Europe population) *Tringa totanus totanus* | 0.28 | 0.62 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 25,000 | 1 | SOSS |
| Ruddy turnstone *Arenaria interpres* | 0.23 | 0.54 | 16.20 | Flap | 0.05 | 0.25 | 0.75 | 48,000 | 0.5 | Musgrove W |

| Species | Body Length (m)[1] | Wingspan (m)[1] | Flight Speed ($ms^{-1}$)[2] | Flight Type | Prop. At CRH[3] (Lower Limit) | Prop. At CRH[3] (Best Estimate) | Prop. At CRH[3] (Upper Limit) | Reference Population Size[4] | Population Size Correction Factor[5] | Derivation of Population Size[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| Short-eared owl *Asio flammeus* | 0.38 | 1.02 | 8.64 | Flap | 0.10 | 0.50 | 0.95 | 1,030 | 0.35 | Musgrove B x emigration (@guessimate 30%) |
| European nightjar *Caprimulgus europaeus* | 0.27 | 0.60 | 8.64 | Flap | 0.10 | 0.50 | 0.95 | 11,500 | 0.1 | Musgrove B |

[1]Taken from BTO BirdFacts (Robinson 2005);

[2]Taken from published values for flight speed of related species (or those expected to fly at a similar speed) during migration; for all goose species, the average speed readings from 10 Svalbard barnacle geese recorded by satellite transmitters during migration was taken from Griffin *et al.* (2011); for all duck species, grebes and coot, the average of Eurasian wigeon and common eider from Pennycuik (2001) was used; for great bittern, the value for grey heron from Pennycuick for hen harrier, short-eared owl and European nightjar the average of common buzzard, Eurasian sparrowhawk and red kite from Pennycuik (2001) was used; for all waders, the average of great knot (calculated from time and distance values in Pennycuick & Battley 2003) and bar-tailed godwit (calculated from track speeds recorded by satellite transmitters during migration from Gill *et al.* 2001) was used.

[3]Taken from Wright *et al.* (2012), except for common scoter which is taken from Cook *et al.* (2012). "Prop. At CRH" is the proportion of migrating birds that are estimated to fly at collision risk height.

[4]The reference population size is defined as the total number of individuals of each species in the population that uses the migration route that encompasses the Dogger Bank.

[5]The "population size correction factor" is the proportion of each reference population that we estimate will cross the North Sea (required to estimate the proportion that will cross the footprint of the wind farm), based on the information in Wright *et al.* (2012), other published sources and expert opinion.

[6]Derivation of population size refers to how population estimates from different sources have been combined. Sources used are SOSS guidance (Wright *et al.* 2012), the Migration Atlas (Wernham *et al.* 2002), breeding/non-breeding population size estimates (GB/UK: Musgrove *et al*. 2013, except for non-breeding hen harrier and passage whimbrel which are from Baker *et al.* 2006; GB/Ireland: Gibbons *et al.* 1993), wintering waterbird population estimates (Ireland: Crowe *et al.* 2008; International: Wetlands International 2012 (WPE5)). Holt *et al*. 2012 was used to look at the ratio of wintering to passage numbers of sanderling. . To convert from breeding pairs to individuals, we multiplied the number of pairs by 2.5 (assuming that three-times the number of breeding pairs would migrate in autumn, following the convention from Stroud *et al.* 2004, but only two times the number of breeding pairs would migrate in spring, so 2.5-times on average per migration).

***Species-specific sensitivities***

4.3.97 Collision will be an on-going effect through the operational lifetime of the project for all species, and thus there is no potential for species to recover from this effect. The degree to which species might be able to avoid or adapt to the effect is incorporated into the estimation of collision rates, by means of specified avoidance rates. A 98% rate has been used in the realistic worst case scenario presented here (Cook *et al.* 2012), though results using rates of 99% and 99.5% are also presented. The species-specific sensitivity of receptors to collision thus primarily reflects the tolerance of the species' populations to the mortality associated with collision (Table 4.20). Many seabird species are long-lived, with correspondingly low reproductive rates and thus may be considered sensitive to any source of increased mortality.

**Table 4.20** Species-specific sensitivities to collision (for key seabird species and migrants considered in this assessment), based on the tolerance of populations to this effect, as assessed by annual survival rates (following Maclean *et al.* 2009 with data taken from Robinson 2005, Grémillet *et al.* 2012, Harding *et al.* 2011 for little auk).

| Species-specific sensitivity | Annual adult survival rate[1] |
|---|---|
| **Very High** | >0.90: northern fulmar (0.972), northern gannet (0.919), barnacle goose (Svalbard population), light-bellied brent goose (Svalbard population), shelduck, black-tailed godwit, black-legged kittiwake (0.941), black-headed gull, lesser black-backed gull (0.913), great black-backed gull, little tern, Sandwich tern, common tern, common guillemot (0.946), razorbill (0.900), Atlantic puffin (0.924) |
| **High** | 0.85-0.90: black-throated diver, great cormorant, oystercatcher, grey plover, whimbrel, ruddy turnstone, Arctic skua (0.886), great skua (0.888), herring gull |
| **Medium** | 0.80-0.85: common eider, goosander, red-throated diver , hen harrier, red knot, sanderling, little auk |
| **Low** | 0.75-0.80: bean goose, common scoter, goldeneye, ringed plover |
| **Very Low** | <0.75: wigeon, gadwall, teal, mallard, pintail, shoveler, pochard, tufted duck, scaup, long-tailed duck, bittern, coot, golden plover, lapwing, dunlin, ruff, snipe, bar-tailed godwit, curlew, redshank, nightjar |

[1] Values taken from Robinson (2005) are provided for key marine birds species considered in this assessment. For species for which no published estimates of annual survival exist, species-specific sensitivity was assessed based on proxy species.

4.3.98 Following Maclean *et al.* (2009), these species-specific sensitivities are combined with the receptor's value to determine the overall sensitivity of species to collision.

4.3.99 An alternative approach used in assessing the significance of the potential collision mortality associated with offshore wind farms has been to relate the number of collisions predicted to the background mortality of a given population. In this way, the magnitude of the impact encompasses the consideration of the species-sensitivity to the effect described above. Here, for marine birds, the number of collisions of adult birds predicted across the year is considered in relation to the background mortality at each protected site, where the background mortality is calculated from the adult mortality (1-adult survival) rates presented in the BTO BirdFacts website (Robinson 2005) and the size of the breeding population at the site.

4.3.100 Typically, the magnitude of the percentage increase in background mortality determined in this way has been categorised according to the same thresholds presented in Table 4.1, and this categorisation of magnitude then combined the categorisation of species' value to provide a determination of significance. However, the application of these thresholds (proposed for the assessment of magnitude in relation to the size of a reference population) to the percentage increase in background mortality is inappropriate, not least because there is the potential for an increase in background mortality of over 100%. In order that there is consistency in the outcomes of the assessments of significance of the effect of collision based on consideration of the proportion of the population impacted or the percentage increase in background mortality, an alternative classification of magnitude is thus proposed for the latter:

**Table 4.21** Alternative definition of the magnitude associated with collision mortality assessed by the percentage increase in background adult mortality.

| Magnitude | Definition |
|---|---|
| **Very High** | >100% increase in background adult mortality |
| **High** | 50-100% increase in background adult mortality |
| **Medium** | 20-50% increase in background adult mortality |
| **Low** | 5-20% increase in background adult mortality |
| **Negligible** | <5% increase in background adult mortality |

4.3.101 Differences in the level of significance determined following this alternative procedure are highlighted in the receptor accounts.

***Confidence***

4.3.102 The assessment of collision risk has been the subject of much development (e.g. Band 2012), although there is still considerable uncertainty regarding some of the key variables used in collision risk modelling, notably avoidance rates and flight heights (Chamberlain *et al.* 2006, Cook *et al.* 2012). For marine birds, the baseline surveys have provided robust estimates of the populations of birds using the project areas that inform the assessment of collision risk. However, given the range of scenarios that need to be considered in relation to this effect, the confidence in predictions in the assessment of collision risk for marine birds is considered to be

medium at its most precautionary. For migrants, there is much greater uncertainty, both in regard to the determination of the numbers of birds passing through each project area and the proportions of these flying at heights which pose a risk of collision. Given these uncertainties, the confidence in predictions in the assessment of collision for migrants is considered to be very low, although it should be noted that the approach used is precautionary.

**Habitat loss and change – construction/decommissioning/operation**

***Description***

4.3.103 In addition to the direct impacts posed by disturbance and displacement, barrier effects and collision, offshore wind farms may also potentially impact birds indirectly through changes to habitat. These effects include:

- Habitat loss due to export cable corridor and wind farm (long-term, but the extent of habitat loss is likely to be spatially limited);
- Habitat change affecting prey species (both during construction and decommissioning periods, and through the operational life of the wind farm) due to:
  - Suspended sediments (temporary through construction and decommissioning of the wind farm and cable laying);
  - Underwater noise (long-term, through both construction and decommissioning and the operational life of the wind farm);
  - Introduction of novel underwater habitat (long-term, through the operational life of the wind farm);
  - Electro-magnetic fields (EMFs) (long-term, through both construction and decommissioning and the operational life of the wind farm);
- Attraction to offshore structures (long-term, through the operational life of the wind farm);
- Changes to fishing activity as a result of the presence of a wind farm (long-term, through the operational life of the wind farm).

4.3.104 Worst case scenarios follow those detailed in Chapter 13 Fish and Shellfish Ecology.

***Habitat loss***

4.3.105 The installation of wind turbines will in itself lead to a loss of habitat that may affect birds' prey species. Introduction of foundations and scour protection will result in permanent loss of seabed habitat throughout operation, for which the worst case is considered as 200 GBS foundations per project. Loss of habitat in the footprints of the foundations would arise giving a maximum total net loss of 4.21km$^2$ of seabed habitat. This effect is considered permanent and long-term through operation. For export cables, direct loss of seabed habitat will occur throughout operation as a result of cable protection measures and crossings including scour protection (up to 1.01km$^2$). However, burial will be carried out where possible and

in these areas the seabed would be expected to return to its natural condition over time. Hence, the extent of habitat loss will be spatially limited.

***Habitat change***

4.3.106 Evidence from similar activities such as aggregate dredging (Cook & Burton 2010) suggests that seabed habitats and the benthic invertebrates and fish fauna associated with them might be altered by wind turbine installation and cable laying activities, thereby leading to potential impacts for birds.

*Suspended sediments*

4.3.107 Disturbance to the seabed would result in an increase in suspended sediment concentrations and subsequent redeposition, for which the worst case is associated with installation of 12m monopoles, where the greatest increase in suspended sediment concentrations and sediment deposition would be seen as a result of both drilling and pile-driving. For cable installation, different techniques may be used, such as jetting, ploughing, trenching, cutting, mass flow excavation and pre-sweeping (dredging). In the worst case the whole volume of sediment from the trench dimension is released for dispersion and coarser particles would be released from cable installation activities than drilling activities associated with monopole installation.

4.3.108 These effects may impact shellfish, sandeel, herring adult and juvenile fish, as well as their eggs and larvae, for instance through hatching success of eggs, reduced larval feeding rate and survival, adult suffocation (e.g. of buried sandeels), and temporary loss of spawning grounds. A progressive loss of habitat for prey species will also occur as the wind farm is constructed and disturbance of the seabed may impact less mobile prey species directly if unable to avoid construction machinery. Increased suspended sediment concentrations are expected to be temporary in nature, significant increase in sediment thickness will cover small areas, and persistency of such thickness will be small.

4.3.109 Suspended sediments may also directly impact the foraging ability of diving birds. However this effect is considered to be short lived – see Chapter 9 Marine Physical Processes – and is therefore considered to have a negligible impact.

4.3.110 In the particular case of the export cable corridor, direct loss of seabed habitat may also occur progressively throughout construction and into the operational phase as a result of cable protection measures and crossings (up to 1.359km$^2$). Furthermore, export cables during operation will also give off EMFs during operation (worst case up to 222km of HVDC 550kV cables, two cables per circuit), which may in turn effect prey of seabirds – these are considered under operational effects.

*Underwater noise*

4.3.111 Underwater noise may be produced through a range of activities. These include: impact piling associated with installation of pin piles and monopiles, rock placement for scour protection and dredging associated with seabed preparation for installation of gravity bases. In addition, noise may be produced from cable laying related activities such as vessel noise, dredging, trenching and rock dumping for cable protection. Impact piling is potentially the most detrimental for fish and shellfish, for which 200 6MW wind turbines and the use of jacket foundations on pin piles (up to six piles per foundation) constitutes the worst case – this gives the smallest hammer energy but the longest duration and frequency of piling activity. However, the lethal effect from piling on fish is localised to within a few metres of the pile, particularly at smaller hammer energies. Underwater noise may affect prey species through direct lethal/injury, for instance from auditory tissue damage, behaviourally through changes in swimming and schooling behaviour affecting spawning which may in turn affect nursery grounds, migration, and feeding patterns. However, underwater noise during construction and decommissioning will be intermittent, localised and short term.

4.3.112 During operation, noise may originate from the wind turbine gearbox and generator, as well as surface vessels servicing the wind farm. Radiated levels of noise are expected to be low (on the basis of the worst case scenario considered by Chapter 13 of the ES (Fish and Shellfish Ecology) that wind turbines are spaced at 750m), decaying rapidly from each wind turbine. Ambient noise including sea-state would increase with addition of wind turbine and vessel noise and would continue throughout operation; however, the spatial extent is considered small and unlikely to result in changes to fish behaviour or injury.

*Introduction of novel underwater habitat*

4.3.113 Given the soft seabed environment for Dogger Bank Teesside A and B, sub-surface wind turbine towers and foundations may require scour protection material, requiring hard substrate introduction. This represents a novel sub-littoral habitat and is expected to be colonised by a range of organisms (e.g. mussels, barnacles, tubeworms, sponges, hydroids, etc), and therefore may attract fish, increasing the prey available to seabirds. This effect is considered long-term through operation.

4.3.114 In addition, changes to currents during the operational lifetime of the projects, resulting from installation of the wind turbines, may also affect seabed habitats and the benthic invertebrates and fish fauna associated with them, thereby also leading to potential impacts for birds. Such effects may lead to either positive or negative impacts.

*Electro-magnetic effects*

**4.3.115** Disruption of prey species due to Electro-magnetic fields (EMFs) may potentially occur throughout the operational life of the wind farm. EMFs may impact

prey species that are electro-sensitive, resulting in changes in behaviour (e.g. migration patterns and feeding activity); in Chapter 13 of the ES, EMF effects on fish and shellfish were deemed to be **minor adverse.** However, the potential impacts of EMFs from cables on seabirds are highly uncertain (Gill 2005, Gill & Bartlett 2010, Gill *et al.* 2005, 2009)

4.3.116 Effects associated with EMFs will be mitigated through armoured array and export cables, and burial to 0.7m. Where burial is not possible cables will be protected and in the absence of further information, it is assumed that the level of residual EMF emission will be the same in each instance. In the worst case, a maximum cabling length is expected to give the strongest field, and cables will include inter-array (up to 950km), inter-platform (up to 320km), and export cables (up to 222km). Although EMFs may occur throughout operation hence being long-term, given the relatively small area where EMF may occur, limited to the vicinity of cables, the magnitude of impact is thought to be small.

***Attraction to offshore structures***

4.3.117 During operation, wind turbines may also provide platforms for perching and roosting birds and could also extend foraging ranges by allowing birds to rest. Evidence suggests that gulls may either fly through or forage within wind farms, or even actively perch on above-surface structures. Moreover, boat traffic during all phases may attract receptors such as northern fulmar, northern gannet, skuas and gulls. Receptors may also be attracted to lighting around offshore structures, which may help in nocturnal prey location (Sage 1979, Hope-Jones 1980, Tasker *et al.* 1986, Wiese *et al.* 2001).

***Changes to fishing activity***

4.3.118 Changes to fishing activity due to presence of the operational wind farm could impact negatively on the seabird species that rely on discards (northern fulmar, northern gannet, gulls and skuas). However, changes to fishing practice may affect fish and shellfish populations and hence birds indirectly. Since fishing may cause physical damage to seabed habitat, disturb sediments, directly remove plants and other organisms, and alter habitat structure, a reduction in fishing could have a positive effect for marine communities and seabird prey species. For the export cable corridor, fishing activities are expected to continue un-interrupted.

***Methodology used to estimate the size or magnitude of impacts and worst case scenarios***

4.3.119 The individual effects outlined above and also (with the exception of attraction to offshore structures) considered in Chapter 13 of the ES (Fish and Shellfish Ecology) were considered as one single overall effect of direct habitat loss or change, though separately for the construction/decommissioning, and operational phases.

4.3.120 The magnitude of impacts associated with habitat loss and change was assessed qualitatively and draws upon the results of Chapter 13 of the ES, which itself draws upon the Chapter 9 (Marine Physical Processes) and Chapter 12 (Marine and Intertidal Ecology).

4.3.121 Information on adult diet for all marine bird receptors (BirdLife International 2012) was reviewed to allow the relevant direct habitat loss effects on fish, shellfish, and other species provided from Chapter 13 of the ES to be used appropriately. The significances of effects on fish receptors were considered for all marine bird receptors, while the significances of effects on 'other' potential prey species were also considered for all species except auks and black-legged kittiwake.

4.3.122 Summarising from Chapter 13, during construction and decommissioning of the wind farm projects, the impact associated with underwater noise was predicted to be negative and of minor adverse significance for fish and shellfish (including eggs and larvae) for all but one receptor, for which an impact of negligible significance was predicted. The impact associated with the effect of increased suspended sediment concentrations during construction and decommissioning of the wind farm projects was also predicted to be negative and of minor adverse significance for all receptors.

4.3.123 The impact associated with effect of underwater noise during construction and decommissioning in the export cable corridor was predicted to be negative and of minor significance for Diadromous species and 'other fish species', but of negligible significance for all other receptors. The impact associated with effect of increased suspended sediment concentrations during construction and decommissioning in the export cable corridor was predicted to be of negligible significance for all species

4.3.124 During operation, all impacts associated with effects on fish and shellfish in the wind farm project areas were predicted to be negative and of minor adverse significance.

4.3.125 To determine the magnitudes of the potential impacts associated with habitat loss and change for marine bird receptors, the percentages of national and biogeographic populations exposed to the effects in the project areas were first considered. Based on the assessment of effects for prey species detailed in Chapter 13, a qualitative assessment was then made as to the proportion of these birds that might be impacted, so as to determine a final magnitude in each case.

***Species-specific sensitivities***

4.3.126 Species-specific sensitivities to habitat loss and change followed Maclean *et al.* (2009), Furness & Wade (2012)/Furness *et al.* (2012, 2013) using the sensitivities defined in the assessment of indirect habitat loss, i.e. displacement (see Tables 4.7 and 4.8). Species-specific sensitivities are combined with the receptor's value following Maclean *et al.* (2009) to determine the overall sensitivity of species to the effect.

***Confidence***

4.3.127 Since the assessment for indirect effects is qualitative and based upon presumed species reactions to changes in habitat and prey rather than actual observations, very low confidence (under a precautionary worst case) was assigned to final predicted significance.

**Summary of worst case scenarios**

4.3.128 Table 4.22 below provides a summary of the worst case scenarios associated with each of the effects described above.

**Table 4.22** Summary of worst case scenarios used in the impact assessment.

| Potential Effect | Realistic Worst Case | Rationale |
|---|---|---|
| Displacement – operation | Results using a range of displacement and mortality rates are presented for each receptor. Realistic species-specific displacement and mortality rates considered in the assessment reflect species-specific sensitivities to disturbance and habitat loss respectively. A buffer distance of 4km is assumed for divers, 2km for all other species, following guidance from NE/JNCC (NE/JNCC 2012) | The determination of appropriate displacement and mortality rates and buffer distances draws from several recent studies, and follows guidance from NE/JNCC (NE/JNCC 2012) |
| Displacement – construction/decommissioning of the wind farm | As above, though with displacement estimates halved | The numbers of birds displaced will increase during construction and decrease during decommissioning in relation to the spatial extent of the wind farm. Assuming a linear progression of activities, the numbers of birds displaced are hence taken to be 50% of those during operation |
| Disturbance – export cable corridor activities | Displacement rates as above for displacement during operation | Maclean *et al.* (2009) recommend that assessment of the effect of disturbance during construction and decommissioning is also undertaken by assuming a worst case scenario that some or all birds are displaced from the area considered. However, given four separate campaigns are predicted individually covering a 1.5km radius each, only a maximum of 7.7% of the total population would be affected at any one |

| | | |
|---|---|---|
| | | time. |
| Barrier effects – operation | That the wind farm project poses a barrier to 100% of birds that are estimated to fly through its area at turbine height | Follows the protocol of Maclean *et al.* (2009) |
| Collision – operation | A total of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m, blade width of 5.5m, rotation speed of 8.84rpm, pitch of 10 degrees; for exceptions, see Appendix 6. Avoidance rate of 99% used for northern gannet and 98% used for all other species; Option 3 of the updated Band (2012) model followed for flight heights for marine bird species. | Based on collision risk analyses of eight scenarios, covering a range of wind turbine sizes and heights (see Appendices 6 and 12). Option 3 of the updated Band (2012) model allows for a variable collision risk within the rotor swept area and, therefore, a more realistic representation of collision risk. Consideration of the results from use of the other flight height model options, as recommended by Band (2012), is provided in Appendix 7 |
| Habitat loss and change – construction/decommissioning/operation | See Chapter 13 of the ES (Fish and Shellfish Ecology) for summary of worst case scenarios related to Increased Suspended Sediment Concentrations and Sediment Re-deposition, Construction Noise, Electro-magnetic fields, Loss of Habitat, Introduction of Hard Substrate, Operational Noise, Changes in Fishing Activity | Effects of habitat loss and change primarily affect birds through impacts on their prey |

**Considerations regarding the assessment of significance**

4.3.129 As outlined in the sections above, a number of considerations need to be taken into account in determining the significance of impacts. These considerations may be relevant to all or only some of the effects assessed, and include:

- The initial assumptions in apportioning effects to protected sites that all birds come from the protected sites identified and that all birds using the project areas through the year originate from breeding sites around the North Sea. To adjust for these initial assumptions, corrections are made using information from the UK SPA Review (Stroud *et al.* 2001) and Skov *et al.* (1995). The former provides an indication, from a Great Britain perspective at least, of the proportions of national breeding populations supported on these protected sites. In those cases where the proportion of the Great Britain breeding population supported by SPAs is significantly less than 100%, correction factors for apportioning impacts to protected sites were derived as follows: for great skua (73.7% of the GB population held by the Great Britain SPA suite: Stroud *et al.* 2001), black-legged kittiwake (78.1%), razorbill (76%), a correction factor of 0.80; for northern fulmar (57.3%) a correction factor of 0.60; for Arctic skua (24.4%) and great black-backed gull (32%), a correction factor of 0.40. For all other species, for which the proportion of the Great Britain breeding population supported by SPAs is close to 100%, no correction was calculated. These correction values allow for the fact that impacts are also apportioned to SSSIs. Numbers of birds supported by the total protected site suite considered here were also expressed as a proportion of North Sea populations, separately for the breeding season and non-breeding seasons, using mean seasonal figures taken from Skov *et al.* (1995) and using assumptions regarding non-breeding birds outlined above, in order to provide alternative correction factors. As the projects are mostly only within the foraging range of protected sites in Great Britain, the apportioning correction factors derived from the values in Stroud *et al.* (2001) were applied to the impacts predicted for breeding birds (Table 4.23). For non-breeders, in the breeding season or in the non-breeding seasons, the lesser of the two correction factors described above was used (Table 4.23);

**Table 4.23** Correction factors used in the apportioning of impacts to protected sites.

| Species | Breeders | Non-breeders, breeding season | Non-breeders, non-breeding season |
|---|---|---|---|
| Northern fulmar | 0.600 | 0.312 | 0.284 |
| Northern gannet | 1.000 | 1.000 | 1.000 |
| Arctic skua | 0.400 | 0.400 | 0.400 |
| Great skua | 0.800 | 0.800 | 0.800 |
| Black-legged kittiwake | 0.800 | 0.800 | 0.800 |
| Lesser black-backed gull | 1.000 | 1.000 | 1.000 |
| Great black-backed gull | 0.400 | 0.335 | 0.076 |
| Common guillemot | 1.000 | 1.000 | 1.000 |
| Razorbill | 0.800 | 0.800 | 0.515 |
| Atlantic puffin | 1.000 | 1.000 | 1.000 |

- That for diving species, there is the potential that some birds may not have been detected by aerial surveys. Consideration of this issue is given in Appendix 5 and correction factors applied to the apportioning to protected sites as above. This is pertinent to the assessment of disturbance, displacement and habitat loss and change, but not collision;
- That the national winter population estimates for gulls come from a survey of terrestrial habitats and inshore waters (Banks *et al.* 2007) and thus do not include birds that frequent offshore waters and so underestimate the overall national populations. Consideration is thus given as to whether the impacts at the national level for these species might be over-estimated;
- That the populations estimated for some species may be underestimated due to the turnover of birds on passage through the area – this is particularly considered for skuas and lesser black-backed gull. Consideration is thus given as to whether the impacts for these species might be under-estimated;
- The alternative scenarios considered in collision risk modelling concerning avoidance rates and model options for considering flight heights. Appendix 6 provides an overview of collision risk results for the range of wind turbine options considered (thus helping to determine worst case scenarios), as well as results for different avoidance rates and flight height model options. Appendix 7 evaluates whether conclusions regarding the significance of impacts might differ according to the different model options for considering flight heights;
- That some species, such as gulls and cormorants, may potentially utilise wind turbines or other above sea structures as roosting or perching posts, and may also be attracted to the wind farm due to changes in fish populations. The potential for attraction is captured within the displacement rates used in the evaluation of that effect, the determination of which draws from several recent studies (Appendix 4). Among the species considered, low displacement rates are assumed for gulls, including black-legged kittiwake, these rates reflecting that both fewer birds of these species might be displaced by offshore wind farms and that some birds may also be attracted. The potential for attraction is also particularly pertinent to the assessment of

collision. However, given the limited evidence regarding the extent of attraction of birds to offshore wind farms and that any attraction might be balanced by the mostly minor adverse impacts predicted for fish for all effects (see in Chapter 13 of the ES), this effect is not considered further in qualifying collision risk.

**Inter-relationship between effects**

4.3.130 As recommended by IEEM (2006, 2010) guidance, the combined impact from each effect will be considered for each receptor. Quantitative combining of separate effects is not possible due to the assumptions associated with the assessment of different effects.

## 4.4 Effects and Definitions of Worst Case Scenarios – Intertidal

**Habitat loss and disturbance – construction**

***Description***

4.4.1 To date, the cable landfall installation methods have not been finalised. The preferred option is to use Horizontal Directional Drill (HDD) to install the cable from the offshore route, under the cliffs to the onshore transition pit. The HDD exit hole will ideally be located in the sub-tidal zone and is anticipated to have little impact on the intertidal area. However, if offshore access is limited, the exit hole may have to be located on the beach above the high water mark or in the intertidal zone and will likely have a bigger impact on the inter-tidal area. The alternate two options may also require the installation of cofferdams in order to contain the slurry produced during drilling operations and to stabilise the exit point. Dimensions of the cofferdam will be no larger than 10m wide, 15m long and 3m deep but up to two per connection could be required.

4.4.2 The preferred construction technique is use of horizontal directional drilling (HDD) which will reduce the likelihood of disruption on the shoreline. In addition to the HDD, some trenching might be required to allow burial of the export cable from the HDD exit point (if on the beach) to the offshore area. This is not anticipated to increase the impact on the inter-tidal area.

4.4.3 The landfall cable installation will be completed by burial using methods similar to those used for the offshore cables but if access is limited, other techniques will have to be considered: ploughing, jet trenching, mechanical trenching from barges and tractors or building temporary barge bridges.

4.4.4 Coastal erosion has been highlighted as an issue via consultation and is reflected in the Environmental Statement and, therefore, will be taken into account in the landfall works (and the position of the transition pit inland).

4.4.5 Construction activities in the inter-tidal area will impact on the ornithological receptors in two main ways:

- *Habitat loss* for feeding birds during the winter (less likely to be an issue for roosting/breeding birds which are likely to make use of the area);
- *Physical, visual and noise disturbance* to feeding and roosting birds (as above). Bird receptors are likely to respond by being displaced from the area affected.

***Methodology used to estimate the size or magnitude of impacts and worst case scenarios***

*Habitat loss*

4.4.6 The impact of habitat loss is likely to be highly localised and is unlikely to extend beyond the boundary of the export cable corridor itself, which is estimated to be no more than 1km in length at the landfall region. Therefore, the scale of the area affected is very small.

4.4.7 The intertidal zone of the landfall is classified as barren littoral coarse sand with no mud to retain moisture. There is little in the way of plant or invertebrate species supported and hence the impact of the inter-tidal installation is likely to be very limited.

4.4.8 The worst case scenario with respect to the cable landfall installation would be if there was limited offshore access as this would result in the HDD exit being located on the beach above the high water mark or in the inter-tidal area and the need for cofferdams. Cofferdams would be removed following installation. However as all of the cabling, the transition pit and cofferdams would ultimately be buried, the duration of the effect of habitat loss would not extend beyond 16 weeks for a single project or 24 weeks for both projects together in parallel.

*Physical, visual and noise disturbance*

4.4.9 The impact of disturbance is likely to be very localised and is unlikely to extend beyond a buffer of 300m from the boundary of the final export cable corridor itself, this distance representing the maximum distance at which coastal waterbirds typically show behavioural responses to human disturbance (see Smit & Visser 1993, Burton *et al.* 2002). Therefore, the scale of area affected is very small and it should not be necessary to close the beach during operations. If closed at all for maintenance, an area in the intertidal zone to low water mark of 10mx10m would be allowed per project. (Note the transition pits and works areas themselves will be less than 1km long.)

***Species-specific sensitivities and overall sensitivity***

*Habitat loss*

4.4.10 Species-specific sensitivities for marine bird receptors were allocated using scores assigned by Furness & Wade (2012)/Furness *et al.* (2012, 2013) in relation to habitat specialisation (see Table 4.10 for further details).

4.4.11 As waders and coastal wildfowl are more typically confined to intertidal habitats, and previous studies have shown that habitat loss can impact their survival (e.g. Burton *et al.* 2006), these species are assumed to have a High species-sensitivity to this effect.

*Physical, visual and noise disturbance*

4.4.12 Species-specific sensitivities for marine bird receptors were allocated using scores assigned by Furness & Wade (2012)/Furness *et al.* (2012, 2013) for their vulnerability to boat disturbance (see Table 4.8 for further details).

4.4.13 There has been considerable research into the potential impacts of disturbance on waders (e.g. Burton *et al.* 2002, Drewitt 2007, Davidson & Rothwell 1993, Smit & Visser 1993) which are typically more sensitive to this effect than gulls, though this varies by species. Large species, such as Eurasian curlew generally take flight at greater disturbance distances than small species such as dunlin (Burton *et al.* 2002, Blumstein *et al.* 2005, Smit & Visser 1993). For the species considered here, a High species-sensitivity to this effect is assumed for Eurasian oystercatcher and northern lapwing whereas a Medium species-sensitivity is assumed for ringed plover, dunlin, sanderling and ruddy turnstone.

**Operational effects**

4.4.14 Assuming that all cables are buried, it is anticipated that there will be no operational effects.

**Decommissioning**

4.4.15 It is most likely that buried assets such as cables will be left in situ when the project is decommissioned. Although it may be possible to partially recover these cables, an additional EIA would have to be carried out in order to investigate the potential effects of the retrieval operations.

## 4.5 Mitigation Measures and Residual Impacts

4.5.1 Mitigation has been incorporated in the project design through the early consideration of the results of baseline surveys which revealed concentrations of birds (notably associated with concentrations of sandeels – see also in Chapter 13 Fish and Shellfish Ecology) in the north-western and western edges of the Dogger

Banks Zone. This area, which supports some of the highest bird densities in the Dogger Bank Zone, has been excluded from the determination of project boundaries – see Project Boundary Selection Report.

4.5.2 Mitigation has also been introduced specifically with respect to the effect of collision risk for birds, a change that was introduced following consultation on the draft Environmental Statement (ES) where concerns were raised over the level of collision impacts. Across species, the probability of avian collision tends to be statistically greater for smaller turbines, both due to their absolute size (Cook *et al.* 2011) – as a greater proportion of the rotor swept area occurs at lower altitudes where, for most species, the densities of flying birds are greatest (Cook *et al.* 2012) – and importantly because with a fixed project capacity, the numbers of turbines may be greater. The maximum number of wind turbines has thus been capped at 200, meaning that the worst case scenario becomes 6MW wind turbines (the largest wind turbines for which the maximum of 200 can be constructed). Also, the minimum lower tip height for all wind turbines has been increased from 22m to 26m above highest astronomical tide.

4.5.3 Following IEEM guidance, where Moderate or Major residual impacts are determined following the use of realistic worst case scenarios, the potential for other defined scenarios (e.g. for collision risk) to mitigate impacts is discussed.

4.5.4 Other specific guidance from the EN-3 National Policy Statement (DECC 2011) on mitigation relating to ornithology, that has been considered in the overall project design, includes the following:

- That aviation and navigation lighting should be minimised to avoid attracting birds, taking into account impacts on safety – this minimum represents compliance with the requirements of the relevant aviation and navigation stakeholders;
- That subject to other constraints, where there is significant risk of collision, wind turbines should be laid out within a site to minimise the risk;
- That construction vessels associated with offshore wind farms should, where practical, avoid rafting seabirds during sensitive periods, hence a code of conduct will be followed by all vessel operators;
- That the exact timing of peak migration events is inherently uncertain. Therefore, shutting down wind turbines during estimated peak migration periods is unlikely to offer suitable mitigation.

## 4.6 Cumulative Impact Assessment Methodology

**Cumulative Impacts – Export Cable Corridor and Project Areas**

4.6.1 Cumulative effects are assessed in relation to all of the main effects outlined above and has drawn from the overall Forewind Cumulative Impact Assessment strategy, which had the following considerations:

i. Whether impacts on a receptor can occur on a cumulative basis between the wind farm project(s) subject to the application(s) and other wind farm projects, activities and plans in the Dogger Bank Zone. At this level, the assessment considers the effects of the Dogger Bank Teesside A and B projects in conjunction with the Dogger Bank Teesside C, Dogger Bank Teesside D, Dogger Bank Creyke Beck A and Dogger Bank Creyke Beck B projects (Figure 1.1);
ii. Whether impacts on a receptor can occur on a cumulative basis between the wind farm project(s) subject to the application(s) and other activities, projects and plans outside the Dogger Bank Zone.

4.6.2 Thus other activities, projects and plans for which there is medium to high confidence data and project information are included in the CIA. Only those activities, projects and plans which may have similar effects on birds as those outlined for the Dogger Bank Teesside A and B projects outlined above are considered here (see Appendix 8).

4.6.3 The methodology for assessing cumulative effects for birds draws from the recommendations of King *et al.* (2009). In brief summary, these recommendations are divided into two parts: data gathering and cumulative effects:

"Data gathering and analysis currently suffer from a lack of standardisation, therefore, guidelines are given for selection of receptors for consideration, projects to be included in the assessment and the spatial scale of the bird reference population to be used. An overarching recommendation is for the provision of quantitative data on raw numbers, densities and population estimates for all receptors and that, wherever possible, impacts are assessed in a quantitative rather than a qualitative way.

The cumulative effects of collision risk and displacement should be assessed by summing the impacts from each component project. Where collision mortality is likely to be significant, more detailed population modelling studies may be required. Disturbance and barrier effects may accrue in a non-linear manner. They should, therefore, firstly be considered in a qualitative manner and, if thought likely to be significant, then a more detailed quantitative study of bird bioenergetics in relation to the effect should be carried-out. In general, all analyses should interpret the significance of mortality in relation to the receptors' background mortality rate to enable its life history parameters and ecology to be taken into account."

Note that when assessing the consequences for population impacts from effects, some impacts may be quite subtle in their implications for population trajectory. These, however, are also just as valid as those more obvious population impacts such as direct collision mortality, especially since adult survival is the key parameter in several population models developed for seabirds, e.g. for gannet (WWT/Macarthur Green/RPS for SOSS-04)".

4.6.4 The cumulative impact assessment for birds considers two spatial scales, for which the methodologies used and the confidence in predictions vary.

4.6.5 At the scale of the Dogger Bank Zone, i.e. for the Dogger Bank Teesside A and B projects in conjunction with the Dogger Bank Teesside C, Dogger Bank Teesside D, Dogger Bank Creyke Beck A and Dogger Bank Creyke Beck B projects, the determination of the magnitudes of cumulative impacts follow the methodologies described in section 4.3 above, with associated assessment of confidence.

4.6.6 Cumulative assessment is also undertaken at the scale of the wider North Sea region (defined by the OSPAR Greater North Sea region). Appendix 8 outlines which projects (which include wind farms and also aggregate sites) were initially considered in the ornithological cumulative impact assessment and which of these projects are also within foraging range of the same protected sites identified to be of relevance to the Dogger Bank Teesside A and B projects.

4.6.7 These projects include those recently constructed, those for which consent has been provided and which are under construction or will be shortly, and others not yet consented. Further screening was undertaken to refine this list based on the status of the projects and the confidence that could be placed in the predictions made in the available project assessments (following the overall Forewind Cumulative Impact Assessment strategy). Thus, completed projects that became operational prior to the collection of baseline data for the present assessment are considered to already have influenced the baseline data and are thus not considered further (e.g. Blyth). Also, because stakeholder discussions are on-going on many Round 3 offshore wind projects (e.g. Firth of Forth Alpha and Bravo, Moray Firth, Neart na Gaoithe), the confidence that can be placed on the predictions provided in the available reports for these projects is considered low and subject to change, and hence these sites are also not included in the cumulative assessment.

4.6.8 At this level a quantitative assessment is made of the potential cumulative effects of displacement and collision associated with offshore wind farms. Following the overall cumulative impact assessment strategy, information on the numbers of birds predicted to be displaced and collision risk estimates were taken from impact assessments or environmental statements where available and no attempt was made to estimate values in other cases. Thus, the projects for which data were available only represent a subset of the suite of projects initially considered in the cumulative assessment in the North Sea region as a whole.

4.6.9 Further, no attempt was made to standardise estimates using the same assumptions as presented in this assessment, as, based on the information presented on other assessments, this would have only have been possible in some cases. In addition the values / assumptions used in other assessments may have been agreed with statutory advisors and/or be specific to those projects and thus it would not be appropriate to use standardised estimates here. The assumptions used in deriving displacement and collision risk estimates in other assessments are highlighted where these differ from those used in this assessment.

4.6.10 It should also be noted that the detailed collision estimates and displacement estimates required for the cumulative assessment were not always both available in the same assessments. Even where data were available, estimates were not available for all the key marine species considered here.

4.6.11 Cumulative impacts were assessed at the scale of the wider North Sea region in relation to national and biogeographic populations. Where collision estimates and displacement estimates were also apportioned in other assessments to individual protected sites, an assessment was made of the cumulative impacts at these sites from these projects in conjunction with those from the Dogger Bank Teesside A, Dogger Bank Teesside B, Dogger Bank Teesside C, Dogger Bank Teesside D, Dogger Bank Creyke Beck A and Dogger Bank Creyke Beck B projects.

4.6.12 Due to the above, and the inherent difficulties of combining information from different sources, where methods may have varied, confidence in all predictions is assigned as very low.

***Disturbance/displacement***

4.6.13 Guidance on the assessment of disturbance/displacement at the cumulative scale is provided in King *et al.* (2009). In the absence of resource competition, the effect of cumulative displacement would be negligible. However, such an assumption is unlikely to be correct given that many areas for seabirds are likely to be at or near carrying capacity, given their sensitivity to changes in prey availability (Frederiksen *et al* 2004; Wanless 2005; Ashbrook *et al.* 2009). Since there is currently no simple method to determine carrying capacity, King *et al.* (2009) recommend that cumulative displacement should be calculated by summing displacement effects from each of the contributing developments.

4.6.14 In assessing the potential impacts of displacement, estimates are required both of the numbers of birds predicted to be displaced and then of the numbers of these that might be expected to die. Following the overall Forewind Cumulative Impact Assessment strategy, information regarding the potential impacts of displacement was taken from impact assessments or environmental statements where available and no attempt was made to estimate values in other cases.

4.6.15 Estimates of numbers of displaced birds were obtained by reviewing environmental statements for planned offshore wind farms in the North Sea. In some cases, while population estimates may have been provided, specific displacement estimates were not available. Thus the sites for which data were available only represent a subset of those considered in the cumulative assessment in the North Sea region as a whole.

4.6.16 The final cumulative assessment presented here considers only those projects for which estimates were provided of the numbers of displaced birds that might then be expected to die. In many instances, while predictions were provided of the numbers of birds that might be expected to be displaced, no information was provided of the likely mortality rates of these birds (often, as mortality was considered as part of the

sensitivity of species to this effect – see Maclean *et al.* 2009). As with displacement rates, mortality rates considered varied between projects, some providing results for a range of rates and carrying through either a worst case or 'realistic' value into the assessment.

4.6.17 Estimates of the numbers of displaced birds that might be expected to die from these projects were added to the numbers predicted for the Dogger Bank Teesside A, Dogger Bank Teesside B, Dogger Bank Teesside C, Dogger Bank Teesside D, Dogger Bank Creyke Beck A and Dogger Bank Creyke Beck B projects, and placed in national and biogeographic contexts. Where estimates were also apportioned to protected sites, these were added to respective apportioned estimates from the Dogger Bank Teesside A, Dogger Bank Teesside B, Dogger Bank Teesside C, Dogger Bank Teesside D, Dogger Bank Creyke Beck A and Dogger Bank Creyke Beck B projects to assess potential impacts at a protected site level.

4.6.18 Note, as in the present assessment, estimates of the numbers of displaced birds and those that might be expected to die are separated into different seasons for most other projects. For consistency with the overall cumulative impact strategy, whereby information is taken from other assessments as presented, total estimates of the numbers of displaced birds and those that might be expected to die are summed across seasons, even where these seasons may not be consistent with those used here.

***Collision***

4.6.19 Annual collision estimates were obtained by reviewing environmental statements for planned offshore wind farms in the North Sea. For each site, the estimate used is that presented in the final assessment of effects, even if this has been calculated using a different avoidance rate. Further, not all estimates will be strictly comparable with those presented within this report as they may use site-specific flight height data rather than the generic flight height curves used in the collision risk modelling for the six Dogger Bank projects.

***Barrier effects***

4.6.20 As indicated in section 4.3, there is considerable uncertainty regarding the assessment of barrier effects posed by offshore wind farms. Assessment of the potential cumulative effects for seabirds from their breeding colonies has not been attempted because of: i. the difficulties in assessing the magnitude of the potential impacts of this effect; ii. the complexities in the numbers of potential projects affecting birds foraging from different colonies (see Appendix 8); and iii. the potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009), and thus are problematic to quantify. Likewise, no attempt was made to assess in a quantified manner the cumulative impact of the potential barrier effects posed by the Dogger Bank Teesside A and B and Dogger Bank Teesside C, Dogger Bank Teesside D, Dogger Bank Creyke Beck A and Dogger Bank Creyke Beck B projects and other wind farm projects within the

North Sea on the populations of those terrestrial or waterbird migrants that are UK SPA features whose migration zones (defined by Wright *et al.* 2012) overlap with the Dogger Bank Teesside A and B project areas.

***Direct habitat loss and change***

4.6.21 A qualitative assessment only is made of the potential of cumulative impacts of habitat loss and change at this scale. Information on the significance of indirect effects from the impact assessments reviewed is presented, where this was available. While indirect effects were considered in most assessments for offshore wind farms, in many they were either scoped out or included in the assessment of other effects, such as displacement. No similar predictions of the potential impacts from habitat loss and change for birds were found in relation to aggregate developments.

**Cumulative Impacts – Intertidal**

4.6.22 There are some other projects which are relevant to the landfall area. The Breagh pipeline runs to the north of the intertidal area, but based on published timescales, it is not expected that construction of this project would overlap with the construction work associated with the cable landfall installation. Further potash mines are also in the vicinity but given that they are underground, no further assessment is carried out. There are also several decommissioned cables in the area, which do not need further consideration.

4.6.23 Of most relevance is the Teesside Offshore Wind Farm (EDF 2004). Aside from the potential effects associated with the wind farm itself (considered elsewhere in the cumulative assessment), this project also considered the potential impacts associated with the grid connection which passes across Coatham Sands, ca. 6km north of the landfall connection for the projects considered here. That part of the Teesside Offshore Wind Farm assessment considered potential impacts of the grid connection for feeding and roosting non-breeding waterbirds (principally waders), roosting seabirds (principally terns and black-legged kittiwakes) and breeding waterbirds and seabirds (principally terns). Due to the short period of disturbance associated with installation of the cable in the intertidal zone, the occurrence of other forms of human disturbance in the area and the availability of alternative suitable habitat, no significant impacts were predicted for these receptors. However, mitigation was proposed in terms of the timing of works in order that impacts on breeding little terns should be avoided. Given that no significant residual impacts were predicted for birds for the installation of the cable in the intertidal zone following this mitigation, that these works have now been completed, and that breeding terns do not occur in the area of the landfall connection for the Dogger Bank Teesside projects, no additional impacts are expected from these projects in combination.

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# 5. ENVIRONMENTAL IMPACT ASSESSMENT RESULTS

## 5.1 Introduction

5.1.1 This section of the report provides the results of the impact assessments for the Dogger Bank Teesside A and Dogger Bank Teesside Beck B projects, together with an assessment of the combined effects of both.

5.1.2 In each case, assessment is first provided of the magnitudes of the impacts from different effects during construction/decommissioning and during operation. Following this, accounts review the sensitivities of each key receptor to these effects and, in combination with the assessment of magnitude, provide an assessment of the overall significance of impacts for each species.

5.1.3 Impacts on receptors in intertidal areas are considered separately as these will apply to both projects cumulatively.

5.1.4 For the effects of disturbance/displacement, barrier effects and collision, apportioning of impacts is made to protected sites (see section 4 for more details and Appendix 9 for detailed results). However, for many species only a proportion of populations may originate from protected sites. Therefore, adjustments were applied to account for proportions of populations that were not covered by the protected site suite – see section 4 for more details.

5.1.5 The apportioning of impacts to protected sites also assumes that all birds using the project area through the year originate from sites in the North Sea. In the case of northern gannet, a recent review has shown that the birds that occur in the North Sea in the winter include birds from colonies further north in Norway as well as from the North Sea. However, many birds from North Sea breeding colonies, such at Bass Rock in the Forth Islands SPA, may winter further south, as far as west Africa (Fort *et al.* 2012). Likewise, in the case of black-legged kittiwake, a recent review has shown that the birds that occur in the North Sea in the winter include birds from colonies further north in the Norwegian Sea, Barents Sea and West Spitsbergen OSPAR regions, as well as from the North Sea; while birds from North Sea breeding colonies may also winter in the Celtic Seas OSPAR region and in the north-west Atlantic, off Labrador (Frederiksen *et al.* 2012).

5.1.6 In addition for five species: white-billed diver, common guillemot, razorbill, little auk, and Atlantic puffin, the proportions of populations impacted by disturbance/displacement were also adjusted for the time potentially spent underwater (see section 4 and Appendix 5).

**Construction and Decommissioning**

5.1.7 Potential impacts associated with the construction and decommissioning of the wind farm, which may occur both within the area of the wind farm project and along the export cable corridor, include:

- Disturbance/displacement; and
- Direct habitat loss or change.

***Disturbance/displacement***

5.1.8 In accordance with guidance from NE/JNCC (2012), for key receptors, a range of displacement and mortality rates were investigated (see Appendix 10). For the chosen displacement and mortality rates for each receptor (see section 4), the numbers of birds predicted to be lost due to the effect of displacement are highlighted in Appendix 10. The numbers of birds displaced at chosen displacement rates (before assessing mortality) are also presented at the start of each assessment in Table 5.1 for Dogger Bank Teesside A, Table 5.8 for Dogger Bank Teesside B, Table 5.17 for Dogger Bank Teesside A and B, and Table 6.1 for the cumulative assessment of Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D.

***Direct habitat loss or change***

5.1.9 The main effects influencing prey species of seabirds during construction and decommissioning are temporary disturbance of the seabed and underwater noise. These individual effects may influence the prey available to seabirds in turn constituting indirect habitat loss. Further changes to habitat occur through presence of additional vessels which may offer positive attraction benefits to seabirds (see section 4). These alterations to the habitat are combined into one single effect of "direct habitat loss and change" to assess the impact on seabirds. Assessment follows the methodology for direct habitat loss or change (see section 4).

5.1.10 Individual effects, defined in Chapter 13 'Fish and Shellfish Ecology', were determined to be minor adverse for fish and shellfish during construction and decommissioning (see section 4).

**Operation**

5.1.11 Potential impacts associated with the operation of the wind farm include:
- Disturbance/displacement;
- Barrier effects;
- Collision; and
- Direct habitat loss or change.

***Disturbance/displacement***

5.1.12 In accordance with guidance from NE/JNCC (2012), for key receptors, a range of displacement and mortality rates were investigated (see Appendix 10). For the chosen displacement and mortality rates for each receptor (see section 4), the numbers of birds predicted to be lost due to the effect of displacement are highlighted in Appendix 10. The numbers of birds displaced at chosen displacement rates (before assessing mortality) are also presented at the start of

each assessment in: Table 5.1 for Dogger Bank Teesside A; Table 5.8 for Dogger Bank Teesside B; Table 5.16 for Dogger Bank Teesside A and B; and Table 6.1 for the cumulative assessment of Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D.

***Barrier effects – Marine Birds***

5.1.13 Dogger Bank Teesside A and B are each within the maximum foraging range of six seabird species – northern fulmar, northern gannet, black-legged kittiwake, common guillemot, razorbill and Atlantic puffin – from protected sites at which they are features (see Appendix 1 for details). Thus, these project areas may potentially pose a barrier effect to these species during the breeding season. Estimates of the maximum numbers of breeding adult birds of these species in flight in the project area, based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, are provided in Table 5.2 for Dogger Bank Teesside A, Table 5.9 for Dogger Bank Teesside B and 5.17 for Dogger Bank Teesside A and B. Table 6.2 presents the rates for the cumulative assessment of Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D.

***Collision – Marine Birds***

5.1.14 An overview of the results of collision risk analyses for marine birds for the Dogger Bank Teesside A and B projects is provided in Appendix 6.

***Worst case scenario per project***

5.1.15 For the nine species considered, the worst case scenario for each of the Dogger Bank Teesside A and B projects was found to be the use of 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m. These are the worst case scenarios against which the environmental impact of the project is assessed. Observed flight heights were within those of the confidence limits of the modelled distribution (see section 4.3). Consequently, it was felt that Option 3 of the Band model, which accounts for differing collision risk within the rotor-swept area, would provide the most realistic estimates of collisions.

***Direct habitat loss or change***

5.1.16 The main effects influencing prey species of seabirds during operation are loss of habitat, introduction of hard substrate, operational noise, electromagnetic fields (EMFs) and changes to fishing activity (see section 4). These effects are combined as a single direct habitat loss and change effect for both the project area and export cable corridor and are assessed following the methodology for direct habitat loss or change.

5.1.17 Individual effects, defined in Chapter 13 ‘Fish and Shellfish Ecology’,were determined to be minor adverse for fish and shellfish during operation (see section 4).

## 5.2 Dogger Bank Teesside A Offshore Ornithology Impact

**Disturbance/displacement**

5.2.1 The numbers of birds predicted to be displaced from the Dogger Bank Teesside A project area and buffer during construction/decommissioning and operation, under chosen displacement rates, are shown in Table 5.1 and are also discussed at the start of each species' account. The values presented incorporate the correction factors for birds underwater (see section 4), but do not represent final magnitude, taking into account mortality rates. Based on a full range of alternative displacement and mortality rates, from 0 to 100%, tabulated summaries of the numbers of birds for each species estimated to be displaced and die, are provided in Appendix 10.

5.2.2 Results of the apportioning of disturbance/displacement impacts to protected sites, incorporating mortality, are shown in Appendix 9. These tables also correct for the initial assumption that all birds come from the protected sites identified (see section 4).

5.2.3 Table 5.1 also provides separate estimates of the numbers of birds predicted to be displaced in respective breeding and winter periods. Birds predicted to be impacted during the breeding season will potentially include both breeders from any breeding colonies that the project is within range of, in addition to a non-breeding component. For gulls and northern gannet, it was possible to estimate the proportion of breeders from boat-survey observations of birds in breeding and juvenile plumages. For all other species within foraging range from protected breeding coloby sites, it was assumed one third of the total number of birds (Stroud *et al.* 2004; Kober *et al.* 2010) present during the breeding season will be non-breeders. These are apportioned to protected sites surrounding the North Sea in the same manner as for seabirds outwith the breeding season (see section 4) in Appendix 10.

**Table 5.1** Numbers of birds displaced during construction / decommissioning and operation for the Dogger Bank Teesside A project during 2010, 2010/11 and 2011/12; mean values are subsequently combined with species specific mortality rates to assess the impact of displacement (see section 4). Full matrices of displacement and mortality are given in Appendix 10 for this and other projects.

| | | **Construction / decommissioning** | | | |
|---|---|---|---|---|---|
| **Species** | **Season** | **2010** | **2010/2011** | **2011/2012** | **Mean** |
| Northern gannet | Breeding | 16 (13-19) | 32 (27-38) | 108 (91-130) | 56 (47-67) |
| | Winter | 29 (24-35) | 99 (84-119) | 158 (131-191) | 99 (83-119) |
| | All | 45 (38-54) | 131 (111-157) | 266 (222-321) | 155 (130-187) |
| Common guillemot | Breeding | 103 (95-114) | 196 (180-216) | 233 (211-261) | 181 (165-200) |
| | Winter | 878 (810-954) | 1127 (1045-1220) | 719 (659-777) | 853 (787-924) |
| | All | 982 (905-1068) | 1323 (1225-1436) | 952 (869-1038) | 1034 (952-1125) |
| Razorbill | Breeding | 14 (11-17) | 31 (24-38) | 69 (53-85) | 38 (29-46) |
| | Winter | 336 (295-379) | 424 (374-478) | 276 (240-316) | 321 (282-364) |
| | All | 349 (306-396) | 455 (398-516) | 344 (294-401) | 358 (311-410) |
| Little auk | Winter | 51 (38-70) | 54 (42-72) | 19 (15-27) | 37 (29-51) |
| Atlantic puffin | Breeding | 5 (4-6) | 9 (7-11) | 4 (4-6) | 6 (5-8) |
| | Winter | 35 (28-44) | 58 (49-70) | 12 (10-15) | 32 (26-39) |
| | All | 40 (32-49) | 67 (56-81) | 17 (13-21) | 38 (31-47) |
| | | **Operation** | | | |
| **Species** | **Season** | **2010** | **2010/2011** | **2011/2012** | **Mean** |
| Northern gannet | Breeding | 31 (27-38) | 64 (55-77) | 216 (183-259) | 112 (95-134) |
| | Winter | 58 (49-69) | 198 (167-238) | 317 (262-383) | 198 (166-239) |
| | All | 89 (75-107) | 263 (222-315) | 533 (445-642) | 310 (260-373) |
| Common guillemot | Breeding | 206 (189-228) | 393 (360-432) | 466 (421-522) | 361 (329-401) |
| | Winter | 1757 (1620-1908) | 2253 (2090-2440) | 1439 (1318-1554) | 1707 (1575-1849) |
| | All | 1963 (1809-2136) | 2646 (2450-2873) | 1905 (1739-2076) | 2068 (1904-2250) |
| Razorbill | Breeding | 27 (21-34) | 61 (49-75) | 137 (106-170) | 75 (59-93) |
| | Winter | 671 (591-758) | 848 (747-957) | 552 (481-632) | 641 (563-727) |
| | All | 698 (612-792) | 909 (796-1032) | 689 (587-802) | 716 (622-820) |
| Little auk | Winter | 102 (76-140) | 107 (84-143) | 37 (29-53) | 75 (57-102) |
| Atlantic puffin | Breeding | 9 (7-12) | 18 (15-22) | 9 (7-12) | 12 (10-15) |
| | Winter | 71 (56-87) | 117 (98-139) | 25 (20-30) | 65 (53-78) |
| | All | 80 (63-99) | 135 (113-161) | 33 (27-42) | 77 (63-93) |

**Barrier effects – Marine Birds**

5.2.4 Numbers of key species in flight potentially exposed to barrier effects are shown in Table 5.2.

**Table 5.2** Estimates of the numbers of breeding adult birds of these species in flight in the Dogger Bank Teesside A project area using the mean of 2010 and 2010/2011 and 2011/12 data.

| Species | Breeding season | Mean |
|---|---|---|
| Northern fulmar | Mar-Sep | 79 (64-95) |
| Northern gannet | Apr-Sep | 54 (45-64) |
| Black-legged kittiwake | Apr-Sep | 327 (288-367) |
| Common guillemot | May-Jul | 55 (50-61) |
| Razorbill | May-Jul | 22 (17-27) |

**Collision – Marine Birds**

5.2.5 An overview of the results of collision risk analyses for marine birds for the Dogger Bank Teesside A project is provided in Appendix 6.

5.2.6 There were strong between-year differences in both the total numbers of birds present within Dogger Bank Teesside A, and annual patterns in their abundance. With only three years of data, it was not possible to determine which year was the most representative of bird abundance within Dogger Bank Teesside A. For these reasons, collision risk estimates were produced for each year separately, rather than for a mean value from the three years.

5.2.7 Using a realistic, precautionary avoidance rate of 98% (SNH 2010, Cook *et al.* 2012), the numbers of Arctic skua, great skua, common guillemot, little auk and Atlantic puffin colliding with wind turbines, based on population estimates from 2010 to 2012, were predicted to be less than one bird per year. Even assuming a more conservative avoidance rate of 95%, the numbers of Arctic skua, common guillemot, little auk and Atlantic puffin predicted to collide with wind turbines were less than one bird per year. Northern fulmar and razorbill had a similarly low collision risk, with just one northern fulmar and one razorbill predicted to collide annually.

5.2.8 The numbers of lesser black-backed gull and great black-backed gull predicted to collide with wind turbines were greater. The collision rates were highest based on the 2010 population estimates for the lesser black-backed gull with 24 birds. For great black-backed gull, the highest collision estimate, of 33 birds, came from the 2010/11 population estimate.

5.2.9 Estimates were greatest for black-legged kittiwake and northern gannet. The maximum collision estimate for black-legged kittiwake was 63 birds based on data from both 2010/11 and 2011/12. For northern gannet the maximum collision estimate was 54 birds based on the 2011/12 population estimate, assuming a 99% avoidance rate.

5.2.10 Collision estimates were greatest for northern gannet, black-legged kittiwake and lesser black-backed gulls during the breeding season. Collision estimates were greater for great black-backed gull during the non-breeding season (Table 5.4).

**Table 5.3** Annual collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A project of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m in response to different avoidance rates. Estimates generated using option 3 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | | | July 2010 – June 2011 | | | | July 2011 – June 2012 | | | | Mean | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 95% | 98% | 99% | 99.5% | 95% | 98% | 99% | 99.5% | 95% | 98% | 99% | 99.5% | 95% | 98% | 99% | 99.5% |
| Northern fulmar | 2 (2 – 2) | 1 (1 – 1) | 0 (0 – 0) | 0 (0 – 0) | 1 (1 – 2) | 0 (0 – 1) | 0 (0 – 0) | 0 (0 – 0) | 2 (2 – 3) | 1 (1 – 1) | 0 (0 – 1) | 0 (0 – 0) | 2 (1-2) | 1 (1-1) | 0 (0-0) | 0 (0-0) |
| Northern gannet | 57 (46 – 69) | 23 (18 – 27) | 11 (9 – 14) | 6 (5 – 7) | 99 (81 – 118) | 40 (32 – 47) | 20 (16 – 24) | 10 (8 – 12) | 269 (219 – 322) | 108 (88 – 129) | 54 (44 – 65) | 27 (22 – 32) | 152 (123-181) | 61 (49-73) | 30 (25-36) | 15 (12-18) |
| Arctic Skua | 0 (0 – 673) | 0 (0 – 269) | 0 (0 – 135) | 0 (0 – 67) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 77) | 0 (0 – 31) | 0 (0 – 15) | 0 (0 – 8) | 0 (0-250) | 0 (0-100) | 0 (0-50) | 0 (0-25) |
| Great Skua | 0 (0 – 1) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 1 (0 – 1) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 1 (1 – 2) | 0 (0 – 1) | 0 (0 – 0) | 0 (0 – 0) | 1 (0-1) | 0 (0-1) | 0 (0-0) | 0 (0-0) |
| Black-legged kittiwake | 87 (78 – 98) | 35 (31 – 39) | 17 (16 – 20) | 9 (8 – 10) | 158 (140 – 179) | 63 (56 – 72) | 32 (28 – 36) | 16 (14 – 18) | 159 (139 – 182) | 63 (56 – 73) | 32 (28 – 36) | 16 (14 – 18) | 132 (117-150) | 53 (47-60) | 26 (23-30) | 13 (12-15) |
| Lesser black-backed gull | 61 (40 – 95) | 24 (16 – 38) | 12 (8 – 19) | 6 (4 – 10) | 38 (23 – 63) | 15 (9 – 25) | 8 (5 – 13) | 4 (2 – 6) | 26 (14 – 47) | 10 (6 – 19) | 5 (3 – 9) | 3 (1 – 5) | 41 (25-67) | 16 (10-27) | 8 (5-13) | 4 (3-7) |
| Great black-backed gull | 70 (50 – 102) | 28 (20 – 41) | 14 (10 – 20) | 7 (5 – 10) | 81 (58 – 119) | 33 (23 – 48) | 16 (12 – 24) | 8 (6 – 12) | 68 (43 – 107) | 27 (17 – 43) | 14 (9 – 21) | 7 (4 – 11) | 71 (49-107) | 28 (20-43) | 14 (10-21) | 7 (5-11) |
| Common guillemot | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Razorbill | 1 (1 – 2) | 1 (0 – 1) | 0 (0 – 0) | 0 (0 – 0) | 3 (2 – 6) | 1 (1 – 2) | 1 (0 – 1) | 0 (0 – 1) | 3 (2 – 5) | 1 (1 – 2) | 1 (0 – 1) | 0 (0 – 0) | 2 (1-4) | 1 (1-2) | 0 (0-1) | 0 (0-0) |
| Little auk | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Atlantic puffin | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0 – 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Table 5.4** Seasonal collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A project of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m and an avoidance rate of 98 % (99% for northern gannet). Estimates generated using option 3 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | July 2010 – June 2011 | | July 2011 – June 2012 | | Mean | |
|---|---|---|---|---|---|---|---|---|
| | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding |
| Northern fulmar | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0-1) | 0 (0-0) |
| Northern gannet | 6 (5 - 7) | 5 (4 - 6) | 8 (6 - 9) | 12 (10 - 14) | 31 (25 - 37) | 23 (19 - 27) | 16 (13-19) | 14 (12-17) |
| Arctic Skua | 0 (0 - 0) | 0 (0 - 269) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 31) | 0 (0 - 0) | 0 (0-10) | 0 (0-90) |
| Great Skua | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |
| Black-legged kittiwake | 13 (12 - 15) | 21 (19 - 24) | 41 (36 - 46) | 23 (20 - 26) | 43 (37 - 49) | 21 (18 - 24) | 33 (29-37) | 20 (18-23) |
| Lesser black-backed gull | 17 (11 - 25) | 7 (4 - 13) | 9 (5 - 14) | 6 (4 - 12) | 5 (2 - 8) | 6 (3 - 10) | 10 (6-15) | 6 (4-12) |
| Great black-backed gull | 8 (5 - 12) | 20 (15 - 29) | 10 (7 - 15) | 23 (17 - 33) | 12 (7 - 21) | 15 (10 - 22) | 10 (6-16) | 18 (13-27) |
| Common guillemot | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |
| Razorbill | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 1 (1 - 2) | 0 (0-0) | 1 (1-1) |
| Little auk | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |
| Atlantic puffin | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |

## Evaluation for Ornithological Receptors

### *White-billed diver*

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 1 | 100% displaced 37.5% mortality 4km buffer | 10,000 | <0.1 | 5,000[3] | 0.01 | 0 | Negligible |
| Displacement (o) | 2 | | 10,000 | <0.1 | 5,000[3] | 0.02 | 0 | Negligible |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 10,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – background adult mortality | <1 | | 1,066 | <0.1 | 533 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.
[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

#### *Summary of population estimates and value*

5.2.11 Numbers in the Dogger Bank Zone as a whole surpassed 1% thresholds for populations of national and international importance. White-billed diver were present in the Dogger Bank Zone between November and April when an average of seven birds were estimated to occur in the Dogger Bank Teesside A project area.

5.2.12 Considering the population of this species in the Dogger Bank Teesside A project area was assessed to be of regional importance, the value of this receptor is assessed to be **medium**.

#### *Construction and Decommissioning*

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.13 White-billed diver has high sensitivity to habitat loss and is considered to have a **high species-specific sensitivity** (i.e. a low tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.14 A full displacement analysis was not undertaken due to the low numbers predicted for the Dogger Bank Teesside A project area (a monthly average of just four birds

was estimated to be displaced between November and April, of which one bird would then be lost through mortality).

5.2.15 The numbers potentially displaced and then lost through mortality are below the thresholds for national and international importance. Therefore, the effect of displacement for white-billed diver for Dogger Bank Teesside A during construction/decommissioning is considered to be of **negligible magnitude** at the national and biogeographic levels.

Significance

5.2.16 This species has a **medium value**. Combining the species' magnitude with value, the impact of this effect for white-billed diver is considered to be **negligible** at both national and biogeographic scales.

*Direct habitat loss or change*

Wind farm

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.17 White-billed diver have high sensitivity to habitat loss, and are considered to have a **high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.18 Considering this and the species' **medium value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.19 White-billed divers are present in the Dogger Bank Zone during winter months only. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species' diet (see section 4), the effect of direct habitat loss or change on white-billed diver is considered to be of **negligible magnitude**.

Significance

5.2.20 Combined with the species' high overall sensitivity to direct habitat loss or change, the impact of this effect for white-billed diver is considered to be **negligible**.

Export cable corridor

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.21 White-billed diver has high sensitivity to displacement from boats and helicopters and is considered to have a **very high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.22 Considering this and the species' **medium value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.23 Individual effects, defined in Chapter 13 'Fish and Shellfish Ecology', were determined to be minor adverse for fish and shellfish within the export cable corridor (see section 4). Information from ESAS data suggests this species is not present within the area (see section 3). However, the data cannot be used to completely deny occurrence of this species (see section 4). Therefore, for this receptor, the effect of direct habitat loss or change on white-billed diver is considered to be of **negligible magnitude**.

Significance

5.2.24 Combined with the species' high overall sensitivity to direct habitat loss or change, the impact of this effect for white-billed diver is considered to be **negligible**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.25 White-billed diver has high sensitivity to habitat loss and is considered to have a **high species-specific sensitivity** (i.e. a low tolerance) to this effect. Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.26 Displacement analysis was not undertaken for this species, due to the low numbers predicted for the Dogger Bank Teesside A project area (a monthly average of just seven birds was estimated between November and April, of which two birds would then be predicted to be lost through mortality).

5.2.27 The numbers potentially displaced and then lost through mortality are below the thresholds for national and international importance. Consequently, the effect of displacement for white-billed diver for Dogger Bank Teesside A during operation is considered to be of **negligible magnitude** at the national and biogeographic levels.

Significance

5.2.28 This species has a **medium value**. Combining the species' magnitude with value, the impact of this effect for white-billed diver is considered to be **negligible** at both national and biogeographic scales.

*Collision*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.29 The annual survival rate of white-billed diver is unknown. However, the annual survival rate for red-throated diver is in the order of 80-85% and that of black-throated diver in the order of 85-90% (Robinson 2005). Assuming an annual survival rate of 85-90%, this species is considered to have a **high species-specific sensitivity** (i.e. a medium tolerance) to this effect.

5.2.30 Considering this and the species' **medium value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.31 Collision risk analysis was not undertaken for this species due to the low numbers predicted for the Dogger Bank Teesside A project area (a monthly average of just five birds was estimated between November and April), and because divers typically fly close to the seas below the height of wind turbines. The modelling work of Cook *et al.* (2012), for example, indicated that just 2% of red-throated diver and 0.1% of black-throated diver flew within an assumed wind turbine collision risk window of 20-150m. Given this, the number of collisions that might be predicted for white-billed diver will be very much less than 0.1 per year, and thus of **negligible magnitude** in relation to national and biogeographic thresholds.

Significance

5.2.32 The effect of collision for white-billed diver for Dogger Bank Teesside A is, thus, considered to be **negligible**.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.33 The white-billed diver has high sensitivity to habitat loss and is considered to have a **high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.34 Considering this and the species' **medium value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.35 Individual effects, defined in Chapter 13 'Fish and Shellfish Ecology', were determined to be minor adverse for fish and shellfish during operation (see section 4). White-billed diver are present in the Dogger Bank Zone during winter months only. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species' diet (see section 4), the effect of direct habitat loss or change on white-billed diver is considered to be of **negligible magnitude**.

Significance

5.2.36 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for white-billed diver is considered to be **negligible**.

***Northern fulmar***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 1 | 98% avoidance Flight height option 3 | 10,200,000 | <0.1 | 1,500,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 190,400 | <0.1 | 28,000 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.2.37 The peak population estimates for the Dogger Bank Teesside A project area in 2010, 2010/2011 and 2011/12 were 569 birds (90% CIs = 476-676) in May, 253 birds (90% CIs = 204-307) in July, and 258 birds (90% CIs = 205-309) in May, respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A project area in either year.

5.2.38 The value of this receptor is assessed as **very high** as the species is a breeding feature of 26 SPAs and a wintering feature of two SPAs in the Greater North Sea OSPAR region.

5.2.39 Dogger Bank Teesside A is within foraging range of seven protected breeding sites in Great Britain, and is within foraging range of eight protected breeding sites around the North Sea at which the species is a feature.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.40 Northern fulmar have a very low sensitivity to habitat loss, and, therefore, and are considered to have a very low species-specific sensitivity (i.e. a very high tolerance) to this effect.

5.2.41 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.42 The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species' diet (see section 4), the effect of direct habitat loss or change on this receptor is considered to be **negligible**.

Significance

5.2.43 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern fulmar is considered to be **negligible**.

Export cable corridor

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.44 Northern fulmar have a very low sensitivity to habitat loss, and are considered to have a **very low species-specific sensitivity** (i.e. a very high tolerance) to this effect.

5.2.45 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.46 For northern fulmar, the 1% thresholds for populations of national and international importance were not exceeded in the export cable corridor area in either year (see section 3). Therefore, the effect of direct habitat loss or change is considered to be **negligible**.

Significance

5.2.47 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern fulmar is considered to be **negligible**.

***Operation***

*Barrier effects*

Magnitude

5.2.48 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 95 adult northern fulmars in flight in the project areas in the breeding season using 2010, 2010/11 and 2010/12 data (Table5.2).

5.2.49 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.1 (Appendix 9) which indicates that between 1 and 5% of the population at the Flamborough Head and Bempton Cliffs SPA, the Weybourne Cliffs SSSI and the Hunstanton Cliffs SSSI might be potentially exposed to this effect.

5.2.50 The increase in flight distance due to the barrier presented by Dogger Bank Teesside A varies by direction of flight, although averages approximately 25km (6.25% of the species' maximum foraging range of 400km). The project is between 195km and 370km from the protected sites within foraging range that would be potentially impacted by this effect (Appendix 1).

5.2.51 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.2.52 Based on the assessment of magnitude and the species' **very high value**, the overall **impact** of the potential barrier effect associated with the Dogger Bank Teesside A project for northern fulmar is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.53 Northern fulmar is long-lived with an annual survival rate of over 90% and a corresponding low reproductive rate (Robinson 2005), and thus is considered to have a **very high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.54 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of one per year for northern fulmar.

5.2.55 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.2.56 Mean annual estimates of the number of collisions represent less than 0.1% of the populations of each protected site within foraging range of the project. Mean

annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.2.57 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British, French and German breeding populations.

5.2.58 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.2.59 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.2.60 Considering the collision risk estimates, based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for northern fulmar for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales. The impact is thus assessed to be **minor adverse**.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.61 Northern fulmar have a very low sensitivity to habitat loss, and, therefore, are considered to have a very low species-specific sensitivity (i.e. a very high tolerance) to this effect.

5.2.62 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.63 For northern fulmar, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.64 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern fulmar is considered to be **negligible**.

***Northern gannet***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 0 | 75% displaced 0% mortality 2km buffer | 967,000 | 0 | 660,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 0 | | 967,000 | 0 | 660,000 | <0.1 | 0 | Minor adverse |
| Collision – population | 36 | 99% avoidance Flight height option 3 | 967,000 | <0.1 | 660,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | 27 | | 52,218 | <0.1 | 35,640 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.2.65 The peak population estimates for the Dogger Bank Teesside A project area in 2010, 2010/11 and 2011/12 were 109 birds (90% CIs =93-131) in October, 820 birds (90% CIs = 691-980) in March, and 1,244 birds (90% CIs = 1,036-1,490) in March respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A project area in any year.

5.2.66 The value of this receptor is assessed as **very high**, as the species in the Greater North Sea OSPAR region is a breeding feature of nine SPAs, a wintering feature of five SPAs and a passage feature of five SPAs.

5.2.67 Dogger Bank Teesside A is within foraging range, during the breeding season, of three protected breeding sites around the North Sea at which the species is a feature – the Seevogelschutzgebiet Helgoland, Forth Islands, and Flamborough Head and Bempton Cliffs SPAs. Dogger Bank Teesside A is therefore within foraging range of two protected breeding sites in Great Britain.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.68 Northern gannet has very low sensitivity to displacement, and is considered to have a **very low species-specific sensitivity** (i.e. a very high tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.69 Based on 50% of the worst case values for displacement, analysis provided estimates of 45 (using 90% confidence limits = 38-54) displaced birds using 2010 data (16 during breeding months, 29 during other months of the year), 131 (using 90% confidence limits = 111-157) displaced birds using 2010/11 data (32 during breeding months, 99 during other months of the year), and 266 (using 90% confidence limits = 222-321) displaced birds using 2011/12 data (108 during breeding months, 158 during other months of the year). The mean value was 155 (using 90% confidence limits = 130-187) displaced birds (56 during breeding months, 99 during other months of the year). However, for this species at the project level, mortality from displacement is considered as zero (see section 4), therefore the effect of displacement for northern gannet for Dogger Bank Teesside A is thus considered of **negligible magnitude** at all scales.

Significance

5.2.70 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Wind farm

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.71 Northern gannet have a very low sensitivity to habitat loss, and, therefore, are considered to have a very low species-specific sensitivity (i.e. a very high tolerance) to this effect.

5.2.72 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.73 For northern gannet, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Therefore, the effect of direct habitat loss or change is assessed as being of **negligible magnitude**.

Significance

5.2.74 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern gannet is considered to be **negligible**.

Export cable corridor

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.75 Northern gannet have a very low sensitivity to habitat loss, and, therefore, are considered to have a very low species-specific sensitivity (i.e. a very high tolerance) to this effect.

5.2.76 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.77 The 1% thresholds for populations of national and international importance were not exceeded in the export cable corridor area in either year (see section 3). Therefore, the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.78 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern gannet is considered to be **negligible**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.79 Northern gannet have a very low sensitivity to habitat loss, and, therefore, and are considered to have a very low species-specific sensitivity (i.e. a very high tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.80 Based on worst case values for displacement, analysis provided estimates of 89 (using 90% confidence limits = 75-107) displaced birds using 2010 data (31 during breeding months, 58 during other months of the year), 263 (using 90% confidence limits = 222-315) displaced birds using 2010/11 data (64 during breeding months, 198 during other months of the year), and 533 (using 90% confidence limits = 445-642) displaced birds using 2011/12 data (216 during breeding months, 317 during other months of the year). The mean value was 310 (using 90% confidence limits = 260-373) displaced birds (112 during breeding months, 198 during other months of the year). However, for this species at the project level, mortality from displacement is considered as zero (see section 4), therefore the effect of displacement for

northern gannet for Dogger Bank Teesside A is thus considered of **negligible magnitude** at all scales.

Significance

5.2.81 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.82 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 64 adult northern gannets in flight in the project areas in the breeding season, using 2010, 2010/11 and 2011/12 data (Table 5.2).

5.2.83 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.2 (Appendix 9) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

5.2.84 The increase in flight distance due to the barrier presented by Dogger Bank Teesside A varies by direction of flight, although averages approximately 25km (10.9% of the species' maximum foraging range of 229km). The project is 195km from the Flamorough Head and Bempton Cliffs SPA, the only protected site within foraging range that would be potentially impacted by this effect (Appendix 1). Recent tracking studies indicate that additional individuals from some other North Sea protected sites may also be impacted (e.g. Wakefield et al. 2013).

5.2.85 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.2.86 Based on the assessment of magnitude and the species' **very high value**, the overall significance of the potential barrier effect associated with the Dogger Bank Teesside A project for northern gannet is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.87 The overall northern gannet population in Great Britain and Ireland increased in size between the 1985-88 and 1998-2002 seabird censuses (Mitchell *et al.* 2004), and has continued to increase in recent years. As such, there is capacity for the species' population to accommodate a threshold of deaths through collision with offshore wind turbines (Trinder *et al.* 2012). Nevertheless, as is typical for many seabird species, the northern gannet is long-lived with an annual survival rate of over 90% and a corresponding low reproductive rate (Robinson 2005), and thus is considered to have a **very high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.88 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of 30 (90% confidence limits = 25 - 36) per year for northern gannet. Of these, 16 were predicted to occur during the breeding season and 14 in the non-breeding season.

5.2.89 Tables A9.3a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. At the protected site level, the largest relative impact was predicted for the Flamborough Head and Bempton Cliffs SPA although, even here, the maximum annual estimates of the number of collisions represent just 0.1% of the site population, using mean annual collision estimates. Mean annual collision estimates represent just 0.01% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.2.90 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British breeding population. There are no national population estimates for this species for the winter.

5.2.91 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.2.92 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.2.93 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than

1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for northern gannet for the Dogger Bank Teesside A project is considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales and considered to be **minor adverse**.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.94 Northern gannet have a very low sensitivity to habitat loss, and, therefore, and are considered to have a very low species-specific sensitivity (i.e. a very high tolerance) to this effect.

5.2.95 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.96 Individual effects, defined in Chapter 13 'Fish and Shellfish Ecology', were determined to be minor adverse for fish and shellfish during operation (see section 4). For northern gannet, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Therefore, we consider the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

5.2.97 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern gannet is considered to be **negligible**.

***Arctic skua***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 75,000 | <0.1 | 6,300 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 5,700 | <0.1 | 479 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.2.98 Arctic skua were present in the Dogger Bank Zone during autumn only. The peak population estimates for the Dogger Bank Teesside A project area in 2010, 2010/11 and 2011/12 were 1 bird (90% CIs = 0-5), 1 bird (90% CIs = 0-5), and 4 birds (90% CIs = 2-10), all peaks being in September, respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A project area in either year.

5.2.99 The value of this receptor is assessed as **very high** as the species is a breeding feature of 12 SPAs and a passage feature of two SPAs in the Greater North Sea OSPAR region.

5.2.100 Dogger Bank Teesside A is outside the foraging range of any protected site at which the species is a breeding feature.

5.2.101 It should be noted that the estimated numbers of Arctic skua in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.102 The Arctic skua has low sensitivity to habitat loss, and is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.103 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.104 For Arctic skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.105 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for Arctic skua is considered to be **negligible**.

Export cable corridor

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.106 Arctic skua has low sensitivity to habitat loss, and is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.107 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.108 Individual effects, defined in Chapter 13 'Fish and Shellfish Ecology', were determined to be minor adverse for fish and shellfish during construction/decommissioning (see section 4). The 1% thresholds for populations of national and international importance were not exceeded in the export cable corridor area in either year (see section 3). Therefore, we consider the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

5.2.109 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for Arctic skua is considered to be **negligible**.

***Operation***

*Collision*

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.110 Arctic skua is long-lived, with an annual survival rate of 85-90% and a corresponding low reproductive rate (Robinson 2005), and thus is considered to have a **high species-specific sensitivity** (i.e. a medium tolerance) to this effect.

5.2.111 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.112 The Band collision risk model (Band *et al.* 2012) provided mean annual estimates of less than one Arctic skua collision per year.

5.2.113 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.2.114 Mean annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.2.115 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.2.116 Given that numbers of this species are possibly underestimated due to turnover (see above), even assuming an order of magnitude difference in the numbers estimated for the Dogger Bank Teesside A project, the magnitude of impact predicted at each geographic scale considered would be unchanged.

5.2.117 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.2.118 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite and biogeographic scales would be impacted by this effect. The effect of collision for Arctic skua for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at protected site, protected site suite and biogeographic scales, and consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.119 Arctic skua has low sensitivity to habitat loss, and is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.120 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.121 For Arctic skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.122 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for Arctic skua is considered to be **negligible**.

***Great skua***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 48,000 | <0.1 | 28,800 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 3,584 | <0.1 | 2,150 | <0.1 | 0 | |

***Summary of population estimates and value***

5.2.123 Great skua were present in the Dogger Bank Zone during autumn only. The peak population estimates for the Dogger Bank Teesside A project area in 2010, 2010/11 and 2011/12 were 2 birds (90% CIs = 1-3), 2 birds (90% CIs = 1-3), and 6 birds (90% CIs = 5-11), all peaks being in September, respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A project area in either year.

5.2.124 The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of seven SPAs and a passage feature of two SPAs.

5.2.125 The proposed project is outside the foraging range of any protected site at which the species is a breeding feature.

5.2.126 It should be noted that the estimated numbers of great skua in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.127 The great skua has low sensitivity to habitat loss, and is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.128 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.129 For great skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.130 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great skua is considered to be **negligible**.

Export cable corridor

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.131 The great skua has low sensitivity to habitat loss, and is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.132 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.133 Individual effects, defined in Chapter 13 'Fish and Shellfish Ecology', were determined to be minor adverse for fish and shellfish during construction/decommissioning (see section 4). The 1% thresholds for populations of national and international importance were not exceeded in the export cable corridor area in either year (see section 3). Therefore, the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.134 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great skua is considered to be **negligible**.

***Operation***

*Collision*

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.135 Great skua is long-lived, with an annual survival rate of over 90% and a corresponding low reproductive rate (Robinson 2005), and thus is considered to have a **high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.136 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.137 The Band collision risk model (Band *et al.* 2012) provided mean annual estimates of less than one great skua collision per year.

5.2.138 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.2.139 Mean annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.2.140 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.2.141 Given that numbers of this species are possibly underestimated due to turnover (see above), even assuming an order of magnitude difference in the numbers estimated for Dogger Bank Teesside A, the magnitude of impact predicted at each geographic scale considered would be unchanged.

5.2.142 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.2.143 Considering the collision risk estimates, based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite and biogeographic scales would be impacted by this effect. The effect of collision for great skua for Dogger Bank Teesside A is thus considered of **negligible magnitude** at protected site, protected site suite and biogeographic scales, and consequently considered to be **minor adverse.**

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.144 The great skua has low sensitivity to habitat loss, and is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.145 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.146 Individual effects, defined in Chapter 13 'Fish and Shellfish Ecology', were determined to be minor adverse for fish and shellfish during operation (see section 4). For great skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.147 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great skua is considered to be **negligible**.

***Black-legged kittiwake***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 60 | 98% avoidance Flight height option 3 | 6,600,000 | <0.1 | 1,110,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | 49 | | 259,600 | <0.1 | 43,660 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.2.148 The peak population estimates for the Dogger Bank Teesside A project area were 2,196 (90% CIs = 1,914-2,467), 4,889 (90% CIs = 4,332-5,464), and 3,540 (90% CIs = 3,117-3,981) for 2010, 2010/11 and 2011/12 respectively, in March in all years. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A project area in either year.

5.2.149 The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 24 SPAs, a wintering feature of four SPAs and a passage feature of six SPAs.

5.2.150 Dogger Bank Teesside A is within foraging range, during the breeding season, of one protected breeding sites around the North Sea at which the species is a feature – the Flamborough Head and Bempton Cliffs SPA. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.151 The black-legged kittiwake have a low sensitivity to habitat loss and are considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.152 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.153 For black-legged kittiwake, the 1% thresholds for populations of national and international importance were not exceeded in Dogger Bank Teesside A in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.154 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for black-legged kittiwake is considered to be **negligible**.

Export cable corridor

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.155 The black-legged kittiwake have a low sensitivity to habitat loss and are considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.156 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.157 The 1% thresholds for populations of national and international importance were not exceeded in the export cable corridor area in either year (see section 3). Therefore, the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.158 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for black-legged kittiwake is considered to be **negligible**.

***Operation***

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.159 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 367 adult black-legged kittiwakes in flight in the project areas in the breeding season, using 2010, 2010/11 and 2011/12 data (Table 5.2).

5.2.160 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.4 (Appendix 9) which indicates that less than 1% of the breeding population at the Flamborough Head and Bempton Cliffs SPA – the only site in foraging range - would be potentially exposed to this effect.

5.2.161 The increase in flight distance due to the barrier presented by Dogger Bank Teesside A varies by direction of flight, although averages approximately 25km (10.8% of the species' maximum foraging range of 231km). The project is 195km from the Flamborough Head and Bempton Cliffs SPA, the only protected site within foraging range that would be potentially exposed to this effect (Appendix 1).

5.2.162 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.2.163 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside A project for black-legged kittiwake is assessed as **minor adverse** at protected site, national and biogeographic levels.

*Collision*

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.164 Black-legged kittiwake is long-lived, with an annual survival rate of over 90% and a corresponding low reproductive rate (Robinson 2005), and thus is considered to have a **very high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.165 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.166 The Band collision risk model (Band *et al.* 2012) provided mean annual collision estimates of 53 (90% confidence limits = 47-60) for black-legged kittiwake. Of these, 33 were predicted to occur during the breeding season and 20 during the non-breeding season.

5.2.167 Tables A9.5a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. The proposed project is within foraging range of one protected breeding site around the North Sea at which the species is a feature – the Flamborough Head and Bempton Cliffs SPA. Mean annual estimates of the number of collisions represent less than 0.1% of the site's population. Mean annual estimates using the same data also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.2.168 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British population.

5.2.169 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.2.170 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.2.171 Considering the collision risk estimates, based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect.

5.2.172 The effect of collision for black-legged kittiwake for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales and, is considered to be **minor adverse**.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.173 Black-legged kittiwake have a low sensitivity to habitat loss and are considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.174 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.175 For black-legged kittiwake, the 1% thresholds for populations of national and international importance were not exceeded Dogger Bank Teesside A in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.176 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for black-legged kittiwake is considered to be **negligible**.

***Lesser black-backed gull***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 27 | 98% avoidance Flight height option 3 | 550,000 | <0.1 | B 120,000 | <0.1 | 0 | Minor adverse |
| | | | | | W 330,000 | <0.1 | | |
| Collision – background adult mortality | 9 | | 31,900 | <0.1 | B 6,960 | <0.1 | 0 | |
| | | | | | *W 19,140* | *<0.1* | | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided; B = Breeding, W = winter.

***Summary of population estimates and value***

5.2.177 The peak population estimates for Dogger Bank Teesside A were 201 birds (90% CIs = 140-286) in June, 108 birds (90% CIs = 76-154) in May, and 55 birds (90% CIs = 22-148) in May for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in Dogger Bank Teesside A in either year.

5.2.178 The value of this receptor is assessed as **very high**, as the species in the Greater North Sea OSPAR region is a breeding feature of 21 SPAs, a wintering feature of two SPAs and a passage feature of three SPAs.

5.2.179 Dogger Bank Teesside A is outside the foraging range of any protected site at which the species is a breeding feature.

5.2.180 It should be noted that national winter population estimates for gulls come from a survey of terrestrial habitats and inshore waters (Burton *et al.* 2013), and thus do not include birds that frequent offshore waters; therefore, underestimating the overall national populations. It should also be noted that the estimated numbers of this species in the Dogger Bank Zone are possibly underestimated, given that those present in the spring may be *intermedius* birds on passage to Scandinavia, and thus due to the potential turnover of birds at this time.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.181 Lesser black-backed gull has very low sensitivity to habitat loss, and is considered to have a **very low species-specific sensitivity** (i.e. a very high tolerance) to this effect.

5.2.182 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.183 The 1% thresholds for populations of national and international importance were not exceeded in Dogger Bank Teesside A in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor, the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.184 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for lesser black-backed gull is considered to be **negligible**.

Export cable corridor

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.185 Lesser black-backed gull has very low sensitivity to habitat loss, and is considered to have a **very low species-specific sensitivity** (i.e. a very high tolerance) to this effect.

5.2.186 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.187 For lesser black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in the export cable corridor area in either year (see section 3). Therefore, the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.188 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for lesser black-backed gull is considered to be **negligible**.

***Operation***

*Collision*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.189 Lesser black-backed gull is long-lived, with an annual survival rate of over 90% and a corresponding low reproductive rate (Robinson 2005), and thus is considered to have a **very high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.190 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.191 The Band collision risk model (Band *et al.* 2012) provided mean annual collision estimates of 16 (90% confidence limits = 10-27) for lesser black-backed gull using 2010 data (ten during breeding months, six during other months of the year).

5.2.192 Tables A9.6a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. The proposed project is outside the foraging range of any protected site at which the species is a breeding feature. Mean annual collision estimates represent less than 0.1% of the populations of each of the protected sites around the North Sea at which the species is a feature.

5.2.193 Mean winter estimates represent less than 0.1% of the winter population estimate for the species in Great Britain.

5.2.194 Mean annual estimates represent less than 0.1% of the species' biogeographic population.

5.2.195 Given that numbers of this species are possibly underestimated due to turnover (see above), even assuming an order of magnitude difference in the numbers estimated for the Dogger Bank Teesside A project, the magnitude of impact predicted at each geographic scale considered would be unchanged.

5.2.196 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.2.197 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for lesser black-backed gull for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently assessed to be **minor adverse** at all scales.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.198 Lesser black-backed gull has very low sensitivity to habitat loss, and is considered to have a **very low species-specific sensitivity** (i.e. a very high tolerance) to this effect.

5.2.199 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.200 For lesser black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.
Significance

5.2.201 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for lesser black-backed gull is considered to be **negligible**.

***Great black-backed gull***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| | | | | | W 75,860 | 0 | | |
| Collision – population | 43 | 98% avoidance Flight height option 3 | 420,000 | <0.1 | B 51,000 | <0.1 | 0 | Minor adverse |
| | | | | | W 75,860 | <0.1 | | |
| Collision – background adult mortality | 12 | | 24,360 | <0.1 | B 2,958 | 0.4 | 0 | |
| | | | | | W 4,400 | 0.3 | | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided; B = Breeding, W = winter.

***Summary of population estimates and value***

5.2.202 The peak population estimates for Dogger Bank Teesside A were 155 birds (90% CIs = 118-188) in January, 113 birds (90% CIs = 87-146) in January, and 81 birds (90% CIs = 56-110) in February for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in Dogger Bank Teesside A in either year.

5.2.203 The value of this receptor is assessed as **very high**, as the species in the Greater North Sea OSPAR region is a breeding feature of 17 SPAs and a wintering feature of two SPAs.

5.2.204 The proposed project is outside the foraging range of any protected site at which the species is a breeding feature.

5.2.205 It should be noted that national winter population estimates for gulls come from a survey of terrestrial habitats and inshore waters (Burton *et al.* 2013), and thus do not include birds that frequent offshore waters; therefore, underestimating the overall national populations. It should also be noted that the estimated numbers of this species in the Dogger Bank Zone are possibly underestimated due to the potential turnover of birds at this time.

***Construction and Decommissioning***

Significance

5.2.206 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at both national and biogeographic scales.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.207 The great black-backed gull have a low sensitivity to habitat loss and are considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.208 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.209 For great black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in Dogger Bank Teesside A in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.210 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great black-backed gull is considered to be **negligible**.

Export cable corridor

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.211 Great black-backed gull have a low sensitivity to habitat loss and are considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.212 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.213 The 1% thresholds for populations of national and international importance were not exceeded in the export cable corridor area in either year (see section 3). Therefore, the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

5.2.214 Combined with the species' **high sensitivity** to direct habitat loss or change, the impact of this effect for great black-backed gull is considered to be **negligible**.

***Operation***

*Collision*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.215 Great black-backed gull is long-lived, with an annual survival rate of over 90% and a corresponding low reproductive rate (Robinson 2005), and thus is considered to have a **very high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.216 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.217 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of 28 (90% confidence limits = 20-43) great black-backed gull collisions (10 during breeding months, 18 during other months of the year).

5.2.218 Tables A9.7a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. The proposed project is outside the foraging range of any protected site at which the species is a breeding feature. Mean annual collision estimates represent less than 0.1% of the populations of each of the protected sites around the North Sea at which the species is a feature.

5.2.219 Mean winter estimates using represent less than 0.1% of the winter population estimate for the species in Great Britain.

5.2.220 Mean annual estimates represent less than 0.1% of the species' biogeographic population.

5.2.221 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.2.222 Considering the collision risk estimates, based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for great black-backed gull for the Dogger Bank Teesside A project is thus considered of

**negligible magnitude** at protected site suite, national and biogeographic scales, and is consequently considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.223 Great black-backed gull have a low sensitivity to habitat loss and are considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.224 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.225 For great black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in Dogger Bank Teesside A in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.226 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great black-backed gull is considered to be **negligible**.

***Common guillemot***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 56 | 50% displaced 5% mortality 2km buffer | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 113 | | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 201,600 | <0.1 | 95,040 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.2.227 The peak population estimates for the Dogger Bank Teesside A project area were 4,196 birds in December (90% CIs = 3,915-4,553), 6,546 birds in April (90% CIs = 6,074-7,052), and 6,681 birds in April (90% CIs = 6,146-7,176) for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in Dogger Bank Teesside A in either year.

5.2.228 The value of this receptor is assessed as **very high,** as the species is a breeding feature of 26 SPAs, a wintering feature of 11 SPAs and a passage feature of one SPA in the Greater North Sea OSPAR region.

5.2.229 Dogger Bank Teesside A is within foraging range of five protected breeding sites around the North Sea at which the species is a feature, of which four are in Great Britain – the Farne Islands, Forth Islands, Flamborough Head and Bempton Cliffs, and St Abb's Head to Fast Castle SPAs, and one borders the North Sea – Seevogelschutzgebiet Helgoland. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.230 Common guillemot has medium sensitivity to displacement, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.231 Based on 50% of the worst case values for displacement, analysis provided estimates of 982 (using 90% confidence limits = 905-1,068) displaced birds using 2010 data (103 during breeding months, 878 during other months of the year), 1,323 (using 90% confidence limits = 1,225-1,436) displaced birds using 2010/11 data (196 during breeding months, 1,127 during other months of the year), and 952 (using 90% confidence limits = 869-1,038) displaced birds using 2011/12 data (233 during breeding months, 719 during other months of the year). The mean value was 1,034 (using 90% confidence limits = 952-1,125) displaced birds (181 during breeding months, 853 during other months of the year).

5.2.232 Tables A9.8a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 0.1% of birds (using mean data) would be impacted.

5.2.233 Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.2.234 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.2.235 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for common guillemot for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at all scales.

Significance

5.2.236 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.237 Common guillemot has medium sensitivity to habitat loss, and is considered to have a **medium** species-specific sensitivity (i.e. a medium tolerance) to this effect.

5.2.238 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.239 The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.240 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for common guillemot is considered to be **minor adverse**.

Export cable corridor

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.241 Common guillemot has medium sensitivity to habitat loss, and is considered to have a **medium** species-specific sensitivity (i.e. a medium tolerance) to this effect.

5.2.242 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.243 For common guillemot, the 1% thresholds for populations of national and international importance were not exceeded in the export cable corridor area in either year (see section 3). Therefore, the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.244 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for common guillemot is considered to be **minor adverse**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.245 Common guillemot has medium sensitivity to habitat loss, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.246 Based on worst case values for displacement, analysis provided estimates of 1,963 (using 90% confidence limits = 1,809-2,136) displaced birds using 2010 data (206 during breeding months, 1,757 during other months of the year), 2,646 (using 90% confidence limits = 2,450-2,873) displaced birds using 2010/11 data (393 during breeding months, 2,253 during other months of the year), and 1,905 (using 90% confidence limits = 1,739-2,076) displaced birds using 2011/12 data (466 during breeding months, 1,439 during other months of the year). The mean value was 2,068 (using 90% confidence limits = 1,904-2,250) displaced birds (361 during breeding months, 1,707 during other months of the year).

5.2.247 Tables A9.9a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 1% (using mean data) of birds would be impacted.

5.2.248 Displacement would affect much less than 0.1 % of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.2.249 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.2.250 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for common guillemot for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at all scales.

Significance

5.2.251 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.252 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 61 adult common guillemots in flight in the project areas in the breeding season using 2010, 2010/11 and 2011/12 data (Table 5.2).

5.2.253 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.10 (Appendix 9) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

5.2.254 The increase in flight distance due to the barrier presented by Dogger Bank Teesside A varies by direction of flight, although averages approximately 25km (7.4% of the species' maximum foraging range of 340km). The project is between 195km and 340km from the protected sites within foraging range that would be potentially exposed to this effect (Appendix 1). This increase might prevent birds from one site – the Forth Islands SPA – from reaching foraging areas beyond the project area.

5.2.255 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.2.256 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside A project for common guillemot is assessed as **minor adverse** at the protected site, national and biogeographic level.

*Collision*

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.257 The common guillemot is long-lived with an average annual survival rate of over 90% (Robinson 2005), and thus is considered to have a **very high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.258 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.259 The Band collision risk model (Band *et al.* 2012) provided estimates of less than one common guillemot collision per year in each study year.

5.2.260 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.2.261 Mean annual estimates of the number of collisions represent less than 0.1% of the populations of each of the five protected breeding sites for the species that the proposed project is within foraging range of. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.2.262 Mean estimates of the number of collisions of birds in the breeding represent less than 0.1% of the species' British, breeding population.

5.2.263 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.2.264 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.2.265 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for common guillemot for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently the impact of the effect is considered to be **minor adverse**.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.266 The common guillemot has medium sensitivity to habitat loss, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

5.2.267 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.268 For common guillemot, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.269 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for common guillemot is considered to be **minor adverse**.

***Razorbill***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 21 | 50% displaced 5% mortality 2km buffer | 1,380,000 | <0.1 | 330,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 41 | | 1,380,000 | <0.1 | 330,000 | <0.1 | 0 | Minor adverse |
| Collision – population | 2 | 98% avoidance Flight height option 3 | 1,380,000 | <0.1 | 330,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 92,000 | <1 | 22,000 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.2.270 The peak population estimates for the Dogger Bank Teesside A project area were 1,585 birds in December (90% CIs = 1,401-1,765), 3,009 birds in April (90% CIs = 2,660-3,364), and 2,464 birds in April (90% CIs = 2,150-2,787) for 2010, 2010/11 and 2011/12 respectively. The 1% threshold for a population of national importance was not exceeded in the Dogger Bank Teesside A project area during the breeding season and the 1% threshold for a population of international importance was not exceeded in either year.

5.2.271 The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 18 SPAs, a wintering feature of five SPAs and a passage feature of two SPAs.

5.2.272 The proposed project is within foraging range of three protected breeding sites around the North Sea at which the species is a feature – the Farne Islands, Flamborough Head and Bempton Cliffs, and St Abb's Head to Fast Castle, all of which are in Great Britain. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.273 The razorbill has medium sensitivity to displacement, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.274 Based on 50% of the worst case values for displacement, analysis provided estimates of 349 (using 90% confidence limits = 306-396) displaced birds using 2010 data (14 during breeding months, 336 during other months of the year), 455 (using 90% confidence limits = 398-516) displaced birds using 2010/11 data (31 during breeding months, 424 during other months of the year), and 344 (using 90% confidence limits = 294-401) displaced birds using 2011/12 data (69 during breeding months, 276 during other months of the year). The mean value was 358 (using 90% confidence limits = 311-410) displaced birds (38 during breeding months, 321 during other months of the year).

5.2.275 Tables A9.11a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 0.1% of birds (using mean data), would be impacted.

5.2.276 Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.2.277 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.2.278 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for razorbill for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at all scales.

Significance

5.2.279 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Wind farm

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.280 The razorbill has a medium sensitivity to habitat loss, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

5.2.281 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.282 For razorbill, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.283 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for razorbill is considered to be **minor adverse**.

Export cable corridor

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.284 The razorbill has a medium sensitivity to habitat loss, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

5.2.285 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.286 For razorbill, the 1% thresholds for populations of national and international importance were not exceeded in the export cable corridor area in any year (see section 3). Therefore, we consider the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

5.2.287 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for razorbill is considered to be **minor adverse**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.288 The razorbill has a medium sensitivity to habitat loss, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.289 Based on worst case values for displacement, analysis provided estimates of 698 (using 90% confidence limits = 612-792) displaced birds using 2010 data (27 during breeding months, 671 during other months of the year), 909 (using 90% confidence limits = 796-1032) displaced birds using 2010/11 data (61 during breeding months, 848 during other months of the year), and 689 (using 90% confidence limits = 587-802) displaced birds using 2011/12 data (137 during breeding months, 552 during other months of the year). The mean value was 716 (using 90% confidence limits = 622-820) displaced birds (75 during breeding months, 641 during other months of the year).

5.2.290 Tables A9.12a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 0.1% of birds (using mean data), would be impacted.

5.2.291 Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.2.292 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.2.293 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for razorbill for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at all scales.

Significance

5.2.294 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.295 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 27 adult razorbills in flight in the project areas in the breeding season using 2010, 2010/11 and 2011/12 data (Table 5.2).

5.2.296 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.13 (Appendix 9) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

5.2.297 The increase in flight distance due to the barrier presented by Dogger Bank Teesside A varies by direction of flight, although averages approximately 25km (8.0% of the species' maximum foraging range of 312km). The project is between 195km and 308km from the protected sites within foraging range that would be potentially exposed to this effect (Appendix 1). This increase might prevent birds from one site – the St Abb's Head to Fast Castle SPA – from reaching foraging areas beyond the project area.

5.2.298 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.2.299 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside A project for razorbill is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.300 The razorbill is long-lived with an average annual survival rate of over 90% (Robinson 2005), and thus is considered to have a **very high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.301 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

The Band collision risk model (Band *et al.* 2012) provided estimates of just one razorbill collisions per year using data from 2010/11.

5.2.302 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.2.303 Mean annual estimates of the number of collisions represent less than 0.1% of the populations of the four protected sites within foraging range of Dogger Bank Teesside A. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.2.304 The proposed project is within foraging range of four protected breeding sites in Great Britain. Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British breeding population. There are no national population estimates for this species for the winter.

5.2.305 Mean annual collision estimates using represent less than 0.1% of the species' biogeographic population.

5.2.306 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.2.307 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for razorbill for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.308 The razorbill has a medium sensitivity to habitat loss, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

5.2.309 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.310 For razorbill, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.311 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for razorbill is considered to be **minor adverse**.

***Little auk***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 3 | 25% displaced 5% mortality 2km buffer | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Displacement (o) | 5 | | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – background adult mortality | <1 | | 8,333,333 | <0.1 | 333 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

[3] Assumption of 50 birds used as a national threshold (see section 4).

***Summary of population estimates and value***

5.2.312 The peak population estimates for the Dogger Bank Teesside A project area were 1,809 birds in December (90% CIs = 1,436-2,424), 1,809 birds in December (90% CIs = 1,436-2,424), and 600 birds in December (90% CIs = 490-816) for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A project area in either year.

5.2.313 The little auk breeds in the high Arctic and only occurs in the North Sea during the winter. Although there is no British population estimate for little auk, given the numbers estimated, this species is deemed to be of national importance in the Dogger Bank Teesside A project area. Consequently, the value of this receptor is assessed to be **high**.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.314 The little auk has low sensitivity to habitat loss, and is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.315 Taking 50% of the worst-case maximum annual estimates in winter months, when this species occurs, a total of 51 birds would be displaced during 2010 (using 90% confidence limits = 38-70), 53.5 during 2010/11 (using 90% confidence limits = 42-72) and 19 during 2011/12 (using 90% confidence limits = 15-27). The mean value was 37 (using 90% confidence limits = 29-51) displaced birds.

5.2.316 Using a national 1% threshold of 500 birds (in the absence of a national winter population estimate), much less than 0.1% of this population would be affected. Displacement would affect much less than 0.1% of the species' biogeographic population.

5.2.317 Less than 1% of reference populations at the national and biogeographic scale would be impacted by this effect. The effect of displacement for little auk for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at both the national and biogeographic levels.

Significance

5.2.318 This species has a **high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **negligible** at the national and biogeographic scales.

*Direct habitat loss or change*

Wind farm

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.319 The little auk has low sensitivity to habitat loss, and is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.320 Considering this and the species' **high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.321 Little auks occur in the Dogger Bank Zone during winter months. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.322 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for little auk is considered to be **negligible**.

Export cable corridor

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.323 The little auk has low sensitivity to habitat loss, and is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.324 Considering this and the species' **high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.325 For little auk, the 1% thresholds for populations of national and international importance were not exceeded in the export cable corridor area in either year (see section 3). Therefore, we consider the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

5.2.326 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for little auk is considered to be **negligible**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.327 The little auk has low sensitivity to habitat loss, and is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.328 Full methodological details and results of displacement analyses are provided in section 4 of this report. Based on worst case values for displacement, analysis provided estimates in winter months, when this species occurs, of 102 birds displaced during 2010 (using 90% confidence limits = 76-140), 107.0 during 2010/11 (using 90% confidence limits = 84-143) and 37.5 during 2011/12 (using 90% confidence limits = 29-53). The mean value was 75 (using 90% confidence limits = 57-102) displaced birds.

5.2.329 Using a national 1% threshold of 500 birds (in the absence of a national winter population estimate), much less than 0.1% of this population would be affected. Displacement would affect much less than 0.1% of the species' biogeographic population.

5.2.330 Less than 1% of reference populations at the national and biogeographic scale would be impacted by this effect. The effect of displacement for little auk for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at the national and biogeographic scale.

Significance

5.2.331 This species has a **high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **negligible** at both national and biogeographic scales.

*Collision*

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.332 The little auk is long-lived with an average annual survival rate in the order of 80-85% (Grémillet *et al.* 2012, Harding *et al.* 2011), and thus is considered to have a **medium species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.333 Considering this and the species' **high value**, the species' **overall sensitivity** to this effect is considered to be **high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.334 The Band collision risk model (Band *et al.* 2012) provided a maximum annual collision estimate of less than one little auk collision in each study year.

5.2.335 The little auk breeds in the high Arctic and only occurs in the North Sea during the winter. There are no national population estimates for this species for the winter. Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.2.336 The predicted number of collisions represents an increase in background mortality of less than 1% at the national and biogeographic population levels.

Significance

5.2.337 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for

little auk for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently considered to be **negligible**.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.338 The little auk has low sensitivity to habitat loss, and is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

5.2.339 Considering this and the species' **high value**, the species' **overall sensitivity** to this effect is considered to be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.340 Little auks occur in the Dogger Bank Zone during winter months. For little auk, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.341 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for little auk is considered to be **negligible**.

***Atlantic puffin***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 2 | 25% displaced 5% mortality 2km buffer | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 5 | | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 684,000 | <0.1 | 88,160 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.2.342 The peak population estimates for the Dogger Bank Teesside A project area were 422 birds in December (90% CIs = 351-497), 582 birds in March (90% CIs = 509-681), and 155 birds in March (90% CIs = 126-188) for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A project area in either year.

5.2.343 The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 16 SPAs.

5.2.344 Dogger Bank Teesside A is outside the foraging range of any protected site at which the species is a breeding feature.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.345 The Atlantic puffin has medium sensitivity to displacement, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.346 Based on 50% of the worst case values for displacement, analysis provided estimates of 40 (using 90% confidence limits = 32-49) displaced birds using 2010 data (5 during breeding months, 35 during other months of the year), 67 (using 90%

confidence limits = 56-81) displaced birds using 2010/11 data (9 during breeding months, 58 during other months of the year), and 17 (using 90% confidence limits = 13-21) displaced birds using 2011/12 data (4 during breeding months, 12 during other months of the year). The mean value was 38 (using 90% confidence limits = 31-47) displaced birds (6 during breeding months, 32 during other months of the year).

5.2.347 Tables A9.14a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.2.348 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.2.349 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for Atlantic puffin for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at all scales.

Significance

5.2.350 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Wind farm

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.351 The Atlantic puffin has medium sensitivity to habitat loss, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

5.2.352 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.353 For Atlantic puffin, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.354 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for Atlantic puffin is considered to be **minor adverse**.

Export cable corridor

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.355 The Atlantic puffin has medium sensitivity to habitat loss, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

5.2.356 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.357 For Atlantic puffin, the 1% thresholds for populations of national and international importance were not exceeded in the export cable corridor area in either year (see section 3). Therefore, we consider the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

5.2.358 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for Atlantic puffin is considered to be **minor adverse**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.359 The Atlantic puffin has medium sensitivity to habitat loss, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.360 Based on worst case values for displacement, analysis provided estimates of 80 (using 90% confidence limits = 63-99) displaced birds using 2010 data (9 during breeding months, 71 during other months of the year), 135 (using 90% confidence limits = 113-161) displaced birds using 2010/11 data (18 during breeding months, 117 during other months of the year), and 33 (using 90% confidence limits = 27-42)

displaced birds using 2011/12 data (9 during breeding months, 25 during other months of the year). The mean value was 77 (using 90% confidence limits = 63-93) displaced birds (12 during breeding months, 65 during other months of the year).

5.2.361 Tables A9.15a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.2.362 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.2.363 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for Atlantic puffin for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at all scales.

Significance

5.2.364 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Collision*

Species-specific sensitivity and overall sensitivity
(Recoverability/Adaptability/Tolerance/Value)

5.2.365 The Atlantic puffin is long-lived with an average annual survival rate of over 90% (Robinson 2005), and thus is considered to have a **very high species-specific sensitivity** (i.e. a low tolerance) to this effect.

5.2.366 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.367 The Band collision risk model (Band *et al.* 2012) provided a maximum annual collision estimate of less than one Atlantic puffin collision in each study year.

5.2.368 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.2.369 Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.2.370 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British, breeding population.

5.2.371 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.2.372 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.2.373 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for Atlantic puffin for the Dogger Bank Teesside A project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and the impact of the effect is consequently considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

5.2.374 The Atlantic puffin has medium sensitivity to habitat loss, and is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

5.2.375 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect is considered to be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.2.376 For Atlantic puffin, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.2.377 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for Atlantic puffin is considered to be **minor adverse**.

***Migrants***

***Operation***

*Collision*

5.2.378 The migration zones (defined by Wright *et al.* 2012) of 45 species' populations of terrestrial or waterbird migrants that are UK SPA features overlap with the Dogger Bank Teesside A project during migration. Collision risk estimates suggest that, on an annual basis, the mortality associated with the Dogger Bank Teesside A project is likely to represent less than 1% of the reference population of each of these species (Table 5.5).

5.2.379 The effect of collision for migrants for the Dogger Bank Teesside A project is thus considered to be of **negligible magnitude** at the national level and **minor adverse** for 15 species' populations and **negligible** for 30 species' populations.

5.2.380 Due to the lack of knowledge concerning species' precise migration routes and their likely variability, no attempt was made to apportion impacts to individual protected sites, and thus it is unknown whether impacts may potentially be greater or less at any one particular site.

5.2.381 It should also be noted that for migrants there is much uncertainty in these calculations, and thus the assessment, both in regard to the determination of the numbers of birds passing through each project area and the proportions of these flying at heights which pose a risk of collision. Given these uncertainties, the confidence in predictions in the assessment of collision for migrants is considered to be very low.

**Table 5.5** Assessment of collision risk for migrants for the Dogger Bank Teesside A project. Estimated numbers of collisions are based on the numbers of birds predicted to pass through the wind farm, a 98% avoidance rate, and expert judgement of the proportion of individuals flying at collision risk height. Values in brackets under "estimated annual collisions" represent the estimates using the lower and upper estimates of the proportion of birds at risk height (as described in Wright *et al*. 2012), and are not a measure of confidence in the collision estimates (which would have a far greater range).

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Bean goose *Anser fabalis* | 0.02 (0.003 - 0.05) | <0.1% | 4.18% | Very High | Low | High | Negligible | Negligible |
| Light-bellied Brent Goose (Svalbard population) *Branta bernicla hrota* | 0.004 (0.001 - 0.01) | <0.1% | 0.19% | Very High | High | Very High | Negligible | Minor adverse |
| Common shelduck *Tadorna tadorna* | 0.75 (0.005 - 3.01) | <0.1% | 3.39% | Very High | High | Very High | Negligible | Minor adverse |
| Eurasian wigeon *Anas penelope* | 4.26 (0.03 - 17.04) | <0.1% | 3.16% | Very High | Very Low | Medium | Negligible | Negligible |
| Gadwall *Anas strepera* | 0.07 (0.0004 - 0.26) | <0.1% | 1.81% | Very High | Very Low | Medium | Negligible | Negligible |
| Eurasian teal *Anas crecca* | 1.01 (0.01 - 4.04) | <0.1% | 3.17% | Very High | Very Low | Medium | Negligible | Negligible |
| Mallard *Anas platyrhynchos* | 3.10 (0.02 - 12.40) | <0.1% | 3.39% | Very High | Very Low | Medium | Negligible | Negligible |
| Northern pintail *Anas acuta* | 0.14 (0.001 - 0.54) | <0.1% | 3.17% | Very High | Very Low | Medium | Negligible | Negligible |
| Northern shoveler *Anas clypeata* | 0.10 (0.001 - 0.42) | <0.1% | 2.71% | Very High | Very Low | Medium | Negligible | Negligible |
| Common pochard *Aythya ferina* | 0.41 (0.003 - 1.63) | <0.1% | 2.71% | Very High | Very Low | Medium | Negligible | Negligible |
| Tufted duck *Aythya fuligula* | 0.77 (0.01 - 3.08) | <0.1% | 3.14% | Very High | Very Low | Medium | Negligible | Negligible |
| Greater scaup *Aythya marila* | 0.003 (0.00002 - 0.01) | <0.1% | 2.60% | Very High | Very Low | Medium | Negligible | Negligible |
| Common scoter *Melanitta nigra* | 0.04 (0.004 - 0.60) | <0.1% | 3.17% | Very High | Low | High | Negligible | Negligible |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Velvet scoter *Melanitta fusca* | 0.02 (0.0002 - 0.09) | <0.1% | 3.72% | Very High | Low | High | Negligible | Negligible |
| Common goldeneye *Bucephala clangula* | 0.26 (0.002 - 1.06) | <0.1% | 3.39% | Very High | Low | High | Negligible | Negligible |
| Red-breasted merganser *Mergus serrator* | 0.03 (0.0002 - 0.14) | <0.1% | 2.28% | Very High | Medium | Very High | Negligible | Minor adverse |
| Goosander *Mergus merganser* (non-breeding) | 0.004 (0.0004 - 0.01) | <0.1% | 3.67% | Very High | Medium | Very High | Negligible | Minor adverse |
| Great bittern *Botaurus stellaris* | 0.09 (0.01 - 0.37) | <0.1% | 1.25% | Very High | Very Low | Medium | Negligible | Negligible |
| Great crested grebe *Podiceps cristatus* | 0.003 (0.0003 - 0.01) | <0.1% | 2.10% | Very High | Medium | Very High | Negligible | Minor adverse |
| Slavonian grebe *Podiceps auritus* | 0.0002 (0.0001 - 0.0004) | <0.1% | 3.17% | Very High | Medium | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (breeding) | 0.01 (0.01 - 0.03) | <0.1% | 0.60% | Very High | Medium | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (non-breeding) | 0.34 (0.03 - 0.65) | <0.1% | 3.72% | Very High | Medium | Very High | Negligible | Minor adverse |
| Eurasian coot *Fulica atra* | 1.44 (0.29 - 4.32) | <0.1% | 0.76% | Very High | Very Low | Medium | Negligible | Negligible |
| Eurasian oystercatcher *Haematopus ostralegus* (non-breeding) | 0.25 (0.05 - 0.75) | <0.1% | 3.17% | Very High | High | Very High | Negligible | Minor adverse |
| Common ringed plover *Charadrius hiaticula* (non-breeding) | 0.03 (0.0002 - 0.14) | <0.1% | 3.45% | Very High | Low | High | Negligible | Negligible |
| Golden plover *Pluvialis apricaria* (non-breeding) | 2.67 (0.53 - 8.01) | <0.1% | 3.15% | Very High | Very Low | Medium | Negligible | Negligible |
| Grey plover *Pluvialis squatarola* | 0.72 (0.14 - 2.16) | <0.1% | 3.42% | Very High | High | Very High | Negligible | Minor adverse |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Northern lapwing<br>*Vanellus vanellus* | 6.65 (1.33 - 19.96) | <0.1% | 3.42% | Very High | Very Low | Medium | Negligible | Negligible |
| Red knot<br>*Calidris canutus* | 2.22 (0.44 - 6.65) | <0.1% | 3.18% | Very High | Medium | Very High | Negligible | Minor adverse |
| Sanderling<br>*Calidris alba* | 0.57 (0.11 - 1.7) | <0.1% | 3.18% | Very High | Medium | Very High | Negligible | Minor adverse |
| Dunlin<br>*Calidris alpina schinzii (passage)* | 0.05 (0.01 - 0.14) | <0.1% | 3.16% | Very High | Very Low | Medium | Negligible | Negligible |
| Dunlin<br>*Calidris alpina alpina*<br>(passage & winter) | 4.78 (0.96 - 14.35) | <0.1% | 2.78% | Very High | Very Low | Medium | Negligible | Negligible |
| Ruff<br>*Philomachus pugnax* | 0.04 (0.01 - 0.12) | <0.1% | 4.03% | Very High | Very Low | Medium | Negligible | Negligible |
| Common snipe<br>*Gallinago gallinago* | 6.54 (1.31 - 19.61) | <0.1% | 3.19% | Very High | Very Low | Medium | Negligible | Negligible |
| Black-tailed godwit<br>*Limosa limosa islandica* | 0.04 (0.01 - 0.11) | <0.1% | 2.90% | Very High | Very High | Very High | Negligible | Minor adverse |
| Bar-tailed godwit<br>*Limosa lapponica* | 0.86 (0.17 - 2.57) | <0.1% | 3.55% | Very High | Very Low | Medium | Negligible | Negligible |
| Whimbrel<br>*Numenius phaeopus* | 0.17 (0.03 - 0.51) | <0.1% | 3.24% | Very High | High | Very High | Negligible | Minor adverse |
| Eurasian curlew<br>*Numenius arquata*<br>(non-breeding) | 1.42 (0.28 - 4.25) | <0.1% | 3.58% | Very High | Very Low | Medium | Negligible | Negligible |
| Greenshank<br>*Tringa nebularia* | 0.0003 (0.0001 - 0.0009) | <0.1% | 2.47% | Very High | Very Low | Medium | Negligible | Negligible |
| Common redshank<br>*Tringa totanus britannica*<br>(breeding) | 0.04 (0.01 - 0.12) | <0.1% | 3.14% | Very High | Very Low | Medium | Negligible | Negligible |
| Common redshank<br>Icelandic population<br>*Tringa totanus robusta*<br>(non-breeding) | 1.67 (0.33 - 5) | <0.1% | 2.89% | Very High | Very Low | Medium | Negligible | Negligible |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Common redshank mainland Europe population *Tringa totanus* (non-breeding) | 0.39 (0.08 - 1.16) | <0.1% | 3.68% | Very High | Very Low | Medium | Negligible | Negligible |
| Ruddy turnstone *Arenaria interpres* | 0.31 (0.06 - 0.93) | <0.1% | 3.17% | Very High | High | Very High | Negligible | Minor adverse |
| Short-eared owl *Asio flammeus* | 0.01 (0.003 - 0.02) | <0.1% | 3.28% | Very High | Very Low | Medium | Negligible | Negligible |
| European Nightjar *Caprimulgus europaeus* | 0.01 (0.002 - 0.02) | <0.1% | 0.75% | Very High | Very Low | Medium | Negligible | Negligible |

[1] The reference population size is defined as the total number of individuals of each species in the population that uses the migration route that encompasses the Dogger Bank. For further details and derivation see Table 4.18.

[2] The migration zone referred to here is the North Sea migration area appropriate to assessment for the Dogger Bank, and not the entire migration zone used by the species around the whole of the UK. The percentage given can be roughly interpreted as the percentage of birds migrating across the North Sea that would cross the wind farm footprint during a single migration period (note for most species there are 2 migrations per year crossing the North Sea). For further details see the SOSS migration modelling tool guidance (Wright *et al*. 2012).

*Barrier effects*

5.2.382 An assessment of the potential barrier effects posed by the Dogger Bank Teesside A project to the 45 species' populations of terrestrial or waterbird migrants that are UK SPA features, whose migration zones (defined by Wright *et al.* 2012) overlap with the project area, is provided in the Table 5.6 below.

5.2.383 The percentages of reference populations estimated to pass through the project area at risk height (following Wright *et al.* 2012), and thus exposed to potential barrier effects were less than 1% for most species considered, but greater than 1% for bean goose, hen harrier and ruff. The estimates of numbers passing through the project area greatly exceed the numbers recorded by boat surveys, though it should be noted that boat surveys were not designed to record migrants and as they only provide a (diurnal) snapshot of birds flying close to the sea, they will inevitably greatly underestimate overall numbers of migrants.

5.2.384 The increase in flight distance due to the barrier presented by Dogger Bank Teesside A varies by direction of flight, although for the shortest approximately east-west route across the North Sea passing through the project, equates to a maximum of approximately 10km (an increase of just 2% on the ca. 575km route).

5.2.385 Considering both the numbers of birds exposed to this effect and the relative increase in flight distance due to the barrier presented by Dogger Bank Teesside A, this impact is considered to be of **negligible magnitude** for all species' populations.

5.2.386 It should be noted that there is considerable uncertainty regarding the assessment of barrier effects posed by offshore wind farms. For migrants, there is great uncertainty in the determination of the numbers of birds passing through each project area. There is little evidence to suggest whether or not migration may be concentrated within corridors within overall migration zones (Wright *et al.* 2012) and it cannot be assumed that birds fly directly to or from the protected sites that they are features of. It is also assumed that the wind farm poses a barrier effect to 100% of birds attempting to fly through at risk height (Maclean *et al.* 2009) which may be over-precautionary. In particular, there is considerable uncertainty as to the actual consequences for survival, and thus for population-level impacts, from the increase in energy expenditure associated with the increases in flight distance for those birds exposed to barrier effects. Given these uncertainties, the confidence in predictions in the assessment of barrier effects is considered to be very low and considerable caution is urged in considering the outcomes of this assessment.

**Table 5.6** Assessment of barrier effects for migrants for the Dogger Bank Teesside A project.

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Bean goose *Anser fabalis* | 0 | 1 | 9 | 1.25% | Very High | Negligible | Minor adverse |
| Light-bellied Brent Goose (Svalbard population) *Branta bernicla hrota* | | | 2 | 0.06% | Very High | Negligible | Minor adverse |
| Common shelduck *Tadorna tadorna* | 0 | 0 | 385 | 0.51% | Very High | Negligible | Minor adverse |
| Eurasian wigeon *Anas penelope* | 0 | 8 | 2353 | 0.45% | Very High | Negligible | Minor adverse |
| Gadwall *Anas strepera* | 0 | 0 | 36 | 0.16% | Very High | Negligible | Minor adverse |
| Eurasian teal *Anas crecca* | 0 | 1 | 593 | 0.24% | Very High | Negligible | Minor adverse |
| Mallard *Anas platyrhynchos* | 2 | 3 | 1636 | 0.36% | Very High | Negligible | Minor adverse |
| Northern pintail *Anas acuta* | 2 | 1 | 72 | 0.24% | Very High | Negligible | Minor adverse |
| Northern shoveler *Anas clypeata* | 0 | 0 | 58 | 0.30% | Very High | Negligible | Minor adverse |
| Common pochard *Aythya ferina* | 0 | 3 | 227 | 0.30% | Very High | Negligible | Minor adverse |
| Tufted duck *Aythya fuligula* | 2 | 0 | 436 | 0.42% | Very High | Negligible | Minor adverse |
| Greater scaup *Aythya marila* | 0 | 0 | 2 | 0.02% | Very High | Negligible | Minor adverse |
| Common scoter *Melanitta nigra* | 113 | 191 | 20 | 0.02% | Very High | Negligible | Minor adverse |
| Velvet scoter *Melanitta fusca* | 4 | 9 | 13 | 0.50% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Common goldeneye *Bucephala clangula* | 2 | 0 | 148 | 0.51% | Very High | Negligible | Minor adverse |
| Red-breasted merganser *Mergus serrator* | 0 | 0 | 1 | 0.03% | Very High | Negligible | Minor adverse |
| Goosander *Mergus merganser* (non-breeding) | 5 | 0 | 18 | 0.55% | Very High | Negligible | Minor adverse |
| Great bittern *Botaurus stellaris* | 0 | 0 | 2 | 0.44% | Very High | Negligible | Minor adverse |
| Great crested grebe *Podiceps cristatus* | 0 | 0 | 51 | 0.21% | Very High | Negligible | Minor adverse |
| Slavonian grebe *Podiceps auritus* | 0 | 0 | 2 | 0.16% | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (breeding) | 0 | 0 | <1 | 0.03% | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (non-breeding) | 0 | 0 | 6 | 1.49% | Very High | Negligible | Minor adverse |
| Eurasian coot *Fulica atra* | 0 | 0 | 199 | 0.19% | Very High | Negligible | Minor adverse |
| Eurasian oystercatcher *Haematopus ostralegus* (non-breeding) | 2 | 8 | 793 | 0.40% | Very High | Negligible | Minor adverse |
| Common ringed plover *Charadrius hiaticula* (non-breeding) | 4 | 4 | 315 | 0.43% | Very High | Negligible | Minor adverse |
| Golden plover *Pluvialis apricaria* (non-breeding) | 0 | 5 | 1574 | 0.39% | Very High | Negligible | Minor adverse |
| Grey plover *Pluvialis squatarola* | 0 | 0 | 421 | 0.85% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Northern lapwing *Vanellus vanellus* | 0 | 19 | 3834 | 0.85% | Very High | Negligible | Minor adverse |
| Red knot *Calidris canutus* | 3 | 15 | 1349 | 0.40% | Very High | Negligible | Minor adverse |
| Sanderling *Calidris alba* | 6 | 0 | 358 | 0.60% | Very High | Negligible | Minor adverse |
| Dunlin *Calidris alpina schinzii (passage)* | 16 | 18 | 29 | 0.79% | Very High | Negligible | Minor adverse |
| Dunlin *Calidris alpina alpina* (passage & winter) | 16 | 18 | 3052 | 0.70% | Very High | Negligible | Minor adverse |
| Ruff *Philomachus pugnax* | 0 | 3 | 24 | 1.01% | Very High | Negligible | Minor adverse |
| Common snipe *Gallinago gallinago* | 1 | 0 | 3989 | 0.40% | Very High | Negligible | Minor adverse |
| Black-tailed godwit *Limosa limosa islandica* | 0 | 0 | 41 | 0.72% | Very High | Negligible | Minor adverse |
| Bar-tailed godwit *Limosa lapponica* | 0 | 0 | 482 | 0.89% | Very High | Negligible | Minor adverse |
| Whimbrel *Numenius phaeopus* | 6 | 27 | 93 | 0.40% | Very High | Negligible | Minor adverse |
| Eurasian curlew *Numenius arquata* (non-breeding) | 51 | 4 | 733 | 0.90% | Very High | Negligible | Minor adverse |
| Greenshank *Tringa nebularia* | 0 | 1 | <1 | 0.06% | Very High | Negligible | Minor adverse |
| Common redshank *Tringa totanus britannica* (breeding) | 0 | 0 | 24 | 0.08% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Common redshank Icelandic population *Tringa totanus robusta* (non-breeding) | 0 | 0 | 993 | 0.36% | Very High | Negligible | Minor adverse |
| Common redshank mainland Europe population *Tringa totanus* (non-breeding) | 0 | 0 | 230 | 0.92% | Very High | Negligible | Minor adverse |
| Ruddy turnstone *Arenaria interpres* | 7 | 12 | 190 | 0.40% | Very High | Negligible | Minor adverse |
| Short-eared owl *Asio flammeus* | 2 | 23 | 6 | 0.57% | Very High | Negligible | Minor adverse |
| European Nightjar *Caprimulgus europaeus* | 0 | 0 | 4 | 0.04% | Very High | Negligible | Minor adverse |

[1] Across Dogger Bank Zone as a whole (see section 3).

[2] The estimated number of individuals of each species crossing the project is the number that would pass through at risk height (using the best estimate of the proportion of migrating birds at risk height from Wright *et al*. 2012 and not accounting for uncertainty) during a single migration season. Note that for most species, two migrations per year would be expected, and different individual birds may be involved during spring and autumn passage.

[3] The reference population size is defined as the total number of individuals of each species in the population that uses the migration route that encompasses the Dogger Bank. For further details and derivation see Table 4.18.

[4] Magnitude is assessed here according to Table 4.1.

***Summary for all receptors***

5.2.387 Table 5.7 below provides a summary of impacts from each effect for all key marine bird receptors.

**Table 5.7** Summary of potential impacts from the Dogger Bank Teesside A project for key marine bird receptors.

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| White-billed diver | Displacement (construction/decommissioning) | National | Medium | - | - | Negligible | Negligible | Low |
| | | Biogeographic | Medium | - | - | Negligible | Negligible | Low |
| | Habitat loss or change (construction/decommissioning) | All | Medium | High | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Medium | High | High | Negligible | Negligible | Very Low |
| | Displacement (operation) | National | Medium | - | - | Negligible | Negligible | Low |
| | | Biogeographic | Medium | - | - | Negligible | Negligible | Low |
| | Collision (operation) | National | Medium | High | High | Negligible | Negligible | Medium |
| | | Biogeographic | Medium | High | High | Negligible | Negligible | Medium |
| | Habitat loss or change (operation) | All | Medium | High | High | Negligible | Negligible | Very Low |
| Northern fulmar | Habitat loss or change (construction/decommissioning) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| Northern gannet | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Disturbance (cable construction) | National | Very High | - | - | Negligible | Minor adverse | Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| Arctic skua | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Collision (operation) | Site suite | Very High | High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Great skua | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Collision (operation) | Site suite | Very High | High | Very High | Negligible | Minor adverse | Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | | National | Very High | High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Black-legged kittiwake | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Lesser black-backed gull | Habitat loss or change (construction/decommissioning) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Collision (operation) | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| Great black-backed gull | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Collision (operation) | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Common guillemot | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| Razorbill | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| Little auk | Displacement (construction/decommissioning) | National | High | - | - | Negligible | Negligible | Low |
| | | Biogeographic | High | - | - | Negligible | Negligible | Low |
| | Habitat loss or change (construction/decommissioning) | All | High | Low | Medium | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | High | Low | Medium | Negligible | Negligible | Very Low |
| | Displacement (operation) | National | High | - | - | Negligible | Negligible | Low |
| | | Biogeographic | High | - | - | Negligible | Negligible | Low |
| | Collision (operation) | National | High | Medium | High | Negligible | Negligible | Medium |
| | | Biogeographic | High | Medium | High | Negligible | Negligible | Medium |
| | Habitat loss or change (operation) | All | High | Low | Medium | Negligible | Negligible | Very Low |
| Atlantic puffin | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |

## 5.3 Dogger Bank Teesside B Offshore Ornithology Impact

**Disturbance/displacement**

5.3.1 The numbers of birds predicted to be displaced from the Dogger Bank Teesside B project area and buffer during construction/decommissioning and operation, under chosen displacement rates, are shown in Table 5.9 and are also discussed at the start of each species' account. The values presented incorporate the correction factors for birds underwater (see section 4), but do not represent final magnitude, taking into account mortality rates. Tabulated summaries for each species of the numbers of birds estimated to be displaced that are then estimated to die based on a full range of alternative displacement and mortality rates from 0 to 100% are provided in Appendix 10.

5.3.2 Results of the apportioning of disturbance/displacement impacts to protected sites, incorporating mortality, are shown in Appendix 9. These tables also correct for the initial assumption that all birds come from the protected sites identified (see section 4).

5.3.3 Table 5.8 also provides separate estimates of the numbers of birds predicted to be displaced in respective breeding and winter periods. Birds predicted to be impacted during the breeding season will potentially include both breeders from any breeding colonies that the project is within range of, and also a non-breeding component. For gulls and northern gannet, it was possible to derive estimates of proportion of breeders from boat-survey observations of birds in breeding and juvenile plumages. For other species, it is assumed that, for species for which the wind farm project is within foraging range of birds from breeding colony protected sites, one third of the total number of birds (Stroud *et al.* 2004; Kober *et al.* 2010) present during the breeding season will be non-breeders. These are apportioned to protected sites surrounding the North Sea in the same manner as for seabirds outwith the breeding season (see section 4).

**Table 5.8** Numbers of birds displaced during construction / decommissioning and operation for the Dogger Bank Teesside B project during 2010, 2010/11 and 2011/12; mean values are subsequently combined with species specific mortality rates to assess the impact of displacement (see section 4). Full matrices of displacement and mortality are given in Appendix 10 for this and other projects.

| | | **Construction / decommissioning** | | | |
|---|---|---|---|---|---|
| **Species** | **Season** | **2010** | **2010/2011** | **2011/2012** | **Mean** |
| Northern gannet | Breeding | 21 (18-25) | 43 (37-50) | 136 (117-160) | 72 (62-85) |
| | Winter | 39 (33-46) | 116 (99-136) | 214 (178-256) | 128 (107-152) |
| | All | 60 (51-71) | 158 (135-186) | 350 (295-416) | 200 (169-237) |
| Common guillemot | Breeding | 212 (197-232) | 412 (383-447) | 477 (437-528) | 373 (345-409) |
| | Winter | 1483 (1367-1605) | 1724 (1597-1859) | 1113 (1022-1201) | 1348 (1244-1455) |
| | All | 1694 (1564-1836) | 2137 (1980-2306) | 1590 (1459-1729) | 1721 (1589-1864) |
| Razorbill | Breeding | 20 (17-25) | 46 (39-55) | 101 (82-123) | 56 (45-67) |
| | Winter | 556 (491-624) | 623 (553-699) | 405 (355-461) | 488 (431-550) |
| | All | 576 (507-648) | 669 (591-754) | 506 (437-585) | 544 (476-617) |
| Little auk | Winter | 62 (46-88) | 54 (42-72) | 19 (15-27) | 41 (31-57) |
| Atlantic puffin | Breeding | 6 (5-7) | 12 (10-14) | 6 (5-7) | 8 (7-9) |
| | Winter | 45 (37-57) | 66 (56-79) | 14 (12-17) | 38 (31-46) |
| | All | 51 (41-64) | 77 (66-93) | 20 (16-25) | 45 (38-56) |
| | | **Operation** | | | |
| **Species** | **Season** | **2010** | **2010/2011** | **2011/2012** | **Mean** |
| Northern gannet | Breeding | 42 (36-50) | 85 (74-100) | 272 (233-321) | 144 (124-169) |
| | Winter | 77 (66-92) | 231 (197-273) | 428 (356-511) | 255 (215-304) |
| | All | 119 (102-141) | 316 (271-373) | 700 (589-832) | 399 (339-473) |
| Common guillemot | Breeding | 424 (393-463) | 824 (765-894) | 954 (875-1056) | 747 (690-818) |
| | Winter | 2965 (2735-3210) | 3449 (3194-3717) | 2226 (2044-2402) | 2696 (2488-2911) |
| | All | 3389 (3128-3673) | 4273 (3959-4611) | 3180 (2919-3458) | 3442 (3177-3729) |
| Razorbill | Breeding | 41 (33-49) | 93 (77-110) | 201 (164-247) | 111 (91-135) |
| | Winter | 1112 (981-1247) | 1245 (1105-1398) | 811 (711-923) | 976 (861-1100) |
| | All | 1153 (1014-1296) | 1338 (1182-1507) | 1012 (874-1169) | 1087 (952-1235) |
| Little auk | Winter | 124 (93-176) | 107 (84-145) | 38 (30-53) | 81 (62-113) |
| Atlantic puffin | Breeding | 12 (9-15) | 23 (20-28) | 11 (9-14) | 16 (13-19) |
| | Winter | 91 (73-113) | 131 (111-159) | 29 (23-35) | 75 (62-92) |
| | All | 103 (83-128) | 155 (131-186) | 40 (33-49) | 91 (75-111) |

**Barrier effects – Marine Birds**

5.3.4 Numbers of key species in flight potentially exposed to barrier effects for Dogger Bank Teesside B are shown in Table 5.9.

**Table 5.9** Estimates of the numbers of breeding adult birds of these species in flight in the Dogger Bank Teesside B project area using the mean of 2010 and 2010/2011 and 2011/12 data.

| Species | Breeding season | Mean |
|---|---|---|
| Northern fulmar | Mar-Sep | 73 (59-87) |
| Northern gannet | Apr-Sep | 70 (60-82) |
| Black-legged kittiwake | Apr-Sep | 540 (485-594) |
| Common guillemot | May-Jul | 114 (105-125) |
| Razorbill | May-Jul | 22 (17-27) |

**Collision – Marine Birds**

5.3.5 An overview of the results of collision risk analyses for marine birds for the Dogger Bank Teesside B project is provided in Appendix 6.

5.3.6 There were strong between year differences in both the total numbers of birds present within Dogger Bank Teesside B, and annual patterns in their abundance. With only three years of data, it was not possible to determine which year was most representative of bird abundance within Dogger Bank Teesside B. For these reasons, collision risk estimates were produced for each year separately, rather than for a mean value from the three years.

5.3.7 Using a realistic, precautionary avoidance rate of 98% (SNH 2010, Cook *et al.* 2012), the numbers of Arctic skua, great skua, common guillemot, little auk and Atlantic puffin colliding with wind turbines, based on population estimates from 2010 to 2012, were predicted to be less than one bird per year. Even assuming a more conservative avoidance rate of 95%, the numbers of Arctic skua, common guillemot, little auk and Atlantic puffin predicted to collide with wind turbines were less than one bird per year. Northern fulmar and razorbill had a similarly low collision risk, with just one northern fulmar predicted to collide each year and a maximum of two razorbills predicted to collide annually.

5.3.8 The numbers of lesser black-backed gull and great black-backed gull predicted to collide with wind turbines were greater. The collision rates were highest based on the 2010 population estimates for the lesser black-backed gull with 25 birds. For great black-backed gull, the highest collision estimates, of 34 birds, came from the 2010/11 population estimate.

5.3.9 Estimates were greatest for black-legged kittiwake and northern gannet. The maximum collision estimate for black-legged kittiwake was 98 birds based on the 2011/12 population estimate. For northern gannet the maximum collision estimate

was 66 birds, also based on the 2011/12 population estimate and assuming a 99% avoidance rate.

5.3.10 Collision estimates were greatest for northern gannet, black-legged kittiwake and lesser black-backed gulls during the breeding season. Collision estimates were greater for great black-backed gull during the non-breeding season (Table 5.11).

**Table 5.10** Annual collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside B project of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m in response to different avoidance rates. Estimates generated using option 3 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | | | July 2010 – June 2011 | | | | July 2011 – June 2012 | | | | Mean | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 95% | 98% | 99% | 99.5% | 95% | 98% | 99% | 99.5% | 95% | 98% | 99% | 99.5% | 95% | 98% | 99% | 99.5% |
| Northern fulmar | 2 (2 - 2) | 1 (1 - 1) | 0 (0 - 0) | 0 (0 - 0) | 1 (1 - 2) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 2 (2 - 2) | 1 (1 - 1) | 0 (0 - 0) | 0 (0 - 0) | 2 (1-2) | 1 (1-1) | 0 (0-0) | 0 (0-0) |
| Northern gannet | 72 (60 - 85) | 29 (24 - 34) | 15 (12 - 17) | 7 (6 - 9) | 121 (100 - 142) | 48 (40 - 57) | 24 (20 - 28) | 12 (10 - 14) | 331 (273 - 388) | 132 (109 - 155) | 66 (55 - 78) | 33 (27 - 39) | 187 (155-220) | 75 (62-88) | 38 (31-44) | 19 (16-22) |
| Arctic Skua | 0 (0 - 582) | 0 (0 - 233) | 0 (0 - 117) | 0 (0 - 58) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 69) | 0 (0 - 27) | 0 (0 - 14) | 0 (0 - 7) | 0 (0-217) | 0 (0-87) | 0 (0-43) | 0 (0-22) |
| Great Skua | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 1 (0-1) | 0 (0-1) | 0 (0-0) | 0 (0-0) |
| Black-legged kittiwake | 139 (125 - 156) | 56 (50 - 62) | 28 (25 - 31) | 14 (13 - 16) | 237 (213 - 265) | 95 (85 - 106) | 47 (43 - 53) | 24 (21 - 26) | 244 (217 - 277) | 98 (87 - 111) | 49 (43 - 55) | 24 (22 - 28) | 203 (182-229) | 81 (73-92) | 41 (36-46) | 20 (18-23) |
| Lesser black-backed gull | 63 (44 - 94) | 25 (18 - 38) | 13 (9 - 19) | 6 (4 - 9) | 37 (24 - 59) | 15 (10 - 24) | 8 (5 - 12) | 4 (2 - 6) | 25 (14 - 44) | 10 (5 - 18) | 5 (3 - 9) | 3 (1 - 4) | 41 (27-64) | 16 (11-26) | 8 (5-13) | 4 (3-6) |
| Great black-backed gull | 81 (58 - 113) | 32 (23 - 45) | 16 (12 - 23) | 8 (6 - 11) | 84 (61 - 119) | 34 (25 - 47) | 17 (12 - 24) | 8 (6 - 12) | 67 (43 - 101) | 27 (17 - 40) | 13 (9 - 20) | 7 (4 - 10) | 75 (52-107) | 30 (21-43) | 15 (10-21) | 7 (5-11) |
| Common guillemot | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Razorbill | 2 (1 - 3) | 1 (0 - 1) | 0 (0 - 1) | 0 (0 - 0) | 4 (3 - 8) | 2 (1 - 3) | 1 (1 - 2) | 0 (0 - 1) | 4 (3 - 6) | 2 (1 - 3) | 1 (1 - 1) | 0 (0 - 1) | 3 (2-5) | 1 (1-2) | 1 (0-1) | 0 (0-1) |
| Little auk | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Atlantic puffin | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Table 5.11** Seasonal collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside B project of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m and an avoidance rate of 98 % (99% for northern gannet). Estimates generated using option 3 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | July 2010 – June 2011 | | July 2011 – June 2012 | | Mean | |
|---|---|---|---|---|---|---|---|---|
| | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding |
| Northern fulmar | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0-1) | 0 (0-0) |
| Northern gannet | 7 (6 - 8) | 8 (6 - 9) | 9 (7 - 10) | 15 (13 - 18) | 34 (28 - 39) | 32 (27 - 38) | 18 (15-21) | 20 (16-23) |
| Arctic Skua | 0 (0 - 0) | 0 (0 - 233) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 27) | 0 (0 - 0) | 0 (0-9) | 0 (0-78) |
| Great Skua | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |
| Black-legged kittiwake | 24 (21 - 27) | 32 (29 - 36) | 65 (59 - 73) | 29 (26 - 33) | 71 (63 - 81) | 26 (24 - 30) | 54 (48-61) | 27 (24-31) |
| Lesser black-backed gull | 19 (14 - 27) | 6 (4 - 11) | 9 (6 - 14) | 6 (3 - 10) | 5 (3 - 9) | 5 (3 - 9) | 11 (7-16) | 6 (4-10) |
| Great black-backed gull | 6 (4 - 8) | 27 (19 - 37) | 7 (5 - 10) | 27 (19 - 37) | 9 (5 - 14) | 18 (12 - 26) | 7 (5-11) | 23 (16-32) |
| Common guillemot | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |
| Razorbill | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 2 (1 - 3) | 0 (0 - 0) | 1 (1 - 2) | 0 (0-0) | 1 (1-2) |
| Little auk | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |
| Atlantic puffin | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |

## Evaluation for Ornithological Receptors

### *White-billed diver*

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 1 | 100% displaced 37.5% mortality 4km buffer | 10,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Displacement (o) | 2 | | 10,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 10,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – background adult mortality | <1 | | 1,066 | <0.1 | 533 | <0.1 | <0.1 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.
[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.
[3] Assumption of 50 birds used as a national threshold (see section 4).

#### *Summary of population estimates and value*

5.3.11 Numbers in the Dogger Bank Zone as a whole surpassed 1% thresholds for populations of national and international importance. White-billed divers were present in the Dogger Bank Zone between November and April when an average of seven birds was estimated to occur in the Dogger Bank Teesside B project area. The population of this species in the Dogger Bank Teesside B project area was assessed to be of regional importance, and consequently the value of this receptor is assessed to be **medium**.

#### *Construction and Decommissioning*

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.12 A full displacement analysis was not undertaken due to the low numbers predicted for the Dogger Bank Teesside B project area (a monthly average of just four birds was estimated between November and April), of which one birds would then be predicted to be lost through mortality.

5.3.13 Consequently, following the method and assumptions presented for Dogger Bank Teesside A, the effect of displacement for white-billed diver is considered to be of **negligible magnitude** at the national and biogeographic scales.

Significance

5.3.14 This species has a **medium value**. Combining the species' magnitude with value, the impact of this effect for white-billed diver is considered to be **negligible** at both national and biogeographic scales.

*Direct habitat loss or change*

Wind farm and export cable corridor

5.3.15 The impact of habitat loss for both the wind farm area and cable corridors for Dogger Bank Teesside B is as assessed for Dogger Bank Teesside A – **negligible.**

***Operation***

*Disturbance/displacement*

5.3.16 A full displacement analysis was not undertaken due to the low numbers predicted for the Dogger Bank Teesside B project area (a monthly average of just seven birds was estimated between November and April), of which two birds would be predicted to be lost through mortality.

5.3.17 Consequently, following the method and assumptions presented for Dogger Bank Teesside A, the effect of displacement for white-billed diver is considered to be of **negligible magnitude** at the national and biogeographic scales.

Significance

5.3.18 This species has a **medium value**. Combining the species' magnitude with value, the impact of this effect for white-billed diver is considered to be **negligible** at both national and biogeographic scales.

*Collision*

5.3.19 The effect of collision for white-billed diver for Dogger Bank Teesside B is considered to be **negligible** following the assessment methodology and justification presented for Dogger Bank Teesside A.

*Direct habitat loss or change*

5.3.20 Following the methodology and justification presented in section 5.2, the impact of habitat loss for white-billed diver is as assessed for Dogger Bank Teesside A – **negligible.**

***Northern fulmar***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 1 | 98% avoidance Flight height option 3 | 10,200,000 | <0.1 | 1,500,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 190,400 | <0.1 | 28,000 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.3.21 The peak population estimates for the Dogger Bank Teesside B project area in 2010, 2010/2011 and 2011/12 were 540 birds (90% CIs = 450-640) in May, 268 birds (90% CIs = 213-323) in July, and 223 birds (90% CIs = 179-264) in May, respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B project area in either year.

5.3.22 The value of this receptor is assessed as **very high** as the species is a breeding feature of 26 SPAs and a wintering feature of two SPAs in the Greater North Sea OSPAR region. Dogger Bank Teesside B is within foraging range of eight protected breeding sites in Great Britain, and is within foraging range of nine protected breeding sites around the North Sea at which the species is a feature.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.23 The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.24 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern fulmar is considered to be **negligible**.

Export cable corridor

5.3.25 The impact of habitat loss of change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Barrier effects*

Magnitude

5.3.26 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 87 adult northern fulmars in flight in the breeding season using 2010, 2010/11 and 2011/12 data (Table 5.9).

5.3.27 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.14 (Appendix 9) which indicates that between 1 and 5% of the population at the Flamborough Head and Bempton Cliffs SPA might be potentially exposed to this effect.

5.3.28 The increase in flight distance due to the barrier presented by Dogger Bank Teesside B varies by direction of flight, although averages approximately 25km (6.25% of the species' maximum foraging range of 400km). The project is between 164km and 388km from the protected sites within foraging range that would be potentially impacted by this effect (Appendix 1). This increase might prevent birds from one site – the Troup, Pennan and Lions Heads SPA – from reaching foraging areas beyond the project area.

5.3.29 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside B, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.3.30 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside B project for northern fulmar is assessed as **minor adverse** at protected site, national and biogeographic levels.

*Collision*

Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.31 The Band collision risk model (Band *et al.* 2012) provided estimates of less than 1 northern fulmar collision per year in each study year.

5.3.32 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.3.33 Mean annual estimates of the number of collisions represent less than 0.1% of the populations of the eight sites in foraging range of Dogger Bank Teesside B. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.3.34 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British breeding population.

5.3.35 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.3.36 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.3.37 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for northern fulmar for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and the impact of the effect is consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.38 For northern fulmar, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.39 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern fulmar is considered to be **negligible**.

***Northern gannet***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 0 | 75% displaced 0% mortality 2km buffer | 967,000 | 0 | 660,000 | 0 | 0 | Minor adverse |
| Displacement (o) | 0 | | 967,000 | 0 | 660,000 | 0 | 0 | Minor adverse |
| Collision – population | 44 | 99% avoidance Flight height option 3 | 967,000 | <0.1 | 660,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | 34 | | 52,218 | <0.1 | 35,640 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.3.40 The peak population estimates for the Dogger Bank Teesside B project area in 2010, 2010/11 and 2011/12 were 155 birds (90% CIs =133-181) in October, 984 birds (90% CIs = 840-1,151) in March, and 1,811 birds (90% CIs = 1,506-2,160) in March respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B project area in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of nine SPAs, a wintering feature of five SPAs and a passage feature of five SPAs.

5.3.41 The proposed project is within foraging range of three protected breeding sites around the North Sea at which the species is a feature – the Seevogelschutzgebiet Helgoland, Forth Islands and Flamborough Head and Bempton Cliffs, and two protected breeding sites in Great Britain at which the species is a feature. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Very Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.42 Based on 50% of the worst case values for displacement, analysis provided estimates of 60 (using 90% confidence limits = 51-71) displaced birds using 2010 data (21 during breeding months, 39 during other months of the year), 158 (using 90% confidence limits = 135-186) displaced birds using 2010/11 data (43 during breeding months, 116 during other months of the year), and 350 (using 90% confidence limits

= 295-416) displaced birds using 2011/12 data (136 during breeding months, 214 during other months of the year). The mean value was 200 (using 90% confidence limits = 169-237) displaced birds (72 during breeding months, 128 during other months of the year). However, for this species at the project level, mortality from displacement is considered as zero (see section 4), therefore the effect of displacement for northern gannet for Dogger Bank Teesside B is thus considered of **negligible magnitude** at all scales.

Significance

5.3.43 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.44 For northern gannet, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Therefore, we consider the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

5.3.45 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern gannet is considered to be **negligible**.

Export cable corridor

5.3.46 The impact of habitat loss/change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Disturbance/displacement*

Sensitivity to habitat loss – Very Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.47 Based on worst case values for displacement, analysis provided estimates of 119 (using 90% confidence limits = 102-141) displaced birds using 2010 data (42 during breeding months, 77 during other months of the year), 316 (using 90% confidence

limits = 271-373) displaced birds using 2010/11 data (85 during breeding months, 231 during other months of the year), and 700 (using 90% confidence limits = 589-832) displaced birds using 2011/12 data (272 during breeding months, 428 during other months of the year). The mean value was 399 (using 90% confidence limits = 339-473) displaced birds (144 during breeding months, 255 during other months of the year). However, for this species at the project level, mortality from displacement is considered as zero (see section 4), therefore the effect of displacement for northern gannet for Dogger Bank Teesside B is thus considered of **negligible magnitude** at all scales.

Significance

5.3.48 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.49 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 70 adult northern gannets in flight in the project areas in the breeding season using 2010, 2010/11 and 2011/12 data.

5.3.50 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.17 (Appendix 9) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

5.3.51 The increase in flight distance due to the barrier presented by Dogger Bank Teesside B varies by direction of flight, although averages approximately 25km (10.9% of the species' maximum foraging range of 229km). The project is 164km from the Flamborough Head and Bempton Cliffs SPA - the protected site within foraging range that would be potentially impacted by this effect (Appendix 1). Recent tracking studies indicate that additional individuals from some other North Sea protected sites may also be impacted (e.g. Wakefield et al. 2013).

5.3.52 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside B, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.3.53 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside

B project for northern gannet is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.54 The Band collision risk model (Band *et al.* 2012) provided mean annual collision estimate of 38 (90% confidence limits = 31-44) per year for northern gannet. Of these, 18 were predicted to occur during the breeding season and 20 during the non-breeding season.

5.3.55 Tables A9.18a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites.

5.3.56 The largest relative impact was predicted for the Flamborough Head and Bempton Cliffs SPA, although even here the mean annual estimates of the number of collisions represent just 0.1% of the site population using the maximum estimates. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.3.57 Mean estimates of the number of collisions of birds in the breeding represent less than 0.1% of the species' British breeding population.

5.3.58 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.3.59 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.3.60 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for northern gannet for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.61 For northern gannet, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Therefore, we consider the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

5.3.62 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern gannet is considered to be **negligible**.

***Arctic skua***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 75,000 | <0.1 | 6,300 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 5,700 | <0.1 | 479 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.3.63 Arctic skua were present in the Dogger Bank Zone during autumn only. The peak population estimates for the Dogger Bank Teesside B project area in 2010, 2010/11 and 2011/12 were 1 bird (90% CIs = 0-5), 1 bird (90% CIs = 0-5), and 4 birds (90% CIs = 2-9), all peaks being in September, respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B project area in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 12 SPAs and a passage feature of two SPAs.

5.3.64 Dogger Bank Teesside B is outside the foraging range of any protected site at which the species is a breeding feature. There are no national population estimates for this species for the passage or winter seasons.

5.3.65 It should be noted that the estimated numbers of Arctic skua in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.66 For Arctic skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4),

the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.67 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for Arctic skua is considered to be **negligible**.

Export cable corridor

5.3.68 The impact of habitat loss of change is as assessed for Dogger Bank Teesside A - **negligible**.

Significance

5.3.69 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for Arctic skua is considered to be **negligible**.

***Operation***

*Collision*

Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.70 The Band collision risk model (Band *et al.* 2012) provided estimates of less than one Arctic skua collision per year in each of the study years.

5.3.71 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.3.72 Mean annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.3.73 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.3.74 Given that numbers of this species are possibly underestimated due to turnover (see above), even assuming an order of magnitude difference in the numbers estimated for the Dogger Bank Teesside B project, the magnitude of impact predicted at each geographic scale considered would be unchanged.

5.3.75 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.3.76 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite and biogeographic scales would be impacted by this effect. The effect of collision for Arctic skua for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at protected site, protected site suite and biogeographic scales, and consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.77 For Arctic skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.78 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for Arctic skua is considered to be **negligible**.

***Great skua***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 48,000 | <0.1 | 28,800 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 3,584 | <0.1 | 2,150 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.3.79 Great skua were present in the Dogger Bank Zone during autumn only. The peak population estimates for the Dogger Bank Teesside B project area in 2010, 2010/11 and 2011/12 were 1 bird (90% CIs = 0-5), 1 bird (90% CIs = 0-5), and 4 birds (90% CIs = 2-9), all peaks being in September, respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B project area in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of seven SPAs and a passage feature of two SPAs.

5.3.80 Dogger Bank Teesside B is outside the foraging range of any protected site at which the species is a breeding feature. There are no national population estimates for this species for the passage or winter seasons.

5.3.81 It should be noted that the estimated numbers of great skua in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.82 For great skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4),

the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.83 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great skua is considered to be **negligible**.

Export cable corridor

5.3.84 The impact of habitat loss of change is as assessed for Dogger Bank Teesside A - **negligible**.

Significance

5.3.85 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great skua is considered to be **negligible**.

***Operation***

*Collision*

Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one great skua collision.

5.3.86 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.3.87 Mean annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.3.88 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.3.89 It should be noted that the estimated numbers of this species in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season. However, even assuming an order of magnitude difference in the numbers estimated for the Dogger Bank Teesside B project, the magnitude of impact predicted at each geographic scale considered would be unchanged.

5.3.90 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.3.91 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite and biogeographic scales would be impacted by this effect. The effect of collision for great skua for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at protected site, protected site suite and biogeographic scales, and the impact of effect is consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.92 For great skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.93 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great skua is considered to be **negligible**.

***Black-legged kittiwake***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 92 | 98% avoidance Flight height option 3 | 6,600,000 | <0.1 | 1,110,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | 74 | | 259,600 | <0.1 | 43,660 | 0.3 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.3.94 The peak population estimates for the Dogger Bank Teesside B project area were 3,398 (90% CIs = 2,985-3,779), 6,487 (90% CIs = 5,864-7,207), and 5,507 (90% CIs = 4,859-6,188) for 2010, 2010/11 and 2011/12 respectively, in March in all years. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B project area in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 24 SPAs, a wintering feature of four SPAs and a passage feature of six SPAs.

5.3.95 The proposed project is within foraging range during the breeding season of two protected breeding sites around the North Sea at which the species is a feature – the Flamborough Head and Bempton Cliffs SPA and Durham Coast and Marsden Bay SSSI, both of which are in the UK. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.96 For black-legged kittiwake, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.97 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for black-legged kittiwake is considered to be **negligible**.

Export cable corridor

5.3.98 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.99 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 540 adult black-legged kittiwakes in flight in the project areas in the breeding season using 2010, 2010/11 and 2011/12 data.

5.3.100 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.19 (Appendix 9) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

5.3.101 The increase in flight distance due to the barrier presented by Dogger Bank Teesside B varies by direction of flight, although averages approximately 25km (10.8% of the species' maximum foraging range of 231km). The project is 164km from the Flamborough Head and Bempton Cliffs SPA, the only protected site within foraging range that would be potentially exposed to this effect (Appendix 1).

5.3.102 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside B, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.3.103 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside B project for black-legged kittiwake is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.104 The Band collision risk model (Band *et al.* 2012) provided a mean collision estimate of 81 (90% confidence limits = 73-92) black-legged kittiwake collisions based on data for 2011/12 (54 during breeding months, 27 during other months of the year).

5.3.105 Tables A9.20a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. Dogger Bank Teesside B is within foraging range of one protected breeding site around the North Sea at which the species is a feature – the Flamborough Head and Bempton Cliffs SPA. Mean annual estimates of the number of collisions represent less than 0.1% of the site population.

5.3.106 Mean annual estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.3.107 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British population.

5.3.108 Mean annual collision estimates using represent less than 0.1% of the species' biogeographic population.

5.3.109 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.3.110 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect.

5.3.111 Based on the size of the impacts predicted relative to population size, the effect of collision for black-legged kittiwake for the Dogger Bank Teesside B project would be considered to be of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and the impact is consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.112 For black-legged kittiwake, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.113 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for black-legged kittiwake is considered to be **negligible**.

***Lesser black-backed gull***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| | | | | | W 330,000 | 0 | | |
| Collision – population | 26 | 98% avoidance Flight height option 3 | 550,000 | <0.1 | B 120,000 | <0.1 | 0 | Minor adverse |
| | | | | | W 330,000 | <0.1 | | |
| Collision – background adult mortality | 8 | | 31,900 | <0.1 | B 6,960 | <0.1 | 0 | |
| | | | | | W 19,140 | <0.1 | | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided; B = Breeding, W = winter.

***Summary of population estimates and value***

5.3.114 The peak population estimates for Dogger Bank Teesside B were 160 birds (90% CIs = 115-228) in June, 81 birds (90% CIs = 59-113) in May, and 44 birds (90% CIs = 18-121) in May for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B project area in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 21 SPAs, a wintering feature of two SPAs and a passage feature of three SPAs.

5.3.115 Dogger Bank Teesside B is outside the foraging range of any protected site at which the species is a breeding feature.

5.3.116 It should be noted that national winter population estimates for gulls come from a survey of terrestrial habitats and inshore waters (Burton *et al.* 2013), and thus do not include birds that frequent offshore waters; therefore, underestimating the overall national populations. It should also be noted that the estimated numbers of this species in the Dogger Bank Zone are possibly underestimated, given that those present in the spring may be *intermedius* birds on passage to Scandinavia, and thus due to the potential turnover of birds at this time.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.117 The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.118 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for lesser black-backed gull is considered to be **negligible**.

Export cable corridor

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.119 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A – **negligible**.

***Operation***

*Collision*

Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.120 The Band collision risk model (Band *et al.* 2012) provideds mean annual collision estimate of 16 (90% confidence limits = 11-26) lesser black-backed gull collisions based on 2010 data (11 during breeding months, six during other months of the year).

5.3.121 Tables A9.21a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. The proposed project is outside the foraging range of any protected site at which the species is a breeding feature. Mean annual collision

estimates represent less than 0.1% of the populations of each of the protected sites around the North Sea at which the species is a feature.

5.3.122 Mean winter estimates represent less than 0.1% of the winter population estimate for the species in Great Britain.

5.3.123 Mean annual estimates represent less than 0.1% of the species' biogeographic population.

5.3.124 Given that numbers of this species are possibly underestimated due to turnover (see above), even assuming an order of magnitude difference in the numbers estimated for the Dogger Bank Teesside B project, the magnitude of impact predicted at each geographic scale considered would be unchanged.

5.3.125 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.3.126 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for lesser black-backed gull for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and the impact of the effect is consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.127 For lesser black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.128 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for lesser black-backed gull is considered to be **negligible**.

***Great black-backed gull***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| | | | | | W 75,860 | 0 | | |
| Collision – population | 43 | 98% avoidance Flight height option 3 | 420,000 | <0.1 | B 51,000 | <0.1 | 0 | Minor adverse |
| | | | | | W 75,860 | <0.1 | | |
| Collision – background adult mortality | 14 | | 24,360 | <0.1 | B 2,958 | 0.5 | 0 | |
| | | | | | W 4,400 | 0.4 | | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided; B = Breeding, W = winter.

***Summary of population estimates and value***

5.3.129 The peak population estimates for Dogger Bank Teesside B were 204 birds (90% CIs = 161-239) in January, 132 birds (90% CIs = 100-172) in March, and 95 birds (90% CIs = 70-127) in February for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B project area in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 17 SPAs and a wintering feature of two SPAs.

5.3.130 Dogger Bank Teesside B is outside the foraging range of any protected site at which the species is a breeding feature.

5.3.131 It should be noted that national winter population estimates for gulls come from a survey of terrestrial habitats and inshore waters (Burton *et al.* 2013), and thus do not include birds that frequent offshore waters; therefore, underestimating the overall national populations. It should also be noted that the estimated numbers of this species in the Dogger Bank Zone are possibly underestimated due to the potential turnover of birds at this time.

***Construction and Decommissioning***

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.132 For great black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project

area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.133 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great black-backed gull is considered to be **negligible**.

Export cable corridor

5.3.134 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Collision*

Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.135 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of 30 (90% confidence limits = 21-43) great black-backed gull collision (seven during breeding months, 23 during other months of the year).

5.3.136 Tables A9.22a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. Mean annual collision estimates represent 0.1% respectively of the populations of each of the protected sites around the North Sea at which the species is a feature.

5.3.137 Mean winter estimates represent less than 0.1% of the winter population estimate for the species in Great Britain.

5.3.138 Mean annual estimates represent less than 0.1% of the species' biogeographic population.

5.3.139 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.3.140 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less

than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect.

5.3.141 The effect of collision for great black-backed gull for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at protected site suite, national and biogeographic scales, and consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.142 For great black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.143 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great black-backed gull is considered to be **negligible**.

***Common guillemot***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 93 | 50% displaced 5% mortality 2km buffer | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 186 | | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 201,600 | <0.1 | 95,040 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.3.144 The peak population estimates for the Dogger Bank Teesside B project area were 6,317 birds in December (90% CIs = 5,877-6,806), 9,719 birds in March (90% CIs = 9,108-10,385), and 9,645 birds in March (90% CIs = 8,879-10,389) for 2010, 2010/11 and 2011/12 respectively. The 1% threshold for a population of national importance was not exceeded in the Dogger Bank Teesside B project area during the breeding season and the 1% threshold for a population of international importance was not exceeded in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 26 SPAs, a wintering feature of 11 SPAs and a passage feature of one SPA.

5.3.145 The proposed project is within foraging range of five protected breeding sites around the North Sea at which the species is a feature, all which all are in Great Britain – the Farne Islands, Forth Islands, Flamborough Head and Bempton Cliffs, Fowlsheugh, and St Abb's Head to Fast Castle SPAs. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.146 Based on 50% of the worst case values for displacement, analysis provided estimates of 1,694 (using 90% confidence limits = 1,564-1,836) displaced birds using

2010 data (212 during breeding months, 1,483 during other months of the year), 2,137 (using 90% confidence limits = 1,980-2,306) displaced birds using 2010/11 data (412 during breeding months, 1,724 during other months of the year), and 1,590 (using 90% confidence limits = 1,459-1,729) displaced birds using 2011/12 data (477 during breeding months, 1,113 during other months of the year). The mean value was 1,721 (using 90% confidence limits = 1,589-1,864) displaced birds (373 during breeding months, 1,348 during other months of the year).

5.3.147 Tables A9.23a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 0.1% of birds would be impacted.

5.3.148 Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.3.149 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.3.150 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for common guillemot for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at all scales.

Significance

5.3.151 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.152 For common guillemot, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.153 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for common guillemot is considered to be **minor adverse**.

Export cable corridor

5.3.154 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **minor adverse**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.155 Based on worst case values for displacement, analysis provided estimates of 3,389 (using 90% confidence limits = 3,128-3,673) displaced birds using 2010 data (424 during breeding months, 2,965 during other months of the year), 4,273 (using 90% confidence limits = 3,959-4,611) displaced birds using 2010/11 data (824 during breeding months, 3,449 during other months of the year), and 3,180 (using 90% confidence limits = 2,919-3,458) displaced birds using 2011/12 data (954 during breeding months, 2,226 during other months of the year). The mean value was 3,442 (using 90% confidence limits = 3,177-3,729) displaced birds (747 during breeding months, 2,696 during other months of the year).

5.3.156 Tables A9.24a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 0.1% of birds (using mean data) would be impacted.

5.3.157 Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1%, of the British breeding population.

5.3.158 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.3.159 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for common guillemot for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at all scales.

Significance

5.3.160 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.161 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 125 adult common guillemots in flight in the project areas in the breeding season using 2010, 2010/11 and 2011/12 data.

5.3.162 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.25 (Appendix 9) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

5.3.163 The increase in flight distance due to the barrier presented by Dogger Bank Teesside B varies by direction of flight, although averages approximately 25km (7.4% of the species' maximum foraging range of 340km). The project is between 164km and 330km from the protected sites within foraging range that would be potentially exposed to this effect (Appendix 1). This increase might prevent birds from one site – the Fowlsheugh SPA – from reaching foraging areas beyond the project area.

5.3.164 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside B, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.3.165 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside B project for common guillemot is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.166 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one common guillemot collision.

5.3.167 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.3.168 Mean annual estimates of the number of collisions represent less than 0.1% of the populations the six protected breeding sites around the North Sea. Mean annual estimates data also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.3.169 The proposed project is within foraging range of six protected breeding sites in Great Britain. Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British, breeding population.

5.3.170 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.3.171 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.3.172 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for common guillemot for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.173 For common guillemot, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.174 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for common guillemot is considered to be **minor adverse**.

***Razorbill***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 31 | 50% displaced 5% mortality 2km buffer | 1,380,000 | <0.1 | 330,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 112 | | 1,380,000 | <0.1 | 330,000 | <0.1 | 0 | Minor adverse |
| Collision – population | 2 | 98% avoidance Flight height option 3 | 1,380,000 | <0.1 | 330,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 92,000 | <0.1 | 22,000 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.3.175 The peak population estimates for the Dogger Bank Teesside B project area were 2,514 birds in February (90% CIs = 2,235-2,793), 4,245 birds in April (90% CIs = 3,800-4,702), and 3,923 birds in March (90% CIs = 3,492-4,386) for 2010, 2010/11 and 2011/12 respectively. The 1% threshold for a population of national importance was not exceeded in the Dogger Bank Teesside B project area during the breeding season and the 1% threshold for a population of international importance was not exceeded in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 18 SPAs, a wintering feature of five SPAs and a passage feature of two SPAs.

5.3.176 The proposed project is within foraging range of four protected breeding sites around the North Sea at which the species is a feature – the Farne Islands, Forth Islands, Flamborough Head and Bempton Cliffs, and St Abb's Head to Fast Castle SPAs. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.177 Based on 50% of the worst case values for displacement, analysis provided estimates of 576 (using 90% confidence limits = 507-648) displaced birds using 2010 data (20.5 during breeding months, 556 during other months of the year), 669 (using 90% confidence limits = 591-754) displaced birds using 2010/11 data (46 during

breeding months, 623 during other months of the year), and 506 (using 90% confidence limits = 437-585) displaced birds using 2011/12 data (101 during breeding months, 405 during other months of the year). The mean value was 544 (using 90% confidence limits = 476-617) displaced birds (56 during breeding months, 488 during other months of the year).

5.3.178 Tables A9.26a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 0.1% of birds (using mean data), would be impacted.

5.3.179 Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.3.180 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.3.181 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for razorbill for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at all scales.

Significance

5.3.182 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to **minor adverse** at all scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.183 For razorbill, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.184 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for razorbill is considered to be **minor adverse**.

Export cable corridor

5.3.185 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **minor adverse**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.186 Based on worst case values for displacement, analysis provided estimates of 1,153 (using 90% confidence limits = 1,014-1,296) displaced birds using 2010 data (41 during breeding months, 1,112 during other months of the year), 1,338 (using 90% confidence limits = 1,182-1,507) displaced birds using 2010/11 data (93 during breeding months, 1,245 during other months of the year), and 1,012 (using 90% confidence limits = 874-1,169) displaced birds using 2011/12 data (201 during breeding months, 811 during other months of the year). The mean value was 1,087 (using 90% confidence limits = 952-1,235) displaced birds (111 during breeding months, 976 during other months of the year).

5.3.187 Tables A9.27a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 0.1% of birds (using mean data), would be impacted.

5.3.188 Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.3.189 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.3.190 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for razorbill for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at all scales.

Significance

5.3.191 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.192 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 27 adult razorbills in flight in the project areas in the breeding season using 2010, 2010/11 and 2011/12 data.

5.3.193 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.28 (Appendix 9) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

5.3.194 The increase in flight distance due to the barrier presented by Dogger Bank Teesside B varies by direction of flight, although averages approximately 25km (8.0% of the species' maximum foraging range of 312km). The project is between 164km and 308km from the protected sites within foraging range that would be potentially exposed to this effect (Appendix 1). This increase might prevent birds from one site – the Forth Islands SPA – from reaching foraging areas beyond the project area.

5.3.195 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside B, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.3.196 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside B project for razorbill is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.197 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of just two razorbill collisions.

5.3.198 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.3.199 Mean annual estimates of the number of collisions represent less than 0.1% of the populations of the five protected sites within foraging range around the North Sea. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.3.200 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British breeding population.

5.3.201 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.3.202 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.3.203 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for razorbill for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and the impact of the effect is consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.204 For razorbill, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.205 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for razorbill is considered to be **minor adverse**.

***Little auk***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 3 | 25% displaced 5% mortality 2km buffer | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Displacement (o) | 6 | | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – background adult mortality | <1 | | 8,333,333 | <0.1 | 333 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

[3] Assumption of 50 birds used as a national threshold (see section 4).

***Summary of population estimates and value***

5.3.206 The peak population estimates for the Dogger Bank Teesside B project area were 1,965 birds in December (90% CIs = 1,582-2,628), 1,965 birds in December (90% CIs = 1,582-2,628), and 606 birds in December (90% CIs = 502-807) for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B project area in either year. The little auk breeds in the high Arctic and only occurs in the North Sea during the winter. Although there is no British population estimate for little auk, given the numbers estimated, this species is deemed to be of national importance in the Dogger Bank Teesside B project area. Consequently, the value of this receptor is assessed to be **high**.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.207 Taking 50% of the worst-case maximum annual estimates in winter months, when this species occurs, a total of 62 birds would be displaced during 2010 (using 90% confidence limits = 46-88), 53.7 during 2010/11 (using 90% confidence limits = 42-72) and 19.0 during 2011/12 (using 90% confidence limits = 15-27). The mean value was 41 (using 90% confidence limits = 31-57) displaced birds.

5.3.208 Using a national 1% threshold of 500 birds (in the absence of a national winter population estimate), much less than 0.1% of this population would be affected. Displacement would affect much less than 0.1% of the species' biogeographic population.

5.3.209 Less than 1% of reference populations at the national and biogeographic scale would be impacted by this effect. The effect of displacement for little auk for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at both the national and biogeographic scale.

Significance

5.3.210 This species has a **high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **negligible** at both national and biogeographic scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.211 The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.212 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for little auk is considered to be of **negligible**.

Export cable corridor

5.3.213 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.214 Based on worst case values for displacement, a total of 124 birds would be displaced during 2010 (using 90% confidence limits = 93-176), 107.4 during 2010/11 (using 90% confidence limits = 84-145) and 38 during 2011/12 (using 90% confidence limits = 30-53). The mean value was 81 (using 90% confidence limits = 62-113) displaced birds.

5.3.215 Using a national 1% threshold of 500 birds (in the absence of a national winter population estimate), much less than 1% of this population would be affected. Displacement would affect much less than 0.1% of the species' biogeographic population.

5.3.216 Less than 1% of reference populations at the national scale would be affected and less than 1% of reference populations at the biogeographic scale would be impacted by this effect. The effect of displacement for little auk for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at the national and biogeographic scale.

Significance

5.3.217 This species has a **high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **negligible** at both national and biogeographic scales.

*Collision*

Overall sensitivity to collision – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.218 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one little auk collision.

5.3.219 The little auk breeds in the high Arctic and only occurs in the North Sea during the winter. There are no national population estimates for this species for the winter. Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.3.220 The predicted number of collisions represents an increase in background mortality of less than 1% at the national and biogeographic population levels.

Significance

5.3.221 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for little auk for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently considered to be **negligible**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.222 For little auk, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.223 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for little auk is considered to be **negligible**.

***Atlantic puffin***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 3 | 25% displaced 5% mortality 2km buffer | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 6 | | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 684,000 | <0.1 | 88,160 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.3.224 The peak population estimates for the Dogger Bank Teesside B project area were 448 birds in December (90% CIs = 383-527), 608 birds in March (90% CIs = 543-698), and 170 birds in March (90% CIs = 145-205) for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B project area in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 16 SPAs.

5.3.225 Dogger Bank Teesside B is outside the foraging range of any protected site at which the species is a breeding feature.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.226 Based on 50% of the worst case values for displacement, analysis provided estimates of 51 (using 90% confidence limits = 41-64) displaced birds using 2010 data (6 during breeding months, 45 during other months of the year), 77 (using 90% confidence limits = 66-93) displaced birds using 2010/11 data (12 during breeding months, 66 during other months of the year), and 20 (using 90% confidence limits = 16-25) displaced birds using 2011/12 data (6 during breeding months, 14 during other months of the year). The mean value was 45 (using 90% confidence limits =

38-56) displaced birds (8 during breeding months, 38 during other months of the year).

5.3.227 Tables A9.29a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.3.228 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.3.229 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for Atlantic puffin for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at all scales.

Significance

5.3.230 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.231 For Atlantic puffin, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.232 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for Atlantic puffin is considered to be **minor adverse**.

Export cable corridor

5.3.233 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **minor adverse**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.234 Based on worst case values for displacement, analysis provided estimates of 103 (using 90% confidence limits = 83-128) displaced birds using 2010 data (12 during breeding months, 91 during other months of the year), 155 (using 90% confidence limits = 131-186) displaced birds using 2010/11 data (23 during breeding months, 131 during other months of the year), and 40 (using 90% confidence limits = 33-49) displaced birds using 2011/12 data (11 during breeding months, 29 during other months of the year). The mean value was 91 (using 90% confidence limits = 75-111) displaced birds (16 during breeding months, 75 during other months of the year).

5.3.235 Tables A9.30a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.3.236 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.3.237 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for Atlantic puffin for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at all scales.

Significance

5.3.238 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Collision*

Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.239 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one Atlantic puffin collision.

5.3.240 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.3.241 Dogger Bank Teesside B is outside the foraging range of any protected site at which the species is a breeding feature. Mean annual estimates of the number of collisions represent less than 0.1% of the populations of each of these sites. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.3.242 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British, breeding population.

5.3.243 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.3.244 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.3.245 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for Atlantic puffin for the Dogger Bank Teesside B project is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently the impact of this effect is considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.3.246 For Atlantic puffin, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside B Project area in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.3.247 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for Atlantic puffin is considered to be **minor adverse**.

***Migrants***

***Operation***

*Collision*

5.3.248 The migration zones (defined by Wright *et al.* 2012) of 45 species' populations of terrestrial or waterbird migrants that are UK SPA features overlap with the Dogger Bank Teesside B project during migration. Collision risk estimates suggest that, on an annual basis, the mortality associated with the Dogger Bank Teesside B project is likely to represent less than 1% of the reference population of each of these species (Table 5.12).

5.3.249 The effect of collision for migrants for the Dogger Bank Teesside B project is thus considered to be of **negligible magnitude** at the national level and **minor adverse** for 15 species' populations and **negligible** for 30 species' populations.

5.3.250 Due to the lack of knowledge concerning species' precise migration routes and their likely variability, no attempt was made to apportion impacts to individual protected sites, and thus it is unknown whether impacts may potentially be greater or less at any one particular site.

5.3.251 It should also be noted that for migrants there is much uncertainty in these calculations, and thus the assessment, both in regard to the determination of the numbers of birds passing through each project area and the proportions of these flying at heights which pose a risk of collision. Given these uncertainties, the confidence in predictions in the assessment of collision for migrants is considered to be very low.

**Table 5.12** Assessment of collision risk for migrants for the Dogger Bank Teesside B project. Estimated numbers of collisions are based on modelling of the numbers of birds predicted to pass through the wind farm project, a 98% avoidance rate, and expert judgement of the proportion of individuals likely to be flying at a height which places them at risk of collision. Three scenarios were run, using the lower, central and upper limits of the range of the proportion of birds at risk height, as described in Wright *et al.* (2012), with the central value used for the purposes of assessment. It is important to note that the values in brackets under "estimated annual collisions" simply represent the estimates using the lower and upper estimates of the proportion of birds at risk height, and do not represent any kind of measure of confidence in the collision estimates (which would have a far greater range).

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Bean goose *Anser fabalis* | 0.02 (0.003 - 0.05) | <0.1% | 4.87% | Very High | Low | High | Negligible | Negligible |
| Light-bellied Brent Goose (Svalbard population) *Branta bernicla hrota* | 0.003 (0.001 - 0.008) | <0.1% | 0.19% | Very High | High | Very High | Negligible | Minor adverse |
| Common shelduck *Tadorna tadorna* | 0.70 (0.005 - 2.79) | <0.1% | 3.80% | Very High | High | Very High | Negligible | Minor adverse |
| Eurasian wigeon *Anas penelope* | 3.95 (0.03 - 15.82) | <0.1% | 3.54% | Very High | Very Low | Medium | Negligible | Negligible |
| Gadwall *Anas strepera* | 0.07 (0.0005 - 0.27) | <0.1% | 2.25% | Very High | Very Low | Medium | Negligible | Negligible |
| Eurasian teal *Anas crecca* | 0.94 (0.01 - 3.75) | <0.1% | 3.55% | Very High | Very Low | Medium | Negligible | Negligible |
| Mallard *Anas platyrhynchos* | 2.88 (0.02 - 11.51) | <0.1% | 3.80% | Very High | Very Low | Medium | Negligible | Negligible |
| Northern pintail *Anas acuta* | 0.13 (0.001 - 0.50) | <0.1% | 3.55% | Very High | Very Low | Medium | Negligible | Negligible |
| Northern shoveler *Anas clypeata* | 0.08 (0.001 - 0.32) | <0.1% | 2.52% | Very High | Very Low | Medium | Negligible | Negligible |
| Common pochard *Aythya ferina* | 0.31 (0.002 - 1.26) | <0.1% | 2.52% | Very High | Very Low | Medium | Negligible | Negligible |
| Tufted Duck *Aythya fuligula* | 0.72 (0.005 - 2.86) | <0.1% | 3.51% | Very High | Very Low | Medium | Negligible | Negligible |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Greater scaup *Aythya marila* | 0.003 (0.00002 - 0.01) | <0.1% | 2.40% | Very High | Very Low | Medium | Negligible | Negligible |
| Common scoter *Melanitta nigra* | 0.03 (0.003 - 0.56) | <0.1% | 3.55% | Very High | Low | High | Negligible | Negligible |
| Velvet scoter *Melanitta fusca* | 0.02 (0.0001 - 0.09) | <0.1% | 4.17% | Very High | Low | High | Negligible | Negligible |
| Common goldeneye *Bucephala clangula* | 0.25 (0.002 - 0.98) | <0.1% | 3.80% | Very High | Low | High | Negligible | Negligible |
| Red-breasted merganser *Mergus serrator* | 0.001 (0.00001 - 0.01) | <0.1% | 2.20% | Very High | Medium | Very High | Negligible | Minor adverse |
| Goosander *Mergus merganser* (non-breeding) | 0.03 (0.0002 - 0.13) | <0.1% | 4.11% | Very High | Medium | Very High | Negligible | Minor adverse |
| Great bittern *Botaurus stellaris* | 0.01 (0.001 - 0.01) | <0.1% | 1.77% | Very High | Very Low | Medium | Negligible | Negligible |
| Great crested grebe *Podiceps cristatus* | 0.08 (0.01 - 0.34) | <0.1% | 2.30% | Very High | Medium | Very High | Negligible | Minor adverse |
| Slavonian grebe *Podiceps auritus* | 0.003 (0.0003 - 0.01) | <0.1% | 3.55% | Very High | Medium | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (breeding) | 0.0003 (0.0002 - 0.001) | <0.1% | 1.25% | Very High | Medium | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (non-breeding) | 0.01 (0.01 - 0.02) | <0.1% | 4.17% | Very High | Medium | Very High | Negligible | Minor adverse |
| Eurasian coot *Fulica atra* | 0.25 (0.02 - 0.47) | <0.1% | 0.66% | Very High | Very Low | Medium | Negligible | Negligible |
| Eurasian oystercatcher *Haematopus ostralegus* (non-breeding) | 1.34 (0.27 - 4.01) | <0.1% | 3.55% | Very High | High | Very High | Negligible | Minor adverse |
| Common ringed plover *Charadrius hiaticula* (non-breeding) | 0.23 (0.05 - 0.69) | <0.1% | 3.81% | Very High | Low | High | Negligible | Negligible |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Golden plover *Pluvialis apricaria* (non-breeding) | 1.78 (0.36 - 5.35) | <0.1% | 2.53% | Very High | Very Low | Medium | Negligible | Negligible |
| Grey plover *Pluvialis squatarola* | 0.66 (0.13 - 1.97) | <0.1% | 3.76% | Very High | High | Very High | Negligible | Minor adverse |
| Northern lapwing *Vanellus vanellus* | 6.07 (1.21 - 18.22) | <0.1% | 3.76% | Very High | Very Low | Medium | Negligible | Negligible |
| Red knot *Calidris canutus* | 2.03 (0.41 - 6.09) | <0.1% | 3.51% | Very High | Medium | Very High | Negligible | Minor adverse |
| Sanderling *Calidris alba* | 0.52 (0.1 - 1.56) | <0.1% | 3.51% | Very High | Medium | Very High | Negligible | Minor adverse |
| Dunlin *Calidris alpina schinzii (passage)* | 0.04 (0.01 - 0.13) | <0.1% | 3.58% | Very High | Very Low | Medium | Negligible | Negligible |
| Dunlin *Calidris alpina alpina* (passage & winter) | 3.80 (0.76 - 11.40) | <0.1% | 2.67% | Very High | Very Low | Medium | Negligible | Negligible |
| Ruff *Philomachus pugnax* | 0.03 (0.01 - 0.10) | <0.1% | 3.92% | Very High | Very Low | Medium | Negligible | Negligible |
| Common snipe *Gallinago gallinago* | 5.98 (1.20 - 17.93) | <0.1% | 3.52% | Very High | Very Low | Medium | Negligible | Negligible |
| Black-tailed godwit *Limosa limosa islandica* | 0.03 (0.01 - 0.09) | <0.1% | 2.95% | Very High | Very High | Very High | Negligible | Minor adverse |
| Bar-tailed godwit *Limosa lapponica* | 0.80 (0.16 - 2.40) | <0.1% | 4.01% | Very High | Very Low | Medium | Negligible | Negligible |
| Whimbrel *Numenius phaeopus* | 0.14 (0.03 - 0.43) | <0.1% | 3.31% | Very High | High | Very High | Negligible | Minor adverse |
| Eurasian curlew *Numenius arquata* (non-breeding) | 1.09 (0.22 - 3.26) | <0.1% | 3.32% | Very High | Very Low | Medium | Negligible | Negligible |
| Greenshank *Tringa nebularia* | 0.0002 (0.00005 - 0.001) | <0.1% | 2.38% | Very High | Very Low | Medium | Negligible | Negligible |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Common redshank *Tringa totanus britannica* (breeding) | 0.03 (0.01 - 0.10) | <0.1% | 3.30% | Very High | Very Low | Medium | Negligible | Negligible |
| Common redshank Icelandic population *Tringa totanus robusta* (non-breeding) | 1.45 (0.29 - 4.35) | <0.1% | 3.04% | Very High | Very Low | Medium | Negligible | Negligible |
| Common redshank mainland Europe population *Tringa totanus* (non-breeding) | 0.36 (0.07 - 1.07) | <0.1% | 4.12% | Very High | Very Low | Medium | Negligible | Negligible |
| Ruddy turnstone *Arenaria interpres* | 0.29 (0.06 - 0.86) | <0.1% | 3.55% | Very High | High | Very High | Negligible | Minor adverse |
| Short-eared owl *Asio flammeus* | 0.01 (0.002 - 0.02) | <0.1% | 3.67% | Very High | Very Low | Medium | Negligible | Negligible |
| European nightjar *Caprimulgus europaeus* | 0.01 (0.002 - 0.02) | <0.1% | 1.27% | Very High | Very Low | Medium | Negligible | Negligible |

[1] The reference population size is defined as the total number of individuals of each species in the population that uses the migration route that encompasses the Dogger Bank. For further details and derivation see Table 4.18.

[2] The migration zone referred to here is the North Sea migration area appropriate to assessment for the Dogger Bank, and not the entire migration zone used by the species around the whole of the UK. The percentage given can be roughly interpreted as the percentage of birds migrating across the North Sea that would cross the wind farm footprint during a single migration period (note for most species there are 2 migrations per year crossing the North Sea). For further details see the SOSS migration modelling tool guidance (Wright *et al*. 2012).

*Barrier effects*

5.3.252 An assessment of the potential barrier effects posed by the Dogger Bank Teesside B project to the 45 species' populations of terrestrial or waterbird migrants that are UK SPA features whose migration zones (defined by Wright *et al.* 2012) overlap with the project area is provided in Table 5.13 below.

5.3.253 The percentages of reference populations estimated to pass through the project area at risk height (following Wright *et al.* 2012), and thus exposed to potential barrier effects were less than 1% for most species considered, but greater than 1% for bean goose, hen harrier, bar-tailed godwit and common redshank (from the mainland Europe population – *totanus* race). The estimates of numbers passing through the project area greatly exceed the numbers recorded by boat surveys, though it should be noted that boat surveys were not designed to record migrants and as they only provide a (diurnal) snapshot of birds flying close to the sea, they will inevitably greatly underestimate overall numbers of migrants.

5.3.254 The increase in flight distance due to the barrier presented by Dogger Bank Teesside B varies by direction of flight, although for the shortest approximately east-west route across the North Sea passing through the project, equates to a maximum of approximately 20km (an increase of just 3% on the ca. 575km route).

5.3.255 Considering both the numbers of birds exposed to this effect and the relative increase in flight distance due to the barrier presented by Dogger Bank Teesside B, this impact is considered to be of **negligible magnitude** for all species' populations.

5.3.256 It should be noted that there is considerable uncertainty regarding the assessment of barrier effects posed by offshore wind farms. For migrants, there is great uncertainty in the determination of the numbers of birds passing through each project area. There is little evidence to suggest whether or not migration may be concentrated within corridors within overall migration zones (Wright *et al.* 2012) and it cannot be assumed that birds fly directly to or from the protected sites that they are features of. It is also assumed that the wind farm poses a barrier effect to 100% of birds attempting to fly through at risk height (Maclean *et al.* 2009) which may be over-precautionary. In particular, there is considerable uncertainty as to the actual consequences for survival, and thus for population-level impacts, from the increase in energy expenditure associated with the increases in flight distance for those birds exposed to barrier effects. Given these uncertainties, the confidence in predictions in the assessment of barrier effects is considered to be very low and considerable caution is urged in considering the outcomes of this assessment.

**Table 5.13** Assessment of barrier effects for migrants for the Dogger Bank Teesside B project.

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Bean goose *Anser fabalis* | 0 | 1 | 11 | 1.46% | Very High | Negligible | Minor adverse |
| Light-bellied Brent Goose (Svalbard population) *Branta bernicla hrota* | 0 | 4 | 2 | 0.06% | Very High | Negligible | Minor adverse |
| Common shelduck *Tadorna tadorna* | 0 | 0 | 431 | 0.57% | Very High | Negligible | Minor adverse |
| Eurasian wigeon *Anas penelope* | 0 | 8 | 2635 | 0.50% | Very High | Negligible | Minor adverse |
| Gadwall *Anas strepera* | 0 | 0 | 45 | 0.20% | Very High | Negligible | Minor adverse |
| Eurasian teal *Anas crecca* | 0 | 1 | 665 | 0.27% | Very High | Negligible | Minor adverse |
| Mallard *Anas platyrhynchos* | 2 | 3 | 1833 | 0.40% | Very High | Negligible | Minor adverse |
| Northern pintail *Anas acuta* | 2 | 1 | 81 | 0.27% | Very High | Negligible | Minor adverse |
| Northern shoveler *Anas clypeata* | 0 | 0 | 54 | 0.28% | Very High | Negligible | Minor adverse |
| Common pochard *Aythya ferina* | 0 | 3 | 212 | 0.28% | Very High | Negligible | Minor adverse |
| Tufted duck *Aythya fuligula* | 2 | 0 | 488 | 0.47% | Very High | Negligible | Minor adverse |
| Greater scaup *Aythya marila* | 0 | 0 | 2 | 0.02% | Very High | Negligible | Minor adverse |
| Common scoter *Melanitta nigra* | 113 | 191 | 22 | 0.02% | Very High | Negligible | Minor adverse |
| Velvet scoter *Melanitta fusca* | 4 | 9 | 14 | 0.56% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Common goldeneye *Bucephala clangula* | 2 | 0 | 166 | 0.57% | Very High | Negligible | Minor adverse |
| Red-breasted merganser *Mergus serrator* | 0 | 0 | 1 | 0.03% | Very High | Negligible | Minor adverse |
| Goosander *Mergus merganser* (non-breeding) | 5 | 0 | 20 | 0.62% | Very High | Negligible | Minor adverse |
| Great bittern *Botaurus stellaris* | 0 | 0 | 2 | 0.62% | Very High | Negligible | Minor adverse |
| Great crested grebe *Podiceps cristatus* | 0 | 0 | 56 | 0.23% | Very High | Negligible | Minor adverse |
| Slavonian grebe *Podiceps auritus* | 0 | 0 | 2 | 0.18% | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (breeding) | 0 | 0 | <1 | 0.06% | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (non-breeding) | 0 | 0 | 6 | 1.67% | Very High | Negligible | Minor adverse |
| Eurasian coot *Fulica atra* | 0 | 0 | 174 | 0.17% | Very High | Negligible | Minor adverse |
| Eurasian oystercatcher *Haematopus ostralegus* (non-breeding) | 2 | 8 | 888 | 0.44% | Very High | Negligible | Minor adverse |
| Common ringed plover *Charadrius hiaticula* (non-breeding) | 4 | 4 | 347 | 0.48% | Very High | Negligible | Minor adverse |
| Golden plover *Pluvialis apricaria* (non-breeding) | 0 | 5 | 1267 | 0.32% | Very High | Negligible | Minor adverse |
| Grey plover *Pluvialis squatarola* | 0 | 0 | 464 | 0.94% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Northern lapwing *Vanellus vanellus* | 0 | 19 | 4225 | 0.94% | Very High | Negligible | Minor adverse |
| Red knot *Calidris canutus* | 3 | 15 | 1489 | 0.44% | Very High | Negligible | Minor adverse |
| Sanderling *Calidris alba* | 6 | 0 | 395 | 0.66% | Very High | Negligible | Minor adverse |
| Dunlin *Calidris alpina schinzii (passage)* | 16 | 18 | 33 | 0.90% | Very High | Negligible | Minor adverse |
| Dunlin *Calidris alpina alpina* (passage & winter) | 16 | 18 | 2926 | 0.67% | Very High | Negligible | Minor adverse |
| Ruff *Philomachus pugnax* | 0 | 3 | 24 | 0.98% | Very High | Negligible | Minor adverse |
| Common snipe *Gallinago gallinago* | 1 | 0 | 4403 | 0.44% | Very High | Negligible | Minor adverse |
| Black-tailed godwit *Limosa limosa islandica* | 0 | 0 | 41 | 0.74% | Very High | Negligible | Minor adverse |
| Bar-tailed godwit *Limosa lapponica* | 0 | 0 | 544 | 1.00% | Very High | Negligible | Minor adverse |
| Whimbrel *Numenius phaeopus* | 6 | 27 | 95 | 0.41% | Very High | Negligible | Minor adverse |
| Eurasian curlew *Numenius arquata* (non-breeding) | 51 | 4 | 679 | 0.83% | Very High | Negligible | Minor adverse |
| Greenshank *Tringa nebularia* | 0 | 1 | <1 | 0.06% | Very High | Negligible | Minor adverse |
| Common redshank *Tringa totanus britannica* (breeding) | 0 | 0 | 25 | 0.08% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Common redshank Icelandic population *Tringa totanus robusta* (non-breeding) | 0 | 0 | 1043 | 0.38% | Very High | Negligible | Minor adverse |
| Common redshank mainland Europe population *Tringa totanus* (non-breeding) | 0 | 0 | 257 | 1.03% | Very High | Negligible | Minor adverse |
| Ruddy turnstone *Arenaria interpres* | 7 | 12 | 213 | 0.44% | Very High | Negligible | Minor adverse |
| Short-eared owl *Asio flammeus* | 2 | 23 | 7 | 0.64% | Very High | Negligible | Minor adverse |
| European Nightjar *Caprimulgus europaeus* | 0 | 0 | 7 | 0.06% | Very High | Negligible | Minor adverse |

[1] Across Dogger Bank Zone as a whole (see section 3).

[2] The estimated number of individuals of each species crossing the project is the number that would pass through at risk height (using the best estimate of the proportion of migrating birds at risk height from Wright *et al*. 2012 and not accounting for uncertainty) during a single migration season. Note that for most species, two migrations per year would be expected, and different individual birds may be involved during spring and autumn passage.

[3] The reference population size is defined as the total number of individuals of each species in the population that uses the migration route that encompasses the Dogger Bank. For further details and derivation see Table 4.18.

[4] Magnitude is assessed here according to Table 4.1.

***Summary for all receptors***

5.3.257 Table 5.14 below provides a summary of impacts from each effect for all key marine bird receptors.

**Table 5.14** Summary of potential impacts from the Dogger Bank Teesside B project for key marine bird receptors.

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| White-billed diver | Displacement (construction/decommissioning) | National | Medium | - | - | Negligible | Negligible | Low |
| | | Biogeographic | Medium | - | - | Negligible | Negligible | Low |
| | Habitat loss or change (construction/decommissioning) | All | Medium | High | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Medium | High | High | Negligible | Negligible | Very Low |
| | Displacement (operation) | National | Medium | - | - | Negligible | Negligible | Low |
| | | Biogeographic | Medium | - | - | Negligible | Negligible | Low |
| | Collision (operation) | National | Medium | High | High | Negligible | Negligible | Medium |
| | | Biogeographic | Medium | High | High | Negligible | Negligible | Medium |
| | Habitat loss/change (operation) | All | Medium | High | High | Negligible | Negligible | Very Low |
| Northern fulmar | Habitat loss or change (construction/decommissioning) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss/change (operation) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| Northern gannet | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | (construction/decommissioning) | | | | | | | |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss/change (operation) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| Arctic skua | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Collision (operation) | Site suite | Very High | High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Great skua | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Collision (operation) | Site suite | Very High | High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | High | Very High | Negligible | Minor adverse | Medium |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | | Biogeographic | Very High | High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Black-legged kittiwake | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Lesser black-backed gull | Habitat loss or change (construction/decommissioning) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Collision (operation) | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| Great black-backed gull | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Collision (operation) | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Common guillemot | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| Razorbill | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | (construction/decommissioning) | | | | | | | |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| Little auk | Displacement (construction/decommissioning) | National | High | - | - | Negligible | Negligible | Low |
| | | Biogeographic | High | - | - | Negligible | Negligible | Low |
| | Habitat loss or change (construction/decommissioning) | All | High | Low | Medium | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | High | Low | Medium | Negligible | Negligible | Very Low |
| | Displacement (operation) | National | High | - | - | Negligible | Negligible | Low |
| | | Biogeographic | High | - | - | Negligible | Negligible | Low |
| | Collision (operation) | National | High | Medium | High | Negligible | Negligible | Medium |
| | | Biogeographic | High | Medium | High | Negligible | Negligible | Medium |
| | Habitat loss or change (operation) | All | High | Low | Medium | Negligible | Negligible | Very Low |
| Atlantic puffin | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |

## 5.4 Dogger Bank Teesside A and B Offshore Ornithology Impact

**Disturbance/displacement**

5.4.1 The numbers of birds predicted to be displaced from the Dogger Bank Teesside A and B project areas and buffers during construction/decommissioning and operation, under chosen displacement rates, are shown in Table 5.15 and are also discussed at the start of each species' account. The values presented incorporate the correction factors for birds underwater (see section 4), but do not represent final magnitude, taking into account mortality rates. Tabulated summaries for each species of the numbers of birds estimated to be displaced that are then estimated to die based on a full range of alternative displacement and mortality rates from 0 to 100% are provided in Appendix 10.

5.4.2 Results of the apportioning of disturbance/displacement impacts to protected sites, incorporating mortality, are shown in Appendix 9. These tables also correct for the initial assumption that all birds come from the protected sites identified (see section 4).

5.4.3 Table 5.15 also provides separate estimates of the numbers of birds predicted to be displaced in respective breeding and winter periods. Birds predicted to be impacted during the breeding season will potentially include both breeders from any breeding colonies that the project is within range of, and also a non-breeding component. For gulls and northern gannet, it was possible to derive estimates of proportion of breeders from boat-survey observations of birds in breeding and juvenile plumages. For other species, it is assumed that, for species for which the wind farm project is within foraging range of birds from breeding colony protected sites, one third of the total number of birds (Stroud *et al.* 2004; Kober *et al.* 2010) present during the breeding season will be non-breeders. These are apportioned to protected sites surrounding the North Sea in the same manner as for seabirds outwith the breeding season (see section 4).

**Table 5.15** Numbers of birds displaced during construction / decommissioning and operation for the Dogger Bank Teesside A and B projects during 2010, 2010/11 and 2011/12; mean values are subsequently combined with species specific mortality rates to assess the impact of displacement (see section 4). Full matrices of displacement and mortality are given in Appendix 10 for this and other projects.

| | | **Construction / decommissioning** | | | |
|---|---|---|---|---|---|
| **Species** | **Season** | **2010** | **2010/2011** | **2011/2012** | **Mean** |
| Northern gannet | Breeding | 37 (31-44) | 75 (64-88) | 244 (208-290) | 128 (109-152) |
| | Winter | 67 (57-81) | 215 (182-255) | 372 (309-447) | 227 (190-271) |
| | All | 104 (89-124) | 289 (246-344) | 616 (517-737) | 355 (299-423) |
| Common guillemot | Breeding | 315 (291-346) | 609 (563-663) | 710 (649-789) | 554 (510-610) |
| | Winter | 2361 (2177-2558) | 2851 (2642-3077) | 1832 (1681-1978) | 2201 (2031-2379) |
| | All | 2676 (2469-2904) | 3460 (3205-3741) | 2542 (2330-2768) | 2755 (2541-2989) |
| Razorbill | Breeding | 34 (27-42) | 77 (63-92) | 169 (134-208) | 93 (75-114) |
| | Winter | 892 (786-1002) | 1048 (927-1178) | 681 (595-778) | 809 (712-914) |
| | All | 926 (814-1044) | 1125 (990-1270) | 851 (730-985) | 902 (787-1027) |
| Little auk | Winter | 113 (84-158) | 107 (84-144) | 38 (30-53) | 78 (60-108) |
| Atlantic puffin | Breeding | 11 (8-13) | 21 (18-25) | 10 (8-13) | 14 (11-17) |
| | Winter | 81 (65-100) | 124 (105-149) | 27 (22-33) | 70 (58-85) |
| | All | 91 (73-113) | 145 (122-174) | 37 (30-45) | 84 (69-102) |
| | | **Operation** | | | |
| **Species** | **Season** | **2010** | **2010/2011** | **2011/2012** | **Mean** |
| Northern gannet | Breeding | 73 (63-87) | 149 (128-177) | 488 (416-580) | 256 (219-303) |
| | Winter | 135 (115-161) | 429 (364-510) | 745 (618-894) | 454 (380-543) |
| | All | 208 (178-248) | 579 (493-687) | 1233 (1034-1474) | 709 (599-846) |
| Common guillemot | Breeding | 630 (583-692) | 1218 (1126-1327) | 1420 (1298-1578) | 1108 (1020-1219) |
| | Winter | 4721 (4354-5117) | 5702 (5284-6155) | 3664 (3362-3957) | 4403 (4062-4759) |
| | All | 5351 (4937-5809) | 6921 (6410-7482) | 5084 (4659-5535) | 5511 (5082-5978) |
| Razorbill | Breeding | 68 (54-83) | 154 (126-185) | 338 (269-416) | 186 (149-227) |
| | Winter | 1783 (1573-2004) | 2096 (1854-2355) | 1363 (1191-1555) | 1618 (1425-1827) |
| | All | 1852 (1627-2088) | 2250 (1980-2540) | 1701 (1459-1971) | 1804 (1574-2054) |
| Little auk | Winter | 225 (169-316) | 214 (168-289) | 76 (59-106) | 156 (119-216) |
| Atlantic puffin | Breeding | 21 (17-26) | 42 (35-50) | 20 (17-26) | 28 (23-34) |
| | Winter | 162 (130-201) | 248 (210-298) | 53 (43-65) | 140 (116-170) |
| | All | 183 (147-227) | 290 (245-348) | 74 (60-91) | 168 (139-204) |

**Barrier effects – Marine Birds**

5.4.4 Numbers of key species in flight potentially exposed to barrier effects for the Dogger Bank Teesside A and B project is shown in Table 5.16.

**Table 5.16** Estimates of the numbers of breeding adult birds of these species in flight in the Dogger Bank Teesside A and B project area using the mean of 2010 and 2010/2011 and 2011/12 data.

| Species | Breeding season | Mean |
|---|---|---|
| Northern fulmar | Mar-Sep | 152 (123-182) |
| Northern gannet | Apr-Sep | 151 (128-180) |
| Black-legged kittiwake | Apr-Sep | 866 (773-961) |
| Common guillemot | May-Jul | 169 (156-186) |
| Razorbill | May-Jul | 54 (43-66) |

**Collision – Marine Birds**

5.4.5 An overview of the combined results of collision risk analyses for marine birds for the Dogger Bank Teesside A and B projects is provided below.

5.4.6 There were strong between year differences in both the total numbers of birds present within Dogger Bank Teesside A and B, and annual patterns in their abundance. With only three years of data, it was not possible to determine which year was most representative of bird abundance within Dogger Bank Teesside A and B. For these reasons, collision risk estimates were produced for each year separately, rather than for a mean value from the three years.

5.4.7 Using a realistic, precautionary avoidance rate of 98% (SNH 2010, Cook *et al.* 2012), the numbers of Arctic skua, common guillemot, little auk and Atlantic puffin colliding with wind turbines, based on population estimates from 2010 to 2012, were predicted to be less than one bird per year. Even assuming a more conservative avoidance rate of 95%, the numbers of Arctic skua, common guillemot, little auk and Atlantic puffin predicted to collide with wind turbines were less than one bird per year. Northern fulmar, great skua and razorbill had a similarly low collision risk, with just two northern fulmar, and a maximum of three razorbill and one great skua predicted to collide annually.

5.4.8 The numbers of lesser black-backed gull and great black-backed gull predicted to collide with wind turbines were greater. The collision rates were highest based on the 2010 population estimates for the lesser black-backed gull with 50 birds. For great black-backed gull, the highest collision estimates, of 66 birds, came from the 2010/11 population estimate.

5.4.9 Estimates were greatest for black-legged kittiwake and northern gannet. The maximum collision estimate for black-legged kittiwake was 161 birds based on the 2011/12 population. For northern gannet the maximum collision estimate was 120

birds, also based on the 2011/12 population estimate and assuming a 99% avoidance rate.

5.4.10 Collision estimates were greatest for northern gannet, black-legged kittiwake and lesser black-backed gulls during the breeding season. Collision estimates were greater for great black-backed gull during the non-breeding season (Table 5.18).

**Table 5.17** Annual collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A and B projects of the Dogger Bank Zone, assuming a worst case scenario of 400 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m in response to different avoidance rates. Estimates generated using option 3 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | | | July 2010 – June 2011 | | | | July 2011 – June 2012 | | | | Mean | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 95% | 98% | 99% | 99.5% | 95% | 98% | 99% | 99.5% | 95% | 98% | 99% | 99.5% | 0.95 | 0.98 | 0.99 | 0.995 |
| Northern fulmar | 4 (3 - 5) | 1 (1 - 2) | 1 (1 - 1) | 0 (0 - 0) | 3 (2 - 3) | 1 (1 - 1) | 1 (0 - 1) | 0 (0 - 0) | 4 (3 - 5) | 2 (1 - 2) | 1 (1 - 1) | 0 (0 - 1) | 3 (3-4) | 1 (1-2) | 1 (1-1) | 0 (0-0) |
| Northern gannet | 130 (106 - 154) | 52 (42 - 61) | 26 (21 - 31) | 13 (11 - 15) | 242 (181 - 259) | 97 (72 - 104) | 48 (36 - 52) | 24 (18 - 26) | 600 (492 - 710) | 240 (197 - 284) | 120 (98 - 142) | 60 (49 - 71) | 339 (278-401) | 136 (111-160) | 68 (56-80) | 34 (28-40) |
| Arctic Skua | 0 (0 - 1255) | 0 (0 - 502) | 0 (0 - 251) | 0 (0 - 126) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 146) | 0 (0 - 58) | 0 (0 - 29) | 0 (0 - 15) | 0 (0-467) | 0 (0-187) | 0 (0-93) | 0 (0-47) |
| Great Skua | 1 (0 - 2) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 2 (1 - 4) | 1 (1 - 2) | 0 (0 - 1) | 0 (0 - 0) | 1 (1-3) | 1 (0-1) | 0 (0-1) | 0 (0-0) |
| Black-legged kittiwake | 226 (203 - 254) | 90 (81 - 102) | 45 (41 - 51) | 23 (20 - 25) | 474 (353 - 444) | 190 (141 - 178) | 95 (71 - 89) | 47 (35 - 44) | 403 (356 - 459) | 161 (143 - 184) | 81 (71 - 92) | 40 (36 - 46) | 335 (298-379) | 134 (119-152) | 67 (60-76) | 34 (30-38) |
| Lesser black-backed gull | 124 (84 - 189) | 50 (33 - 76) | 25 (17 - 38) | 12 (8 - 19) | 75 (47 - 122) | 30 (19 - 49) | 15 (9 - 24) | 8 (5 - 12) | 51 (28 - 91) | 20 (11 - 36) | 10 (6 - 18) | 5 (3 - 9) | 82 (52-132) | 33 (21-53) | 16 (10-26) | 8 (5-13) |
| Great black-backed gull | 150 (108 - 216) | 60 (43 - 86) | 30 (22 - 43) | 15 (11 - 22) | 168 (120 - 238) | 67 (48 - 95) | 34 (24 - 48) | 17 (12 - 24) | 135 (86 - 208) | 54 (34 - 83) | 27 (17 - 42) | 13 (9 - 21) | 146 (101-214) | 58 (40-85) | 29 (20-43) | 15 (10-21) |
| Common guillemot | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Razorbill | 3 (2 - 6) | 1 (1 - 2) | 1 (0 - 1) | 0 (0 - 1) | 9 (5 - 14) | 4 (2 - 5) | 2 (1 - 3) | 1 (0 - 1) | 7 (4 - 11) | 3 (2 - 4) | 1 (1 - 2) | 1 (0 - 1) | 6 (4-10) | 2 (1-4) | 1 (1-2) | 1 (0-1) |
| Little auk | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Atlantic puffin | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Table 5.18** Seasonal collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A and B projects of the Dogger Bank Zone, assuming a worst case scenario of 400 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m and an avoidance rate of 98 % (99% for northern gannet). Estimates generated using option 3 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | July 2010 – June 2011 | | July 2011 – June 2012 | | Mean | |
|---|---|---|---|---|---|---|---|---|
| | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding |
| Northern fulmar | 2 (0 - 2) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 2 (0 - 2) | 0 (0 - 0) | 1 (1-1) | 0 (0-1) |
| Northern gannet | 13 (11 - 15) | 13 (10 - 15) | 17 (13 - 19) | 27 (23 - 32) | 65 (53 - 76) | 55 (46 - 65) | 34 (28-40) | 34 (28-40) |
| Arctic Skua | 0 (0 - 0) | 0 (0 - 502) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 58) | 0 (0 - 0) | 0 (0-19) | 0 (0-168) |
| Great Skua | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-1) | 0 (0-1) |
| Black-legged kittiwake | 37 (33 - 42) | 53 (48 - 60) | 106 (95 - 119) | 52 (46 - 59) | 114 (100 - 130) | 47 (42 - 54) | 87 (77-98) | 48 (42-54) |
| Lesser black-backed gull | 36 (25 - 52) | 13 (8 - 24) | 18 (11 - 28) | 12 (7 - 22) | 10 (5 - 17) | 11 (6 - 19) | 20 (13-31) | 12 (7-22) |
| Great black-backed gull | 14 (9 - 20) | 47 (34 - 66) | 17 (12 - 25) | 50 (36 - 70) | 21 (12 - 35) | 33 (22 - 48) | 17 (11-27) | 41 (29-59) |
| Common guillemot | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |
| Razorbill | 0 (0 - 0) | 2 (0 - 2) | 0 (0 - 0) | 3 (2 - 5) | 0 (0 - 0) | 2 (2 - 4) | 0 (0-0) | 2 (1-3) |
| Little auk | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |
| Atlantic puffin | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |

## Evaluation for Ornithological Receptors

### *White-billed diver*

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 2 | 100% displaced 37.5% mortality 4km buffer | 10,000 | <0.1 | 5,000[3] | 0.01 | 0 | Negligible |
| Displacement (o) | 4 | | 10,000 | <0.1 | 5,000[3] | 0.02 | 0 | Negligible |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 10,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – background adult mortality | <1 | | 1,066 | <0.1 | 533 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

[3] Assumption of 50 birds used as a national threshold (see section 4).

#### *Summary of population estimates and value*

5.4.11 Numbers in the Dogger Bank Zone as a whole surpassed 1% thresholds for populations of national and international importance. White-billed divers were present in the Dogger Bank Zone between November and April when an average of 15 birds was estimated to occur in the Dogger Bank Teesside A and B project areas. The population of this species in the Dogger Bank Teesside A and B project areas was assessed to be of regional importance and consequently the value of this receptor is assessed to be **medium**.

#### *Construction and Decommissioning*

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.12 A full displacement analysis was not undertaken due to the low numbers predicted for the Dogger Bank Teesside A and B project areas (a monthly average of just seven birds was estimated between November and April), of which two birds would be predicted to be lost through mortality.

5.4.13 Consequently, following the method and assumptions presented for Dogger Bank Teesside A, the effect of displacement for white-billed diver is considered to be of **negligible magnitude** at the national and biogeographic scales.

Significance

5.4.14 This species has a **medium value**. Combining the species' magnitude with value, the impact of this effect for white-billed diver is considered to be **negligible** at both national and biogeographic scales.

*Direct habitat loss or change*

Wind farm and export cable corridor

5.4.15 The impact of habitat loss for both the wind farm area and cable corridors for Dogger Bank Teesside A and B combined is as assessed for Dogger Bank Teesside A – **negligible.**

***Operation***

*Disturbance/displacement*

5.4.16 A full displacement analysis was not undertaken due to the low numbers predicted for the Dogger Bank Teesside A and B project areas (a monthly average of just 15 birds was estimated between November and April), of which four birds would be predicted to be lost through mortality.

5.4.17 Consequently, following the method and assumptions presented for Dogger Bank Teesside A, the effect of displacement for white-billed diver is considered to be of **negligible magnitude** at the national and biogeographic scales.

Significance

5.4.18 This species has a **medium value**. Combining the species' magnitude with value, the impact of this effect for white-billed diver is considered to be **negligible** at both national and biogeographic scales.

*Collision*

Species Overall sensitivity to collision – High (see section 5.2)

5.4.19 The effect of collision for white-billed diver for Dogger Bank Teesside A and B is considered to be **negligible** following the assessment methodology and justification presented for Dogger Bank Teesside A.

*Direct habitat loss or change*

5.4.20 Following the methodology and justification presented in section 5.2, the impact of habitat loss for white-billed diver in Dogger Bank Teesside A and B is as assessed for Dogger Bank Teesside A – **negligible.**

***Northern fulmar***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 2 | 98% avoidance Flight height option 3 | 10,200,000 | <0.1 | 1,500,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 190,400 | <0.1 | 28,000 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.4.21 The peak population estimates for the Dogger Bank Teesside A and B project area in 2010, 2010/2011 and 2011/12 were 1,110 birds (90% CIs = 926-1,316) in May, 522 birds (90% CIs = 417-630) in July, and 481 birds (90% CIs = 384-574) in May, respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project area in either year.

5.4.22 The value of this receptor is assessed as **very high** as the species is a breeding feature of 26 SPAs and a wintering feature of two SPAs in the Greater North Sea OSPAR region. Dogger Bank Teesside A and B is within foraging range of eight protected breeding sites in Great Britain, and is within foraging range of nine protected breeding sites around the North Sea at which the species is a feature.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.23 The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.24 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern fulmar is considered to be **negligible**.

Export cable corridor

5.4.25 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Barrier effects*

Magnitude

5.4.26 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 182 adult northern fulmars in flight in the projects areas in the breeding season using 2010, 2010/11 and 2011/12 data (Table 5.18).

5.4.27 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.31 (Appendix 9) which indicates that over 5% of the population at the Flamborough Head and Bempton Cliffs SPA and between 1 and 5% of the populations at the Weybourne Cliffs SSSI, the Hunstanton Cliffs SSSI, the North Berwick Coast SSSI and the Forth Islands SPA might be potentially exposed to this effect.

5.4.28 The potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009) and in this case, due to the positions and separation of the projects, the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B is unlikely to be more than the greater presented by the two wind farm projects on their own. The average increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B is thus approximately 25km (6.25% of the species' maximum foraging range of 400km). The projects are between 164km and 388km from the protected sites within foraging range that would be potentially impacted by this effect (Appendix 1). This increase might prevent birds from one site – the Troup, Pennan and Lions Heads SPA – from reaching foraging areas beyond the project areas.

5.4.29 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.4.30 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside A and B projects for northern fulmar is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.31 The Band collision risk model (Band *et al.* 2012) provided mean estimates of just one northern fulmar collision per year.

5.4.32 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.4.33 Mean annual estimates of the number of collisions represent less than 0.1% of the populations of the eight sites in foraging range around the North Sea. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.4.34 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British breeding population.

5.4.35 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.4.36 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.4.37 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for northern fulmar for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.38 For northern fulmar, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species' diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.39 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern fulmar is considered to be **negligible**.

***Northern gannet***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 0 | 75% displaced 0% mortality 2km buffer | 967,000 | 0 | 660,000 | 0 | 0 | Minor adverse |
| Displacement (o) | 0 | | 967,000 | 0 | 660,000 | 0 | 0 | Minor adverse |
| Collision – population | 80 | 99% avoidance Flight height option 3 | 967,000 | <0.1 | 660,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | 61 | | 52,218 | <0.1 | 35,640 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.4.40 The peak population estimates for the Dogger Bank Teesside A and B project areas in 2010, 2010/11 and 2011/12 were 264 birds (90% CIs =226-312) in October, 1,805 birds (90% CIs = 1,532-2,131) in March, and 3,054 birds (90% CIs = 2,542-3,650) in March respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of nine SPAs, a wintering feature of five SPAs and a passage feature of five SPAs.

5.4.41 The Dogger Bank Teesside A and B projects are within foraging range of three protected breeding sites around the North Sea at which the species is a feature – the Seevogelschutzgebiet Helgoland, Forth Islands and Flamborough Head and Bempton Cliffs, and is therefore within foraging range during the breeding season of two protected breeding sites in the UK at which the species is a feature. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Very Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.42 Based on 50% of the worst case values for displacement, analysis provided estimates of 104 (using 90% confidence limits = 89-124) displaced birds using 2010 data (37 during breeding months, 67 during other months of the year), 289 (using 90% confidence limits = 246-344) displaced birds using 2010/11 data (75 during breeding

months, 215 during other months of the year), and 616 (using 90% confidence limits = 517-737) displaced birds using 2011/12 data (244 during breeding months, 372 during other months of the year). The mean value was 355 (using 90% confidence limits = 299-423) displaced birds (128 during breeding months, 227 during other months of the year). However, for this species at the project level, mortality from displacement is considered as zero (see section 4), therefore the effect of displacement for northern gannet for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at all scales.

Significance

5.4.43 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.44 For northern gannet, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Therefore, we consider the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

5.4.45 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern gannet is considered to be **negligible**.

Export cable corridor

5.4.46 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Disturbance/displacement*

Sensitivity to habitat loss – Very Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.47 Based on worst case values for displacement, analysis provided estimates of 208 (using 90% confidence limits = 178-248) displaced birds using 2010 data (73 during

breeding months, 135 during other months of the year), 579 (using 90% confidence limits = 493-687) displaced birds using 2010/11 data (149 during breeding months, 429 during other months of the year), and 1233 (using 90% confidence limits = 1034-1474) displaced birds using 2011/12 data (488 during breeding months, 745 during other months of the year). The mean value was 709 (using 90% confidence limits = 599-846) displaced birds (256 during breeding months, 454 during other months of the year). However, for this species at the project level, mortality from displacement is considered as zero (see section 4), therefore the effect of displacement for northern gannet for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at all scales.

Significance

5.4.48 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.49 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a maxima of 180 adult northern gannets in flight in the projects areas in the breeding season using 2010, 2010/11 and 2011/12 data (Table 5.18).

5.4.50 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Appendix 9 (Table A9.32) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

5.4.51 The potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009) and in this case, due to the positions and separation of the projects, the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B is unlikely to be more than the greater presented by the two wind farm projects on their own. The average increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B is thus approximately 25km (10.9% of the species' maximum foraging range of 229km). The projects are 164km from the Flamborough Head and Bempton Cliffs SPA, the only protected site within foraging range that would be potentially impacted by this effect (Appendix 1). Recent tracking studies indicate that additional individuals from some other North Sea protected sites may also be impacted (e.g. Wakefield et al. 2013).

5.4.52 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, this

impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.4.53 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside A and B projects for northern gannet is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.54 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of 68 (90% confidence limits = 56-80) for northern gannet. Of these, 34 were predicted to occur during the breeding season and 34 during the non-breeding season.

5.4.55 Tables A9.33a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. The largest relative impact was predicted for the Flamborough Head and Bempton Cliffs SPA, where the mean annual estimates of the number of collisions represent less than 0.1% of the site population. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.4.56 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British breeding population.

5.4.57 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.4.58 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.4.59 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted. The effect of collision for northern gannet for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales and the impact of the effect is consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.60 For northern gannet, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Therefore, we consider the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

5.4.61 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern gannet is considered to be **negligible**.

***Arctic skua***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 75,000 | <0.1 | 6,300 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 5,700 | <0.1 | 479 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.4.62 Arctic skua were present in the Dogger Bank Zone during autumn only. The peak population estimates for the Dogger Bank Teesside A and B project areas in 2010, 2010/11 and 2011/12 were 3 birds (90% CIs = 0-10), 3 birds (90% CIs = 0-10), and 8 birds (90% CIs = 4-19), all peaks being in September, respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 12 SPAs and a passage feature of two SPAs.

5.4.63 The Dogger Bank Teesside A and B projects are outside the foraging range of any protected site at which the species is a breeding feature. There are no national population estimates for this species for the passage or winter seasons.

5.4.64 It should be noted that the estimated numbers of Arctic skua in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.65 For Arctic skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see

section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.66 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for Arctic skua is considered to be **negligible**.

Export cable corridor

5.4.67 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.68 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one Arctic skua collision.

5.4.69 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.4.70 The proposed projects are outside the foraging range of any protected site at which the species is a breeding feature. Mean annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.4.71 There are no national population estimates for this species for the passage or winter seasons. Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.4.72 Given that numbers of this species are possibly underestimated due to turnover (see above), even assuming an order of magnitude difference in the numbers estimated for the Dogger Bank Teesside A and B projects, the magnitude of impact predicted at each geographic scale considered would be unchanged.

5.4.73 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.4.74 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite and biogeographic scales would be impacted by this effect. The effect of collision for Arctic skua for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at protected site, protected site suite and biogeographic scales, and consequently, the impact of the effect is considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.75 For Arctic skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.76 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for Arctic skua is considered to be **negligible**.

***Great skua***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 1 | 98% avoidance Flight height option 3 | 48,000 | <0.1 | 28,800 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 3,584 | <0.1 | 2,150 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.4.77 Great skua were present in the Dogger Bank Zone during autumn only. The peak population estimates for the Dogger Bank Teesside A and B project areas in 2010, 2010/11 and 2011/12 were 4 birds (90% CIs = 2-6), 4 birds (90% CIs = 2-6), and 13 birds (90% CIs = 10-22), all peaks being in September, respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of seven SPAs and a passage feature of two SPAs.

5.4.78 The Dogger Bank Teesside A and B projects are outside the foraging range of any protected site at which the species is a breeding feature. There are no national population estimates for this species for the passage or winter seasons.

5.4.79 It should be noted that the estimated numbers of great skua in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.80 For great skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see

section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.81 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great skua is considered to be **negligible**.

Export cable corridor

5.4.82 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.83 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of just one great skua collision.

5.4.84 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.4.85 Mean annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.4.86 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.4.87 Given that numbers of this species are possibly underestimated due to turnover (see above), even assuming an order of magnitude difference in the numbers estimated for the Dogger Bank Teesside A and B projects, the magnitude of impact predicted at each geographic scale considered would be unchanged.

5.4.88 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.4.89 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite and biogeographic scales would be impacted by this effect. The effect of collision for great skua for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at protected site, protected site suite and biogeographic scales, and consequently, the impact of the effect is considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.90 For great skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.91 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great skua is considered to be **negligible**.

***Black-legged kittiwake***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 152 | 98% avoidance Flight height option 3 | 6,600,000 | <0.1 | 1,110,000 | < 0.1 | 0 | Minor adverse |
| Collision – background adult mortality | 123 | | 259,600 | <0.1 | 43,660 | 0.5 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.4.92 The peak population estimates for the Dogger Bank Teesside A and B project areas were 5,594 (90% CIs = 4,899-6,246), 11,376 (90% CIs = 10,196-12,671), and 9,047 (90% CIs = 7,976-10,170) for 2010, 2010/11 and 2011/12 respectively, in March in all years. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 24 SPAs, a wintering feature of four SPAs and a passage feature of six SPAs.

5.4.93 The proposed project is within foraging range during the breeding season of two protected breeding sites around the North Sea at which the species is a feature – the Flamborough Head and Bempton Cliffs SPA and Durham Coast and Marsden Bay SSSI, both of which are in the UK. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.94 For black-legged kittiwake, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.95 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for black-legged kittiwake is considered to be **negligible**.

Export cable corridor

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.96 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.97 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a maxima of 961 adult black-legged kittiwakes in flight in the projects areas in the breeding season using 2010, 2010/11 and 2011/12data (Table 5.18).

5.4.98 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The Dogger Bank Teesside A and B projects are within foraging range of the Flamborough Head and Bempton Cliffs SPA. Between 1 and 5% of the population at the Flamborough Head and Bempton Cliffs SPA might be potentially exposed to this effect (Table A9.34).

5.4.99 The potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009) and in this case, due to the positions and separation of the projects, the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B is unlikely to be more than the greater presented by the two wind farm projects on their own. The average increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B is thus approximately 25km (10.8% of the species' maximum foraging range of 231km). The projects are 164km from the Flamborough Head and Bempton Cliffs SPA, the only protected site within foraging range that would be potentially exposed to this effect (Appendix 1).

5.4.100 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.4.101 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside A and B projects for black-legged kittiwake is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.102 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of 134 (90% confidence limits = 119-152) for black-legged kittiwake. Of these, 87 were predicted to occur during the breeding season and 48 were predicted to occur in the non-breeding season.

5.4.103 Tables A9.35a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. The proposed project is within foraging range of one protected breeding site around the North Sea at which the species is a feature – the Flamborough Head and Bempton Cliffs SPA. Mean annual estimates of the number of collisions represent less than 0.1% of this site's population.

5.4.104 Mean annual estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.4.105 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British population.

5.4.106 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.4.107 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.4.108 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for black-legged kittiwake for the Dogger Bank Teesside A and B projects is considered

to be of **negligible magnitude**, and consequently the impact of the effect is considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.109 For black-legged kittiwake, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.110 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for black-legged kittiwake is considered to be **negligible**.

***Lesser black-backed gull***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| | | | | | W 330,000 | 0 | | |
| Collision – population | 53 | 98% avoidance Flight height option 3 | 550,000 | <0.1 | B 120,000 | <0.1 | 0 | Minor adverse |
| | | | | | W 330,000 | <0.1 | | |
| Collision – background adult mortality | 16 | | 31,900 | <0.1 | B 6,960 | 0.2 | 0 | |
| | | | | | W 19,140 | <0.1 | | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided; B = Breeding, W = winter.

***Summary of population estimates and value***

5.4.111 The peak population estimates for Dogger Bank Teesside A and B project areas were 361 birds (90% CIs = 254-514) in June, 189 birds (90% CIs = 136-267) in May, and 99 birds (90% CIs = 39-269) in May for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 21 SPAs, a wintering feature of two SPAs and a passage feature of three SPAs.

5.4.112 The Dogger Bank Teesside A and B projects are outside the foraging range of any protected site at which the species is a breeding feature.

5.4.113 It should be noted that national winter population estimates for gulls come from a survey of terrestrial habitats and inshore waters (Burton *et al.* 2013), and thus do not include birds that frequent offshore waters; therefore, underestimating the overall national populations. It should also be noted that the estimated numbers of this species in the Dogger Bank Zone are possibly underestimated, given that those present in the spring may be *intermedius* birds on passage to Scandinavia, and thus due to the potential turnover of birds at this time.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.114 The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.115 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for lesser black-backed gull is considered to be **negligible**.

Export cable corridor

5.4.116 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.117 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of 33 (90% confidence limits = 21-53) for lesser black-backed gull. Of these, 20 were predicted to occur during the breeding season and 12 during the non-breeding season.

5.4.118 Tables A9.36a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. Mean annual collision estimates represent less than 0.1% of the populations of each of the protected sites around the North Sea at which the species is a feature.

5.4.119 Mean winter estimates represent less than 0.1% of the winter population estimate for the species in Great Britain.

5.4.120 Mean annual estimates represent less than 0.1% of the species' biogeographic population.

5.4.121 Given that numbers of this species are possibly underestimated due to turnover (see above), even assuming an order of magnitude difference in the numbers estimated for the Dogger Bank Teesside A and B projects, the magnitude of impact predicted at each geographic scale considered would be unchanged.

5.4.122 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.4.123 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for lesser black-backed gull for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently the impact of the effect is considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.124 For lesser black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.125 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for lesser black-backed gull is considered to be **negligible**.

***Great black-backed gull***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 85 | 98% avoidance Flight height option 3 | 420,000 | <0.1 | B 51,000 | 0.2 | 0 | Minor adverse |
| | | | | | W 75,860 | 0.1 | | |
| Collision – background adult mortality | 26 | | 24,360 | 0.1 | B 2,958 | 0.9 | 0 | |
| | | | | | W 4,400 | 0.6 | | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided; B = Breeding, W = winter.

***Summary of population estimates and value***

5.4.126 The peak population estimates for Dogger Bank Teesside A and B projects were 360 birds (90% CIs = 279-427) in January, 243 birds (90% CIs = 189-305) in March, and 177 birds (90% CIs = 127-237) in February for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 17 SPAs and a wintering feature of two SPAs.

5.4.127 The Dogger Bank Teesside A and B projects are outside the foraging range of any protected site at which the species is a breeding feature.

5.4.128 It should be noted that national winter population estimates for gulls come from a survey of terrestrial habitats and inshore waters (Burton *et al.* 2013), and thus do not include birds that frequent offshore waters; therefore, underestimating the overall national populations. It should also be noted that the estimated numbers of this species in the Dogger Bank Zone are possibly underestimated due to the potential turnover of birds at this time.

***Construction and Decommissioning***

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.129 For great black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B

project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.130 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great black-backed gull is considered to be **negligible**.

Export cable corridor

5.4.131 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A – **negligible**.

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.132 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of 58 (90% confidence limits = 40-85) for great black-backed gull. Of these, 17 were predicted to occur during the breeding season and 41 during the non-breeding season.

5.4.133 Tables A9.37a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. Mean annual collision estimates represent less than 0.1% of the populations of the protected sites around the North Sea at which the species is a feature.

5.4.134 Mean winter estimates represent less than 0.2% of the winter population estimate for the species in Great Britain.

5.4.135 Mean annual estimates represent less than 0.1% of the species' biogeographic population.

5.4.136 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.4.137 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less

than 1% of reference populations at the protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for great black-backed gull for the Dogger Bank Teesside A and B projects is thus considered to be of **negligible magnitude**, and thus the impact of the effect is considered to be **minor adverse** at the protected site suite, national and biogeographic scales.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.138 For great black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.139 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great black-backed gull is considered to be **negligible**.

***Common guillemot***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 149 | 50% displaced 5% mortality 2km buffer | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 299 | | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 201,600 | <0.1 | 95,040 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided; B = Breeding, W = winter.

***Summary of population estimates and value***

5.4.140 The peak population estimates for the Dogger Bank Teesside A and B project areas were 10,513 birds in December (90% CIs = 9,792-11,359), 16,188 birds in March (90% CIs = 15,159-17,360), and 16,170 birds in April (90% CIs = 14,947-17,377) for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for a breeding population of national importance and a population of international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year. However, numbers of common guillemots within the areas of the Dogger Bank Teesside A and B projects and the 2km buffers around these were of national importance in the 2011 breeding season. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 26 SPAs, a wintering feature of 11 SPAs and a passage feature of one SPA.

5.4.141 The Dogger Bank Teesside A and B projects are within foraging range of six protected breeding sites around the North Sea at which the species is a feature, five of which are in Great Britain – Seevogelschutzgebiet Helgoland, the Farne Islands, Forth Islands, Flamborough Head and Bempton Cliffs, Fowlsheugh and St Abb's Head to Fast Castle SPAs. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.142 Based on 50% of the worst case values for displacement, analysis provided estimates of 2,676 (using 90% confidence limits = 2,469-2,904) displaced birds using 2010 data (315 during breeding months, 2,361 during other months of the year), 3,460 (using 90% confidence limits = 3,205-3,741) displaced birds using 2010/11 data (609 during breeding months, 2,851 during other months of the year), and 2,542 (using 90% confidence limits = 2,330-2,768) displaced birds using 2011/12 data (710 during breeding months, 1,832 other months of the year). The mean value was 2,755 (using 90% confidence limits = 2,541-2,989) displaced birds (554 during breeding months, 2,201 during other months of the year).

5.4.143 Tables A9.38a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 0.1% of birds (using mean data) would be impacted.

5.4.144 Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.4.145 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.4.146 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for common guillemot for the Dogger Bank Teesside A and B project is thus considered of **negligible magnitude** at all scales.

Significance

5.4.147 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.148 For common guillemot, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.149 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for common guillemot is considered to be **minor adverse**.

Export cable corridor

5.4.150 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **minor adverse**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.151 Based on worst case values for displacement, analysis provided estimates of 5,351 (using 90% confidence limits = 4,937-5,809) displaced birds using 2010 data (630 during breeding months, 4,721 during other months of the year), 6,921 (using 90% confidence limits = 6,410-7,482) displaced birds using 2010/11 data (1,218 during breeding months, 5,702 during other months of the year), and 5,084 (using 90% confidence limits = 4,659-5,535) displaced birds using 2011/12 data (1,420 during breeding months, 3,664 other months of the year). The mean value was 5,511 (using 90% confidence limits = 5,082-5,978) displaced birds (1,108 during breeding months, 4,403 during other months of the year).

5.4.152 Tables A9.39a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 0.1% of birds (using mean data) would be impacted.

5.4.153 Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.4.154 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.4.155 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for common guillemot for the Dogger Bank Teesside A and B project is thus considered of **negligible magnitude** at all scales.

Significance

5.4.156 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.157 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 169 adult common guillemots in flight in the projects areas in the breeding season using 2010, 2010/11 and 2011/12 data (Table 5.18).

5.4.158 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Appendix 9 (Table A9.40) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

5.4.159 The potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009) and in this case, due to the positions and separation of the projects, the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B is unlikely to be more than the greater presented by the two wind farm projects on their own. The average increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B is thus approximately 25km (7.4% of the species' maximum foraging range of 340km). The projects are between 164km and 340km from the protected sites within foraging range that would be potentially exposed to this effect (Appendix 1). This increase might prevent birds from two sites – the Fowlsheugh SPA and the Forth Islands SPA – from reaching foraging areas beyond the project areas.

5.4.160 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, this

impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.4.161 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside A and B projects for common guillemot is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.162 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one common guillemot collision.

5.4.163 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.4.164 Mean annual estimates of the number of collisions represent less than 0.1% of the populations of each of the five protected breeding sites for the species that the proposed project is within foraging range of. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.4.165 The proposed projects are within foraging range of six protected breeding sites in Great Britain. Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British, breeding population.

5.4.166 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.4.167 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.4.168 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for

common guillemot for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.169 For common guillemot, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.170 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for common guillemot is considered to be **minor adverse**.

***Razorbill***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 51 | 50% displaced 5% mortality 2km buffer | 1,380,000 | <0.1 | 330,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 103 | | 1,380,000 | <0.1 | 330,000 | <0.1 | 0 | Minor adverse |
| Collision – population | 4 | 98% avoidance Flight height option 3 | 1,380,000 | <0.1 | 330,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 92,000 | <0.1 | 22,000 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.4.171 The peak population estimates for the Dogger Bank Teesside A and B project areas were 3,978 birds in February (90% CIs = 3,537-4,433), 7,254 birds in April (90% CIs = 6,459-8,065), and 6,207 birds in April (90% CIs = 5,533-6,935) for 2010, 2010/11 and 2011/12 respectively. The 1% threshold for a population of national importance was not exceeded in the Dogger Bank Teesside A and B project areas during the breeding season. However, the upper confidence limit for the numbers of razorbills within the areas of the Dogger Bank Teesside A and B projects and the 2km buffers around these exceeded the 1% threshold for national importance in the 2011 breeding season. The 1% threshold for a population of international importance was not exceeded in either year. However, the numbers of razorbills within the areas of the Dogger Bank Teesside A and B projects and the 2km buffers around these were of international importance in 2011. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 18 SPAs, a wintering feature of five SPAs and a passage feature of two SPAs.

5.4.172 The Dogger Bank Teesside A and B project is within foraging range of four protected breeding sites around the North Sea at which the species is a feature – the Farne Islands, Forth Islands, Flamborough Head and Bempton Cliffs and St Abb's Head to Fast Castle SPAs. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.173 Based on 50% of the worst case values for displacement, analysis provided estimates of 926 (using 90% confidence limits = 814-1,044) displaced birds using 2010 data (34 during breeding months, 892 during other months of the year), 1,125 (using 90% confidence limits = 990-1,270) displaced birds using 2010/11 data (77 during breeding months, 1,048 during other months of the year), and 851 (using 90% confidence limits = 730-985) displaced birds using 2011/12 data (169 during breeding months, 681 other months of the year). The mean value was 902 (using 90% confidence limits = 787-1,027) displaced birds (93 during breeding months, 809 during other months of the year).

5.4.174 Tables A9.41a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 0.1% of birds (using mean data), would be impacted.

5.4.175 Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.4.176 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.4.177 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for razorbill for the Dogger Bank Teesside A and B project is thus considered of **negligible magnitude** at all scales.

Significance

5.4.178 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to **minor adverse** at all scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.179 For razorbill, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.180 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for razorbill is considered to be **minor adverse**.

Export cable corridor

5.4.181 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **minor adverse**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.182 Based on worst case values for displacement, analysis provided estimates of 1,852 (using 90% confidence limits = 1,627-2,088) displaced birds using 2010 data (68 during breeding months, 1,783 during other months of the year), 2,250 (using 90% confidence limits = 1,980-2,540) displaced birds using 2010/11 data (154 during breeding months, 2,096 during other months of the year), and 1,701 (using 90% confidence limits = 1,459-1,971) displaced birds using 2011/12 data (338 during breeding months, 1,363 other months of the year). The mean value was 1,804 (using 90% confidence limits = 1,574-2,054) displaced birds (186 during breeding months, 1,618 during other months of the year).

5.4.183 Tables A9.42a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where less than 0.1% of birds (using mean data), would be impacted.

5.4.184 Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.4.185 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.4.186 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for razorbill for the Dogger Bank Teesside A and B project is thus considered of **negligible magnitude** at all scales.

Significance

This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.187 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 66 adult razorbills in flight in the projects areas in the breeding season using 2010, 2010/11 and 2011/12 data (Table 5.18)..

5.4.188 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.43 (Appendix 9) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

5.4.189 The potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009) and in this case, due to the positions and separation of the projects, the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B is unlikely to be more than the greater presented by the two wind farm projects on their own. The average increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B is thus approximately 25km (8.0% of the species' maximum foraging range of 312km). The projects are between 164km and 308km from the protected sites within foraging range that would be potentially exposed to this effect (Appendix 1). This increase might prevent birds from two sites – the Forth Islands SPA and St Abb's Head to Fast Castle SPA – from reaching foraging areas beyond the project areas.

5.4.190 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A

and B, this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

5.4.191 Based on the assessment of magnitude and the species' **very high value**, the overall **significance** of the potential barrier effect associated with the Dogger Bank Teesside A and B projects for razorbill is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.192 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of just three razorbill collisions.

5.4.193 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.4.194 Mean annual estimates of the number of collisions represent less than 0.1% of the populations of all five of the protected sites around the North Sea that are within foraging range for this species. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.4.195 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British breeding population.

5.4.196 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.4.197 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.4.198 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for razorbill for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.199 For razorbill, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.200 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for razorbill is considered to be **minor adverse**.

***Little auk***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 5 | 25% displaced | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Displacement (o) | 11 | 5% mortality 2km buffer | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – population | <1 | 98% avoidance | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – background adult mortality | <1 | Flight height option 3 | 8,333,333 | <0.1 | 333 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

[3] Assumption of 50 birds used as a national threshold (see section 4).

***Summary of population estimates and value***

5.4.201 The peak population estimates for the Dogger Bank Teesside A and B project areas were 3,774 birds in December (90% CIs = 3,018-5,052), 3,774 birds in December (90% CIs = 3,018-5,052), and 1,206 birds in December (90% CIs = 992-1,623) for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year. The little auk breeds in the high Arctic and only occurs in the North Sea during the winter. Although there is no British population estimate for little auk, given the numbers estimated, this species is deemed to be of national importance in the Dogger Bank Teesside A and B project areas. Consequently, the value of this receptor is assessed to be **high**.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.202 Taking 50% of the worst-case maximum annual estimates in winter months, when this species occurs, a total of 113 birds would be displaced during 2010 (using 90% confidence limits = 84-158), 107.2 during 2010/11 (using 90% confidence limits = 84-144) and 37.8 during 2011/12 (using 90% confidence limits = 30-53). The mean value was 78 (using 90% confidence limits = 60-108) displaced birds.

5.4.203 Using a national 1% threshold of 500 birds (in the absence of a national winter population estimate), much less than 0.1% of this population would be

affected. Displacement would affect much less than 0.1% of the species' biogeographic population.

5.4.204 Less than 1% of reference populations at the national and biogeographic scales would be impacted by this effect. The effect of displacement for little auk for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at the national and biogeographic scale.

Significance

5.4.205 This species has a **high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **negligible** at both national and biogeographic scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.206 Little auks occur in the Dogger Bank Zone during winter months. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.207 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for little auk is considered to be **negligible**.

Export cable corridor

5.4.208 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **negligible**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.209 Based on worst case values for displacement, a total of 225 birds would be displaced during 2010 (using 90% confidence limits = 169-316), 214.4 during 2010/11 (using 90% confidence limits = 168-289) and 76 during 2011/12 (using 90% confidence limits = 59-106). The mean value was 156 (using 90% confidence limits = 119-216) displaced birds.

5.4.210 Using a national 1% threshold of 500 birds (in the absence of a national winter population estimate), much less than 0.1% of this population would be affected. Displacement would affect much less than 0.1% of the species' biogeographic population.

5.4.211 Less than 1% of reference populations at the national and biogeographic scale would be impacted by this effect. The effect of displacement for little auk for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at the national and biogeographic scale.

Significance

5.4.212 This species has a **high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **negligible** at both national and biogeographic scales.

*Collision*

Species Overall sensitivity to collision – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.213 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one for little auk.

5.4.214 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

5.4.215 The predicted number of collisions represents an increase in background mortality of less than 1% at the national and biogeographic population levels.

Significance

5.4.216 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for little auk for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently considered to be **negligible**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.217 Little auks occur in the Dogger Bank Zone during winter months. For little auk, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.218 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for little auk is considered to be **negligible**.

***Atlantic puffin***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 5 | 25% displaced 5% mortality 2km buffer | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 10 | | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 684,000 | <0.1 | 88,160 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

5.4.219 The peak population estimates for the Dogger Bank Teesside A and B project areas were 870 birds in December (90% CIs = 734-1,024), 1,189 birds in March (90% CIs = 1,052-1,379), and 318 birds in March (90% CIs = 270-381) for 2010, 2010/11 and 2011/12 respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 16 SPAs.

5.4.220 The Dogger Bank Teesside A and B projects are outside the foraging range of any protected site at which the species is a breeding feature.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.221 Based on 50% of the worst case values for displacement, analysis provided estimates of 91 (using 90% confidence limits = 73-113) displaced birds using 2010 data (11 during breeding months, 81 during other months of the year), 145 (using 90% confidence limits = 122-174) displaced birds using 2010/11 data (21 during breeding months, 124 during other months of the year), and 37 (using 90% confidence limits = 30-45) displaced birds using 2011/12 data (10 during breeding months, 27 other months of the year). The mean value was 84 (using 90%

confidence limits = 69-102) displaced birds (14 during breeding months, 70 during other months of the year).

5.4.222 Tables A9.44a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.4.223 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.4.224 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for Atlantic puffin for the Dogger Bank Teesside A and B project is thus considered of **negligible magnitude** at all scales.

Significance

5.4.225 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.226 For Atlantic puffin, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.227 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for Atlantic puffin is considered to be **minor adverse**.

Export cable corridor

5.4.228 The impact of habitat loss or change is as assessed for Dogger Bank Teesside A - **minor adverse**.

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.229 Based on worst case values for displacement, analysis provided estimates of 183 (using 90% confidence limits = 147-227) displaced birds using 2010 data (21 during breeding months, 162 during other months of the year), 290 (using 90% confidence limits = 245-348) displaced birds using 2010/11 data (42 during breeding months, 248 during other months of the year), and 74 (using 90% confidence limits = 60-91) displaced birds using 2011/12 data (20 during breeding months, 53 other months of the year). The mean value was 168 (using 90% confidence limits = 139-204) displaced birds (28 during breeding months, 140 during other months of the year).

5.4.230 Tables A9.45a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

5.4.231 Displacement would affect much less than 0.1% of the species' biogeographic population.

5.4.232 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for Atlantic puffin for the Dogger Bank Teesside A and B project is thus considered of **negligible magnitude** at all scales.

Significance

5.4.233 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.234 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one for Atlantic puffin.

5.4.235 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

5.4.236 Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

5.4.237 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British, breeding population.

5.4.238 Mean annual collision estimates using represent less than 0.1% of the species' biogeographic population.

5.4.239 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

5.4.240 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for Atlantic puffin for the Dogger Bank Teesside A and B projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales, and consequently considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

5.4.241 For Atlantic puffin, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B project areas in either year (see section 3). Combined with information on this species diet (see section 4), the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

5.4.242 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for Atlantic puffin is considered to be **minor adverse**.

***Migrants***

***Operation***

*Collision*

5.4.243 The migration zones (defined by Wright *et al.* 2012) of 45 species' populations of terrestrial or waterbird migrants that are UK SPA features overlap with the Dogger Bank Teesside A and B projects during migration. Collision risk estimates suggests that on an annual basis the mortality associated with the Dogger Bank Teesside A and B projects is likely to represent less than 1% of the reference population of each of these species (Table 5.19).

5.4.244 The effect of collision for migrants for the Dogger Bank Teesside A and B projects is thus considered to be of **negligible magnitude** at the national level and **minor adverse** for 15 species' populations and **negligible** for 30 species' populations.

5.4.245 Due to the lack of knowledge concerning species' precise migration routes and their likely variability, no attempt was made to apportion impacts to individual protected sites, and thus it is unknown whether impacts may potentially be greater or less at any one particular site.

5.4.246 It should also be noted that for migrants there is much greater uncertainty in these calculations, and thus the assessment both in regard to the determination of the numbers of birds passing through each project area and the proportions of these flying at heights which pose a risk of collision. Given these uncertainties the confidence in predictions in the assessment of collision for migrants is considered to be very low.

**Table 5.19** Assessment of collision risk for migrants for the Dogger Bank Teesside A and B projects. Estimated numbers of collisions are based on modelling of the numbers of birds predicted to pass through the wind farm project, a 98% avoidance rate and expert judgement of the proportion of individuals likely to be flying at a height which places them at risk of collision. Three scenarios were run using the lower central and upper limits of the range of the proportion of birds at risk height as described in Wright *et al.* (2012) with the central value used for the purposes of assessment. It is important to note that the values in brackets under "estimated annual collisions" simply represent the estimates using the lower and upper estimates of the proportion of birds at risk height, and do not represent any kind of measure of confidence in the collision estimates (which would have a far greater range).

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Bean goose *Anser fabalis* | 0.03 (0.01 - 0.08) | <0.1% | 8.33% | Very High | Low | High | Negligible | Negligible |
| Light-bellied Brent Goose (Svalbard population) *Branta bernicla hrota* | 0.003 (0.0005 - 0.007) | <0.1% | 0.19% | Very High | High | Very High | Negligible | Minor adverse |
| Common shelduck *Tadorna tadorna* | 1.23 (0.01 - 4.92) | <0.1% | 6.80% | Very High | High | Very High | Negligible | Minor adverse |
| Eurasian wigeon *Anas penelope* | 6.98 (0.05 - 27.90) | <0.1% | 6.33% | Very High | Very Low | Medium | Negligible | Negligible |
| Gadwall *Anas strepera* | 0.09 (0.001 - 0.36) | <0.1% | 3.01% | Very High | Very Low | Medium | Negligible | Negligible |
| Eurasian teal *Anas crecca* | 1.65 (0.01 - 6.61) | <0.1% | 6.35% | Very High | Very Low | Medium | Negligible | Negligible |
| Mallard *Anas platyrhynchos* | 5.07 (0.03 - 20.30) | <0.1% | 6.80% | Very High | Very Low | Medium | Negligible | Negligible |
| Northern pintail *Anas acuta* | 0.22 (0.001 - 0.89) | <0.1% | 6.35% | Very High | Very Low | Medium | Negligible | Negligible |
| Northern shoveler *Anas clypeata* | 0.14 (0.001 - 0.58) | <0.1% | 4.59% | Very High | Very Low | Medium | Negligible | Negligible |
| Common pochard *Aythya ferina* | 0.56 (0.004 - 2.26) | <0.1% | 4.59% | Very High | Very Low | Medium | Negligible | Negligible |
| Tufted duck *Aythya fuligula* | 1.26 (0.01 - 5.05) | <0.1% | 6.29% | Very High | Very Low | Medium | Negligible | Negligible |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Greater scaup *Aythya marila* | 0.005 (0.00003 - 0.02) | <0.1% | 4.30% | Very High | Very Low | Medium | Negligible | Negligible |
| Common scoter *Melanitta nigra* | 0.06 (0.01 - 0.99) | <0.1% | 6.35% | Very High | Low | High | Negligible | Negligible |
| Velvet scoter *Melanitta fusca* | 0.04 (0.0003 - 0.15) | <0.1% | 7.45% | Very High | Low | High | Negligible | Negligible |
| Goldeneye *Bucephala clangula* | 0.43 (0.003 - 1.74) | <0.1% | 6.80% | Very High | Low | High | Negligible | Negligible |
| Red-breasted merganser *Mergus serrator* | 0.003 (0.00002 - 0.01) | <0.1% | 3.86% | Very High | Medium | Very High | Negligible | Minor adverse |
| Goosander *Mergus merganser* (non-breeding) | 0.06 (0.0004 - 0.23) | <0.1% | 7.35% | Very High | Medium | Very High | Negligible | Minor adverse |
| Great bittern *Botaurus stellaris* | 0.01 (0.001 - 0.01) | <0.1% | 2.15% | Very High | Very Low | Medium | Negligible | Negligible |
| Great crested grebe *Podiceps cristatus* | 0.13 (0.01 - 0.51) | <0.1% | 3.52% | Very High | Medium | Very High | Negligible | Minor adverse |
| Slavonian grebe *Podiceps auritus* | 0.005 (0.0005 - 0.02) | <0.1% | 6.35% | Very High | Medium | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (breeding) | 0.0005 (0.0002 - 0.001) | <0.1% | 1.85% | Very High | Medium | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (non-breeding) | 0.02 (0.01 - 0.04) | <0.1% | 7.45% | Very High | Medium | Very High | Negligible | Minor adverse |
| Eurasian coot *Fulica atra* | 0.39 (0.04 - 0.73) | <0.1% | 1.04% | Very High | Very Low | Medium | Negligible | Negligible |
| Eurasian oystercatcher *Haematopus ostralegus* (non-breeding) | 2.36 (0.47 - 7.08) | <0.1% | 6.35% | Very High | High | Very High | Negligible | Minor adverse |
| Common ringed plover *Charadrius hiaticula* (non-breeding) | 0.41 (0.08 - 1.22) | <0.1% | 6.86% | Very High | Low | High | Negligible | Negligible |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Golden plover *Pluvialis apricaria* (non-breeding) | 3.79 (0.76 - 11.38) | <0.1% | 5.47% | Very High | Very Low | Medium | Negligible | Negligible |
| Grey plover *Pluvialis squatarola* | 1.17 (0.23 - 3.50) | <0.1% | 6.78% | Very High | High | Very High | Negligible | Minor adverse |
| Northern lapwing *Vanellus vanellus* | 10.79 (2.16 - 32.38) | <0.1% | 6.78% | Very High | Very Low | Medium | Negligible | Negligible |
| Red knot *Calidris canutus* | 3.60 (0.72 - 10.80) | <0.1% | 6.33% | Very High | Medium | Very High | Negligible | Minor adverse |
| Sanderling *Calidris alba* | 0.92 (0.18 - 2.77) | <0.1% | 6.33% | Very High | Medium | Very High | Negligible | Minor adverse |
| Dunlin *Calidris alpina schinzii (passage)* | 0.08 (0.02 - 0.23) | <0.1% | 6.39% | Very High | Very Low | Medium | Negligible | Negligible |
| Dunlin *Calidris alpina alpina* (passage & winter) | 6.49 (1.30 - 19.48) | <0.1% | 4.63% | Very High | Very Low | Medium | Negligible | Negligible |
| Ruff *Philomachus pugnax* | 0.06 (0.01 - 0.17) | <0.1% | 7.22% | Very High | Very Low | Medium | Negligible | Negligible |
| Common snipe *Gallinago gallinago* | 10.61 (2.12 - 31.83) | <0.1% | 6.34% | Very High | Very Low | Medium | Negligible | Negligible |
| Black-tailed godwit *Limosa limosa islandica* | 0.06 (0.01 - 0.17) | <0.1% | 5.36% | Very High | Very High | Very High | Negligible | Minor adverse |
| Bar-tailed godwit *Limosa lapponica* | 1.41 (0.28 - 4.22) | <0.1% | 7.16% | Very High | Very Low | Medium | Negligible | Negligible |
| Whimbrel *Numenius phaeopus* | 0.26 (0.05 - 0.79) | <0.1% | 6.23% | Very High | High | Very High | Negligible | Minor adverse |
| Eurasian curlew *Numenius arquata* (non-breeding) | 2.09 (0.42 - 6.26) | <0.1% | 6.46% | Very High | Very Low | Medium | Negligible | Negligible |
| Greenshank *Tringa nebularia* | 0.0004 (0.0001 - 0.001) | <0.1% | 4.07% | Very High | Very Low | Medium | Negligible | Negligible |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Common redshank *Tringa totanus britannica* (breeding) | 0.06 (0.01 - 0.18) | <0.1% | 5.91% | Very High | Very Low | Medium | Negligible | Negligible |
| Common redshank Icelandic population *Tringa totanus robusta* (non-breeding) | 2.57 (0.51 - 7.7) | <0.1% | 5.45% | Very High | Very Low | Medium | Negligible | Negligible |
| Common redshank mainland Europe population *Tringa totanus* (non-breeding) | 0.63 (0.13 - 1.89) | <0.1% | 7.37% | Very High | Very Low | Medium | Negligible | Negligible |
| Ruddy turnstone *Arenaria interpres* | 0.51 (0.10 - 1.52) | <0.1% | 6.35% | Very High | High | Very High | Negligible | Minor adverse |
| Short-eared owl *Asio flammeus* | 0.02 (0.004 - 0.04) | <0.1% | 6.56% | Very High | Very Low | Medium | Negligible | Negligible |
| European nightjar *Caprimulgus europaeus* | 0.01 (0.002 - 0.02) | <0.1% | 1.35% | Very High | Very Low | Medium | Negligible | Negligible |

[1] The reference population size is defined as the total number of individuals of each species in the population that uses the migration route that encompasses the Dogger Bank. For further details and derivation see Table 4.18.

[2] The migration zone referred to here is the North Sea migration area appropriate to assessment for the Dogger Bank, and not the entire migration zone used by the species around the whole of the UK. The percentage given can be roughly interpreted as the percentage of birds migrating across the North Sea that would cross the wind farm footprint during a single migration period (note for most species there are 2 migrations per year crossing the North Sea). For further details see the SOSS migration modelling tool guidance (Wright *et al*. 2012).

*Barrier effects*

5.4.247 An assessment of the potential barrier effects posed by the Dogger Bank Teesside A and B projects to the 45 species' populations of terrestrial or waterbird migrants that are UK SPA features whose migration zones (defined by Wright *et al.* 2012) overlap with the project area is provided in Table 5.20 below.

5.4.248 The percentages of reference populations estimated to pass through the project areas at risk height (following Wright *et al.* 2012), and thus exposed to potential barrier effects were less than 1% for 28 of the species' populations considered, but greater than 1% for 17 species' populations. The estimates of numbers passing through the project areas greatly exceed the numbers recorded by boat surveys, though it should be noted that boat surveys were not designed to record migrants and as they only provide a (diurnal) snapshot of birds flying close to the sea, they will inevitably greatly underestimate overall numbers of migrants.

5.4.249 The increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B varies by direction of flight, although due to the positions of the projects, for the shortest approximately east-west route across the North Sea passing through the project, equates to a maximum of approximately 25km (an increase of just 4% on the ca. 575km route).

5.4.250 Considering both the numbers of birds exposed to this effect and the relative increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, this impact is considered to be of **negligible magnitude** for all species' populations.

5.4.251 It should be noted that there is considerable uncertainty regarding the assessment of barrier effects posed by offshore wind farms. For migrants, there is great uncertainty in the determination of the numbers of birds passing through each project area. There is little evidence to suggest whether or not migration may be concentrated within corridors within overall migration zones (Wright *et al.* 2012) and it cannot be assumed that birds fly directly to or from the protected sites that they are features of. It is also assumed that the wind farm poses a barrier effect to 100% of birds attempting to fly through at risk height (Maclean *et al.* 2009) which may be over-precautionary. In particular, there is considerable uncertainty as to the actual consequences for survival, and thus for population-level impacts, from the increase in energy expenditure associated with the increases in flight distance for those birds exposed to barrier effects. Given these uncertainties, the confidence in predictions in the assessment of barrier effects is considered to be very low and considerable caution is urged in considering the outcomes of this assessment.

**Table 5.20** Assessment of barrier effects for migrants for the Dogger Bank Teesside A and B projects.

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Bean goose *Anser fabalis* | 0 | 1 | 18 | 2.50% | Very High | Negligible | Minor adverse |
| Light-bellied Brent Goose (Svalbard population) *Branta bernicla hrota* | 0 | 4 | 2 | 0.06% | Very High | Negligible | Minor adverse |
| Common shelduck *Tadorna tadorna* | 0 | 0 | 771 | 1.02% | Very High | Negligible | Minor adverse |
| Eurasian wigeon *Anas penelope* | 0 | 8 | 4715 | 0.90% | Very High | Negligible | Minor adverse |
| Gadwall *Anas strepera* | 0 | 0 | 60 | 0.27% | Very High | Negligible | Minor adverse |
| Eurasian teal *Anas crecca* | 0 | 1 | 1189 | 0.48% | Very High | Negligible | Minor adverse |
| Mallard *Anas platyrhynchos* | 2 | 3 | 3279 | 0.71% | Very High | Negligible | Minor adverse |
| Northern pintail *Anas acuta* | 2 | 1 | 144 | 0.48% | Very High | Negligible | Minor adverse |
| Northern shoveler *Anas clypeata* | 0 | 0 | 98 | 0.52% | Very High | Negligible | Minor adverse |
| Common pochard *Aythya ferina* | 0 | 3 | 385 | 0.52% | Very High | Negligible | Minor adverse |
| Tufted duck *Aythya fuligula* | 2 | 0 | 873 | 0.85% | Very High | Negligible | Minor adverse |
| Greater scaup *Aythya marila* | 0 | 0 | 3 | 0.03% | Very High | Negligible | Minor adverse |
| Common scoter *Melanitta nigra* | 113 | 191 | 39 | 0.03% | Very High | Negligible | Minor adverse |
| Velvet scoter *Melanitta fusca* | 4 | 9 | 25 | 1.01% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Common goldeneye *Bucephala clangula* | 2 | 0 | 297 | 1.02% | Very High | Negligible | Minor adverse |
| Red-breasted merganser *Mergus serrator* | 0 | 0 | 2 | 0.06% | Very High | Negligible | Minor adverse |
| Goosander *Mergus merganser* (non-breeding) | 5 | 0 | 36 | 1.10% | Very High | Negligible | Minor adverse |
| Great bittern *Botaurus stellaris* | 0 | 0 | 3 | 0.75% | Very High | Negligible | Minor adverse |
| Great crested grebe *Podiceps cristatus* | 0 | 0 | 86 | 0.35% | Very High | Negligible | Minor adverse |
| Slavonian grebe *Podiceps auritus* | 0 | 0 | 3 | 0.32% | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (breeding) | 0 | 0 | <1 | 0.09% | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (non-breeding) | 0 | 0 | 11 | 2.98% | Very High | Negligible | Minor adverse |
| Eurasian coot *Fulica atra* | 0 | 0 | 273 | 0.26% | Very High | Negligible | Minor adverse |
| Eurasian oystercatcher *Haematopus ostralegus* (non-breeding) | 2 | 8 | 1588 | 0.79% | Very High | Negligible | Minor adverse |
| Common ringed plover *Charadrius hiaticula* (non-breeding) | 4 | 4 | 626 | 0.86% | Very High | Negligible | Minor adverse |
| Golden plover *Pluvialis apricaria* (non-breeding) | 0 | 5 | 2737 | 0.68% | Very High | Negligible | Minor adverse |
| Grey plover *Pluvialis squatarola* | 0 | 0 | 836 | 1.70% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Northern lapwing *Vanellus vanellus* | 0 | 19 | 7614 | 1.70% | Very High | Negligible | Minor adverse |
| Red knot *Calidris canutus* | 3 | 15 | 2681 | 0.79% | Very High | Negligible | Minor adverse |
| Sanderling *Calidris alba* | 6 | 0 | 712 | 1.19% | Very High | Negligible | Minor adverse |
| Dunlin *Calidris alpina schinzii (passage)* | 16 | 18 | 59 | 1.60% | Very High | Negligible | Minor adverse |
| Dunlin *Calidris alpina alpina* (passage & winter) | 16 | 18 | 5072 | 1.16% | Very High | Negligible | Minor adverse |
| Ruff *Philomachus pugnax* | 0 | 3 | 43 | 1.80% | Very High | Negligible | Minor adverse |
| Common snipe *Gallinago gallinago* | 1 | 0 | 7927 | 0.79% | Very High | Negligible | Minor adverse |
| Black-tailed godwit *Limosa limosa islandica* | 0 | 0 | 75 | 1.34% | Very High | Negligible | Minor adverse |
| Bar-tailed godwit *Limosa lapponica* | 0 | 0 | 971 | 1.79% | Very High | Negligible | Minor adverse |
| Whimbrel *Numenius phaeopus* | 6 | 27 | 179 | 0.78% | Very High | Negligible | Minor adverse |
| Eurasian curlew *Numenius arquata* (non-breeding) | 51 | 4 | 1323 | 1.62% | Very High | Negligible | Minor adverse |
| Greenshank *Tringa nebularia* | 0 | 1 | <1 | 0.10% | Very High | Negligible | Minor adverse |
| Common redshank *Tringa totanus britannica* (breeding) | 0 | 0 | 44 | 0.15% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Common redshank Icelandic population *Tringa totanus robusta* (non-breeding) | 0 | 0 | 1872 | 0.68% | Very High | Negligible | Minor adverse |
| Common redshank mainland Europe population *Tringa totanus* (non-breeding) | 0 | 0 | 461 | 1.84% | Very High | Negligible | Minor adverse |
| Ruddy turnstone *Arenaria interpres* | 7 | 12 | 381 | 0.79% | Very High | Negligible | Minor adverse |
| Short-eared owl *Asio flammeus* | 2 | 23 | 12 | 1.15% | Very High | Negligible | Minor adverse |
| European Nightjar *Caprimulgus europaeus* | 0 | 0 | 8 | 0.07% | Very High | Negligible | Minor adverse |

[1] Across Dogger Bank Zone as a whole (see section 3).

[2] The estimated number of individuals of each species crossing the project is the number that would pass through at risk height (using the best estimate of the proportion of migrating birds at risk height from Wright *et al*. 2012 and not accounting for uncertainty) during a single migration season. Note that for most species, two migrations per year would be expected, and different individual birds may be involved during spring and autumn passage.

[3] The reference population size is defined as the total number of individuals of each species in the population that uses the migration route that encompasses the Dogger Bank. For further details and derivation see Table 4.18.

[4] Magnitude is assessed here according to Table 4.1.

***Summary for all receptors***

5.4.252 Table 5.21 below provides a summary of impacts from each effect for all key marine bird receptors.

**Table 5.21** Summary of potential impacts from the Dogger Bank Teesside A and B projects for key marine bird receptors.

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| White-billed diver | Displacement (construction/decommissioning) | National | Medium | - | - | Negligible | Negligible | Low |
| | | Biogeographic | Medium | - | - | Negligible | Negligible | Low |
| | Habitat loss or change (construction/decommissioning) | All | Medium | High | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Medium | High | High | Negligible | Negligible | Very Low |
| | Displacement (operation) | National | Medium | - | - | Negligible | Negligible | Low |
| | | Biogeographic | Medium | - | - | Negligible | Negligible | Low |
| | Collision (operation) | National | Medium | High | High | Negligible | Negligible | Medium |
| | | Biogeographic | Medium | High | High | Negligible | Negligible | Medium |
| | Habitat loss or change (operation) | All | Medium | High | High | Negligible | Negligible | Very Low |
| Northern fulmar | Habitat loss or change (construction/decommissioning) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| Northern gannet | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| Arctic skua | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Collision (operation) | Site suite | Very High | High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Great skua | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable | All | Very High | Low | High | Negligible | Negligible | Very Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | construction) | | | | | | | |
| | Collision (operation) | Site suite | Very High | High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Black-legged kittiwake | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Lesser black-backed gull | Habitat loss or change (construction/decommissioning) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| | Collision (operation) | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Very Low | Medium | Negligible | Negligible | Very Low |
| Great black-backed gull | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible | Negligible | Very Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| | Collision (operation) | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible | Negligible | Very Low |
| Common guillemot | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| Razorbill | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Very Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| Little auk | Displacement (construction/decommissioning) | National | High | - | - | Negligible | Negligible | Low |
| | | Biogeographic | High | - | - | Negligible | Negligible | Low |
| | Habitat loss or change (construction/decommissioning) | All | High | Low | Medium | Negligible | Negligible | Very Low |
| | Habitat loss or change (cable construction) | All | High | Low | Medium | Negligible | Negligible | Very Low |
| | Displacement (operation) | National | High | - | - | Negligible | Negligible | Low |
| | | Biogeographic | High | - | - | Negligible | Negligible | Low |
| | Collision (operation) | National | High | Medium | High | Negligible | Negligible | Medium |
| | | Biogeographic | High | Medium | High | Negligible | Negligible | Medium |
| | Habitat loss or change | All | High | Low | Medium | Negligible | Negligible | Very Low |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude | Significance | Confidence |
|---|---|---|---|---|---|---|---|---|
| | (operation) | | | | | | | |
| Atlantic puffin | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible | Minor adverse | Low |
| | | Site suite | Very High | - | - | Negligible | Minor adverse | Very Low |
| | | National | Very High | - | - | Negligible | Minor adverse | Low |
| | | Biogeographic | Very High | - | - | Negligible | Minor adverse | Low |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Site suite | Very High | Very High | Very High | Negligible | Minor adverse | Low |
| | | National | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | | Biogeographic | Very High | Very High | Very High | Negligible | Minor adverse | Medium |
| | Habitat loss or change (operation) | All | Very High | Medium | Very High | Negligible | Minor adverse | Very Low |

## 5.5 Ornithology Impact Assessment for the Intertidal Areas of the Dogger Bank Teesside A and B Cable Landfall

**Ornithological interest of the intertidal site**

5.5.1 The study area is likely to be of the highest importance during the following periods: autumn passage, winter and spring passage. Most of survey data (NEWS and commissioned surveys) focussed on the wintering period with the exception of the winter of 2012/13 where it was possible to distinguish between records from the autumn passage and wintering period from the field maps. Therefore, in terms of the ornithological interest, the winter bird assemblage and to a lesser extent the autumn passage period is referred to hereafter.

5.5.2 The key ornithological receptors, based on count numbers (≥10) and receptor value (low to very high value), found at the intertidal site during the winter and autumn period are as follows: Eurasian oystercatcher, northern lapwing, ringed plover, ruddy turnstone, sanderling, dunlin, black-headed gull, herring gull and linnet. (Note, assessment of the latter terrestrial species is considered separately under the onshore assessment.)

**Evaluation for Ornithological Receptors**

***Eurasian oystercatcher* Haematopus ostralegus**

***Operation***

*Habitat loss*

Species sensitivity to habitat loss (Recoverability/Adaptability/Tolerance/Value)

5.5.3 This species is considered to have a **high species-specific sensitivity** to this effect.

5.5.4 Considering this and the species' **low value**, the species' **overall sensitivity** to this effect will be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.5 Habitat loss for feeding birds could potentially occur during the intertidal installation of the cable. The impact of this effect would be restricted to the area in which drilling or open trenching operations occur and is likely to be less than 1km in length of the coastline.

5.5.6 It is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects on the habitat beyond several days from completion.

5.5.7 Given this, the likely habitat loss experienced will be of **negligible magnitude**.

Significance

5.5.8 The effect of habitat loss for Eurasian oystercatcher for the intertidal project is thus considered to be **negligible**.

*Physical, visual and noise displacement*

5.5.9 This species is considered to have a **high species-specific sensitivity** to this effect.

5.5.10 Considering this and the species' **low value**, the species' **overall sensitivity** to this effect will be **medium**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.11 The impact of physical, visual and noise displacement would extend beyond the study area. Assuming that birds will be affected up to a distance of 300m, the impact of this effect would be restricted to an intertidal zone of less than 2.1km in length.

5.5.12 It is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects in terms of physical, visual and noise displacement once construction was complete (no available information on anticipated time required).

5.5.13 Given this, the likely effect of physical, visual and noise displacement experienced will be of **negligible magnitude**.

Significance

5.5.14 The effect of physical, visual and noise displacement on Eurasian oystercatcher for the intertidal project is thus considered to be **negligible**.

***Northern lapwing* Vanellus vanellus**

***Operation***

*Habitat loss*

Species sensitivity to habitat loss (Recoverability/Adaptability/Tolerance/Value)

5.5.15 This species is considered to have a **high species-specific sensitivity** to habitat loss.

5.5.16 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect will be **very high.**

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.17 As for Eurasian oystercatcher, the impact of this effect would be restricted and it is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects beyond several days from completion.

5.5.18 Given this, the likely habitat loss experienced will be of **negligible magnitude.**

Significance

5.5.19 The effect of habitat loss for northern lapwing for the intertidal project is thus considered to be **minor adverse.**

*Physical, visual and noise displacement*

Species sensitivity to physical, visual and noise displacement (Recoverability/Adaptability/Tolerance/Value)

5.5.20 This species is considered to have a **high species-specific sensitivity** to this effect

5.5.21 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect will be **very high.**

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.22 The impact of physical, visual and noise displacement would extend beyond the study area. Assuming that birds will be affected up to a distance of 300m, the impact of this effect would be restricted to an intertidal zone of less than 2.1km in length.

5.5.23 It is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects in terms of physical, visual and noise displacement once construction was complete (no available information on anticipated time required).

5.5.24 Given this, the likely effect of physical, visual and noise displacement experienced will be of **negligible magnitude**.

Significance

5.5.25 The effect of physical, visual and noise displacement on northern lapwing for the intertidal project is thus considered to be **minor adverse**.

***Ringed Plover* Charadrius hiaticula**

***Operation***

*Habitat loss*

Species sensitivity to habitat loss (Recoverability/Adaptability/Tolerance/Value)

5.5.26 This species is considered to have a **high species-specific sensitivity** to this effect.

5.5.27 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect will be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.28 As for Eurasian oystercatcher, the impact of this effect would be restricted and it is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects beyond several days from completion and would be limited to the area in which drilling or trenching operations took place.

5.5.29 Given this, the likely habitat loss experienced will be of **negligible magnitude.**

Significance

5.5.30 The effect of habitat loss on ringed plover associated with works in the intertidal is thus considered to be **minor adverse.**

*Physical, visual and noise displacement*

Species sensitivity to physical, visual and noise displacement (Recoverability/Adaptability/Tolerance/Value)

5.5.31 This species is considered to have a **medium species-specific sensitivity** to this effect.

5.5.32 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect will be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.33 The impact of physical, visual and noise displacement would extend beyond the study area. Assuming that birds will be affected up to a distance of 300m, the impact of this effect would be restricted to an intertidal zone of less than 2.1km in length.

5.5.34 It is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects in terms of physical, visual and noise displacement once construction was complete (no available information on anticipated time required).

5.5.35 Given this, the likely habitat loss experienced will be of **negligible magnitude**.

Significance

5.5.36 The effect of habitat loss on ringed plover for the intertidal project is thus considered to be **minor adverse.**

***Ruddy Turnstone* Arenaria interpres**

***Operation***

*Habitat loss*

Species sensitivity to habitat loss (Recoverability/Adaptability/Tolerance/Value)

5.5.37 This species is considered to have a **high species-specific sensitivity** to habitat loss.

5.5.38 Considering this and the species' **low value**, the species' **overall sensitivity** to this effect will be **medium.**

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.39 As for Eurasian oystercatcher, the impact of this effect would be restricted and it is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects beyond several days from completion.

5.5.40 Given this, the likely habitat loss experienced will be of **negligible magnitude**.

Significance

5.5.41 The effect of habitat loss for ruddy turnstone for the intertidal project is thus considered to be **negligible.**

*Physical, visual and noise displacement*

Species sensitivity to physical, visual and noise displacement (Recoverability/Adaptability/Tolerance/Value)

5.5.42 This species is considered to have a **medium species-specific sensitivity** to this effect.

5.5.43 Considering this and the species' **low value**, the species' **overall sensitivity** to this effect will be **low**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.44 The impact of physical, visual and noise displacement would extend beyond the study area. Assuming that birds will be affected up to a distance of 300m, the intertidal zone affected will be less than 2.1km in length.

5.5.45 It is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects in terms of physical, visual and noise displacement once construction was complete.

5.5.46 Given this, the likely physical, visual and noise displacement experienced will be of **negligible magnitude**.

Significance

5.5.47 The effect of physical, visual and noise displacement on ruddy turnstone for the intertidal project is thus considered to be **negligible**.

***Sanderling* Calidris alba**

***Operation***

*Habitat loss*

Species sensitivity to habitat loss (Recoverability/Adaptability/Tolerance/Value)

5.5.48 This species is considered to have a **high species-specific sensitivity** to habitat loss.

5.5.49 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect will be **very high.**

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.50 As for Eurasian oystercatcher, the impact of this effect would be restricted and it is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects beyond several days from completion.

5.5.51 Given this, the likely habitat loss experienced will be of **negligible magnitude**.

Significance

5.5.52 The effect of habitat loss for sanderling for the intertidal project is thus considered to be **minor adverse**.

*Physical, visual and noise displacement*

Species sensitivity to physical, visual and noise displacement (Recoverability/Adaptability/Tolerance/Value)

5.5.53 This species is considered to have a **medium species-specific sensitivity** to this effect.

5.5.54 Considering this and the species' **very high value**, the species' **overall sensitivity** to this effect will be **very high**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.55 The impact of physical, visual and noise displacement would extend beyond the study area. Assuming that birds will be affected up to a distance of 300m, the intertidal zone affected will be less than 2.1km in length.

5.5.56 It is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects in terms of physical, visual and noise displacement once construction was complete (no available information on anticipated time required).

5.5.57 Given this, the likely physical, visual and noise displacement experienced will be of **negligible magnitude**.

Significance

5.5.58 The effect of physical, visual and noise displacement for sanderling for the intertidal project is thus considered to be **minor adverse**.

***Dunlin* Calidris alpina**

***Operation***

*Habitat loss*

Species sensitivity to habitat loss (Recoverability/Adaptability/Tolerance/Value)

5.5.59 This species is considered to have a **high species-specific sensitivity** to habitat loss.

5.5.60 Considering this and the species' **low value**, the species' **overall sensitivity** to this effect will be **medium.**

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.61 As for Eurasian oystercatcher, the impact of this effect would be restricted and it is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects beyond several days from completion.

5.5.62 Given this, the likely habitat loss experienced will be of **negligible magnitude**.

Significance

5.5.63 The effect of habitat loss for dunlin for the intertidal project is thus considered to be **negligible.**

*Physical, visual and noise displacement*

Species sensitivity to physical, visual and noise displacement (Recoverability/Adaptability/Tolerance/Value)

5.5.64 This species is considered to have a **medium species-specific sensitivity** to this effect.

5.5.65 Considering this and the species' **low value**, the species' **overall sensitivity** to this effect will be **low**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.66 The impact of physical, visual and noise displacement would extend beyond the study area. Assuming that birds will be affected up to a distance of 300m, the intertidal zone affected will be less than 2.1km in length.

5.5.67 It is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects in terms of physical, visual and noise displacement once construction was complete.

5.5.68 Given this, the likely physical, visual and noise displacement experienced will be of **negligible magnitude**.

Significance

5.5.69 The effect of physical, visual and noise displacement on dunlin for the intertidal project is thus considered to be **negligible**.

***Black-headed gull* Chroicocephalus ridibundus**

***Operation***

*Habitat loss*

Species sensitivity to habitat loss (Recoverability/Adaptability/Tolerance/Value)

5.5.70 Black-headed gulls display little habitat specialisation. They are highly capable of exploiting a range of coastal and inland habitats during the winter such as ploughed

land, grass, refuse tips, lochs and estuaries (Furness *et al.* 2012) and have a **low species-specific sensitivity** to habitat loss.

5.5.71 Considering this and the species' **low value**, the species' **overall sensitivity** to this effect will be **low**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.72 As for Eurasian oystercatcher, the impact of this effect would be restricted and it is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects beyond several days from completion.

5.5.73 Given this, the likely habitat loss experienced will be of **negligible magnitude.**

Significance

5.5.74 The effect of habitat loss for black-headed gull for the intertidal project is thus considered to be **negligible.**

*Physical, visual and noise displacement*

Species sensitivity to physical, visual and noise displacement (Recoverability/Adaptability/Tolerance/Value)

5.5.75 There is little information on the sensitivity of black-headed gulls to displacement which could arise during the intertidal installation of the cable. Black-headed gulls, in response to ship traffic, however, are known to show slight avoidance at short range (Furness *et al.* 2012) and consequently, this species is considered to have a **low species-specific sensitivity** to this effect.

5.5.76 Considering this and the species' **low value**, the species' **overall sensitivity** to this effect will be **low**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.77 The impact of physical, visual and noise displacement would extend beyond the study area. Assuming that birds will be affected up to a distance of 300m, the impact of this effect would be restricted to an intertidal zone of less than 2.1km in length.

5.5.78 It is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects in terms of physical, visual and noise displacement once construction was complete (no available information on anticipated time required).

5.5.79 Given this, the likely effect of physical, visual and noise displacement experienced will be of **negligible magnitude**.

Significance

5.5.80 The effect of physical, visual and noise displacement on black-headed gull for the intertidal project is thus considered to be **negligible.**

***Herring Gull* Larus argentatus**

***Operation***

*Habitat loss*

Species sensitivity to habitat loss (Recoverability/Adaptability/Tolerance/Value)

5.5.81 Herring gulls display little habitat specialisation. They are known to forage around in open sea (and specifically around ships at sea) and in inshore areas as well as more terrestrial habitats such as the intertidal zone, agricultural areas, on refuse and in urban areas (Furness *et al.* 2012). Consequently, this species is considered to have a **low species-specific sensitivity** to this habitat loss, notably for inland areas.

5.5.82 Considering this and the species' **medium value**, the species' **overall sensitivity** to this effect will be **low.**

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.83 As for Eurasian oystercatcher, the impact of this effect would be restricted and it is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects beyond several days from completion.

5.5.84 Given this, the likely habitat loss experienced will be of **negligible magnitude**.

Significance

5.5.85 The effect of habitat loss for herring gull for the intertidal project is thus considered to be **negligible.**

*Physical, visual and noise displacement*

Species sensitivity to physical, visual and noise displacement (Recoverability/Adaptability/Tolerance/Value)

5.5.86 There is little information on the sensitivity of herring gulls to displacement which could arise during the intertidal installation of the cable. Herring gulls, in response to ship traffic, however, show slight avoidance at short range (Furness *et al.* 2012) and consequently, this species is considered to have a **low species-specific sensitivity** to this effect.

5.5.87 Considering this and the species' **low value**, the species' **overall sensitivity** to this effect will be **low**.

Magnitude of effect (Duration/Frequency/Extent/Size)

5.5.88 The impact of physical, visual and noise displacement would extend beyond the study area. Assuming that birds will be affected up to a distance of 300m, the impact of this effect would be restricted to an intertidal zone of less than 2.1km in length.

5.5.89 It is unlikely that any of the potential methods of intertidal cable installation would result in any residual effects in terms of physical, visual and noise displacement once construction was complete (no available information on anticipated time required).

5.5.90 Given this, the likely effect of physical, visual and noise displacement experienced will be of **negligible magnitude**.

Significance

5.5.91 The effect of physical, visual and noise displacement on herring gull for the intertidal project is thus considered to be **negligible**.

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# 6. CUMULATIVE IMPACT ASSESSMENT RESULTS

## 6.1 Introduction

6.1.1 This section of the report provides the results of the cumulative impact assessment for the Dogger Bank Teesside A and Dogger Bank Teesside B projects.

6.1.2 In each case, assessment is first provided of the magnitudes of the impacts from different effects during construction and decommissioning and during operation. Following this, accounts review the sensitivities of each key receptor to these effects and, in combination with the assessment of magnitude, provide an assessment of the overall significance of impacts for each species.

6.1.3 Impacts on receptors in intertidal areas are considered separately as these will apply for both projections in combination.

6.1.4 The cumulative impact assessment for birds considers two spatial scales, for which the methodologies used and the confidence in predictions vary:

i. At the scale of the Dogger Bank Zone, i.e. for the Dogger Bank Teesside A and B projects in conjunction with the Dogger Bank Creyke Beck A and B projects and Dogger Bank Teesside C and D projects;
ii. On a regional scale, between the Dogger Bank Teesside A and B projects and other activities, projects and plans outside the Dogger Bank Zone which share receptors with the Dogger Bank Teesside A and B projects.

## 6.2 Cumulative Impacts of the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D Projects

**Disturbance/displacement**

6.2.1 The numbers of birds predicted to be displaced from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas and buffers during construction/decommissioning and operation, under chosen displacement rates, are shown in Table 6.1 and are also discussed at the start of each species' account. The values presented incorporate the correction factors for birds underwater (see section 4), but do not represent final magnitude, taking into account mortality rates. For each species, tabulated summaries of the number of birds estimated to be displaced, that are then estimated to die, based on a full range of alternative displacement and mortality rates, from 0 to 100%, are provided in Appendix 10.

6.2.2 Results of the apportioning of disturbance/displacement impacts to protected sites, incorporating mortality, are shown in Appendix 9. These tables also correct for the initial assumption that all birds come from the protected sites identified (see section 4).

6.2.3 Table 6.1 also provides separate estimates of the numbers of birds predicted to be displaced in respective breeding and winter periods. Birds predicted to be impacted during the breeding season will potentially include both breeders from any breeding colonies that the project is within range of, and also a non-breeding component. For gulls and northern gannet, it was possible to derive estimates of proportion of breeders from boat-survey observations of birds in breeding and juvenile plumages. For other species, it is assumed that, for species for which the wind farm project is within foraging range of birds from breeding colony protected sites, one third of the total number of birds (Stroud *et al.* 2004; Kober *et al.* 2010) present during the breeding season will be non-breeders. These are apportioned to protected sites surrounding the North Sea in the same manner as for seabirds outside the breeding season (see section 4).

**Table 6.1** Numbers of birds displaced during construction / decommissioning and operation for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects during 2010, 2010/11 and 2011/12; mean values are subsequently combined with species specific mortality rates to assess the impact of displacement (see section 4). Full matrices of displacement and mortality are given in Appendix 10 for this and other projects.

| | | **Construction / decommissioning** | | | |
|---|---|---|---|---|---|
| **Species** | **Season** | **2010** | **2010/2011** | **2011/2012** | **Mean** |
| Northern gannet | Breeding | 153 (129-181) | 296 (253-349) | 940 (799-1119) | 501 (427-594) |
| | Winter | 232 (196-277) | 626 (533-742) | 1203 (1004-1435) | 719 (605-856) |
| | All | 384 (326-458) | 922 (786-1091) | 2143 (1803-2554) | 1220 (1031-1450) |
| Common guillemot | Breeding | 2268 (2098-2479) | 4252 (3925-4620) | 4940 (4495-5460) | 3870 (3552-4242) |
| | Winter | 11192 (10274-12172) | 12805 (11806-13865) | 7969 (7333-8648) | 9907 (9120-10749) |
| | All | 13460 (12371-14650) | 17057 (15731-18485) | 12909 (11828-14108) | 13777 (12671-14991) |
| Razorbill | Breeding | 148 (121-181) | 323 (268-386) | 710 (577-879) | 392 (320-480) |
| | Winter | 3747 (3266-4252) | 4165 (3664-4715) | 2558 (2241-2930) | 3202 (2805-3641) |
| | All | 3896 (3387-4433) | 4488 (3933-5102) | 3268 (2818-3809) | 3594 (3125-4121) |
| Little auk | Winter | 347 (260-488) | 283 (223-377) | 109 (87-151) | 225 (173-311) |
| Atlantic puffin | Breeding | 51 (40-64) | 104 (88-124) | 50 (40-62) | 68 (56-83) |
| | Winter | 386 (314-479) | 524 (441-635) | 114 (93-136) | 303 (250-369) |
| | All | 437 (354-543) | 629 (529-759) | 164 (133-198) | 371 (306-453) |
| | | **Operation** | | | |
| **Species** | **Season** | **2010** | **2010/2011** | **2011/2012** | **Mean** |
| Northern gannet | Breeding | 305 (259-363) | 592 (507-698) | 1880 (1597-2238) | 1002 (854-1188) |
| | Winter | 463 (393-554) | 1252 (1065-1485) | 2406 (2009-2869) | 1438 (1209-1713) |
| | All | 768 (652-916) | 1844 (1572-2183) | 4286 (3606-5108) | 2440 (2063-2901) |
| Common guillemot | Breeding | 4536 (4196-4957) | 8504 (7850-9239) | 9880 (8989-10919) | 7741 (7103-8483) |
| | Winter | 22385 (20547-24343) | 25609 (23611-27731) | 15937 (14666-17297) | 19814 (18239-21499) |
| | All | 26921 (24743-29301) | 34114 (31462-36970) | 25817 (23655-28216) | 27555 (25342-29982) |
| Razorbill | Breeding | 297 (242-362) | 646 (537-773) | 1420 (1154-1758) | 784 (640-959) |
| | Winter | 7495 (6532-8504) | 8329 (7329-9431) | 5115 (4483-5860) | 6405 (5610-7283) |
| | All | 7792 (6774-8866) | 8976 (7865-10204) | 6536 (5636-7618) | 7188 (6251-8242) |
| Little auk | Winter | 693 (519-977) | 565 (447-755) | 218 (174-301) | 450 (346-622) |
| Atlantic puffin | Breeding | 101 (80-129) | 208 (176-248) | 100 (81-124) | 137 (112-167) |
| | Winter | 772 (628-958) | 1049 (882-1269) | 227 (186-272) | 605 (500-739) |
| | All | 873 (708-1087) | 1257 (1057-1517) | 328 (267-396) | 742 (613-906) |

**Barrier effects – Marine Birds**

6.2.4 Numbers of key species in flight potentially exposed to barrier effects for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are shown in Table 6.2.

**Table 6.2** Estimates of the numbers of breeding adult birds of these species in flight in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project area using the mean of 2010 and 2010/2011 and 2011/12 data.

| Species | Breeding season | Mean |
|---|---|---|
| Northern fulmar | Mar-Sep | 446 (360-540) |
| Northern gannet | Apr-Sep | 482 (540-572) |
| Black-legged kittiwake | Apr-Sep | 3,877 (614-4,307) |
| Common guillemot | May-Jul | 1,179 (1,003-1,292) |
| Razorbill | May-Jul | 228 (278-278) |

**Collision – Marine Birds**

6.2.5 An overview of the combined results of collision risk analyses for marine birds for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D Projects is provided below.

6.2.6 There were strong between year differences in both the total numbers of birds present within Dogger Bank Teesside A, B, C and D and Dogger Bank Creyke Beck A and B, and annual patterns in their abundance. With only three years of data, it was not possible to determine which year was most representative of bird abundance within Dogger Bank Teesside A, B, C and D and Dogger Bank Creyke Beck A and B. For these reasons, collision risk estimates were produced for each year separately, rather than for a mean value from the three years.

6.2.7 Using a realistic, precautionary avoidance rate of 98% (SNH 2010, Cook *et al.* 2012), the numbers of Arctic skua, common guillemot, little auk and Atlantic puffin colliding with wind turbines, based on population estimates from 2010 to 2012, were predicted to be less than one bird per year. Even assuming a more conservative avoidance rate of 95%, the numbers of Arctic skua, common guillemot, little auk and Atlantic puffin predicted to collide with wind turbines were less than one bird per year. Northern fulmar, great skua and razorbill had a similarly low collision risk, with a maximum of two great skua, four northern fulmar and 11 razorbill predicted to collide annually.

**Table 6.3** Annual collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A and B, Dogger Bank Creyke A and B and Dogger Bank Teesside C and D projects of the Dogger Bank Zone, assuming a worst case scenario of 1,200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m in response to different avoidance rates. Estimates generated using option 3 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | | | July 2010 – June 2011 | | | | July 2011 – June 2012 | | | | Mean | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 95% | 98% | 99% | 99.5% | 95% | 98% | 99% | 99.5% | 95% | 98% | 99% | 99.5% | 0.95 | 0.98 | 0.99 | 0.995 |
| Northern fulmar | 10 (8 - 13) | 4 (3 - 5) | 2 (2 - 3) | 1 (1 - 1) | 7 (6 - 9) | 3 (2 - 4) | 1 (1 - 2) | 1 (1 - 1) | 11 (9 - 14) | 4 (4 - 6) | 2 (2 - 3) | 1 (1 - 1) | 10 (8-12) | 4 (3-5) | 2 (2-2) | 1 (1-1) |
| Northern gannet | 434 (354 - 518) | 174 (142 - 207) | 87 (71 - 104) | 43 (35 - 52) | 684 (561 - 810) | 274 (225 - 324) | 137 (112 - 162) | 68 (56 - 81) | 1,910 (1,560 – 2,266) | 765 (624 - 907) | 382 (312 - 454) | 191 (156 - 227) | 1085 (888-1287) | 434 (356-515) | 217 (178-258) | 109 (89-129) |
| Arctic Skua | 0 (0 - 3121) | 0 (0 - 1249) | 0 (0 - 625) | 0 (0 - 312) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 363) | 0 (0 - 145) | 0 (0 - 73) | 0 (0 - 36) | 0 (0-1162) | 0 (0-465) | 0 (0-233) | 0 (0-116) |
| Great Skua | 2 (1 - 4) | 1 (0 - 2) | 0 (0 - 1) | 0 (0 - 0) | 3 (1 - 6) | 1 (1 - 2) | 1 (0 - 1) | 0 (0 - 1) | 5 (3 - 10) | 2 (1 - 4) | 1 (1 - 2) | 1 (0 - 1) | 4 (2-7) | 2 (1-3) | 1 (0-1) | 0 (0-1) |
| Black-legged kittiwake | 924 (824 – 1,049) | 370 (330 - 420) | 185 (165 - 210) | 93 (82 - 105) | 1,629 (1,448 – 1,841) | 652 (579 - 737) | 326 (290 - 369) | 163 (145 - 184) | 1,651 (1,457 – 1,888) | 661 (583 - 756) | 330 (292 - 378) | 165 (146 - 189) | 1382 (1225-1571) | 553 (490-629) | 277 (245-314) | 138 (123-157) |
| Lesser black-backed gull | 336 (226 - 516) | 135 (91 - 207) | 67 (45 - 103) | 34 (23 - 52) | 202 (125 - 325) | 81 (50 - 130) | 40 (25 - 65) | 20 (13 - 33) | 135 (69 - 240) | 54 (28 - 96) | 27 (14 - 48) | 13 (7 - 24) | 219 (137-353) | 88 (55-141) | 44 (27-71) | 22 (14-35) |
| Great black-backed gull | 448 (312 - 642) | 179 (125 - 257) | 90 (63 - 129) | 45 (31 - 64) | 452 (316 - 646) | 181 (127 - 259) | 91 (63 - 129) | 45 (32 - 65) | 361 (229 - 551) | 145 (92 - 221) | 72 (46 - 110) | 36 (23 - 55) | 407 (276-592) | 163 (111-237) | 81 (55-118) | 41 (28-59) |
| Common guillemot | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Razorbill | 12 (7 - 19) | 5 (3 - 8) | 2 (1 - 4) | 1 (1 - 2) | 27 (16 - 47) | 11 (6 - 19) | 5 (3 - 9) | 3 (2 - 5) | 23 (15 - 38) | 9 (6 - 15) | 5 (3 - 8) | 2 (2 - 4) | 20 (12-33) | 8 (5-13) | 4 (2-7) | 2 (1-3) |
| Little auk | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Atlantic puffin | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Table 6.4** Seasonal collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A and B, Dogger Bank Creyke A and B and Dogger Bank Teesside C and D projects of the Dogger Bank Zone, assuming a worst case scenario of 1,200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m and an avoidance rate of 98 % (99% for northern gannet). Estimates generated using option 3 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | July 2010 – June 2011 | | July 2011 – June 2012 | | Mean | |
|---|---|---|---|---|---|---|---|---|
| | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding |
| Northern fulmar | 4 (0 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 4 (0 - 5) | 0 (0 - 1) | 2 (2-3) | 1 (1-2) |
| Northern gannet | 41 (5 - 50) | 5 (37 - 54) | 52 (41 - 62) | 84 (70 - 100) | 195 (160 - 229) | 187 (154 - 222) | 104 (85-122) | 114 (93-135) |
| Arctic Skua | 0 (0 - 0) | 0 (0 - 1248) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 144) | 0 (0 - 0) | 0 (0-48) | 0 (0-417) |
| Great Skua | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 1 (0-1) | 1 (0-2) |
| Black-legged kittiwake | 173 (12 - 197) | 21 (177 - 223) | 477 (424 - 538) | 175 (155 - 200) | 503 (442 - 574) | 159 (141 - 182) | 388 (344-441) | 165 (146-188) |
| Lesser black-backed gull | 101 (11 - 150) | 7 (20 - 57) | 51 (32 - 80) | 29 (17 - 52) | 28 (14 - 50) | 26 (14 - 46) | 58 (38-88) | 30 (17-53) |
| Great black-backed gull | 29 (5 - 44) | 20 (106 - 213) | 36 (25 - 54) | 145 (102 - 204) | 43 (25 - 76) | 101 (67 - 146) | 36 (23-58) | 127 (88-179) |
| Common guillemot | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |
| Razorbill | 0 (0 - 0) | 1 (2 - 7) | 0 (0 - 0) | 10 (6 - 17) | 0 (0 - 0) | 8 (6 - 14) | 0 (0-1) | 7 (5-12) |
| Little auk | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |
| Atlantic puffin | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0-0) | 0 (0-0) |

6.2.8 The numbers of lesser black-backed gull and great black-backed gull predicted to collide with wind turbines were greater. The collision rates were highest based on the 2010 population estimates for the lesser black-backed gull with 135 birds. For great black-backed gull, the highest collision estimates, of 181 birds, came from the 2010/11 population estimate.

6.2.9 Estimates were greatest for black-legged kittiwake and northern gannet. The maximum collision estimate for black-legged kittiwake was 661 birds based on the 2011/12 population. For northern gannet the maximum collision estimate was 382 birds, also based on the 2011/12 population and assuming a 99% avoidance rate.

6.2.10 Collision estimates were greatest for black-legged kittiwake and lesser black-backed gulls during the breeding season. Collision estimates were greater for the northern gannet and great black-backed gull during the non-breeding season (Table 5.4).

## Evaluation for Ornithological Receptors

### *White-billed diver*

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 5 | 100% displaced 37.5% mortality 4km buffer | 10,000 | <0.1 | 5000[3] | 0.1 | 0 | Negligible |
| Displacement (o) | 11 | | 10,000 | 0.1 | 5000[3] | 0.2 | 0 | Negligible |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 10,000 | <0.1 | 5000[3] | <0.1 | 0 | Negligible |
| Collision – background adult mortality | <1 | | 1,066 | <0.1 | 533 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.
[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.
[3] Assumption of 50 birds used as a national threshold (see section 4).

#### *Summary of population estimates and value*

6.2.11 Numbers in the Dogger Bank Zone as a whole surpassed 1% thresholds for populations of national and international importance. White-billed divers were present in the Dogger Bank Zone between November and April when an average of 43 birds was estimated to occur in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas. The population of this species was assessed to be of regional importance and consequently, the value of this receptor is assessed to be **medium**.

#### *Construction and Decommissioning*

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.12 A full displacement analysis was not undertaken due to the low numbers predicted for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas (a monthly average of just 22 birds was estimated between November and April), of which five birds would be predicted to be lost through mortality.

6.2.13 Consequently, following the method and assumptions presented for Dogger Bank Teesside A, the effect of displacement for white-billed diver is considered to be of **negligible magnitude** at the national and biogeographic scales.

Significance

6.2.14 This species has a **medium value**. Combining the species' magnitude with value, the impact of this effect for white-billed diver is considered to be of **negligible** at both national and biogeographic scales.

*Direct habitat loss or change*

Wind farm and export cable corridors

6.2.15 The impact of habitat loss for both the wind farm area and cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **negligible.**

***Operation***

*Disturbance/displacement*

6.2.16 A full displacement analysis was not undertaken due to the low numbers predicted for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas (a monthly average of just 43 birds was estimated between November and April), of which 11 birds would be predicted to be lost through mortality.

6.2.17 Consequently, following the method and assumptions presented for Dogger Bank Creyke Beck A, the effect of displacement for white-billed diver is considered to be of **negligible magnitude** at the national and biogeographic scales.

Significance

6.2.18 This species has a **medium value**. Combining the species' magnitude with value, the impact of this effect for white-billed diver is considered to be **negligible** at both national and biogeographic scales.

*Collision*

Species Overall sensitivity to collision – High (see section 5.2)

6.2.19 The effect of collision for white-billed diver for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is considered to be **negligible** following the assessment methodology and justification presented for Dogger Bank Teesside A.

*Direct habitat loss or change*

6.2.20 Following the methodology and justification presented in section 5.2, the impact of habitat loss for white-billed diver in Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **negligible.**

***Northern fulmar***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 5 | 98% avoidance Flight height option 3 | 10,200,000 | <0.1 | 1,500,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 190,400 | <0.1 | 28,000 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

6.2.21 The peak population estimates for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D in 2010, 2010/11 and 2011/12 were 3,285 birds (90% CIs = 2,684-3,894) in June, 1,611 birds (90% CIs = 1,283-1,968) in July, and 1,458 birds (90% CIs = 1,144-1,758) in October, respectively. The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project area in either year.

6.2.22 The value of this receptor is assessed as **very high** as the species is a breeding feature of 26 SPAs and a wintering feature of two SPAs in the Greater North Sea OSPAR region. The Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are within foraging range of eight protected breeding sites in Great Britain, and a further site - Seevogelschutzgebiet Helgoland - around the North Sea.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.23 The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.24 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern fulmar is considered to be **negligible**.

Export cable corridor

6.2.25 The impact of habitat loss for the cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **negligible.**

***Operation***

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.26 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 540 adult northern fulmars in flight in the project areas in the breeding season using 2010, 2010/11 and 2011/12 data (Table 6.2).

6.2.27 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.46 (Appendix 9), and indicates that between 5 and 20% of the population at the Flamborough Head and Bempton Cliffs SPA and the Weybourne Cliffs and Hunstanton Cliffs SSSIs, and 1 and 5% of the populations at Buchan Ness to Collieston Coast SPA, Forth Islands SPA, Fowlsheugh SPA, Seevogelschutzgebiet Helgoland SPA, North Berwick Cliffs SSSI, Troup, Pennan and Lions Heads SSSI and Weybourne Cliffs SSSI are potentially exposed to this effect.

6.2.28 The potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009). In this case, the positions and separation of the projects means the increase in flight distance, due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, is unlikely to be more than the distance presented by the six wind farm projects on their own. The average increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is approximately 25km (6.25% of the species' maximum foraging range of 400km). The projects are between 130km and 388km from the protected sites within foraging range that would be potentially impacted by this effect (Appendix 1). This increase might prevent birds from two sites – the Troup, Pennan and Lions Heads and Seevogelschutzgebiet Helgoland SPAs – from reaching foraging areas beyond the project areas.

6.2.29 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

6.2.30 Based on the assessment of magnitude and the species' **very high value**, the overall significance of the potential barrier effect associated with the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects for northern fulmar is assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.31 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of just five northern fulmar per year.

6.2.32 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

6.2.33 Mean annual estimates of the number of collisions represent less than 0.1% of the populations of each of the protected sites around the North Sea within foraging range. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

6.2.34 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British breeding population.

6.2.35 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

6.2.36 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

6.2.37 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and

biogeographic scales would be impacted by this effect. The effect of collision for northern fulmar for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales and consequently, the impact of the effect considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.38 For northern fulmar, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.39 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern fulmar is considered to be **negligible**.

***Northern gannet***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 73 | 75% displaced 5% mortality 2km buffer | 967,000 | <0.1 | 660,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 145 | | 967,000 | <0.1 | 660,000 | <0.1 | 0 | Minor adverse |
| Collision – population | 258 | 99% avoidance Flight height option 3 | 967,000 | <0.1 | 660,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | 198 | | 52,218 | 0.4 | 35,640 | 0.5 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

6.2.40 The peak population estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in 2010, 2010/11 and 2011/12 were 1,075 birds (90% CIs =916-1,269) in October, 5,047 birds (90% CIs = 4,323-5,903) in March, and 9,628 birds (90% CIs = 8,053-11,449) in March respectively. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of nine SPAs, a wintering feature of five SPAs and a passage feature of five SPAs.

6.2.41 The Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are within foraging range of three protected breeding sites around the North Sea (two of which are within Great Britain) at which the species is a feature – the Seevogelschutzgebiet Helgoland, Firth of Forth Islands, and Flamborough Head and Bempton Cliffs SPAs. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Very Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.42 Based on 50% of the worst case values for displacement, analysis provided estimates of 384 (using 90% confidence limits = 326-458) displaced birds using 2010 data (153 during breeding months, 232 during other months of the year), 922 (using 90% confidence limits = 786-1,091) displaced birds using 2010/11 data (296 during breeding months, 626 during other months of the year), and 2,143 (using 90%

confidence limits = 1,803-2,554) displaced birds using 2011/12 data (940 during breeding months, 1,203 during other months of the year). The mean value was 1,220 (using 90% confidence limits = 1,031-1,450) displaced birds (501 during breeding months, 719 during other months of the year).

6.2.43 Tables A9.47a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where less than 0.1% of birds would be impacted.

6.2.44 Maximum estimates of the number of birds that are displaced and subsequently die, suggests that displacement would affect less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Less than 0.1% of the British breeding population would be impacted by this effect.

6.2.45 Displacement would affect much less than 0.1% of the species' biogeographic population.

6.2.46 Less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for northern gannet for is thus considered of **negligible magnitude** at all scales.

Significance

6.2.47 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.48 For northern gannet, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Therefore, we consider the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

6.2.49 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern gannet is considered to be **negligible**.

Export cable corridor

6.2.50 The impact of habitat loss for the cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **negligible.**

***Operation***

*Disturbance/displacement*

Sensitivity to habitat loss – Very Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.51 Based on worst case values for displacement, analysis provided estimates of 768 (using 90% confidence limits = 652-916) displaced birds using 2010 data (305 during breeding months, 463 during other months of the year), 1,844 (using 90% confidence limits = 1,572-2,183) displaced birds using 2010/11 data (592 during breeding months, 1,252 during other months of the year), and 4,286 (using 90% confidence limits = 3,605-5,108) displaced birds using 2011/12 data (1,880 during breeding months, 2,406 during other months of the year). The mean value was 2,440 (using 90% confidence limits = 2,063-2,901) displaced birds (1,002 during breeding months, 1,438 during other months of the year).

6.2.52 Tables A9.48a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where much less than 0.1% of birds would be impacted.

6.2.53 Maximum estimates of the number of birds that are displaced and subsequently die, suggests that displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Less than 0.1% of the British breeding population would be impacted by this effect.

6.2.54 Displacement would affect much less than 0.1% of the species' biogeographic population.

6.2.55 Less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for northern gannet is thus considered of **negligible magnitude** at all scales.

Significance

6.2.56 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.57 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 572 adult northern gannets in flight in the project areas in the breeding season using 2010, 2010/11 and 2011/12 data (Table 6.2).

6.2.58 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.49 (Appendix 9) which indicates that between 1 and 5% of the population at the Flamborough Head and Bempton Cliffs SPA might be potentially exposed to this effect.

6.2.59 The potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009) and in this case, due to the positions and separation of the projects, the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is unlikely to be more than the value presented by the six wind farm projects on their own. The average increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is thus approximately 25km, which is 10.9% of the species' maximum foraging range of 229km. The projects are between 130km and 195km from the protected sites within foraging range that would be potentially impacted by this effect (Appendix 1). Recent tracking studies indicate that additional individuals from some other North Sea protected sites may also be impacted (e.g. Wakefield *et al.* 2013).

6.2.60 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

6.2.61 Based on the assessment of magnitude and the species' **very high value**, the overall significance of the potential barrier effect associated with the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects for northern gannet is therefore, assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.62 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of 217 (90% confidence limits = 178-258) northern gannet per year. Of these, 104 were predicted to occur during the breeding season and 114 were predicted to occur during the non-breeding season.

6.2.63 Tables A9.50a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. The largest relative impact was predicted for the Flamborough Head and Bempton Cliffs SPA, where estimates of collisions during the breeding season represent 0.22% of the site population. Mean annual estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

6.2.64 The mean annual estimates, using 2011/12 data, of the numbers of collisions of adult birds apportioned to the Flamborough Head and Bempton Cliffs SPA represent 2.7% of the background mortality of adult northern gannets at this site and thus may be considered to be of **negligible magnitude** using this alternative approach.

6.2.65 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British breeding population.

6.2.66 Mean annual collision estimates represent much less than 0.1% of the species' biogeographic population.

6.2.67 The predicted number of collisions represents an increase in background mortality of less than 1% at the national and biogeographic population levels.

Significance

6.2.68 At the protected site, protected site suite, national and biogeographic scales, the effect of collision for northern gannet for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is considered to be of **negligible magnitude** and consequently, the impact is considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.69 For northern gannet, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Therefore, we consider the effect of direct habitat loss or change to be of **negligible magnitude**.

Significance

6.2.70 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for northern gannet is considered to be **negligible**.

***Arctic skua***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 75,000 | <0.1 | 6,300 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 5,700 | <0.1 | 479 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

6.2.71 Arctic skua were present in the Dogger Bank Zone during autumn only. The peak population estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in 2010, 2010/11 and 2011/12 were 8 birds (90% CIs =1-26), 7 birds (90% CIs = 1-26), and 22 birds (90% CIs = 12-51), all peaks being in September, respectively. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 12 SPAs and a passage feature of two SPAs.

6.2.72 The Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are outside the foraging range of any protected site at which the species is a breeding feature. There are no national population estimates for this species for the passage or winter seasons.

6.2.73 It should be noted that the estimated numbers of Arctic skua in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.74 For Arctic skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for

this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.75 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for Arctic skua is considered to be **negligible**.

Export cable corridor

6.2.76 The impact of habitat loss for the cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **negligible.**

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.77 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one Arctic skua collision per year.

6.2.78 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

6.2.79 Mean annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

6.2.80 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

6.2.81 Given that numbers of this species are possibly underestimated due to turnover (see above), even assuming an order of magnitude difference in the numbers estimated for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, the magnitude of impact predicted at each geographic scale considered would be unchanged.

6.2.82 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

6.2.83 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite and biogeographic scales would be impacted by this effect. The effect of collision for Arctic skua for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is thus considered of **negligible magnitude** at protected site, protected site suite and biogeographic scales and consequently, the impact of the effect is considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.84 For Arctic skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.85 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for Arctic skua is considered to be **negligible**.

***Great skua***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 3 | 98% avoidance Flight height option 3 | 48,000 | <0.1 | 28,800 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 3,584 | <0.1 | 2,150 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

6.2.86 Great skua were present in the Dogger Bank Zone during autumn only. The peak population estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in 2010, 2010/11 and 2011/12 were 10 birds (90% CIs = 5-19), 10 birds (90% CIs = 5-19), and 39 birds (90% CIs = 28-61), all peaks being in September, respectively. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of seven SPAs and a passage feature of two SPAs.

6.2.87 The Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are outside the foraging range of any protected site at which the species is a breeding feature. There are no national population estimates for this species for the passage or winter seasons.

6.2.88 It should be noted that the estimated numbers of great skua in the Dogger Bank Zone are probably underestimated due to the turnover of birds through the passage season.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.89 For great skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for

this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.90 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great skua is considered to be **negligible**.

Export cable corridor

6.2.91 The impact of habitat loss for the cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **negligible.**

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.92 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of just two great skua collisions per year.

6.2.93 Estimates have not been apportioned to protected sites, due to the small numbers predicted. Maximum annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

6.2.94 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

6.2.95 Given that numbers of this species are possibly underestimated due to turnover (see above), even assuming an order of magnitude difference in the numbers estimated for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, the magnitude of impact predicted at each geographic scale considered would be unchanged.

6.2.96 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

6.2.97 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite and biogeographic scales would be impacted by this effect. The effect of collision for great skua for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is thus considered of **negligible magnitude** at protected site, protected site suite and biogeographic scales and consequently, the impact of the effect is considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.98 For great skua, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.99 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great skua is considered to be **negligible**.

***Black-legged kittiwake***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 629 | 98% avoidance Flight height option 3 | 6,600,000 | <0.1 | 1,110,000 | <0.1 | 0 | Moderate adverse |
| Collision – background adult mortality | 510 | | 259,600 | 0.1 | 43,660 | 1.1 | 1 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

6.2.100 The peak population estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas were 18,441 (90% CIs = 16,021-20,618), 36,712 (90% CIs = 33,142-41,034), and 32,286 (90% CIs = 28,419-36,529) for 2010, 2010/11 and 2011/12 respectively, in March in all years. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 24 SPAs, a wintering feature of four SPAs and a passage feature of six SPAs.

6.2.101 The proposed project is within foraging range during the breeding season of three protected breeding sites around the North Sea at which the species is a feature, all of which are in Great Britain – Flamborough Head and Bempton Cliffs and Farne Islands SPAs and the Durham Coast and Marsden Bay SSSI. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.102 For black-legged kittiwake, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.103 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for black-legged kittiwake is considered to be **negligible**.

Export cable corridor

6.2.104 The impact of habitat loss for the cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **negligible.**

***Operation***

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.105 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 4,307 adult black-legged kittiwakes in flight in the project areas in the breeding season using 2010, 2010/11 and 2011/12 data (Table 6.2).

6.2.106 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.51 (Appendix 9). The Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are within foraging range of the Flamborough Head and Bempton Cliffs SPA and the Farne Islands SPA. Between 5 and 20% of the population at the Flamborough Head and Bempton Cliffs SPA and 1 and 5% of the Farne Islands SPA might be potentially exposed to this effect.

6.2.107 The potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009) and in this case, due to the positions and separation of the projects, the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is unlikely to be more than the greater presented by the six wind farm projects on their own. The average increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is thus approximately 25km (10.8% of the species' maximum foraging range of 231km). The projects are between 130km and 225km from the protected sites within foraging range that would be potentially impacted by this effect (Appendix 1). This increase might prevent birds from one site – the Durham Coast and Marsden Bay SSSI – from reaching foraging areas beyond the project areas.

6.2.108 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

6.2.109 Based on the assessment of magnitude and the species' **very high value**, the overall significance of the potential barrier effect associated with the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects for black-legged kittiwake is therefore, assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.110 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of 553 (90% confidence limits = 490-629) black-legged kittiwake collisions per year. Of these, 388 were predicted to occur during the breeding season and 165 during the non-breeding season.

6.2.111 Tables A9.52a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. The proposed projects are within foraging range of the Flamborough Head and Bempton Cliffs and Farne Islands SPAs, and the Durham Coast SSSI. Maximum annual estimates of the number of collisions represent 0.34%, 0.11% and 0.20% of these sites' respective populations.

6.2.112 The mean annual estimates of the numbers of collisions of adult birds apportioned to the Flamborough Head and Bempton Cliffs SPA represent 5.72% of the background mortality of adult black-legged kittiwakes at this site and thus may be considered to be of **low magnitude** using this alternative approach.

6.2.113 Mean annual estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

6.2.114 The proposed projects are within foraging range of two protected breeding sites in Great Britain. Mean estimates of the number of collisions of birds in the breeding season represent 0.1% of the species' British population.

6.2.115 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

6.2.116 The predicted number of collisions represents an increase in background mortality of 1.1% at the national population level.

6.2.117 The predicted number of collisions represents an increase in background mortality of less than 1% at the biogeographic population level.

Significance

6.2.118 Based on the size of the impacts predicted relative to population size, the effect of collision for black-legged kittiwake for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects would be considered to be of Negligible magnitude and consequently, **Minor adverse** for the Farne Islands SPA and at protected site suite, national and biogeographic scales. However, the number of collisions of adult birds apportioned to the Flamborough Head and Bempton Cliffs SPA exceeds 5% of the background mortality of adult black-legged kittiwakes at this site. According to this alternative approach, this effect should also be considered of **low magnitude** for black-legged kittiwake at this site and thus the impact of the effect is considered to be **moderate adverse**.

6.2.119 At the protected site suite, national and biogeographic scales, effect of collision for black-legged kittiwake for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is considered to be of **negligible magnitude** and consequently, the impact is considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.120 For black-legged kittiwake, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.121 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for black-legged kittiwake is considered to be **negligible**.

***Lesser black-backed gull***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 141 | 98% avoidance Flight height option 3 | 550,000 | <0.1 | B 120,000 | <0.1 | 0 | Minor adverse |
| | | | | | W 330,000 | <0.1 | | |
| Collision – background adult mortality | 39 | | 31,900 | 0.1 | B 6,960 | 0.5 | 0 | |
| | | | | | W 19,140 | 0.2 | | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided; B = Breeding, W = winter.

***Summary of population estimates and value***

6.2.122 The peak population estimates for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas were 916 birds (90% CIs = 648-1,303) in June, 462 birds (90% CIs = 329-639) in May, and 250 birds (90% CIs = 97-708) in May for 2010, 2010/11 and 2011/12 respectively. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 21 SPAs, a wintering feature of two SPAs and a passage feature of three SPAs.

6.2.123 The Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are outside the foraging range of any protected site at which the species is a breeding feature.

6.2.124 It should be noted that national winter population estimates for gulls come from a survey of terrestrial habitats and inshore waters (Burton *et al.* 2013) and thus do not include birds that frequent offshore waters; therefore, underestimating the overall national populations. It should also be noted that the estimated numbers of this species in the Dogger Bank Zone are possibly underestimated, given that those present in the spring may be *intermedius* birds on passage to Scandinavia and thus due to the potential turnover of birds at this time.

***Construction and Decommissioning***

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.125 The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.126 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for lesser black-backed gull is considered to be **negligible**.

Export cable corridor

6.2.127 The impact of habitat loss for the cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **negligible.**

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.128 The Band collision risk model (Band *et al.* 2012) provided a meanannual collision estimate of 88 (90% confidence limits = 55-141) lesser black-backed gull collisions per year. Of these, 58 were predicted to occur during the breeding season and 30 during the non-breeding season.

6.2.129 Tables A9.53a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. Mean annual collision estimates represent less than 0.1% of the populations of each of the protected sites around the North Sea at which the species is a feature.

6.2.130 Mean winter estimates represent 0.1% of the winter population estimate for the species in Great Britain.

6.2.131 Mean annual estimates represent less than 0.1% of the species' biogeographic population.

6.2.132 The predicted number of collisions represents an increase in background mortality of less than 1% (up to 0.29% using mean data) at the protected site, protected site suite, national and biogeographic population levels.

Significance

6.2.133 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for great black-backed gull for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is thus considered to be of **negligible magnitude** at all scales and thus **minor adverse** at all scales.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.134 For lesser black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.135 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for lesser black-backed gull is considered to be **negligible**.

***Great black-backed gull***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Collision – population | 237 | 98% avoidance Flight height option 3 | 420,000 | <0.1 | B 51,000 | 0.5 | 0 | Minor adverse |
| | | | | | W 75,860 | 0.3 | | |
| Collision – background adult mortality | 79 | | 24,360 | 0.3 | B 2,958 | 2.6 | 0 | |
| | | | | | W 4,400 | 1.7 | | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided; B = Breeding, W = winter.

***Summary of population estimates and value***

6.2.136 The peak population estimates for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas were 1,237 birds (90% CIs = 959-1,467) in January, 756 birds (90% CIs = 565-959) in March, and 553 birds (90% CIs = 406-725) in February for 2010, 2010/11 and 2011/12 respectively. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 17 SPAs and a wintering feature of two SPAs.

6.2.137 The Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are outside the foraging range of any protected site at which the species is a breeding feature.

6.2.138 It should be noted that national winter population estimates for gulls come from a survey of terrestrial habitats and inshore waters (Burton *et al.* 2013) and thus do not include birds that frequent offshore waters; therefore, underestimating the overall national populations. It should also be noted that the estimated numbers of this species in the Dogger Bank Zone are possibly underestimated due to the potential turnover of birds at this time.

***Construction and Decommissioning***

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.139 For great black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B,

Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.140 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great black-backed gull is considered to be **negligible**.

Export cable corridor

6.2.141 The impact of habitat loss for the cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **negligible.**

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.142 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of 163 (90% confidence limits = 111-237) great black-backed gull collisions per year. Of these, 36 were predicted to occur in the breeding season and 127 were predicted to occur in the non-breeding season.

6.2.143 Tables A9.54a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites. Mean annual collision estimates represent 0.34% of the populations of each of the protected sites around the North Sea at which the species is a feature.

6.2.144 The mean annual estimates of the numbers of collisions represent an increase in background mortality of 1.1% at each of the protected sites around the North Sea at which this species is a feature. Under this alternative approach, the impact of collisions would be considered as being of **negligible magnitude** at the protected site and protected site suite levels.

6.2.145 Mean winter estimates represent 0.2% of the winter population estimate for the species in Great Britain.

6.2.146 Mean annual estimates represent less than 0.1% of the species' biogeographic population.

6.2.147 The predicted number of collisions represents an increase in background mortality of 2.6% at the national level during the breeding season and 1.7% during the non-breeding season.

6.2.148 The predicted number of collisions represents an increase in background mortality of less than 1% at the biogeographic population level.

Significance

6.2.149 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for great black-backed gull for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is thus considered to be of **negligible magnitude** at all scales and thus **minor adverse** at all scales. Background mortality at the protected site and protected site suite level is also considered to be of **negligible magnitude** and therefore **minor adverse** at these scales following this alternative approach.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.150 For great black-backed gull, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.151 Combined with the species' High overall sensitivity to direct habitat loss or change, the impact of this effect for great black-backed gull is considered to be **negligible**.

***Common guillemot***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 750 | 50% displaced 5% mortality 2km buffer | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 1,499 | | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 5,600,000 | <0.1 | 2,640,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 201,600 | < 0.01 | 95,040 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

6.2.152 The peak population estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas were 43,806 birds in January (90% CIs = 40,080-47,811), 61,271 birds in March (90% CIs = 57,309-65,435), and 67,841 birds in April (90% CIs = 62,995-73,587) for 2010, 2010/11 and 2011/12 respectively. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 26 SPAs, a wintering feature of 11 SPAs and a passage feature of one SPA.

6.2.153 The Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are within foraging range of seven protected breeding sites around the North Sea at which the species is a feature, of which six are in Great Britain – Buchan Ness to Collieston Coast, the Farne Islands, Firth of Forth Islands, Flamborough Head and Bempton Cliffs, Fowlsheugh and St Abb's Head to Fast Castle SPAs, and one borders the North Sea - Seevogelschutzgebiet Helgoland. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.154 Based on 50% of the worst case values for displacement, analysis provided estimates of 13,460 (using 90% confidence limits = 12,371-14,650) displaced birds

using 2010 data (2,268 during breeding months, 11,192 during other months of the year), 17,057 (using 90% confidence limits = 15,731-18,485) displaced birds using 2010/11 data (4,252 during breeding months, 12,805 during other months of the year), and 12,909 (using 90% confidence limits = 11,828-14,108) displaced birds using 2011/12 data (4,940 during breeding months, 7,969 during other months of the year). The mean value was 13,777 (using 90% confidence limits = 12,671-14,991) displaced birds (3,870 during breeding months, 9,907 during other months of the year).

6.2.155 Tables A9.55a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where up to 0.13 (0.11-0.14)% of birds (using mean data) would be impacted.

6.2.156 Displacement would affect less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

6.2.157 Displacement would affect much less than 0.1% of the species' biogeographic population.

6.2.158 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for common guillemot for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project is thus considered of **negligible magnitude** at all scales.

Significance

6.2.159 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.160 For common guillemot, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.161 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for common guillemot is considered to be **minor adverse**.

Export cable corridor

6.2.162 The impact of habitat loss for the cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **minor adverse.**

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.163 Based on worst case values for displacement, analysis provided estimates of 26,921 (using 90% confidence limits = 24,743-29,301) displaced birds using 2010 data (4,536 during breeding months, 22,385 during other months of the year), 34,114 (using 90% confidence limits = 31,462-36,970) displaced birds using 2010/11 data (8,504 during breeding months, 25,609 during other months of the year), and 25,817 (using 90% confidence limits = 23,655-28,216) displaced birds using 2011/12 data (9,880 during breeding months, 15,937 during other months of the year). The mean value was 27,555 (using 90% confidence limits = 25,342-29,982) displaced birds (7,741 during breeding months, 19,814 during other months of the year).

6.2.164 Tables A9.56a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where less than 1%, of birds, up to 0.25 (0.23-0.27)% (using mean data), would be impacted.

6.2.165 Displacement would affect up to 0.11% (using mean data), of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect less than 0.1% of the British breeding population.

6.2.166 Displacement would affect much less than 0.1% of the species' biogeographic population.

6.2.167 Less than 1% of the reference population at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect

of displacement for common guillemot for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project is thus considered of **negligible magnitude** at all scales.

Significance

6.2.168 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.169 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 1,292 adult common guillemots in flight in the project areas in the breeding season using 2010, 2010/11 and 2011/12 data (Table 6.2).

6.2.170 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.57 (Appendix 9) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

6.2.171 The potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009) and in this case, due to the positions and separation of the projects, the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is unlikely to be more than the greater presented by the six wind farm projects on their own. The average increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is thus approximately 25km (7.4% of the species' maximum foraging range of 340km). The projects are between 130km and 340km from the protected sites within foraging range that would be potentially exposed to this effect (Appendix 1). This increase might prevent birds from five sites – the Fowlsheugh SPA, Forth Islands SPA, Buchan Ness to Collieston Coast SPAand St Abb's Head to Fast Castle SPA – from reaching foraging areas beyond the project areas.

6.2.172 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.173 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one common guillemot collision.

6.2.174 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

6.2.175 Mean annual estimates of the number of collisions represent less than 0.1% of the populations of each of the six protected sites within foraging range around the North Sea. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

6.2.176 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British, breeding population.

6.2.177 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

6.2.178 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

6.2.179 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for common guillemot for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales and consequently, the impact of the effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.180 For common guillemot, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.181 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for common guillemot is considered to be **minor adverse**.

***Razorbill***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 206 | 50% displaced 5% mortality 2km buffer | 1,380,000 | <0.1 | 330,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 412 | | 1,380,000 | <0.1 | 330,000 | 0.12 | 0 | Minor adverse |
| Collision – population | 17 | 98% avoidance Flight height option 3 | 1,380,000 | <0.1 | 330,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 92,000 | <0.1 | 22,000 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

6.2.182 The peak population estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas were 16,113 birds in January (90% CIs = 13,809-18,637), 29,932 birds in April (90% CIs = 26,685-33,522), and 23,879 birds in March (90% CIs = 21,320-26,916) for 2010, 2010/11 and 2011/12 respectively. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 18 SPAs, a wintering feature of five SPAs and a passage feature of two SPAs.

6.2.183 The Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are within foraging range of five protected breeding sites around the North Sea at which the species is a feature – the Farne Islands, Firth of Forth Islands, Flamborough Head and Bempton Cliffs, Fowlsheugh and St Abb's Head to Fast Castle SPAs. There are no national population estimates for this species for the winter.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.184 Based on 50% of the worst case values for displacement, analysis provided estimates of 3,896 (using 90% confidence limits = 3,387-4,433) displaced birds using 2010 data (148 during breeding months, 3,747 during other months of the year), 4,488 (using 90% confidence limits = 3,933-5,102) displaced birds using 2010/11 data (323 during breeding months, 4,165 during other months of the year), and 3,268

(using 90% confidence limits = 2,818-3,809) displaced birds using 2011/12 data (710 during breeding months, 2,558 during other months of the year). The mean value was 3,594 (using 90% confidence limits = 3,125-4,121) displaced birds (392 during breeding months, 3,202 during other months of the year).

6.2.185 Tables A9.58a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where up to 0.11 (0.1-0.13)% of birds (using mean data), would be impacted.

6.2.186 Displacement would affect less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

6.2.187 Displacement would affect much less than 0.1% of the species' biogeographic population.

6.2.188 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for razorbill for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project is thus considered of **negligible magnitude** at all scales.

Significance

6.2.189 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at the all scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.190 For razorbill, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.191 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for razorbill is considered to be **negligible**.

Export cable corridor

Export cable corridor

6.2.192 The impact of habitat loss for the cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **minor adverse.**

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.193 Based on worst case values for displacement, analysis provided estimates of 7,792 (using 90% confidence limits = 6,774-8,866) displaced birds using 2010 data (297 during breeding months, 7,495 during other months of the year), 8,976 (using 90% confidence limits = 7,866-10,204) displaced birds using 2010/11 data (646 during breeding months, 8,329 during other months of the year), and 6,536 (using 90% confidence limits = 5,636-7,618) displaced birds using 2011/12 data (1,420 during breeding months, 5,115 during other months of the year). The mean value was 7,188 (using 90% confidence limits = 6,251-8,242) displaced birds (784 during breeding months, 6,405 during other months of the year).

6.2.194 Tables A9.59a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). The biggest effect would be at the Flamborough Head and Bempton Cliffs SPA, where less than 1%, up to 0.23 (0.19-0.26)% of birds (using mean data), would be impacted.

6.2.195 Displacement would affect up to 0.16% (using mean data), of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect up to 0.12% (using mean data), of the British breeding population.

6.2.196 Displacement would affect much less than 0.1% of the species' biogeographic population.

6.2.197 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for razorbill for the Dogger Bank Teesside A and B, Dogger Bank

Creyke Beck A and B and Dogger Bank Teesside C and D project is thus considered of **negligible magnitude** at all scales.

Significance

6.2.198 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Barrier effects*

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.199 Based on upper 90% confidence limits and estimates of the proportions of birds in flight from boat surveys, it was estimated that there would be a mean maxima of 278 adult razorbills in flight in the project areas in the breeding season using 2010,2010/11 and 2011/12 data (Table 6.2).

6.2.200 The numbers of birds exposed to this effect represent less than 0.1% of national or biogeographic populations. The apportioning of these estimates to individual protected sites is summarised in Table A9.60 (Appendix 9) which indicates that less than 1% of the breeding populations at each of the sites within foraging range would be potentially exposed to this effect.

6.2.201 The potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009) and in this case, due to the positions and separation of the projects, the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is unlikely to be more than the greater presented by the six wind farm projects on their own. The average increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is thus approximately 25km (8.0% of the species' maximum foraging range of 312km). The projects are between 130km and 308km from the protected sites within foraging range that would be potentially exposed to this effect (Appendix 1). This increase might prevent birds from three sites – the Firth of Forth Islands, Fowlsheugh and St Abb's Head to Fast Castle SPAs – from reaching foraging areas beyond the project areas.

6.2.202 Considering both the numbers of birds exposed to this effect and the increase in flight distance due to the barrier presented by Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D this impact is considered to be of **negligible magnitude** at protected site, national and biogeographic levels.

Significance

6.2.203 Based on the assessment of magnitude and the species' **very high value,** the overall significance of the potential barrier effect associated with the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and

D projects for razorbill is therefore, assessed as **minor adverse** at the protected site, national and biogeographic levels.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.204 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of just 10 (90% CIs 6 – 17) razorbill collisions, restricted to the non-breeding season.

6.2.205 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

6.2.206 Mean annual estimates of the number of collisions represent less than 0.1% of the populations of each of the five protected sites within foraging range around the North Sea. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

6.2.207 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British breeding population.

6.2.208 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

6.2.209 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

6.2.210 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for razorbill for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales and consequently, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.211 For razorbill, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.212 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for razorbill is considered to be **minor adverse**.

***Little auk***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 16 | 25% displaced 5% mortality 2km buffer | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Displacement (o) | 31 | | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 125,000,000 | <0.1 | 5,000[3] | <0.1 | 0 | Negligible |
| Collision – background adult mortality | <1 | | 8,333,333 | <0.1 | 333 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.
[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.
[3] Assumption of 50 birds used as a national threshold (see section 4).

***Summary of population estimates and value***

6.2.213 The peak population estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas were 9,781 birds in December (90% CIs = 7,998-12,775), 9,781 birds in December (90% CIs = 7,998-12,775), and 3,442 birds in December (90% CIs = 2,871-4,531) for 2010, 2010/11 and 2011/12 respectively. The little auk breeds in the high Arctic and only occurs in the North Sea during the winter. Although there is no British population estimate for little auk, given the numbers estimated, this species is deemed to be of national importance in the Dogger Bank Creyke Beck A and B project areas. Consequently, the value of this receptor is assessed to be **high**.

***Construction and Decommissioning***

*Disturbance/displacement*

Wind farm

Species-specific sensitivity to habitat loss – Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.214 Taking 50% of the worst-case maximum annual estimates in winter months, when this species occurs, a total of 347 birds would be displaced during 2010 (using 90% confidence limits = 260-488), 282.7 during 2010/11 (using 90% confidence limits = 223-377) and 108.9 during 2011/12 (using 90% confidence limits = 87-151). The mean value was 225 (using 90% confidence limits = 173-311) displaced birds.

6.2.215 Using a national 1% threshold of 500 birds (in the absence of a national winter population estimate), much less than 0.1% of this population would be affected. Displacement would affect much less than 0.1% of the species' biogeographic population.

6.2.216 Less than 1% of reference populations at the national and biogeographic scales would be impacted by this effect. The effect of displacement for little auk for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project is thus considered of **negligible magnitude** at national level and biogeographic scales.

Significance

6.2.217 This species has a **high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **negligible** at national and biogeographic scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.218 The 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.219 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for little auk is considered to be **negligible**.

Export cable corridor

6.2.220 The impact of habitat loss for the cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **negligible.**

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Low (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.221 Based on worst case values for displacement, a total of 693 birds would be displaced during 2010 (using 90% confidence limits = 519-977), 565.4 during 2010/11 (using 90% confidence limits = 447-755) and 218 during 2011/12 (using 90% confidence limits = 174-301). The mean value was 450 (using 90% confidence limits = 346-622) displaced birds.

6.2.222 Using a national 1% threshold of 500 birds (in the absence of a national winter population estimate), less than 0.1% of this population would be affected. Displacement would affect much less than 0.1% of the species' biogeographic population.

6.2.223 Less than 1% of reference populations at the national and biogeographic scales would be impacted by this effect. The effect of displacement for little auk for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project is thus considered of **negligible magnitude** at national and biogeographic scales.

Significance

6.2.224 This species has a **high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **negligible** at both national and biogeographic scales.

*Collision*

Species Overall sensitivity to collision – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.225 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one little auk collision per year.

6.2.226 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

6.2.227 The predicted number of collisions represents an increase in background mortality of less than 1% at the national and biogeographic population levels.

Significance

6.2.228 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for little auk for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales and consequently, considered to be **negligible**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.229 For little auk, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.230 Combined with the species' Medium overall sensitivity to direct habitat loss or change, the impact of this effect for little auk is considered to be **negligible**.

***Atlantic puffin***

| Effect[1] | Impact | Assumptions | Biogeographic population[2] | | National population[2] | | Protected sites impacted | Significance |
|---|---|---|---|---|---|---|---|---|
| | | | Size | % | Size | % | | |
| Displacement (c/d) | 23 | 25% displaced 5% mortality 2km buffer | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Displacement (o) | 45 | | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Collision – population | <1 | 98% avoidance Flight height option 3 | 13,500,000 | <0.1 | 1,740,000 | <0.1 | 0 | Minor adverse |
| Collision – background adult mortality | <1 | | 68,4000 | <0.1 | 88,160 | <0.1 | 0 | |

[1] The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner; for details see text below; c= construction, d = decommissioning; o = operation.

[2] Individuals; in relation to collision, the estimated background adult mortality is also provided.

***Summary of population estimates and value***

6.2.231 The peak population estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas were 3,634 birds in October (90% CIs = 3,018-4,502), 4,119 birds in March (90% CIs = 3,699-4,734), and 1,157 birds in March (90% CIs = 996-1,380) for 2010, 2010/11 and 2011/12 respectively. The value of this receptor is assessed as **very high** as the species in the Greater North Sea OSPAR region is a breeding feature of 16 SPAs.

6.2.232 The proposed project is outside the foraging range of any protected site at which the species is a breeding feature.

***Construction and Decommissioning***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.233 Based on 50% of the worst case values for displacement, analysis provided estimates of 437 (using 90% confidence limits = 354-543) displaced birds using 2010 data (51 during breeding months, 386 during other months of the year), 629 (using 90% confidence limits = 529-759) displaced birds using 2010/11 data (104 during breeding months, 524 during other months of the year), and 164 (using 90% confidence limits = 133-198) displaced birds using 2011/12 data (50 during breeding months, 114 during other months of the year). The mean value was 371 (using 90% confidence limits = 306-453) displaced birds (68 during breeding months, 303 during other months of the year).

6.2.234 Tables A9.61a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

6.2.235 Displacement would affect much less than 0.1% of the species' biogeographic population.

6.2.236 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for Atlantic puffin for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project is thus considered of **negligible magnitude** at all scales.

Significance

6.2.237 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Direct habitat loss or change*

Wind farm

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.238 For Atlantic puffin, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.239 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for Atlantic puffin is considered to be **minor adverse**.

Export cable corridor

6.2.240 The impact of habitat loss for the cable corridors for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D is as assessed for Dogger Bank Teesside A – **minor adverse.**

***Operation***

*Disturbance/displacement*

Species-specific sensitivity to habitat loss – Medium (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.241 Based on worst case values for displacement, analysis provided estimates of 873 (using 90% confidence limits = 708-1,087) displaced birds using 2010 data (101 during breeding months, 772 during other months of the year), 1,257 (using 90% confidence limits = 1,057-1,517) displaced birds using 2010/11 data (208 during breeding months, 1,049 during other months of the year), and 328 (using 90% confidence limits = 267-396) displaced birds using 2011/12 data (100 during breeding months, 227 during other months of the year). The mean value was 742 (using 90% confidence limits = 613-906) displaced birds (137 during breeding months, 605 during other months of the year).

6.2.242 Tables A9.62a-d (Appendix 9) summarise the apportioning of these estimates to individual protected sites for the maximal displacement scenario, after applying the mortality value for this species (5%). Displacement would affect much less than 0.1% of the total population of the suite of protected sites around the North Sea at which the species is a feature. Displacement would affect much less than 0.1% of the British breeding population.

6.2.243 Displacement would affect much less than 0.1% of the species' biogeographic population.

6.2.244 Less than 1% of reference populations at the protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of displacement for Atlantic puffin for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project is thus considered of **negligible magnitude** at all scales.

Significance

6.2.245 This species has a **very high value**. Combining the species' magnitude with value, the impact of this effect is considered to be **minor adverse** at all scales.

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.246 The Band collision risk model (Band *et al.* 2012) provided a mean annual collision estimate of less than one Atlantic puffin collision per year.

6.2.247 Estimates have not been apportioned to protected sites, due to the small numbers predicted.

6.2.248 Mean annual estimates of the number of collisions represent less than 0.1% of the populations at the protected site level. Mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

6.2.249 Mean estimates of the number of collisions of birds in the breeding season represent less than 0.1% of the species' British, breeding population.

6.2.250 Mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

6.2.251 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

Significance

6.2.252 Considering the collision risk estimates based on the upper 90% confidence limit of the population in the year in which the species' population was greatest, less than 1% of reference populations at protected site, protected site suite, national and biogeographic scales would be impacted by this effect. The effect of collision for Atlantic puffin for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales and consequently, considered to be **minor adverse**.

*Direct habitat loss or change*

Overall sensitivity to habitat loss – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.2.253 For Atlantic puffin, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in

either year (see section 3). Combined with information on this species diet (see section 4), for this receptor the effect of direct habitat loss or change is considered to be of **negligible magnitude**.

Significance

6.2.254 Combined with the species' Very High overall sensitivity to direct habitat loss or change, the impact of this effect for Atlantic puffin is considered to be **minor adverse**.

***<u>Migrants</u>***

***Operation***

*Collision*

6.2.255 The migration zones (defined by Wright *et al.* 2012) of 47 species' populations of terrestrial or waterbird migrants that are UK SPA features overlap with the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects during migration. Note, the migration zone of two of these – barnacle goose (from the Svalbard population) and goosander (males from the British Isles breeding population on moult migration) – only overlapped the Dogger Bank Creyke Beck B and Dogger Bank Teesside C and D projects. Collision risk estimates suggest that, on an annual basis, the mortality associated with the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is likely to represent less than 1% of the reference population of each of these species (Table 6.5).

6.2.256 The effect of collision for migrants for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects is thus considered to be of **negligible magnitude** at the national level and **minor adverse** for 17 species' populations and **negligible** for 30 species' populations.

6.2.257 Due to the lack of knowledge concerning species' precise migration routes and their likely variability no attempt was made to apportion impacts to individual protected sites and thus it is unknown whether impacts may potentially be greater or less at any one particular site.

6.2.258 It should also be noted that for migrants there is much greater uncertainty in these calculations and thus the assessment both in regard to the determination of the numbers of birds passing through each project area and the proportions of these flying at heights which pose a risk of collision. Given these uncertainties the confidence in predictions in the assessment of collision for migrants is considered to be very low.

**Table 6.5** Assessment of collision risk for migrants for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects. Estimated numbers of collisions are based on modelling of the numbers of birds predicted to pass through the wind farm project, a 98% avoidance rate and expert judgement of the proportion of individuals likely to be flying at a height which places them at risk of collision. Three scenarios were run using the lower central and upper limits of the range of the proportion of birds at risk height as described in Wright *et al.* (2012) with the central value used for the purposes of assessment. It is important to note that the values in brackets under "estimated annual collisions" simply represent the estimates using the lower and upper estimates of the proportion of birds at risk height, and do not represent any kind of measure of confidence in the collision estimates (which would have a far greater range).

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Bean goose<br>*Anser fabalis* | 0.10 (0.02 - 0.24) | <0.1% | 12.47% | Very High | Low | High | Negligible | Negligible |
| Barnacle goose<br>(Svalbard population)<br>*Branta leucopsis* | 0.08 (0.01 - 0.20) | <0.1% | 0.24% | Very High | Very High | Very High | Negligible | Minor adverse |
| Light-bellied brent goose<br>(Svalbard population)<br>*Branta bernicla hrota* | 0.25 (0.041 - 0.62) | <0.1% | 7.40% | Very High | High | Very High | Negligible | Minor adverse |
| Common shelduck<br>*Tadorna tadorna* | 3.93 (0.03 - 15.70) | <0.1% | 10.28% | Very High | High | Very High | Negligible | Minor adverse |
| Eurasian wigeon<br>*Anas penelope* | 22.25 (0.15 - 89.01) | <0.1% | 9.58% | Very High | Very Low | Medium | Negligible | Negligible |
| Gadwall<br>*Anas strepera* | 0.36 (0.002 - 1.45) | <0.1% | 5.77% | Very High | Very Low | Medium | Negligible | Negligible |
| Eurasian teal<br>*Anas crecca* | 5.27 (0.04 - 21.09) | <0.1% | 9.61% | Very High | Very Low | Medium | Negligible | Negligible |
| Mallard<br>*Anas platyrhynchos* | 16.19 (0.11 - 64.75) | <0.1% | 10.28% | Very High | Very Low | Medium | Negligible | Negligible |
| Northern pintail<br>*Anas acuta* | 0.71 (0.005 - 2.84) | <0.1% | 9.61% | Very High | Very Low | Medium | Negligible | Negligible |
| Northern shoveler<br>*Anas clypeata* | 0.54 (0.004 - 2.17) | <0.1% | 8.19% | Very High | Very Low | Medium | Negligible | Negligible |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Common pochard *Aythya ferina* | 2.12 (0.01 - 8.49) | <0.1% | 8.19% | Very High | Very Low | Medium | Negligible | Negligible |
| Tufted duck *Aythya fuligula* | 4.03 (0.03 - 16.10) | <0.1% | 9.51% | Very High | Very Low | Medium | Negligible | Negligible |
| Greater scaup *Aythya marila* | 0.02 (0.0001 - 0.07) | <0.1% | 7.63% | Very High | Very Low | Medium | Negligible | Negligible |
| Common scoter *Melanitta nigra* | 0.19 (0.02 - 3.16) | <0.1% | 9.61% | Very High | Low | High | Negligible | Negligible |
| Velvet scoter *Melanitta fusca* | 0.12 (0.001 - 0.49) | <0.1% | 11.27% | Very High | Low | High | Negligible | Negligible |
| Common goldeneye *Bucephala clangula* | 1.38 (0.01 - 5.54) | <0.1% | 10.28% | Very High | Low | High | Negligible | Negligible |
| Red-breasted merganser *Mergus serrator* | 0.01 (0.0001 - 0.04) | <0.1% | 7.18% | Very High | Medium | Very High | Negligible | Minor adverse |
| Goosander *Mergus merganser* (breeding males) | 0.003 (0.00002 - 0.01) | <0.1% | 0.15% | Very High | Medium | Very High | Negligible | Minor adverse |
| Goosander *Mergus merganser* (non-breeding) | 0.18 (0.001 - 0.72) | <0.1% | 11.12% | Very High | Medium | Very High | Negligible | Minor adverse |
| Great bittern *Botaurus stellaris* | 0.02 (0.002 - 0.05) | <0.1% | 4.17% | Very High | Very Low | Medium | Negligible | Negligible |
| Great crested grebe *Podiceps cristatus* | 0.53 (0.05 - 2.10) | <0.1% | 6.87% | Very High | Medium | Very High | Negligible | Minor adverse |
| Slavonian grebe *Podiceps auritus* | 0.02 (0.002 - 0.06) | <0.1% | 9.61% | Very High | Medium | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (breeding) | 0.003 (0.001 - 0.005) | <0.1% | 4.70% | Very High | Medium | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (non-breeding) | 0.07 (0.03 - 0.14) | <0.1% | 11.27% | Very High | Medium | Very High | Negligible | Minor adverse |
| Eurasian coot *Fulica atra* | 0.84 (0.08 - 1.59) | <0.1% | 1.07% | Very High | Very Low | Medium | Negligible | Negligible |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Eurasian oystercatcher *Haematopus ostralegus* (non-breeding) | 7.53 (1.51 - 22.58) | <0.1% | 9.61% | Very High | High | Very High | Negligible | Minor adverse |
| Common ringed plover *Charadrius hiaticula* (non-breeding) | 1.30 (0.26 - 3.91) | <0.1% | 10.39% | Very High | Low | High | Negligible | Negligible |
| Golden plover *Pluvialis apricaria* (non-breeding) | 13.45 (2.69 - 40.36) | <0.1% | 9.20% | Very High | Very Low | Medium | Negligible | Negligible |
| Grey plover *Pluvialis squatarola* | 3.73 (0.75 - 11.19) | <0.1% | 10.29% | Very High | High | Very High | Negligible | Minor adverse |
| Northern lapwing *Vanellus vanellus* | 34.52 (6.90 - 103.55) | <0.1% | 10.29% | Very High | Very Low | Medium | Negligible | Negligible |
| Red knot *Calidris canutus* | 11.51 (2.30 - 34.53) | <0.1% | 9.59% | Very High | Medium | Very High | Negligible | Minor adverse |
| Sanderling *Calidris alba* | 2.95 (0.59 - 8.84) | <0.1% | 9.59% | Very High | Medium | Very High | Negligible | Minor adverse |
| Dunlin *Calidris alpina schinzii (passage)* | 0.24 (0.05 - 0.72) | <0.1% | 9.62% | Very High | Very Low | Medium | Negligible | Negligible |
| Dunlin *Calidris alpina alpina* (passage & winter) | 26.27 (5.25 - 78.81) | <0.1% | 8.88% | Very High | Very Low | Medium | Negligible | Negligible |
| Ruff *Philomachus pugnax* | 0.19 (0.04 - 0.56) | <0.1% | 11.06% | Very High | Very Low | Medium | Negligible | Negligible |
| Common snipe *Gallinago gallinago* | 33.91 (6.78 - 101.73) | <0.1% | 9.61% | Very High | Very Low | Medium | Negligible | Negligible |
| Black-tailed godwit *Limosa limosa islandica* | 0.20 (0.04 - 0.60) | <0.1% | 9.08% | Very High | Very High | Very High | Negligible | Minor adverse |
| Bar-tailed godwit *Limosa lapponica* | 4.47 (0.89 - 13.41) | <0.1% | 10.78% | Very High | Very Low | Medium | Negligible | Negligible |
| Whimbrel *Numenius phaeopus* | 0.85 (0.17 - 2.55) | <0.1% | 9.47% | Very High | High | Very High | Negligible | Minor adverse |

| Species | Estimated annual collisions | % reference population[1] | % migration zone[2] | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|---|
| Eurasian curlew *Numenius arquata* (non-breeding) | 6.83 (1.37 - 20.49) | <0.1% | 10.03% | Very High | Very Low | Medium | Negligible | Negligible |
| Greenshank *Tringa nebularia* | 0.002 (0.0003 - 0.005) | <0.1% | 7.62% | Very High | Very Low | Medium | Negligible | Negligible |
| Common redshank *Tringa totanus britannica* (breeding) | 0.22 (0.04 - 0.65) | <0.1% | 9.95% | Very High | Very Low | Medium | Negligible | Negligible |
| Common redshank Icelandic population *Tringa totanus robusta* (non-breeding) | 9.11 (1.82 - 27.34) | <0.1% | 9.17% | Very High | Very Low | Medium | Negligible | Negligible |
| Common redshank mainland Europe population *Tringa totanus* (non-breeding) | 2.01 (0.40 - 6.04) | <0.1% | 11.15% | Very High | Very Low | Medium | Negligible | Negligible |
| Ruddy turnstone *Arenaria interpres* | 1.62 (0.32 - 4.85) | <0.1% | 9.60% | Very High | High | Very High | Negligible | Minor adverse |
| Short-eared owl *Asio flammeus* | 0.07 (0.01 - 0.13) | <0.1% | 9.93% | Very High | Very Low | Medium | Negligible | Negligible |
| European nightjar *Caprimulgus europaeus* | 0.06 (0.01 - 0.11) | <0.1% | 3.09% | Very High | Very Low | Medium | Negligible | Negligible |

[1] The reference population size is defined as the total number of individuals of each species in the population that uses the migration route that encompasses the Dogger Bank. For further details and derivation see Table 4.18.

[2] The migration zone referred to here is the North Sea migration area appropriate to assessment for the Dogger Bank, and not the entire migration zone used by the species around the whole of the UK. The percentage given can be roughly interpreted as the percentage of birds migrating across the North Sea that would cross the wind farm footprint during a single migration period (note for most species there are 2 migrations per year crossing the North Sea). For further details see the SOSS migration modelling tool guidance (Wright *et al*. 2012).

*Barrier effects*

6.2.259 An assessment of the potential barrier effects posed by the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects to the 47 species' populations of terrestrial or waterbird migrants that are UK SPA features whose migration zones (defined by Wright *et al.* 2012) overlap with the project area is provided in Table 6.6 below. Note, the migration zone of two of these – barnacle goose (from the Svalbard population) and goosander (males from the British Isles breeding population on moult migration) – only overlapped the Dogger Bank Creyke Beck B and Dogger Bank Teesside C and D projects.

6.2.260 The percentages of reference populations estimated to pass through the project areas at risk height (following Wright *et al.* 2012) and thus exposed to potential barrier effects were less than 1% for 17 of the species' populations considered, but greater than 1% for 30 species' populations. The estimates of numbers passing through the project areas greatly exceed the numbers recorded by boat surveys, though it should be noted that boat surveys were not designed to record migrants and as they only provide a (diurnal) snapshot of birds flying close to the sea, they will inevitably greatly underestimate overall numbers of migrants.

6.2.261 The increase in flight distance due to the barrier presented by the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects varies by direction of flight, although due to the positions of the projects, for the shortest approximately east-west route across the North Sea passing through the project, equates to a maximum of approximately 45km (an increase of just 8% on the ca. 575km route).

6.2.262 Considering both the numbers of birds exposed to this effect and the relative increase in flight distance due to the barrier presented by the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, this impact is considered to be of **negligible magnitude** for all species' populations.

**6.2.263** It should be noted that there is considerable uncertainty regarding the assessment of barrier effects posed by offshore wind farms. For migrants, there is great uncertainty in the determination of the numbers of birds passing through each project area. There is little evidence to suggest whether or not migration may be concentrated within corridors within overall migration zones (Wright *et al.* 2012) and it cannot be assumed that birds fly directly to or from the protected sites that they are features of. It is also assumed that the wind farm poses a barrier effect to 100% of birds attempting to fly through at risk height (Maclean *et al.* 2009) which may be over-precautionary. In particular, there is considerable uncertainty as to the actual consequences for survival, and thus for population-level impacts, from the increase in energy expenditure associated with the increases in flight distance for those birds exposed to barrier effects. Given these uncertainties, the confidence in predictions in the assessment of barrier effects is considered to be very low and considerable caution is urged in considering the outcomes of this assessment.

**Table 6.6** Assessment of barrier effects for migrants for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects.

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Bean goose *Anser fabalis* | 0 | 1 | 27 | 3.74% | Very High | Negligible | Minor adverse |
| Barnacle goose (Svalbard population) *Branta leucopsis* | 0 | 4 | 23 | 0.07% | Very High | Negligible | Minor adverse |
| Light-bellied Brent Goose (Svalbard population) *Branta bernicla hrota* | 0 | 30 | 75 | 2.22% | Very High | Negligible | Minor adverse |
| Common shelduck *Tadorna tadorna* | 0 | 0 | 1166 | 1.54% | Very High | Negligible | Minor adverse |
| Eurasian wigeon *Anas penelope* | 0 | 8 | 7132 | 1.37% | Very High | Negligible | Minor adverse |
| Gadwall *Anas strepera* | 0 | 0 | 114 | 0.52% | Very High | Negligible | Minor adverse |
| Eurasian teal *Anas crecca* | 0 | 1 | 1799 | 0.72% | Very High | Negligible | Minor adverse |
| Mallard *Anas platyrhynchos* | 2 | 3 | 4960 | 1.08% | Very High | Negligible | Minor adverse |
| Northern pintail *Anas acuta* | 2 | 1 | 218 | 0.72% | Very High | Negligible | Minor adverse |
| Northern shoveler *Anas clypeata* | 0 | 0 | 174 | 0.92% | Very High | Negligible | Minor adverse |
| Common pochard *Aythya ferina* | 0 | 3 | 687 | 0.92% | Very High | Negligible | Minor adverse |
| Tufted duck *Aythya fuligula* | 2 | 0 | 1321 | 1.28% | Very High | Negligible | Minor adverse |
| Greater scaup *Aythya marila* | 0 | 0 | 6 | 0.06% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Common scoter *Melanitta nigra* | 113 | 191 | 59 | 0.05% | Very High | Negligible | Minor adverse |
| Velvet scoter *Melanitta fusca* | 4 | 9 | 38 | 1.52% | Very High | Negligible | Minor adverse |
| Common goldeneye *Bucephala clangula* | 2 | 0 | 450 | 1.54% | Very High | Negligible | Minor adverse |
| Red-breasted merganser *Mergus serrator* | 0 | 0 | 3 | 0.11% | Very High | Negligible | Minor adverse |
| Goosander *Mergus merganser* (breeding males) | 5 | 0 | 1 | 0.02% | Very High | Negligible | Minor adverse |
| Goosander *Mergus merganser* (non-breeding) | 5 | 0 | 54 | 1.67% | Very High | Negligible | Minor adverse |
| Great bittern *Botaurus stellaris* | 0 | 0 | 6 | 1.46% | Very High | Negligible | Minor adverse |
| Great crested grebe *Podiceps cristatus* | 0 | 0 | 167 | 0.69% | Very High | Negligible | Minor adverse |
| Slavonian grebe *Podiceps auritus* | 0 | 0 | 5 | 0.48% | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (breeding) | 0 | 0 | 1 | 0.24% | Very High | Negligible | Minor adverse |
| Hen harrier *Circus cyaneus* (non-breeding) | 0 | 0 | 17 | 4.51% | Very High | Negligible | Minor adverse |
| Eurasian coot *Fulica atra* | 0 | 0 | 281 | 0.27% | Very High | Negligible | Minor adverse |
| Eurasian oystercatcher *Haematopus ostralegus* (non-breeding) | 2 | 8 | 2403 | 1.20% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Common ringed plover *Charadrius hiaticula* (non-breeding) | 4 | 4 | 948 | 1.30% | Very High | Negligible | Minor adverse |
| Golden plover *Pluvialis apricaria* (non-breeding) | 0 | 5 | 4602 | 1.15% | Very High | Negligible | Minor adverse |
| Grey plover *Pluvialis squatarola* | 0 | 0 | 1268 | 2.57% | Very High | Negligible | Minor adverse |
| Northern lapwing *Vanellus vanellus* | 0 | 19 | 11548 | 2.57% | Very High | Negligible | Minor adverse |
| Red knot *Calidris canutus* | 3 | 15 | 4063 | 1.20% | Very High | Negligible | Minor adverse |
| Sanderling *Calidris alba* | 6 | 0 | 1079 | 1.80% | Very High | Negligible | Minor adverse |
| Dunlin *Calidris alpina schinzii (passage)* | 16 | 18 | 89 | 2.40% | Very High | Negligible | Minor adverse |
| Dunlin *Calidris alpina alpina* (passage & winter) | 16 | 18 | 9729 | 2.22% | Very High | Negligible | Minor adverse |
| Ruff *Philomachus pugnax* | 0 | 3 | 66 | 2.77% | Very High | Negligible | Minor adverse |
| Common snipe *Gallinago gallinago* | 1 | 0 | 12015 | 1.20% | Very High | Negligible | Minor adverse |
| Black-tailed godwit *Limosa limosa islandica* | 0 | 0 | 128 | 2.27% | Very High | Negligible | Minor adverse |
| Bar-tailed godwit *Limosa lapponica* | 0 | 0 | 1462 | 2.69% | Very High | Negligible | Minor adverse |
| Whimbrel *Numenius phaeopus* | 6 | 27 | 273 | 1.18% | Very High | Negligible | Minor adverse |
| Eurasian curlew *Numenius arquata* (non-breeding) | 51 | 4 | 2052 | 2.51% | Very High | Negligible | Minor adverse |

| Species | Number recorded by boat surveys in 2010[1] | Number recorded by boat surveys in 2011[1] | Estimated number crossing project[2] | % reference population[3] | Value | Magnitude[4] | Significance |
|---|---|---|---|---|---|---|---|
| Greenshank *Tringa nebularia* | 0 | 1 | 1 | 0.19% | Very High | Negligible | Minor adverse |
| Common redshank *Tringa totanus britannica* (breeding) | 0 | 0 | 75 | 0.25% | Very High | Negligible | Minor adverse |
| Common redshank Icelandic population *Tringa totanus robusta* (non-breeding) | 0 | 0 | 3152 | 1.15% | Very High | Negligible | Minor adverse |
| Common redshank mainland Europe population *Tringa totanus* (non-breeding) | 0 | 0 | 697 | 2.79% | Very High | Negligible | Minor adverse |
| Ruddy turnstone *Arenaria interpres* | 7 | 12 | 576 | 1.20% | Very High | Negligible | Minor adverse |
| Short-eared owl *Asio flammeus* | 2 | 23 | 18 | 1.74% | Very High | Negligible | Minor adverse |
| European Nightjar *Caprimulgus europaeus* | 0 | 0 | 18 | 0.15% | Very High | Negligible | Minor adverse |

[1] Across Dogger Bank Zone as a whole (see section 3).

[2] The estimated number of individuals of each species crossing the project is the number that would pass through at risk height (using the best estimate of the proportion of migrating birds at risk height from Wright *et al*. 2012 and not accounting for uncertainty) during a single migration season. Note that for most species, two migrations per year would be expected, and different individual birds may be involved during spring and autumn passage.

[3] The reference population size is defined as the total number of individuals of each species in the population that uses the migration route that encompasses the Dogger Bank. For further details and derivation see Table 4.18.

[4] Magnitude is assessed here according to Table 4.1.

***Summary for all receptors***

6.2.264 Table 6.7 below provides a summary of impacts from each effect for all key marine bird receptors.

**Table 6.7** Summary of potential impacts from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects for key marine bird receptors.

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude |
|---|---|---|---|---|---|---|
| White-billed diver | Displacement (construction/decommissioning) | National | Medium | - | - | Negligible |
| | | Biogeographic | Medium | - | - | Negligible |
| | Habitat loss or change (construction/decommissioning) | All | Medium | High | High | Negligible |
| | Habitat loss or change (cable construction) | All | Medium | High | High | Negligible |
| | Displacement (operation) | National | Medium | - | - | Negligible |
| | | Biogeographic | Medium | - | - | Negligible |
| | Collision (operation) | National | Medium | High | High | Negligible |
| | | Biogeographic | Medium | High | High | Negligible |
| | Habitat loss or change (operation) | All | Medium | High | High | Negligible |
| Northern fulmar | Habitat loss or change (construction/decommissioning) | All | Very High | Very Low | Medium | Negligible |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible |
| | | Site suite | Very High | Very High | Very High | Negligible |
| | | National | Very High | Very High | Very High | Negligible |
| | | Biogeographic | Very High | Very High | Very High | Negligible |
| | Habitat loss or change (operation) | All | Very High | Very Low | Medium | Negligible |
| Northern gannet | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible |
| | | Site suite | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Very Low | Medium | Negligible |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible |
| | | Site suite | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible |
| | | Site suite | Very High | Very High | Very High | Negligible |
| | | National | Very High | Very High | Very High | Negligible |
| | | Biogeographic | Very High | Very High | Very High | Negligible |
| | Habitat loss or change (operation) | All | Very High | Very Low | Medium | Negligible |
| Arctic skua | Habitat loss or change | All | Very High | Low | High | Negligible |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude |
|---|---|---|---|---|---|---|
| | (construction/decommissioning) | | | | | |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible |
| | Collision (operation) | Site suite | Very High | High | Very High | Negligible |
| | | National | Very High | High | Very High | Negligible |
| | | Biogeographic | Very High | High | Very High | Negligible |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible |
| Great skua | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible |
| | Collision (operation) | Site suite | Very High | High | Very High | Negligible |
| | | National | Very High | High | Very High | Negligible |
| | | Biogeographic | Very High | High | Very High | Negligible |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible |
| Black-legged kittiwake | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Low |
| | | Site suite | Very High | Very High | Very High | Negligible |
| | | National | Very High | Very High | Very High | Negligible |
| | | Biogeographic | Very High | Very High | Very High | Negligible |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible |
| Lesser black-backed gull | Habitat loss or change (construction/decommissioning) | All | Very High | Very Low | Medium | Negligible |
| | Habitat loss or change (cable construction) | All | Very High | Very Low | Medium | Negligible |
| | Collision (operation) | Site suite | Very High | Very High | Very High | Negligible |
| | | National | Very High | Very High | Very High | Negligible |
| | | Biogeographic | Very High | Very High | Very High | Negligible |
| | Habitat loss or change (operation) | All | Very High | Very Low | Medium | Negligible |
| Great black-backed gull | Habitat loss or change (construction/decommissioning) | All | Very High | Low | High | Negligible |
| | Habitat loss or change (cable construction) | All | Very High | Low | High | Negligible |
| | Collision (operation) | Site suite | Very High | Very High | Very High | Negligible |
| | | National | Very High | Very High | Very High | Negligible |
| | | Biogeographic | Very High | Very High | Very High | Negligible |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negligible |
| Common guillemot | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible |
| | | Site suite | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Habitat loss or change | All | Very High | Medium | Very High | Negligible |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude |
|---|---|---|---|---|---|---|
| | (construction/decommissioning) | | | | | |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible |
| | | Site suite | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible |
| | | Site suite | Very High | Very High | Very High | Negligible |
| | | National | Very High | Very High | Very High | Negligible |
| | | Biogeographic | Very High | Very High | Very High | Negligible |
| | Habitat loss or change (operation) | All | Very High | Medium | Very High | Negligible |
| Razorbill | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible |
| | | Site suite | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Medium | Very High | Negligible |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible |
| | | Site suite | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Barrier effects (operation) | Protected site | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible |
| | | Site suite | Very High | Very High | Very High | Negligible |
| | | National | Very High | Very High | Very High | Negligible |
| | | Biogeographic | Very High | Very High | Very High | Negligible |
| | Habitat loss or change (operation) | All | Very High | Medium | Very High | Negligible |
| Little auk | Displacement (construction/decommissioning) | National | High | - | - | Negligible |
| | | Biogeographic | High | - | - | Negligible |
| | Habitat loss or change (construction/decommissioning) | All | High | Low | Medium | Negligible |
| | Habitat loss or change (cable construction) | All | High | Low | Medium | Negligible |
| | Displacement (operation) | National | High | - | - | Negligible |
| | | Biogeographic | High | - | - | Negligible |
| | Collision (operation) | National | High | Medium | High | Negligible |
| | | Biogeographic | High | Medium | High | Negligible |
| | Habitat loss or change (operation) | All | High | Low | Medium | Negligible |
| Atlantic puffin | Displacement (construction/decommissioning) | Protected site | Very High | - | - | Negligible |
| | | Site suite | Very High | - | - | Negligible |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magnitude |
|---|---|---|---|---|---|---|
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Habitat loss or change (construction/decommissioning) | All | Very High | Medium | Very High | Negligible |
| | Habitat loss or change (cable construction) | All | Very High | Medium | Very High | Negligible |
| | Displacement (operation) | Protected site | Very High | - | - | Negligible |
| | | Site suite | Very High | - | - | Negligible |
| | | National | Very High | - | - | Negligible |
| | | Biogeographic | Very High | - | - | Negligible |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negligible |
| | | Site suite | Very High | Very High | Very High | Negligible |
| | | National | Very High | Very High | Very High | Negligible |
| | | Biogeographic | Very High | Very High | Very High | Negligible |
| | Habitat loss or change (operation) | All | Very High | Medium | Very High | Negligible |

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## 6.3 Cumulative Impacts of the Dogger Bank Teesside A and B Projects at a North Sea scale

### Introduction

6.3.1 In addition to an assessment of the potential cumulative impacts of the Dogger Bank Teesside A and B projects in conjunction with the Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, cumulative assessment is also undertaken at the scale of the wider North Sea 'region' (defined by the OSPAR Greater North Sea region). While the majority of marine birds that occur in the areas of Dogger Bank Teesside A and B during the breeding season may originate from a restricted number of protected sites, those that are present in the Dogger Bank Zone outside the defined breeding seasons or during the breeding season as non-breeders, and migrants that pass through the area in autumn and spring, are not constrained to particular protected sites and could potentially originate from sites in a wider geographical area. Therefore, the populations potentially impacted by the Dogger Bank Teesside projects might also be impacted by many other projects across a wide area. Appendix 8 outlines which projects (which include wind farms and also aggregate sites) in the wider North Sea region were initially considered in the ornithological cumulative impact assessment and also which of these projects are within foraging range of the same protected sites identified to be of relevance to Dogger Bank Teesside A and B.

6.3.2 Here, we present quantitative assessments of the potential cumulative impacts from the effects of displacement and collision associated with other wind farm projects in this wider region and a qualitative assessment of the potential cumulative impacts associated with direct habitat loss or change from other wind farm projects. Note that the assessment of displacement is carried out as one for the construction, operation and decommissioning phases, as at any one time there will likely be a combination of wind farms under construction or already in operation and ultimately also being decommissioned.

6.3.3 Following the overall cumulative impact assessment strategy, information on the numbers of birds predicted to be displaced and collision risk estimates were taken from impact assessments or environmental statements where available and no attempt was made to estimate values in other cases. Thus the sites for which data were available only represent a subset of those initially considered in the cumulative assessment in the North Sea region as a whole. Due to this, and the inherent difficulties of combining information from different sources, where methods may have varied, confidence in all predictions is assigned as very low. Despite this, it should be noted that there may be inherent caution within those assessments for which data were available, in that similar worst case scenario approaches may have been used as in the assessment provided for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D.

6.3.4 As indicated in previous sections, there is considerable uncertainty regarding the assessment of barrier effects posed by offshore wind farms. Assessment of the potential cumulative effects for seabirds from their breeding colonies has not been attempted because of: i. the difficulties in assessing the magnitude of the potential impacts of this effect; ii. the complexities in the numbers of potential projects affecting birds foraging from different colonies (see Appendix 8); and iii. the potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009), and thus are problematic to quantify. Likewise, no attempt was made to assess in a quantified manner the cumulative impact of the potential barrier effects posed by the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects and other wind farm projects within the North Sea on the 46 species' populations of terrestrial or waterbird migrants that are UK SPA features whose migration zones (defined by Wright *et al.* 2012) overlap with the Dogger Bank Teesside A and B project areas.

**Disturbance/displacement**

6.3.5 In assessing the potential impacts of displacement, estimates are required both of the numbers of birds predicted to be displaced and then of the numbers of these that might be expected to die. Following the overall Forewind Cumulative Impact Assessment strategy, information regarding the potential impacts of displacement was taken from impact assessments or environmental statements where available and no attempt was made to estimate values in other cases.

6.3.6 Estimates of numbers of displaced birds were obtained by reviewing environmental statements for planned offshore wind farms in the North Sea. Detailed information was available from six additional projects – Beatrice, East Anglia ONE, the European Offshore Wind Development Centre, Galloper, Hornsea Project One and Thanet (Table 6.8) (Royal Haskoning 2005, 2010, 2011; Arcus 2012; APEM 2013a, b, c; Smart Wind Ltd 2013a, b; Technip 2012). In other cases, while population estimates may have been provided, specific displacement estimates were not available. Thus, the sites for which data were available only represent a subset of those considered in the cumulative assessment in the North Sea region as a whole. The numbers of birds currently predicted to be displaced from these projects are summarised in Table 6.9.

**Table 6.8** Tabulation of projects next to sources of information either (a) included in, or (b) excluded from in the CIA, for which reasoning is provided; also shown are where information of disturbance/displacement and collision were available for projects, together with the report status from which information was extracted.

(a)

| | Site | UK Round | Site status | Report type / status | Disturbance / Displacement | Collision | Reference |
|---|---|---|---|---|---|---|---|
| Inlcuded | Beatrice | Scottish | Consent Application Submitted | ES | Y | Y | Arcus 2012; 2013a, b, c |
| | Blyth Offshore Wind Demonstration Site | - | Consent Application Submitted | Draft ES | | Y | narec (2012) |
| | Breeveerten II | - | Consent Authorised | *** | | Y | *** |
| | Dudgeon | 2 | Consent Authorised | ES | | Y | ECON 2010 |
| | East Anglia ONE | 3 | Consent Application Submitted | ES | Y | Y | APEM 2013a, b, c, d, e; |
| | European Offshore Wind Development Centre | - | Consent Authorised | ES / final report | Y | Y | Technip 2012 |
| | Galloper | Extension | Consent Authorised | ES | Y | Y | Royal Haskoning 2010, 2011 |
| | Greater Gabbard | 2 | Fully Commissioned | Baseline/EIA | | Y | Banks et al. 2006 |
| | Hornsea Project One | 3 | Consent Application Submitted | ES | Y | Y | Smart Wind Ltd (2013a, b) |
| | Humber Gateway | 2 | Consent Authorised | ES | | Y | E.ON (2007) |
| | Lincs | 2 | Partial Generation/Under Construction | ES | | Y | Centrica Energy 2007a |
| | London Array I/II | 2 | Fully Commissioned / Consent authorised | ES | Y | Y | RPS (2005); APEM (2013)[1] |
| | Race Bank | 2 | Consent Authorised | ES | | Y | Centrica Energy 2007b |
| | Sheringham Shoal | 2 | Fully Commissioned | ES | | Y | Scira Offshore Energy Ltd 2006 |
| | Teesside | 1 | Partial Generation/Under Construction | ES | | Y | EDF 2004 |
| | Thanet | 2 | Fully Commissioned | ES | Y | Y | Royal Haskoning 2005 |

| | Site | UK Round | Site status | Report type / status | Disturbance / Displacement | Collision | Reference |
|---|---|---|---|---|---|---|---|
| | Triton Knoll | 2 | Consent Authorised | EIA Scoping / statement of common ground | | Y | nPower Renewables 2010, 2012 |
| | Westernmost Rough | 2 | Consent Authorised | ES | | Y | RPS 2009 |
| | Dogger Bank Creyke Beck A and B | 3 | Concept/Early Planning | Technical report | Y | Y | This assessment |
| | Dogger Bank Teesside C and D | 3 | Concept/Early Planning | Technical report | Y | Y | This assessment |

[1]Note, for the London Array Phase I/II development, collision values for gannet were obtained from finalised figures quoted in the cumulative assessment within an update to the East Anglia One development APEM (2013); for displacement, values for London Array were obtained from the original ES (RPS 2005); note also that for collision, RPS (2005) reported percentage impacts rather than numbers of birds that may die, thus no figures for collision were extracted from the original ES.

(b)

| | Site | UK Round | Site status | Report type / status | Reference | Justification for screening out |
|---|---|---|---|---|---|---|
| Excluded | Firth of Forth Bravo and Alpha projects | 3 | Consent Application Submitted | Draft ES | SeaGreen 2012 | Forewind are aware that the Firth of Forth project is shortly to submit additional information relating to their application as is permitted under the section 36 application process (applicable in Scotland under the Electricity Act). It is anticipated that this will significantly alter the the number of birds likely to be impacted through collision and also displacement effects as originally outlined in their submitted ES. These changes are likely to have important consequences for attribution of impacts to specific designated SPA populations and hence confidence in the submitted information and assessment outcomes is low and the project has been screened out. |
| | Moray Firth | 3 | Concept/Early Planning | Draft ES | Moray Offshore Renewables | As noted above for the Firth of Forth projects and as has been demonstrated by the submission of additional information by the Beatrice project it is expected that this project, which falls under section 36 of the Electricity Act (as it is within Scottish |

| | Site | UK Round | Site status | Report type / status | Reference | Justification for screening out |
|---|---|---|---|---|---|---|
| | | | | | Ltd. 2012 | waters) will also provide a submission of additional environmental information on ornithological impacts as part of the examination process. As a result, there is low confidence that the values presented in the submitted ES will remain the same. |
| | Neart na Gaoithe | Scottish | Consent Application Submitted | Draft ES | Mainstream 2012 | As noted above for the Firth of Forth projects and as has been demonstrated by the submission of additional information by the Beatrice project it is expected that this project, which falls under section 36 of the Electricity Act (as it is within Scottish waters) will also provide a submission of additional environmental information on ornithological impacts as part of the examination process. As a result, there is low confidence that the values presented in the submitted ES will remain the same. |

6.3.7 The final cumulative assessment presented here considers only those projects for which estimates were provided of the numbers of displaced birds that might then be expected to die. In many instances, while predictions were provided of the numbers of birds that might be expected to be displaced, no information was provided of the likely mortality rates of these birds (often, as mortality was considered as part of the sensitivity of species to this effect – see Maclean *et al.* 2009). As with displacement rates, mortality rates considered varied between projects, some providing results for a range of rates and carrying through either a worst case or 'realistic' value into the assessment.

6.3.8 Estimates of the numbers of displaced birds that might be expected to die from these projects were added to the numbers predicted for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, and placed in national and biogeographic contexts. Where estimates were also apportioned to protected sites, these were added to respective apportioned estimates from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects to assess potential impacts at a protected site level.

**Table 6.9** Predictions of the numbers of displaced birds obtained for additional offshore wind farm sites in the North Sea, used as part of the cumulative impact assessment. Note that the final magnitudes presented in the cumulative assessment only consider the proportion of those birds displaced that may subsequently die.

| Site | Season | Northern gannet | Common guillemot | Razorbill | Little Auk | Atlantic puffin |
|---|---|---|---|---|---|---|
| Beatrice | Total | | 3,112 | 528 | | 641 |
| East Anglia ONE | Spring | 65 | 430 | 120 | | |
| | Breeding | 43 | | | | |
| | Autumn | 1870 | | | | |
| | Winter | 64 | 820 | 200 | | |
| | Total | 2042 | 1250 | 320 | | |
| European Offshore Wind Development Centre / Aberdeen Offshore Wind Farm | Total | 32 | 386 | 129 | | 62 |
| Galloper[1] | Breeding[2] | | | | | |
| | Winter[2] | | 3,219 | 342 | | |
| | Total | | 3,219 | 342 | | |
| London Array I/II | Total | 162 | 2,400 | 250 | | |
| Hornsea Project One | Breeding | 239 | 1,037 | 366 | | 428 |
| | Post-breeding | | 5,705 | 2926 | | |
| | Winter | 237 | 4,609 | 2628 | | 503 |
| | Total | 476 | 11351 | 5920 | | 931 |
| Thanet[1] | Total | 37 | 193[3] | 193[3] | | 193[3] |
| Dogger Bank Teesside A and B and Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D[4] | Breeding | 1,002 (256) | 7,741 (1,108) | 784 (186) | - | 137 (28) |
| | Winter | 1,438 (454) | 19,814 (4,4403) | 6,405 (1,618) | 450 (156) | 605 (140) |
| | Total | 2,440 (709) | 27,555 (5,511) | 7,188 (1,804) | 450 (156) | 742 (168) |
| **TOTAL** | | **5,280** | **49,466** | **14,870** | **450** | **2,569** |

[1] No specific displacement rates were presented; hence, we assume all birds in the areas of the respective projects were displaced; [2] A total displacement estimate was obtained following the methodology used in the Dogger Bank Teesside A and B assessments, assuming that breeding populations were separate to non-breeding (post-breeding/migration/wintering) populations; [3] Impacts of displacement were predicted for all auks combined; a worst case was assumed by applying the combined estimate to each species; [4] Figures based on median population estimates are used for consistency across projects – Dogger Bank Teesside A and B values are provided in brackets.

**Collision**

6.3.9 Annual collision estimates were obtained by reviewing environmental statements for planned offshore wind farms in the North Sea. In addition to data for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, collision estimates were obtained for marine birds for the following sites – Beatrice, Breeveerten II, Dudgeon, East Anglia ONE, the European Offshore Wind Development Centre, Galloper, Greater Gabbard, Hornsea Project One, Humber Gateway, Lincs, Race Bank, Sheringham Shoal, Dogger Bank Teesside, Thanet, Triton Knoll and Westernmost Rough (EDF 2004; Royal Haskoning 2005, 2010, 2011; RPS 2005; RWE nPower Renewables 2010, 2012; Arcus 2012, 2013a, b, c; Technip 2012; Vatenfall 2012; APEM 2013a, b, c, d, e; DECC 2013; Smart Wind Ltd 2013a, b). Note, that the sites for which data were available do not represent all those considered in the cumulative assessment in the North Sea region.

6.3.10 For each site, the estimate used is that presented in the final assessment of effects, even if this has been calculated using a different avoidance rate. Further, not all estimates will be strictly comparable with those presented within this report. Several of the earlier impact assessments make use of earlier iterations of the Band model (Band 2000, Band *et al.* 2007), developed for use in the onshore environment and not necessarily directly applicable to offshore. Furthermore, where the updated Band model (Band 2012) has been used, sites have not made use of its ability to incorporate variable collision risk within the rotor-swept area. Consequently, in these cases collision estimates are potentially an order of magnitude greater than those presented for the four Dogger Bank projects. Finally, uncertainty in the most appropriate avoidance rates has led to a wide range of values being used. Again, this means that reported collision estimates are not strictly comparable with those obtained for the Dogger Bank projects. Annual collision estimates for each additional site are presented in Table 6.10.

**Table 6.10** Annual collision estimates obtained for additional offshore wind farm sites in the North Sea, used as part of the cumulative impact assessment, assumes a 98% avoidance rate unless otherwise stated.

| Wind Farm | Model Used | Northern fulmar | Northern gannet | Arctic skua | Great skua | Black-legged kittiwake | Lesser black-backed gull | Great black-backed gull | Common guillemot | Razorbill | Atlantic puffin |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Beatrice | Band (2012) Option 1(*) / Option 3 (**) | 13[1**] | 21[3**] | 11[1*] | 25[1*] | 44[1**] | | 239[1**] | 27[1*] | 1[1*] | |
| Blyth Demonstrator | Band (2012) Option 1 | | 15[2] | | | 10[2] | | 33[2] | | | |
| Breeveerten II | Band *et al.* (2007) | | 137 | | | | 548 | 40 | | | |
| Dudgeon | Band (2000) | | 597[4] | | | | 153[3] | | | | |
| East Anglia ONE | Band (2012) Option 1 | | 850[1] | | | 1,056[1] | 394 | 115 | | | |
| European Offshore Wind Development Centre / Aberdeen Offshore Wind Farm | Band (2012) Option 2 | 2 | 17 | | | 34 | | 12 | 3 | 1 | |
| Galloper | Band *et al.* (2007) | | 112 | 4 | 27 | 148 | 661 | 104 | | | |
| Greater Gabbard | Band (2000) | | | | 15[5] | | 252[5] | | | | |
| Hornsea Project One | Band (2012) Option 4 | | 27[3] | 9[1] | <1[1] | 31[1] | 22[1] | 127[1] | | | |
| Humber Gateway | Band (2000) | | 18[6] | 1[6] | 1[6] | 34[6] | 13[6] | 64[6] | | | |
| Lincs | Band (2000) | | 9 | | | | 34 | | | | |
| London Array I/II | Band (2000) | | 5[3] | | | | | | | | |
| Race Bank | Band (2000) | 8 | 198 | | | | 296 | 96 | 3 | 1 | |
| Sheringham Shoal | Band (2000) | | 31 | | | | 33 | | | | |
| Teesside | Band (2000) | | 2[7] | 1[7] | | 28[7] | | 33[7] | | | |
| Thanet | Band (2000) | | 1 | | | 1 | 32 | 1 | | | |
| Triton Knoll | Band (2000) | 7 | 129 | | 4 | 158 | 85 | 487 | 3 | | |
| Westernmost Rough | Band (2000) | | 1 | | | 1 | 1 | 1 | | | |
| Dogger Bank Teesside A and B and Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D[8] | Band (2012) Option 3 | 4 (1) | 217 (68) | 0 (0) | 2 (1) | 553 (134) | 88 (33) | 163 (58) | 0 (0) | 8 (2) | 0 (0) |
| **TOTAL** | | **34** | **2,387** | **26** | **74** | **2,098** | **2,612** | **1,515** | **36** | **11** | **0** |

[1]Avoidance rate of 98% used; [2]Avoidance rate of 88% used; [3]Avoidance rate of 99% used; [4]Avoidance rate of 97% used; [5]Avoidance rate of 99.82% used; [6]Avoidance rate of 95% used; [7]Avoidance rate of 99.62% used; [8]Figures based on median population estimates are used for consistency across projects – Dogger Bank Teesside A and B values are provided in brackets.

**Habitat loss and/or change**

6.3.11 Table 6.11 summarises information on the significance of indirect effects where presented in the impact assessments reviewed. While indirect effects were considered in most assessments, in many they were either scoped out or included in the assessment of other effects, such as displacement.

6.3.12 For example, for the European Offshore Wind Development Centre, effects on prey species were considered as part of the effect of displacement and so it was therefore, not possible to disentangle for individual effect assessment. For Greater Gabbard, indirect habitat loss was considered in conjunction with disruption of flight lines (i.e. barrier effects). However, the significance of indirect habitat loss was considered to be either low or very low for most species, except northern fulmar, great black-backed gull, lesser black-backed gull, and red-throated diver.

6.3.13 In the Beatrice assessment, indirect effects were determined to be negligible or minor adverse and therefore, not significant for any species (Table 6.11). For Galloper, during construction, the impact associated with "indirect disturbance" (arising from habitat alterations and hence changes to prey) was assessed as minor adverse adverse for red-throated diver, herring gull and great black-backed gull, and negligible for all other species. For Triton Knoll, indirect effects during construction were predicted to be minor adverse for little gull, Sandwich tern, common guillemot, razorbill and Atlantic puffin, and negligible for northern fulmar, northern gannet, sooty shearwater and black-legged kittiwake. At Dudgeon, indirect effects were determined to be negligible for northern fulmar, northern gannet and lesser black-backed gull.

6.3.14 Considering the maximum significance of all indirect effects obtained from other environmental statements (Table 6.11), the cumulative effect of habitat loss and/or change was considered as Minor adverse for northern fulmar, northern gannet, Arctic skua, great skua, black-legged kittiwake and great black-backed gull, common guillemot, razorbill and puffin, and Negligible for white-billed diver, lesser black-backed gull and little auk.

**Table 6.11** Summary of information on the significance of indirect effects where presented in the impact assessments reviewed for the cumulative impact assessment.

| Species | White-billed Diver | Northern fulmar | Northern gannet | Arctic skua | Great skua | Black-legged kittiwake | Lesser black-backed gull | Great black-backed gull | Common guillemot | Razorbill | Little auk | Atlantic puffin |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Beatrice | | Minor | Minor | Minor | Minor | Minor | | Minor | Minor | Minor | | Minor |
| Dudgeon | | Negligible | Negligible | | | | Negligible | | | | | |
| Galloper | | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Minor | Negligible | Negligible | | |
| Triton Knoll | | Negligible | Negligible | | | Negligible | | | Minor | Minor | | Minor |
| Teesside A and B, Creyke Beck A and B and Teesside C and D | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible |
| **Maximum** | **Negligible** | **Minor** | **Minor** | **Minor** | **Minor** | **Minor** | **Negligible** | **Minor** | **Minor** | **Minor** | **Negligible** | **Minor** |

**Evaluation for Ornithological Receptors**

***White-billed diver***

***Construction and Decommissioning/Operation***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

6.3.15 The white-billed diver has high sensitivity to habitat loss, and therefore, is considered to have a **high species-specific sensitivity** (i.e. a low tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.16 Predictions of the numbers of birds potentially displaced by other projects were unavailable in any additional environmental impact assessments. This partly reflects the probable absence of this species in the areas of other projects, but also the previous lack of information of the species' distribution in the North Sea. The maximum number of birds recorded within the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects was 43 birds, of which all are assumed to be displaced (see section 4), of which 37.5% (11 birds) are predicted to be lost through mortality.

6.3.17 There are no breeding populations of this species in the UK. Cumulative displacement would affect less than the threshold of 50 birds used for assessing national importance. Cumulative displacement would also affect much less than 0.1% of the species' biogeographic population.

6.3.18 The effect of displacement is thus considered of **negligible magnitude** at both national and biogeographic scales.

Significance

6.3.19 This species has a **medium value**. Combining the species' magnitude with value, the cumulative impact of this effect is considered to be **negligible** at both the national and biogeographic scale.

***Operation***

*Collision*

Species Overall sensitivity to collision – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.20 No additional collision estimates for white-billed diver were obtained other than those already presented in section 6.2.

Significance

6.3.21 Thus, as for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, the cumulative effect of collision for white-billed diver is thus considered of **negligible magnitude** at national and biogeographic scales and consequently, considered to be **negligible**.

***Northern fulmar***

***Construction and Decommissioning/Operation***

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.22 Full methodological details and results of collision risk analysis for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are provided in section 4 of this report. Using data presented in available environmental impact assessments from four additional sites – Beatrice, the European Offshore Wind Development Centre, Race Bank and Triton Knoll, and combining information with estimates presented in Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B, and Tesside C and D projects, the annual cumulative collision estimate for northern fulmar is 34 birds per year.

6.3.23 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of northern fulmar.

6.3.24 The proposed projects are within foraging range of nine protected breeding sites in Great Britain, where the species is a designated feature, while birds occurring outside the breeding season may originate from a wider suite of sites. Of these, in addition to the apportioning undertaken for the assessment of the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, collision estimates were only provided for East Caithness Cliffs SPA (from the Beatrice Offshore Wind Farm assessment). The cumulative collision estimate for northern fulmar for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D and the Beatrice Offshore Wind Farm amounts to less than 1% of the population at East Caithness Cliffs SPA.

6.3.25 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, national and biogeographic population levels.

Significance

6.3.26 The cumulative collision risk estimates were less than 1% of reference populations at protected site suite, national and biogeographic scales. The cumulative effect of collision for northern fulmar is thus considered of **negligible magnitude** at protected site, national and biogeographic scales and consequently, considered to be **minor adverse**.

***Northern gannet***

***Construction and Decommissioning/Operation***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

6.3.27 The northern gannet has very low sensitivity to habitat loss, and therefore, is considered to have a **very low species-specific sensitivity** (i.e. a very high tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.28 Predictions of the numbers of birds potentially displaced by other projects were available from four additional environmental impact assessments – East Anglia ONE, the European Offshore Wind Development Centre, Hornsea Project One and Thanet. Combining these data with the displacement estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, the cumulative number of birds estimated to be displaced across these projects was 5,280.

6.3.29 Estimates of the numbers of displaced birds that might be expected to die were available from East Anglia ONE (30 birds) and Hornsea Project One (7 birds . A total of 122 birds were predicted to be lost through mortality following displacement from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, giving a total of 159 birds across all projects that were predicted to be lost through displacement mortality.

6.3.30 In addition to the apportioning undertaken for the assessment of the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, estimates of the numbers of displaced birds that might be expected to die were apportioned to individual protected sites in the Hornsea Project One assessment for the Flamborough Head and Bempton Cliffs SPA. However, no birds were predited to be impacted at this site from Hornsea Project One. The number of birds predicted to be lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects alone, was 17 birds, less than 0.1% of the population at Flamborough Head and Bempton Cliffs SPA.

6.3.31 Displacement would also affect less than 0.1% of the British breeding population and less than 0.1% of the species biogeographic population. The cumulative effect of displacement is therefore, considered to be of **negligible magnitude** at all scales.

Significance

6.3.32 This species has a **very high value**. Combining the species' magnitude with value, the cumulative impact of this effect is considered to be **minor adverse** at all scales.

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.33 Full methodological details and results of collision risk analysis for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are provided in section 4 of this report. Combining data presented in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (217 birds) together with information available in 15 additional environmental impact assessments – Beatrice, Breeveerten II, Dudgeon, East Anglia ONE, the European Offshore Wind Development Centre, Galloper, Hornsea Project One, Humber Gateway, Lincs, Race Bank, Sheringham Shoal, Dogger Bank Teesside, Thanet, Triton Knoll, Westernmost Rough – the cumulative collision estimate for northern gannet is 2,387 birds per year.

6.3.34 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of northern gannet. The predicted number of collisions reflects an increase of 4.3% of the background mortality at a national level and 2.9% at an international level. Under this approach, the impact of collisions on northern gannet populations would be considered to be of **negligible magnitude.**

6.3.35 The proposed projects are within foraging range of three protected breeding sites in Great Britain, where the species is a designated feature, while birds occurring outside the breeding season may originate from a wider suite of sites. Of these, in addition to the apportioning undertaken for the assessment of the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, collision estimates were only provided for the Flamborough Head and Bempton Cliffs SPA (from the Triton Knoll and Dudgeon assessments).

6.3.36 The cumulative collision estimate for northern gannet for the Dudgeon, East Anglia ONE, Hornsea Project One, Triton Knoll and the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects for the Flamborough Head and Bempton Cliffs SPA amounts to 858 birds (extrapolating from upper confidence limits from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects assessment, this equates to up to 5.5% of the population and an increase in background mortality of 66.9% at this site). In this case, it should be acknowledged that, as a worst case scenario, 100% of the impacts associated with the Dudgeon were apportioned to this site, even though it was also recognised that the projects were in the foraging range of other sites. Thus, this figure should be considered an overestimate.

6.3.37 Based on these figures, the numbers of collisions apportioned to the Flamborough Head and Bempton Cliffs SPA for these projects is likely to be a considerable over-estimate, for the reasons outlined above, the cumulative effect of collisions for northern gannet at this SPA, based on the sites for which data were available, is considered to be of **low magnitude**.

Significance

6.3.38 The cumulative collision risk estimate for birds at the Flamborough Head & Bempton Cliffs SPA was considered to be of a **low magnitude** and therefore, **moderate adverse.** At a national and biogeographic scale, collision risk estimates represent less than a 5% increase of adult background mortality, and consequently the cumulative effect of collision at these scales was considered to be of **negligible magnitude** and therefore **minor adverse**.

***Arctic skua***

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.39 Full methodological details and results of collision risk analysis for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are provided in section 4 of this report. Combining collision estimates from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects with data presented in available environmental impact assessments from five additional projects – Beatrice, Galloper, Hornsea Project One, Humber Gateway and Dogger Bank Teesside, the cumulative collision estimate for Arctic skua is estimated as 26 birds per year.

6.3.40 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of Arctic skua.

6.3.41 Cumulative collision estimates were not apportioned to protected sites in assessments other than that undertaken here for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects.

6.3.42 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, national and biogeographic population levels.

Significance

6.3.43 The cumulative collision risk estimates amount to less than 1% of reference populations at national and biogeographic scales. The cumulative effect of collision for Arctic skua is thus considered of **negligible magnitude** at protected site, national and biogeographic scales and consequently, considered to be **minor adverse**.

***Great skua***

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.44 Full methodological details and results of collision risk analysis for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are provided in section 4 of this report. Combining collision estimates from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects with data presented in available environmental impact assessments from six additional projects – Beatrice, Galloper, Greater Gabbard, Hornsea Project One, Humber Gateway and Triton Knoll, the cumulative collision estimate for Great skua is estimated as 74 birds per year

6.3.45 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of great skua.

6.3.46 Cumulative collision estimates were not apportioned to protected sites in assessments other than that undertaken here for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects.

6.3.47 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, national and biogeographic population levels.

Significance

6.3.48 The cumulative collision risk estimates amount to less than 1% of reference populations at national and biogeographic scales. The cumulative effect of collision for great skua is thus considered of **negligible magnitude** at protected site, national and biogeographic scales and consequently, considered to be **minor adverse**.

***Black-legged kittiwake***

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.49 Full methodological details and results of collision risk analysis for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are provided in section 4 of this report. Combining collision estimates from Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, with data presented in ten available environmental impact assessments – Beatrice, Breeveerten II, East Anglia ONE, the European Offshore Wind Development Centre, Galloper, Hornsea Project One, Humber Gateway, Teesside, Thanet, Triton Knoll and Westernmost Rough, the annual cumulative collision estimate for black-legged kittiwake is 2,098 birds per year.

6.3.50 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of black-legged kittiwake. The predicted cumulative collision rates reflect an increase in background mortality of 2.9% at the national level and less than 0.4% at the biogeographic level. Following this alternative approach, the cumulative impact of collision would be considered of **negligible magnitude** at both national and biogeographic levels.

6.3.51 The proposed projects are within foraging range of three protected breeding sites in Great Britain, where the species is a designated feature, while birds occurring outside the breeding season may originate from a wider suite of sites. Of these, in addition to the apportioning undertaken for the assessment of the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, collision estimates were provided for the East Caithness Cliffs SPA (from the Beatrice assessment) and the Flamborough Head and Bempton Cliffs SPA (from the East Anglia One, Hornsea Project One and Triton Knoll assessments).

6.3.52 The cumulative collision estimate for black-legged kittiwake for the East Anglia One, Hornsea Project One and Triton Knoll assessment and the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects for the Flamborough Head and Bempton Cliffs SPA amounts to 566 birds (Appendix 13) (extrapolating from upper confidence limits from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects assessment, this equates to less than 1%, up to 0.7%, of the population at this site). In this case, it should be acknowledged that, as a worst case scenario, 100% of the impact associated with the Triton Knoll project was apportioned to this site, even though the project is also in the foraging range of other sites. This figure should thus be considered an overestimate.

6.3.53 The cumulative collision estimate for black-legged kittiwake for Beatrice, the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects for the East Caithness Cliffs SPA amounts to 63 birds (extrapolating from upper confidence limits from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects assessment, this equates to less than 1% of the population at this site). In this case, it should be acknowledged that, as a worst case scenario, 100% of the impact associated with the Beatrice project was apportioned to this site, even though the project is also in the foraging range of other sites. This figure should thus be considered an overestimate.

6.3.54 The numbers of collisions of adult birds apportioned to the Flamborough Head and Bempton Cliffs SPA for these projects represents up to approximately 11.4% of the background mortality of adult black-legged kittiwakes at this site and thus may be considered to be of **low magnitude** using this alternative approach. The numbers of collisions of adult birds apportioned to the East Caithness Cliffs SPA for these projects represents up to approximately 0.9% of the background mortality of adult black-legged kittiwakes at this site. The cumulative effect of collisions for black-legged kittiwake at this SPA, based on the sites for which data were available, is therefore considered to be of **negligible magnitude**.

Significance

6.3.55 The cumulative collision risk estimates to birds at the Flamborough Head & Bempton Cliffs SPA was considered to be of **low magnitude** and therefore, **moderate adverse.** At a national and biogeographic scale, collision risk estimates were less than 1% of the reference populations, consequently, the cumulative effect of collision at these scales was considered to be of **negligible magnitude** and therefore, **minor adverse**.

***Lesser black-backed gull***

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.56 Full methodological details and results of collision risk analysis for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are provided in section 4 of this report. Combining collision estimates from Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects with data presented in 13 available environmental impact assessments – Breeveerten II, Dudgeon, East Anglia ONE, Galloper, Greater Gabbard, Hornsea Project One, Humber Gateway, Lincs, Race Bank, Sheringham Shoal, Thanet, Triton Knoll, Westernmost Rough – the cumulative collision estimate for lesser black-backed gulls is estimated at 2,612 birds per year.

6.3.57 The annual cumulative collision estimate amounts to 0.8% of the British breeding population of lesser black-backed gulls. The annual cumulative collision estimate amounts to 2.1% of the British wintering population of lesser black-backed gull (although it should be noted that this population itself may be an underestimate and thus this percentage over-estimated).

6.3.58 The predicted cumulative collision rates reflect an increase in background mortality of 8.2% at the national level and 4.9% at the biogeographic level. Following this alternative approach, the cumulative impact of collision would be considered of **low magnitude** at the national level and and **negligible magnitude** at the biogeographic level.

6.3.59 The proposed projects are outside the foraging range of any protected site at which the species is a breeding feature, though birds occurring outside the breeding season or during the breeding season as non-breeders may originate from a wider suite of sites. However, collision estimates were available from one additional assessment – East Anglia ONE (16 birds) for the Alde-Ore estuary SPA. The cumulative collision estimate for lesser black-backed gull for the East Anglia ONE and the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects for Alde-Ore estuary SPA amounts to 19 birds. Extrapolating from upper confidence limits from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects assessment, this equates to up to 0.36% of the population and an increase in background mortality of 1.76% at this site. Therefore this effect is considered of **negligible magnitude** at the protected site level.

Significance

6.3.60 Annual cumulative collision estimates amount to between 1 and 5% of the British wintering population and predicted cumulative collision rates suggest an increase in adult background mortality of between 5 and 20% at the national level. Annual cumulative collision estimates amount to less than 1% at the biogeographic scale and predicted cumulative collision rates represent less than 5% at the biogeographic level. The cumulative impact of collision is thus be considered of **low magnitude** at the national level and **negligible magnitude** at the biogeographic level. Annual cumulative collision estimates amounts to less than 1% at the protected site level. Consequently, the cumulative effect of collision for lesser black-backed gull is considered of **minor adverse** significance at the protected site and biogeographic scales, but of **moderate adverse** significance at the national scale.

***Great black-backed gull***

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.61 Full methodological details and results of collision risk analysis for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are provided in section 4 of this report. Combining collision estimates from Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects with data presented in 12 available environmental impact assessments – Beatrice, Breeveerten II, the European Offshore Wind Development Centre, East Anglia ONE, Galloper, Hornsea Project One, Humber Gateway, Race Bank, Teesside, Thanet, Triton Knoll and Westernmost Rough – the cumulative collision estimate for great black-backed gulls is estimated at 1,515 birds per year.

6.3.62 The annual cumulative collision estimate amounts to 3.0% of the British breeding population of great black-backed gull, and 2.0% of the the British wintering population (although it should be noted that this population itself may be an underestimate and thus this percentage over-estimated). It should be noted that the majority of collisions for this species are predicted from outside of the breeding season and would thus involve birds from other countries; hence this figure over-estimates the impact on the British breeding population.

6.3.63 The cumulative collision estimate amounts to less than 1% of the biogeographic population of the great black-backed gull.

6.3.64 The predicted cumulative collision rates reflect an increase in background mortality of 32.2% at the national level and 3.9% at the biogeographic level. However, as noted above, the majority of collisions are likely to occur outside the breeding season. The cumulative impact of collision on the British breeding population is therefore likely to be a considerable over-estimate as the wintering population includes a significant number of birds from other populations, and is itself believed to have been underestimated. Therefore, following this alternative approach, the cumulative impact of collision would be considered of **low magnitude** at the national level and **negligible magnitude** at the biogeographic levels.

6.3.65 The proposed projects are outside the foraging range of any protected site at which the species is a breeding feature, though birds occurring outside the breeding season or during the breeding season as non-breeders may originate from a wider suite of sites. Of these, in addition to the apportioning undertaken for the assessment of the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank

Teesside C and D projects, collision estimates were only provided for the East Caithness Cliffs SPA (from the Beatrice assessment). The cumulative collision estimate for great black-backed gull for Beatrice, the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects for the East Caithness Cliffs SPA amounts to 19 birds, this figure being almost entirely associated with the Beatrice project. This represents reflect an increase in background mortality of 17.5% at this SPA.

Significance

6.3.66 The cumulative collision risk estimates to birds at the East Caithness Cliffs SPA and for the British breeding and wintering populations were considered to be of **low magnitude** and therefore, **moderate adverse**. At a biogeographic scale, the cumulative collision risk estimate was less than 1% of the reference population, consequently, the cumulative effect of collision at this scale was considered to be of **negligible magnitude** and therefore, **minor adverse**.

***Common guillemot***

***Construction and Decommissioning/Operation***

*Disturbance/displacement*

Species-specific sensitivity and overall sensitivity (Recoverability/Adaptability/Tolerance/Value)

6.3.67 The common guillemot has medium sensitivity to habitat loss, and therefore, is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.68 Predictions of the numbers of birds potentially displaced by other projects were available from six additional environmental impact assessments – Beatrice, East Anglia ONE, the European Offshore Wind Development Centre, Galloper, Hornsea Project One and Thanet. Combining these data with the displacement estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, the cumulative number of birds estimated to be displaced across these projects was 49,466.

6.3.69 Estimates of the numbers of displaced birds that might be expected to die were available for three projects: East Anglia ONE (125), the European Offshore Wind Development Centre (386 birds), and Hornsea Project One (264). Combining this estimates with predictions of the numbers of birds lost through mortality following displacement from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (1,378) provided a cumulative estimate of displaced birds that might be expected to die of 2,153.

6.3.70 In addition to the apportioning undertaken for the assessment of the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, estimates of the numbers of displaced birds that might be expected to die were apportioned to individual protected sites in the European Offshore Wind Development Centre assessment. (In this case, while the assessment only apportions numbers of displaced birds to protected sites, a worst case 100% mortality was presented in the assessment.) A cumulative impact of 337 birds lost through mortality following displacement was calculated for the Buchan Ness to Collieston SPA, 1.6% of the population of this site. Note, however, that the number of guillemots impacted at the Buchan Ness to Collieston Coast SPA from the EOWDC assessment alone was 1.5% (see Appendix 13). A cumulative impact of 186 birds lost through mortality following displacement was also calculated for the Fowlsheugh SPA, 0.3% of the population of this site.

6.3.71 In addition to the apportioning undertaken for the assessment of the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and

D projects, estimates of the numbers of displaced birds that might be expected to die were apportioned to individual protected sites in the Hornsea Project One assessment. A cumulative impact of 371 birds lost through mortality following displacement was calculated for the Flamborough Head and Bempton Cliffs SPA, 0.4% of the population of this site (see Appendix 13).

6.3.72 Cumulative displacement would affect much less than 0.1% of the British breeding and biogeographic populations, respectively. Based on the projects for which estimates of the numbers of displaced birds that might be expected to die were available (and the assumptions followed in these assessments), the cumulative effect of displacement is thus considered to be of **low magnitude** at the protected site level, and **negligible magnitude** at all other scales.

Significance

6.3.73 This species has a **very high value**. Combining the species' magnitude with value, the cumulative impact of this effect is considered to be **moderate adverse** at the protected site level, and **minor adverse** at the all other scales.

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.74 Full methodological details and results of collision risk analysis for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are provided in section 4 of this report. Combining collision estimates from Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects with data presented in four available environmental impact assessments – Beatrice, the European Offshore Wind Development Centre, Race Bank and Triton Knoll – the cumulative collision estimate for common guillemot is estimated as 36 birds per year.

6.3.75 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of common guillemot.

6.3.76 Cumulative collision estimates were not apportioned to protected sites in assessments other than that undertaken here for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects and that for the Beatrice project. Cumulative collision estimates amount to considerably less than 1% of the populations of those sites concerned.

6.3.77 Cumulative collision estimates have not been apportioned to protected sites, due to the small numbers predicted for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects.

6.3.78 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, national and biogeographic population levels.

Significance

6.3.79 The cumulative collision risk estimates were less than 1% of reference populations at protected site suite, national and biogeographic scales. The cumulative effect of collision for common guillemot is thus considered of **negligible magnitude** at protected site, national and biogeographic scales and consequently, considered to be **minor adverse**.

***Razorbill***

***Construction and Decommissioning/Operation***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

6.3.80 The razorbill has medium sensitivity to habitat loss, and therefore, is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.81 Predictions of the numbers of birds potentially displaced by other projects were available from six additional environmental impact assessments – Beatrice, East Anglia ONE, the European Offshore Wind Development Centre, Galloper, Hornsea Project One, and Thanet. Combining these data with the displacement estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, the cumulative number of birds estimated to be displaced across these projects was 14,870.

6.3.82 Estimates of the numbers of displaced birds that might be expected to die were available for three projects: East Anglia ONE (20 birds), the European Offshore Wind Development Centre (129 birds), and Hornsea Project One (121 birds). Combining these estimates with predictions of the numbers of birds lost through mortality following displacement from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (359 birds) provided a cumulative estimate of displaced birds that might be expected to die of 629.

6.3.83 In addition to the apportioning undertaken for the assessment of the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, estimates of the numbers of displaced birds that might be expected to die were apportioned to individual protected sites in the European Offshore Wind Development Centre assessment. (In this case, while the assessment only apportions numbers of displaced birds to protected sites, a worst case 100% mortality was presented in the assessment.) A cumulative impact of 46 birds lost through mortality following displacement was calculated for the Fowlsheugh SPA, less than 1% (0.8%) of the population at this site.

6.3.84 In addition to the apportioning undertaken for the assessment of the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, estimates of the numbers of displaced birds that might be expected to die were apportioned to individual protected sites in the Hornsea Project One assessment. A cumulative impact of 142 birds lost through mortality following displacement was calculated for the Flamborough Head and Bempton Cliffs SPA, 0.63% of the population of this site (see Appendix 13).

6.3.85 Cumulative displacement would affect less than 1% of the British breeding population (up to 0.19%) and much less than 0.1% of the biogeographic population. Based on the projects for which estimates of the numbers of displaced birds that might be expected to die were available (and the assumptions followed in these assessments), the cumulative effect of displacement is thus considered to be of **negligible magnitude** at all scales.

Significance

6.3.86 This species has a **very high value**. Combining the species' magnitude with value, the cumulative impact of this effect is considered to be **minor adverse** at all scales.

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.87 Full methodological details and results of collision risk analysis for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are provided in section 4 of this report. Combining collision estimates from Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects with data presented in three available environmental impact assessments – Beatrice, the European Offshore Wind Development Centre and Race Bank – the cumulative collision estimate for razorbill is estimated as just seven birds per year.

6.3.88 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of razorbill.

6.3.89 Cumulative collision estimates were not apportioned to protected sites in assessments other than that undertaken here for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects and that for the Beatrice project. Cumulative collision estimates amount to considerably less than 1% of the populations of those sites concerned.

6.3.90 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, national and biogeographic population levels.

Significance

6.3.91 The cumulative collision risk estimates were less than 1% of reference populations at protected site suite, national and biogeographic scales. The cumulative effect of collision for razorbill is thus considered of **negligible magnitude** at protected site,

national and biogeographic scales and consequently, considered to be **minor adverse**.

***Little auk***

***Construction and Decommissioning/Operation***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

6.3.92 The little auk has low sensitivity to habitat loss, and therefore, is considered to have a **low species-specific sensitivity** (i.e. a high tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.93 Predictions of the numbers of birds potentially displaced by other projects were unavailable from any additional environmental impact assessments. Thus the cumulative effect of displacement is taken to equate to that for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, and therefore, of **negligible magnitude** at the national and biogeographic scale.

Significance

6.3.94 This species has a **high value**. Combining the species' magnitude with value, the cumulative impact of this effect is considered to be **negligible** at the national and biogeographic scale.

***Operation***

*Collision*

Species Overall sensitivity to collision – High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.95 No additional collision estimates for little auk were obtained other than those already presented in section 6.2.

6.3.96 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, national and biogeographic population levels.

Significance

6.3.97 Thus, as for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, the cumulative effect of collision for little auk is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales and consequently, considered to be **negligible**.

***Atlantic puffin***

***Construction and Decommissioning/Operation***

*Disturbance/displacement*

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

6.3.98 The Atlantic puffin has medium sensitivity to habitat loss, and therefore, is considered to have a **medium species-specific sensitivity** (i.e. a medium tolerance) to this effect.

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.99 Predictions of the numbers of birds potentially displaced by other projects were available from four additional environmental impact assessments – Beatrice, The European Offshore Wind Development Centre, Hornsea Project One and Thanet. Combining these data with the displacement estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, the cumulative number of birds estimated to be displaced across these projects was 2,569.

6.3.100 Estimates of the numbers of displaced birds that might be expected to die were available for the European Offshore Wind Development Centre (62 birds) and Hornsea Project One (48 birds). Combining these estimates with predictions of the numbers of birds lost through mortality following displacement from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (37 birds) provided a cumulative estimate of 147 displaced birds that might be expected to die.

6.3.101 In addition to the apportioning undertaken for the assessment of the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, estimates of the numbers of displaced birds that might be expected to die were apportioned to individual protected sites in the Hornsea Project One assessment. A cumulative impact of just three birds lost through mortality following displacement was calculated for the Flamborough Head and Bempton Cliffs SPA, 0.31% of the population of this site (see Appendix 13). A cumulative impact of 12 birds lost through mortality following displacement was also calculated for the Coquet Island SPA, less than 0.1% of the population of this site (see Appendix 13). A cumulative impact of 25 birds lost through mortality following displacement was also calculated for the Farne Islands SPA, less than 0.1% of the population of this site (see Appendix 13 for details).

6.3.102 The cumulative effect of displacement is thus considered to be of **negligible magnitude** all scales

Significance

6.3.103 This species has a **very high value**. Combining the species' magnitude with value, the cumulative impact of this effect is considered to be **minor adverse** at all scales.

***Operation***

*Collision*

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.104 No additional collision estimates for Atlantic puffin were obtained other than those already presented in section 6.2.

6.3.105 The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, national and biogeographic population levels.

Significance

6.3.106 Thus, as for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, the cumulative effect of collision for Atlantic puffin is thus considered of **negligible magnitude** at protected site, protected site suite, national and biogeographic scales and consequently, considered to be **minor adverse**.

***Migrants***

***Operation***

*Collision*

6.3.107 Annual collision estimates were obtained by reviewing environmental statements for planned offshore wind farms in the North Sea. Aside from data for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, collision estimates were only available for migrants for the following sites – Beatrice, Breeveerten II, the European Offshore Wind Development Centre, Lincs and Dogger Bank Teesside.

6.3.108 Collision risk estimates were only provided in these assessments for two species whose migration zones overlap with the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (barnacle goose and common scoter), five further species (whooper swan, pink-footed goose, greylag goose, common eider, red-throated diver) and for species groups (landbirds, waders, geese/swans). These only represent a small proportion of those species likely to cross the overall suite of wind farm projects considered in the cumulative assessment in the North Sea region, for which assessment is now possible through the work of Wright *et al.* (2012). Further, the number of other projects for which estimates were provided for migrants were very few, and the sites, for which data were available, only represent a very small proportion of the overall suite in the North Sea region initially considered in the cumulative assessment.

6.3.109 The cumulative numbers of barnacle geese and common scoters predicted to collide across these wind farms is presented in Table 6.12 below.

6.3.110 For those species whose migration zones overlap with the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, indicative figures of the percentages of these migration zones that overlap with the overall suite of wind farm projects considered in the cumulative assessment in the North Sea region are also shown in Table 6.13.

**Table 6.12** Assessment of cumulative collision risk for migrants. Note, estimates were only available for species whose migration zones overlap with the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects from this assessment and for the assessment for the European Offshore Wind Development Centre.

| Species | Estimated annual collisions | % GB or GB/Ireland population | Value | Species sensitivity | Overall Sensitivity | Magnitude | Significance |
|---|---|---|---|---|---|---|---|
| Barnacle goose (Svalbard population) *Branta leucopsis* | 7.70 | <0.1% | Very High | Very High | Very High | Negligible | Minor adverse |
| Common scoter *Melanitta nigra* | 3.69 | <0.1% | Very High | Low | High | Negligible | Negligible |

**Table 6.13** Indicative figures of the percentages of the migration zones of migrants that overlap with the overall suite of wind farm projects in the North Sea region considered in the cumulative assessment (calculated following Wright *et al.* 2012). Only those species whose migration routes overlap with the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are shown.

| Species | % migration zone | Overall Sensitivity |
|---|---|---|
| Bean Goose<br>*Anser fabalis* | 74% | High |
| Barnacle Goose<br>(Svalbard population)<br>*Branta leucopsis* | 59% | Very High |
| Light-bellied Brent Goose<br>(Svalbard population)<br>*Branta bernicla hrota* | 62% | Very High |
| Shelduck<br>*Tadorna tadorna* | 69% | Very High |
| Eurasian wigeon<br>*Anas penelope* | 62% | Medium |
| Gadwall<br>*Anas strepera* | 41% | Medium |
| Teal<br>*Anas crecca* | 62% | Medium |
| Mallard<br>*Anas platyrhynchos* | 68% | Medium |
| Pintail<br>*Anas acuta* | 62% | Medium |
| Shoveler<br>*Anas clypeata* | 61% | Medium |
| Pochard<br>*Aythya ferina* | 61% | Medium |
| Tufted Duck<br>*Aythya fuligula* | 61% | Medium |
| Scaup<br>*Aythya marila* | 51% | Medium |
| Common Scoter<br>*Melanitta nigra* | 62% | High |
| Velvet Scoter<br>*Melanitta fusca* | 74% | High |
| Goldeneye<br>*Bucephala clangula* | 69% | High |
| Red-breasted Merganser<br>*Mergus serrator* | 55% | Very High |
| Goosander<br>*Mergus merganser*<br>(Breeding Males) | 74% | Very High |
| Goosander<br>*Mergus merganser*<br>(Non-breeding) | 59% | Very High |
| Bittern<br>*Botaurus stellaris* | 63% | Medium |
| Great Crested Grebe<br>*Podiceps cristatus* | 53% | Very High |

| Species | % migration zone | Overall Sensitivity |
|---|---|---|
| Slavonian Grebe<br>*Podiceps auritus* | 62% | Very High |
| Hen Harrier<br>*Circus cyaneus*<br>(breeding) | 48% | Very High |
| Hen Harrier<br>*Circus cyaneus*<br>(non-breeding) | 75% | Very High |
| Coot<br>*Fulica atra* | 67% | Medium |
| Oystercatcher<br>*Haematopus ostralegus*<br>(non-breeding) | 63% | Very High |
| Ringed Plover<br>*Charadrius hiaticula*<br>(non-breeding) | 61% | High |
| Golden Plover<br>*Pluvialis apricaria*<br>(non-breeding) | 50% | Medium |
| Grey Plover<br>*Pluvialis squatarola* | 68% | Very High |
| Lapwing<br>*Vanellus vanellus* | 68% | Medium |
| Knot<br>*Calidris canutus* | 62% | Very High |
| Sanderling<br>*Calidris alba* | 62% | Very High |
| Dunlin<br>*Calidris alpina*<br>*schinzii* & *C. a. arctica*<br>*(passage)* | 61% | Medium |
| Dunlin<br>*Calidris alpina alpina*<br>(passage & winter) | 61% | Medium |
| Ruff<br>*Philomachus pugnax* | 67% | Medium |
| Snipe<br>*Gallinago gallinago* | 62% | Medium |
| Black-tailed Godwit<br>*Limosa limosa islandica* | 57% | Medium |
| Bar-tailed Godwit<br>*Limosa lapponica* | 72% | Medium |
| Whimbrel<br>*Numenius phaeopus* | 60% | Very High |
| Curlew<br>*Numenius arquata*<br>(non-breeding) | 68% | Medium |
| Greenshank<br>*Tringa nebularia* | 58% | Medium |
| Redshank<br>*Tringa totanus britannica*<br>(breeding) | 66% | Medium |
| Redshank<br>Icelandic population<br>*Tringa totanus robusta* | 57% | Medium |

| Species | % migration zone | Overall Sensitivity |
|---|---|---|
| (non-breeding) | | |
| Redshank<br>mainland Europe population<br>*Tringa totanus*<br>(non-breeding) | 74% | Medium |
| Turnstone<br>*Arenaria interpres* | 62% | Very High |
| Short-eared<br>*Owl Asio flammeus* | 67% | Medium |
| Nightjar<br>*Caprimulgus europaeus* | 60% | Medium |

*Barrier effects*

6.3.111 The barrier effects for migrants posed by the Dogger Bank Teesside A and B projects may act in combination, not only with the Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, but also with other wind farm projects within the North Sea, to potentially impact the populations of terrestrial or waterbird species that breed or overwinter in the British Isles.

6.3.112 Due to a lack of information from assessments, no attempt was made to assess, in a quantified manner, the cumulative impact of the potential barrier effects posed by the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects and other wind farm projects within the North Sea on the 46 species' populations of terrestrial or waterbird migrants that are UK SPA features whose migration zones (defined by Wright *et al.* 2012) overlap with the Dogger Bank Creyke Beck A and B project areas.

6.3.113 This is also in part because the potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009) and thus, are problematic to quantify. The indicative figures, presented in Table 6.14, provide some indication of percentages of species' migration zones that overlap with the overall suite of wind farm projects in the North Sea region considered in the cumulative assessment.

6.3.114 As indicated in previous sections, it should be noted that there is considerable uncertainty regarding the assessment of barrier effects posed by offshore wind farms. However, considering the proportions of species' migration zones that overlap with wind farms in the Greater North Sea region, it is clear that considerable proportions of species' populations would potentially be exposed to this effect.

***Summary for all receptors***

6.3.115 Table 6.14 below provides a summary of impacts from each effect for all key marine bird receptors.

**Table 6.14** Summary of potential cumulative impacts for key marine bird receptors.

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magn |
|---|---|---|---|---|---|---|
| White-billed diver | Displacement (operation) | National | Medium | - | - | Negl |
| | | Biogeographic | Medium | - | - | Negl |
| | Collision (operation) | National | Medium | High | High | Negl |
| | | Biogeographic | Medium | High | High | Negl |
| | Habitat loss or change (operation) | All | Medium | - | - | |
| Northern fulmar | Collision (operation) | Protected site | Very High | Very High | Very High | Negl |
| | | National | Very High | Very High | Very High | Negl |
| | | Biogeographic | Very High | Very High | Very High | Negl |
| | Habitat loss or change (operation) | All | Very High | - | - | |
| Northern gannet | Displacement (operation) | Protected site | Very High | - | - | Negl |
| | | National | Very High | - | - | Negl |
| | | Biogeographic | Very High | - | - | Negl |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Lo |
| | | National | Very High | Very High | Very High | Negl |
| | | Biogeographic | Very High | Very High | Very High | Negl |
| | Habitat loss or change (operation) | All | Very High | - | - | |
| Arctic skua | Collision (operation) | Protected site | Very High | High | Very High | Negl |
| | | National | Very High | High | Very High | Negl |
| | | Biogeographic | Very High | High | Very High | Negl |
| | Habitat loss or change (operation) | All | Very High | - | - | |
| Great skua | Collision (operation) | Protected site | Very High | High | Very High | Negl |
| | | National | Very High | High | Very High | Negl |
| | | Biogeographic | Very High | High | Very High | Negl |
| | Habitat loss or change (operation) | All | Very High | - | - | |
| Black-legged kittiwake | Collision (operation) | Protected site | Very High | Very High | Very High | Lo |
| | | National | Very High | Very High | Very High | Negl |
| | | Biogeographic | Very High | Very High | Very High | Negl |
| | Habitat loss or change (operation) | All | Very High | - | - | |
| Lesser black-backed gull | Collision (operation) | Protected site | Very High | Very High | Very High | Negl |
| | | National | Very High | Very High | Very High | Lo |
| | | Biogeographic | Very High | Very High | Very High | Negl |
| | Habitat loss or change (operation) | All | Very High | - | - | |
| Great black-backed gull | Collision (operation) | Protected site | Very High | Very High | Very High | Lo |
| | | National | Very High | Very High | Very High | Lo |

| Receptor | Effect | Geographical scale | Value | Species sensitivity | Overall sensitivity | Magr |
|---|---|---|---|---|---|---|
| | | Biogeographic | Very High | Very High | Very High | Negl |
| | Habitat loss or change (operation) | All | Very High | Low | High | Negl |
| Common guillemot | Displacement (operation) | Protected site | Very High | - | - | Lo |
| | | National | Very High | - | - | Negl |
| | | Biogeographic | Very High | - | - | Negl |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negl |
| | | National | Very High | Very High | Very High | Negl |
| | | Biogeographic | Very High | Very High | Very High | Negl |
| | Habitat loss or change (operation) | All | Very High | - | - | |
| Razorbill | Displacement (operation) | Protected site | Very High | - | - | Negl |
| | | National | Very High | - | - | Negl |
| | | Biogeographic | Very High | - | - | Negl |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negl |
| | | National | Very High | Very High | Very High | Negl |
| | | Biogeographic | Very High | Very High | Very High | Negl |
| | Habitat loss or change (operation) | All | Very High | - | - | |
| Little auk | Displacement (operation) | National | High | - | - | Negl |
| | | Biogeographic | High | - | - | Negl |
| | Collision (operation) | National | High | Medium | High | Negl |
| | | Biogeographic | High | Medium | High | Negl |
| | Habitat loss or change (operation) | All | High | - | - | |
| Atlantic puffin | Displacement (operation) | Protected site | Very High | - | - | Negl |
| | | National | Very High | - | - | Negl |
| | | Biogeographic | Very High | - | - | Negl |
| | Collision (operation) | Protected site | Very High | Very High | Very High | Negl |
| | | National | Very High | Very High | Very High | Negl |
| | | Biogeographic | Very High | Very High | Very High | Negl |
| | Habitat loss or change (operation) | All | Very High | - | - | |

# 7. SUMMARY AND TRANSBOUNDARY EFFECTS

## 7.1 Introduction

7.1.1 Summaries of the potential impacts for key marine bird receptors from the Dogger Bank Teesside A project, Dogger Bank Teesside B project and Dogger Bank Teesside A and B projects are provided at the ends of sections 5.2, 5.3 and 5.4 respectively. A summary of the potential cumulative impacts from these projects in conjunction with the Dogger Bank Teesside C and D and Dogger Bank Creyke Back A and B projects is provided at the end of section 6.2.

7.1.2 The following section provides an overview, by these different levels, of potential impacts assessed to be of moderate or major significance and also highlights where potential transboundary impacts have been identified. These may be either because potential impacts have been identified in relation to a species' biogeographic (or international) population, or because potential impacts have been identified in relation to specific protected sites or the suite of protected sites around the North Sea 'region'. It should be noted, in this respect, that for marine birds it has only been possible to ascertain whether there might be impacts on the breeding colony protected sites that they are features of. In addition to the protected sites at which they are breeding features (Appendix 1), a number of the marine bird species considered in this assessment are also included as winter or passage features of further Special Protection Areas (Appendix 2). However, as the extent of movements of birds between the Dogger Bank Teesside projects and other marine areas is unknown, it is not possible to ascertain whether there might also be impacts on these sites.

7.1.3 In summarising the significance of different effects, it is also important to consider the combined impacts of each effect for each receptor. In this assessment, it should be noted that while not mutually exclusive effects, the potential for displacement is also reflected (through macro-avoidance of the wind farm) in the avoidance rates used in collision risk calculations. Thus, the combined impact of these effects may theoretically be considered. In practice, this is problematic as the two effects are assessed in different ways. The assessment of displacement considers how many birds will be lost to the population in the long-term (based on the methodology outlined below), due to the effective loss of habitat associated with this effect. In contrast, the assessment of collision considers how many birds might be lost over the course of a year, and thus considers these annual impacts both in relation to reference population sizes and in relation to changes in background annual mortality.

7.1.4 As summarised in the tables below, the species potentially impacted by these effects also differ. For displacement, potential impacts are greater for auk species – common guillemot, razorbill, little auk and Atlantic puffin – for which collision estimates are small. For collision, potential impacts are greater for northern gannet, black-legged kittiwake and great black-backed gull, for which the numbers of birds predicted to be impacted by displacement were either relatively small or zero due to

their low or very low sensitivity to habitat loss. Hence, the overall significance of effects for each receptor does not exceed that resulting from the effect that they are most sensitive to.

## 7.2 Dogger Bank Teesside A

7.2.1 No impacts of moderate or major adverse significance were predicted for any receptor for any effect.

**Table 7.1** Effects considered for each receptor for the Dogger Bank Teesside A project and summary of impacts[1].

| Receptor | Displacement | | Habitat loss or change | | Barrier effects | Collision |
|---|---|---|---|---|---|---|
| | Construction/ Decommissioning | Operation | Construction/ Decommissioning | Operation | Operation | Operation |
| White-billed diver | Negligble/ Negligible | Negligible/ Negligible | Negligible | Negligible | - | Negligible/ Negligible |
| Northern fulmar | - | - | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Northern gannet | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Arctic skua | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Great skua | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Black-legged kittiwake | - | - | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Lesser black-backed gull | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Great black-backed gull | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Common guillemot | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Razorbill | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Little auk | Negligble/ Negligible | Negligble/ Negligible | Negligible | Negligible | - | Negligble/ Negligible |
| Atlantic puffin | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | - | Minor/Minor/ Minor/Minor |

1 Minor = minor adverse; Moderate = moderate adverse

## 7.3 Dogger Bank Teesside B

7.3.1 No impacts of moderate or major adverse significance were predicted for any receptor for any effect.

**Table 7.2** Effects considered for each receptor for the Dogger Bank Teesside B project and summary of impacts[1].

| Receptor | Displacement | | Habitat loss or change | | Barrier effects | Collision |
|---|---|---|---|---|---|---|
| | Construction/ Decommissioning | Operation | Construction/ Decommissioning | Operation | Operation | Operation |
| White-billed diver | Negligble/ Negligible | Negligible/ Negligible | Negligible | Negligible | - | Negligible/ Negligible |
| Northern fulmar | - | - | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Northern gannet | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Arctic skua | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Great skua | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Black-legged kittiwake | - | - | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Lesser black-backed gull | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Great black-backed gull | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Common guillemot | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Razorbill | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Little auk | Negligble/ Negligible | Negligble/ Negligible | Negligible | Negligible | - | Negligble/ Negligible |
| Atlantic puffin | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | - | Minor/Minor/ Minor/Minor |

1 Minor = minor adverse; Moderate = moderate adverse

## 7.4 Dogger Bank Teesside A and B

7.4.1 No impacts of moderate or major adverse significance were predicted for any receptor for any effect.

**Table 7.3** Effects considered for each receptor for the Dogger Bank Teesside A and B projects and summary of impacts[1].

| Receptor | Displacement | | Habitat loss or change | | Barrier effects | Collision |
|---|---|---|---|---|---|---|
| | Construction/ Decommissioning | Operation | Construction/ Decommissioning | Operation | Operation | Operation |
| White-billed diver | Negligble/ Negligible | Negligible/ Negligible | Negligible | Negligible | - | Negligible/ Negligible |
| Northern fulmar | - | - | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Northern gannet | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Arctic skua | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Great skua | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Black-legged kittiwake | - | - | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Lesser black-backed gull | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Great black-backed gull | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Common guillemot | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Razorbill | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Little auk | Negligble/ Negligible | Negligble/ Negligible | Negligible | Negligible | - | Negligble/ Negligible |
| Atlantic puffin | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | - | Minor/Minor/ Minor/Minor |

1 Minor = minor adverse; Moderate = moderate adverse

## 7.5 Dogger Bank Teesside A and B, Dogger Bank Teesside C and D and Dogger Bank Creyke Beck A and B

### Displacement (operation)

7.5.1 No impacts of moderate or major adverse significance were predicted for any receptor for this effect.

### Collision (operation)

7.5.1 An impact of moderate adverse significance was predicted for black-legged kittiwake for the Flamborough Head and Bempton Cliffs SPA, based on background mortality.

**Table 7.4** Effects considered for each receptor for the Dogger Bank Teesside A and B, Dogger Bank Teesside C and D and Dogger Bank Creyke Beck A and B projects and summary of impacts[1].

| Receptor | Displacement | | Habitat loss or change | | Barrier effects | Collision |
|---|---|---|---|---|---|---|
| | Construction/ Decommissioning | Operation | Construction/ Decommissioning | Operation | Operation | Operation |
| White-billed diver | Negligble/ Negligible | Negligible/ Negligible | Negligible | Negligible | - | Negligible/ Negligible |
| Northern fulmar | - | - | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Northern gannet | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Arctic skua | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Great skua | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Black-legged kittiwake | - | - | Negligible | Negligible | Minor/Minor/ Minor/Minor | **Moderate**/Minor/ Minor/Minor |
| Lesser black-backed gull | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Great black-backed gull | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Common guillemot | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Razorbill | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Little auk | Negligble/ Negligible | Negligble/ Negligible | Negligible | Negligible | - | Negligble/ Negligible |
| Atlantic puffin | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | - | Minor/Minor/ Minor/Minor |

1 Minor = minor adverse; Moderate = moderate adverse

## 7.6 Cumulative Assessment

7.6.1 In addition to an assessment of the potential cumulative impacts of the Dogger Bank Teesside A and B projects in conjunction with the Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, a cumulative assessment was also undertaken at the scale of the wider North Sea 'region' (defined by the OSPAR Greater North Sea region). Following the overall cumulative impact assessment strategy, information on the numbers of birds predicted to be displaced and collision risk estimates was taken from impact assessments or environmental statements where available and no attempt was made to estimate values in other cases. Thus the sites for which data were available only represent a subset of those initially considered in the cumulative assessment in the North Sea region as a whole. Due to this, and the inherent difficulties of combining information from different sources, where methods may have varied, confidence in all predictions is assigned as very low.

**Displacement (construction and decommissioning/operation)**

7.6.2 Based on the projects for which estimates of the numbers of displaced birds that might be expected to die were available (and the assumptions followed in these assessments), impacts of moderate adverse significance were predicted only for common guillemot for the Buchan Ness to Collieston Coast SPA. Note, however, that the number of guillemots impacted at the Buchan Ness to Collieston Coast SPA from the EOWDC assessment alone was 1.5% prior to cumulative assessment being carried out.

**Collision (operation)**

7.6.3 Impacts of moderate adverse significance were predicted for northern gannet for the Flamborough Head & Bempton Cliffs SPA, for black-legged kittiwake for Flamborough Head & Bempton Cliffs SPA, and for great black-backed gull for the East Caithness Cliffs SPA. Impacts of moderate adverse significance were also predicted for great black-backed gull and lesser black-backed gull for the British breeding and wintering populations.

***Habitat loss and/or change***

7.5.2 No impacts of moderate or major adverse significance were predicted for any receptor for this effect.

**Table 7.5** Effects considered for each receptor for the Dogger Bank Teesside A and B projects in combination with other projects in the wider North Sea and summary of impacts[1].

| Receptor | Displacement | | Habitat loss or change | | Barrier effects | Collision |
|---|---|---|---|---|---|---|
| | Construction/ Decommissioning | Operation | Construction/ Decommissioning | Operation | Operation | Operation |
| White-billed diver | Negligble/ Negligible | Negligible/ Negligible | Negligible | Negligible | - | Negligible/ Negligible |
| Northern fulmar | - | - | Negligible | Negligible | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Northern gannet | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Negligible | Negligible | Minor/Minor/ Minor/Minor | **Moderate**/Minor/ Minor/Minor |
| Arctic skua | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Great skua | - | - | Negligible | Negligible | - | Minor/Minor/ Minor/Minor |
| Black-legged kittiwake | - | - | Negligible | Negligible | Minor/Minor/ Minor/Minor | **Moderate**/Minor/ Minor/Minor |
| Lesser black-backed gull | - | - | Negligible | Negligible | - | Minor/**Moderate**/ Minor/Minor |
| Great black-backed gull | - | - | Negligible | Negligible | - | **Moderate**/**Moderate**/ **Moderate**/Minor |
| Common guillemot | Minor/Minor/ Minor/Minor | **Moderate**/Minor/ Minor/Minor | Minor | Minor | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Razorbill | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor |
| Little auk | Negligble/ Negligible | Negligble/ Negligible | Negligible | Negligible | - | Negligble/ Negligible |
| Atlantic puffin | Minor/Minor/ Minor/Minor | Minor/Minor/ Minor/Minor | Minor | Minor | - | Minor/Minor/ Minor/Minor |

1 Minor = minor adverse; Moderate = moderate adverse

## 7.7 Monitoring

7.7.1 Post-consents monitoring is required to confirm whether impacts predicted in the Environmental Impact Assessment occur, most particularly in those instances where there is uncertainty as to the scale of impacts.

7.7.2 At this stage, it is envisaged that the survey programme will build on that already established and developed through the baseline characterisation (Austin *et al.* 2011), although it is likely that only digital aerial surveys and not boat surveys will be undertaken due to developments in the former. The present survey design has provided greatest survey effort at the tranche/project level, with reduced but concurrent survey effort across the Dogger Bank Zone as a whole. Aerial surveys have been carried out monthly across the year, with boat surveys more recently carried out in selected months to inform on the proportions of different species in species groups across different seasons.

7.7.3 At present, the main limitation of the aerial surveys is that identification to species level has often not been possible and thus information on the proportions of different species in species groups is required from the boat surveys so that counts of birds from the aerial surveys that are presently assigned to species groups can be apportioned to species. There has been considerable progress in improving the identification of species by aerial surveys since 2011, which if incorporated may reduce the need for boat surveys.

7.7.4 The main aim of future monitoring should be to establish whether numbers of marine birds change within the project areas during and after construction. As significant numbers of different species are present in the Dogger Bank Zone across the year, surveys may need to continue on a seasonal, or potentially monthly, basis.

7.7.5 It is also recommended that changes in numbers are evaluated through density surface modelling approaches, as used in the calculation of population estimates here and recommended by recent work (Maclean *et al.* 2006, 2007, 2012, Rexstad & Buckland 2012).

7.7.6 The full scope and specific objectives of monitoring will be determined through consultation with stakeholders, including Joint Nature Conservation Committee, Royal Society for the Protection of Birds, Natural England and the Wildlife Trusts.

**Acknowledgements**

We are grateful to Julie Drew, Sophie Barrell, Kate Buckle, Gavin Clark, Magnus Eriksen, Martin Goff, Mark Legerton, Gareth Lewis, Alastair Mackay, Phil Redstone, Andrew Riley, Michael Stephenson and Sharn Ward from Forewind Ltd, and Rob Staniland, Adam Pharaoh and Keith Henson from Royal HaskoningDHV for their help during the course of this work. Our thanks too to stakeholders from the Joint Nature Conservation Committee, Royal Society for the Protection of Birds, Natural England and the Wildlife Trusts for their comments and guidance. We are also particularly grateful to Ryan Irvine, Isabelle Sikora and Nick Robinson from Gardline Environmental Ltd and Andy Webb, Rhys Hexter, Mark Robinson, Matt Mellor and John Martin from HiDef Ltd for their help and advice regarding the boat and aerial survey datasets. Maria Knight and Nicki Read helped to format this report.

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## APPENDIX 1 Summary of protected sites within the North Sea region considered in the Ornithology Technical Report of which breeding seabirds are a feature

A1.1 The following tables provide a summary of protected sites within the Greater North Sea OSPAR Region considered in the Ornithology Technical Report of which breeding seabirds are a feature (Tables A1.1 and A1.2). Protected sites considered here include Sites of Special Scientific Interest (SSSIs), Special Protection Areas (SPAs) and Ramsar sites. For the purpose of this table, note that SSSIs are only explicitly mentioned if they are not component parts of SPAs, or if a species is a feature of a SSSI that is a component part of an SPA but are not a feature of that SPA.

A1.2 This appendix does not consider protected sites for which seabirds or waterbirds are specified as either a passage or winter feature. It makes an assessment of whether during the breeding season, species identified as features of breeding colonies should be screened in or out of the EIA process, by considering whether the foraging ranges of the species concerned are likely to overlap with the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects within the Dogger Bank Offshore wind farm zone (Table A1.1) and the Dogger Bank Teesside A and B, Dogger Bank Teesside C and D and Dogger Bank Creyke Beck A and B export cable corridor areas. It is important to note that this assessment refers only to breeding seabirds during the breeding season, and not those present in the project areas during the winter or migration periods or as non-breeders during the breeding season. Sites are defined here as those that are share a border or touch the coastline, however two sites (for Arctic Skua) – Doomy and Whitemoor Hill SSSI and Crussa Field and the Heoggs SSSI – are very close to the coast and so were retained.

A1.3 For breeding seabirds, information on foraging ranges (Thaxter *et al.* 2012) has been used to determine the species and suites of protected sites that might potentially be impacted by the effects associated with each wind farm project during the breeding season. The mean maximum foraging ranges across all studies reviewed by Thaxter *et al.* (2012) have been used, unless other evidence, e.g. from tracking studies, suggests that birds from more distant protected sites might also utilise feeding areas within the Dogger Bank Zone.

A1.4 For three species, Black-legged Kittiwake[1], Common Guillemot[2,3], and Razorbill[2], foraging ranges were taken from FAME (2012) (E. Owen pers. comm.) which suggested larger maximum foraging ranges than Thaxter *et al.* (2012). This, together with the continuing use and concentration of birds in the western part of the Dogger Bank Zone during the breeding season, suggests that birds from breeding colonies do forage at least in this area. For northern gannet, more specific information is available for British, Irish and French breeding colonies (Wakefield et al. 2013). This indicates that northern gannets may forage in the zone from both the Flamborough

[1] http://www.fameproject.eu/en/results/
[2] http://atlanticarea.ccdr-n.pt/news/docs/fame-article
[3] http://www.bbc.co.uk/news/uk-scotland-16687214.

& Bempton Cliffs SPA and Forth Islands SPA, but not from 10 other colonies considered by this study. Thus the Dogger Bank Zone is considered to be within foraging range of birds from these two sites, while (given the foraging range of these birds) it cannot be discounted that birds from the Seevogelschutzgebiet Helgoland SPA in Germany might also forage within the Zone. Information from birds tagged at the Farne Islands SPA, also suggest that the Dogger Bank Zone is outside foraging range of this site[4], as also supported by the mean foraging range for this species in Thaxter *et al.* (2012). Greater Black-backed Gull was not reviewed by Thaxter *et al.* (2012), therefore a separate review was conducted, giving a maximum value of 60 km reported from Seys *et al.* (2001) based on density of birds from at-sea surveys. However, since this was only one study, with foraging ranges albeit unknown but potentially above this value, we used 60 km as the representative foraging range for this species. Similarly, a foraging range for Black-throated Diver was taken as 2 km from Bight *et al.* (2006).

A1.5 For some SPAs and all SSSIs, no population information was available. For these sites population sizes were taken from the Seabird 2000 (Mitchell *et al.* 2004) census by matching site grid references to SPA and SSSI shapefiles in GIS.

A1.6 For Scottish SPAs, citations follow those presented by SNH (2012): http://gateway.snh.gov.uk/sitelink/index.jsp.

A1.7 Analyses aimed to use up-to-date population estimates for sites in order that impacts based on the population estimates produced for the Dogger Bank Teesside projects from the 2010 and 2011 survey data were appropriately apportioned. For Scottish SPAs, recent population estimates were provided by JNCC. Where available, data for English sites and Scottish SSSIs were taken from the JNCC Seabird Monitoring Programme Online Database (JNCC 2012b) for the most recent year between 2007 and 2011. If no data were available for these sites from this source for these years, data were obtained from the Seabird 2000 survey (which ran from 1998-2002) and numbers adjusted using country (Scotland, England) Seabird Monitoring Programme trends (JNCC 2012a) to provide a value for 2011. Population estimates used for the Flamborough Head and Bempton Cliffs SPA and its proposed extension were based on data for 2007 to 2011 and follow guidance provided by Natural England (see Appendix 3). For non-UK sites, data were taken from citation information available through Europa (2012) and Ramsar (2012).

A1.8 It should be noted that the below information considers the breeding season only. It makes no assessment of whether designated features of breeding colony protected sites may occur in the project areas outside the breeding season, for example during passage periods or over winter. Furthermore, it does not consider sites for which seabirds or waterbirds are specified as either a passage or winter feature.

[4] http://www.bbc.co.uk/news/10528822

**Table A1.1** Protected sites for which seabirds are designated features within the North Sea region considered in the Ornithology Technical Report and their distances to the Dogger Bank Creyke Beck A (CBa), Dogger Bank Creyke Beck B (CBb), Dogger Bank Teesside A (TEESa), Dogger Bank Teesside B (TEESb), Dogger Bank Teesside C (TEESc) and Dogger Bank Teesside D (TEESd) projects within the Dogger Bank Offshore Wind Farm Zone. Also shown is whether the breeding populations of each species at each site should be screened in (I) or out (O) of the EIA process during the breeding season, based on whether or not each project is within the maximum foraging range of each species from the site (see EIA methodology for more details).

| Species | Foraging range (km) | Sites | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Name of site | SPA No | Country | Site designation | Pop. (pairs) citation | Pop. (pairs) 2000 | Pop. (pairs) 2011 | D CBa | | D CBb | | D TEESa | | D TEESb | | D TEESc | | D TEESd | |
| **Red-throated diver *Gavia stellata*** | **9** | Caithness and Sutherland Peatlands | 4 | UK | SPA, SSSI | 89 | - | - | 491 | O | 465 | O | 504 | O | 485 | O | 453 | O | 466 | O |
| | | Foula | 1 | UK | SPA, SSSI | 11 | - | - | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 26 | - | - | 671 | O | 643 | O | 656 | O | 648 | O | 621 | O | 623 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 58 | - | - | 527 | O | 501 | O | 537 | O | 519 | O | 487 | O | 499 | O |
| | | Ronas Hill – North Roe and Tingon | 5 | UK | SPA, RAMSAR, SSSI | 56 | - | - | 656 | O | 628 | O | 644 | O | 634 | O | 607 | O | 610 | O |
| | | Rousay | - | UK | SSSI | - | - | - | 555 | O | 528 | O | 559 | O | 544 | O | 512 | O | 522 | O |
| **Black-throated Diver *Gavia arctica*** | **2** | Caithness and Sutherland Peatlands | - | UK | SPA, SSSI | 26 | - | - | 491 | O | 465 | O | 504 | O | 485 | O | 453 | O | 466 | O |
| **Northern fulmar *Fulmarus glacialis*** | **400** | Buchan Ness to Collieston Coast | 10 | UK | SPA, SSSI | 1,765 | 1,976 | 1,389 | 354 | I | 328 | I | 370 | I | 350 | I | 319 | I | 334 | I |
| | | Calf of Eday | 15 | UK | SPA, SSSI | 1,955 | 1,842 | 1,782 | 552 | O | 525 | O | 554 | O | 539 | O | 508 | O | 518 | O |
| | | Cape Wrath | - | UK | SPA | 2,300 | 2,107 | 2,251 | 574 | O | 548 | O | 592 | O | 572 | O | 539 | O | 555 | O |
| | | Copinsay | 13 | UK | SPA, SSSI | 1,615 | 5,891 | 1,638 | 518 | O | 491 | O | 522 | O | 507 | O | 475 | O | 485 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 15,000 | 14,075 | 14,202 | 484 | O | 458 | O | 498 | O | 479 | O | 447 | O | 460 | O |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Fair Isle | 17 | UK | SPA, SSSI | 35,210 | 20,424 | 29,649 | 552 | O | 524 | O | 545 | O | 533 | O | 504 | O | 510 | O |
| | | Fetlar | 20 | UK | SPA, SSSI | 9,500 | 8,672 | 9,266 | 650 | O | 622 | O | 634 | O | 626 | O | 599 | O | 601 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 798 | 1,561 | 569 | 300 | I | 280 | I | 340 | I | 308 | I | 270 | I | 302 | I |
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | - | 846 | 1,447 | 130 | I | 130 | I | 195 | I | 164 | I | 159 | I | 188 | I |
| | | Foula | 1 | UK | SPA, SSSI | 46,800 | 21,106 | 22,552 | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |
| | | Fowlsheugh | 8 | UK | SPA, SSSI | 1,170 | 352 | 119 | 329 | I | 304 | I | 354 | I | 330 | I | 297 | I | 317 | I |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 19,539 | 14,647 | 15,650 | 671 | O | 643 | O | 656 | O | 648 | O | 621 | O | 623 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 35,000 | 26,455 | 19,586 | 527 | O | 501 | O | 537 | O | 519 | O | 487 | O | 499 | O |
| | | Hunstanton Cliffs | - | UK | SSSI | - | 65 | 91 | 198 | I | 212 | I | 243 | I | 223 | I | 255 | I | 273 | I |
| | | North Berwick Coast | - | UK | SSSI | - | 509 | 544 | 300 | I | 280 | I | 340 | I | 308 | I | 273 | I | 306 | I |
| | | North Caithness Cliffs | 12 | UK | SPA, SSSI | 14,700 | 22,291 | 13,950 | 503 | O | 476 | O | 512 | O | 495 | O | 463 | O | 475 | O |
| | | Noss | 19 | UK | SPA, SSSI | 6,350 | 5,169 | 5,248 | 607 | O | 579 | O | 594 | O | 584 | O | 557 | O | 560 | O |
| | | Rousay | 14 | UK | SPA, SSSI | 1,240 | 895 | 1,030 | 555 | O | 528 | O | 559 | O | 544 | O | 512 | O | 522 | O |
| | | Sumburgh Head | 18 | UK | SPA, SSSI | 2,542 | 2,444 | 233 | 581 | O | 554 | O | 571 | O | 561 | O | 532 | O | 537 | O |
| | | Troup, Pennan and Lions Heads | 9 | UK | SPA, SSSI | 4,400 | 2,900 | 1,600 | 393 | I | 367 | I | 407 | O | 388 | I | 356 | I | 370 | I |
| | | West Westray | 16 | UK | SPA, SSSI | 1,400 | 3,544 | 677 | 565 | O | 538 | O | 569 | O | 553 | O | 522 | O | 532 | O |
| | | Weybourne Cliffs | - | UK | SSSI | - | 17 | 18 | 198 | I | 212 | I | 243 | I | 223 | I | 246 | I | 259 | I |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 92 | - | - | 362 | I | 386 | I | 313 | I | 347 | I | 377 | I | 345 | I |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 30 -35 | - | - | 704 | O | 713 | O | 752 | O | 731 | O | 746 | O | 765 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 100 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Falaise du Bessin Occidental | - | France | SPA | 140 | - | - | 617 | O | 630 | O | 662 | O | 642 | O | 663 | O | 678 | O |
| | | Littoral Seino-Marin | - | France | SPA | 41 | - | - | 509 | O | 529 | O | 549 | O | 532 | O | 561 | O | 571 | O |
| | | Ouessant-Molene | - | France | SPA | 100 | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| | | Recifs et lands de la Hague | - | France | SPA | - | - | - | 604 | O | 613 | O | 653 | O | 631 | O | 646 | O | 665 | O |
| | | Tregor Goelo | - | France | SPA | 10 | - | - | 717 | O | 725 | O | 768 | O | 746 | O | 758 | O | 779 | O |
| **European storm petrel *Hydrobates pelagicus*** | **65** | Auskerry | 21 | UK | SPA, SSSI | 3,600 | 994 | - | 530 | O | 503 | O | 533 | O | 518 | O | 487 | O | 497 | O |
| | | Eilean nan Ron | - | UK | SSSI | - | 448 | - | 574 | O | 548 | O | 567 | O | 547 | O | 516 | O | 531 | O |
| | | Foula (Foula SPA) | - | UK | SSSI | - | - | - | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |
| | | Lamb Hoga (Fetlar SPA) | - | UK | SSSI | - | - | - | 650 | O | 622 | O | 634 | O | 626 | O | 599 | O | 601 | O |
| | | Mousa | 22 | UK | SPA, SSSI | 4,750 | 6,800 | - | 596 | O | 569 | O | 585 | O | 575 | O | 547 | O | 551 | O |
| | | Sule Skerry | - | UK | SSSI | 1,000 | 309 | - | 592 | O | 566 | O | 606 | O | 587 | O | 555 | O | 568 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 40-49 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| | | Ouessant-Molene | - | France | SPA | 560-360 | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| **Leach's storm petrel *Oceanodroma leucorhoa*** | **92** | Foula | 1 | UK | SPA, SSSI | 50 | 15 | - | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |
| | | Ramna Stacks and Gruney | 23 | UK | SPA, SSSI | 20 | 20 | - | 647 | O | 656 | O | 641 | O | 669 | O | 621 | O | 624 | O |
| | | Sule Skerry and Sule Stack | - | UK | SPA | 5 | 0 | - | 592 | O | 566 | O | 606 | O | 587 | O | 555 | O | 568 | O |
| **Northern gannet *Morus bassanus*** | **229**** | Fair Isle | 17 | UK | SPA, SSSI | 1,166 | 1,123 | 3.582 | 552 | O | 524 | O | 545 | O | 533 | O | 504 | O | 510 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 21,600 | 43,648 | 55,482 | 300 | I | 280 | I | 340 | I | 308 | I | 270 | I | 302 | I |
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | 2,501 | 2,548 | 8,469 | 130 | I | 130 | I | 195 | I | 164 | I | 159 | I | 188 | I |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 16,400 | 14,541 | 24,353 | 671 | O | 643 | O | 656 | O | 648 | O | 621 | O | 623 | O |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Noss | 19 | UK | SPA, SSSI | 6,860 | 8,017 | 9,767 | 607 | O | 579 | O | 594 | O | 584 | O | 557 | O | 560 | O |
| | | Sule Skerry and Sule Stack | - | UK | SPA, SSSI | 5,900 | 5,137 | 4,675 | 592 | O | 566 | O | 606 | O | 587 | O | 555 | O | 568 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 114 | - | - | 362 | I | 386 | I | 313 | I | 347 | I | 377 | I | 345 | I |
| | | Chausay | - | France | SPA | - | - | - | 675 | O | 685 | O | 721 | O | 701 | O | 718 | O | 736 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 19,526 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| **Great cormorant *Phalacrocorax carbo*** | **25** | Abberton Reservoir | 25 | UK | SPA, RAMSAR, SSSI | 490 | 370 | - | 322 | O | 339 | O | 365 | O | 346 | O | 371 | O | 383 | O |
| | | Blackwater Estuary | - | UK | SSSI | - | - | - | 349 | O | 368 | O | 343 | O | 325 | O | 375 | O | 387 | O |
| | | Calf of Eday | 15 | UK | SPA, SSSI | 223 | 138 | - | 552 | O | 525 | O | 554 | O | 539 | O | 508 | O | 518 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 230 | 235 | 109 | 484 | O | 458 | O | 498 | O | 479 | O | 447 | O | 460 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 194 | 238 | - | 223 | O | 205 | O | 269 | O | 235 | O | 204 | O | 239 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 200 | 213 | - | 300 | O | 280 | O | 340 | O | 308 | O | 270 | O | 302 | O |
| | | Duinen Vlieland | - | Netherlands | SPA | 870 | - | - | 247 | O | 268 | O | 225 | O | 247 | O | 283 | O | 266 | O |
| | | Veerse Meere | - | Netherlands | SPA, RAMSAR | 490 | - | - | 359 | O | 382 | O | 376 | O | 373 | O | 414 | O | 413 | O |
| | | Voornes Duin | - | Netherlands | SPA | 1,100 | - | - | 336 | O | 359 | O | 346 | O | 347 | O | 388 | O | 384 | O |
| | | Zwanenwater | - | Netherlands | SPA, RAMSAR | 790 | - | - | 270 | O | 292 | O | 259 | O | 273 | O | 312 | O | 300 | O |
| | | Baie de Morlaix | - | France | SPA | 130-140 | - | - | 757 | O | 764 | O | 810 | O | 788 | O | 796 | O | 819 | O |
| | | Baie de Saint-Brieuc-Est | - | France | SPA | 35 | - | - | 731 | O | 740 | O | 780 | O | 758 | O | 773 | O | 792 | O |
| | | Baie de Seine Occidentale | - | France | SPA | 406-660 | - | - | 600 | O | 612 | O | 645 | O | 625 | O | 645 | O | 661 | O |
| | | Baie du Mont Saint Michel | - | France | SPA | 220-230 | - | - | 694 | O | 705 | O | 740 | O | 719 | O | 738 | O | 755 | O |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Chausay | - | France | SPA | 230-235 | - | - | 675 | O | 685 | O | 721 | O | 701 | O | 718 | O | 736 | O |
| | | Ilot du Trevors | - | France | SPA | 37 | - | - | 809 | O | 815 | O | 864 | O | 841 | O | 847 | O | 870 | O |
| | | Littoral Seino-Marin | - | France | SPA | 55 | - | - | 509 | O | 529 | O | 549 | O | 532 | O | 561 | O | 571 | O |
| | | Marais Audomarois | - | France | SPA | 105-270 | - | - | 431 | O | 454 | O | 465 | O | 451 | O | 487 | O | 491 | O |
| | | Ouessant-Molene | - | France | SPA | 90-110 | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| | | Tregor Goelo | - | France | SPA | - | - | - | 717 | O | 725 | O | 768 | O | 746 | O | 758 | O | 779 | O |
| | | Aebelo og kysten ved Naera | - | Denmark | SPA | 2,114 | - | - | 504 | O | 519 | O | 441 | O | 482 | O | 497 | O | 462 | O |
| | | Harboore Tange, Plet Enge og Gjeller So | - | Denmark | SPA, RAMSAR | 1,000 | - | - | 400 | O | 358 | O | 429 | O | 424 | O | 404 | O | 370 | O |
| | | Horsens Fjord og Endelave | - | Denmark | SPA | 900 | - | - | 504 | O | 519 | O | 441 | O | 482 | O | 498 | O | 463 | O |
| | | Hov Vig | - | Denmark | SPA | 1,086 | - | - | 608 | O | 612 | O | 628 | O | 650 | O | 607 | O | 572 | O |
| | | Lille Vildmose | - | Denmark | SPA | 2,149 | - | - | 593 | O | 595 | O | 528 | O | 482 | O | 528 | O | 494 | O |
| | | Stavns Fjord | - | Denmark | SPA | 2,100 | - | - | 544 | O | 559 | O | 481 | O | 522 | O | 538 | O | 503 | O |
| **European shag *Phalacrocorax aristotelis*** | **15** | Buchan Ness to Collieston Coast | 10 | UK | SPA, SSSI | 1,045 | 415 | - | 354 | O | 328 | O | 370 | O | 350 | O | 319 | O | 334 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 2,300 | 1,051 | 1,056 | 484 | O | 458 | O | 498 | O | 479 | O | 447 | O | 460 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 1,100 | 663 | - | 552 | O | 524 | O | 545 | O | 533 | O | 504 | O | 510 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 994 | 1,280 | - | 223 | O | 205 | O | 269 | O | 235 | O | 204 | O | 239 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 2,400 | 1,048 | - | 300 | O | 280 | O | 340 | O | 308 | O | 270 | O | 302 | O |
| | | Flamborough Head and Bempton Cliffs | - | UK | SPA, SSSI | - | 24 | 0 | 130 | O | 130 | O | 195 | O | 164 | O | 159 | O | 188 | O |
| | | Foula | 1 | UK | SPA, SSSI | 2,400 | 2,300 | - | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 450 | 191 | - | 671 | O | 643 | O | 656 | O | 648 | O | 621 | O | 623 | O |

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| | | St Abb's Head to Fast Castle | 27 | UK | SPA, SSSI | 560 | 323 | - | 264 | O | 245 | O | 308 | O | 275 | O | 243 | O | 275 | O |
| | | Sule Skerry | - | UK | SSSI | - | 777 | - | 592 | O | 566 | O | 606 | O | 587 | O | 555 | O | 568 | O |
| | | Sumburgh Head | - | UK | SSSI | - | 270 | - | 581 | O | 554 | O | 571 | O | 561 | O | 532 | O | 537 | O |
| | | Baie de Morlaix | - | France | SPA | 365 | - | - | 757 | O | 764 | O | 810 | O | 788 | O | 796 | O | 819 | O |
| | | Baie de Saint-Brieuc-Est | - | France | SPA | 35 | - | - | 731 | O | 740 | O | 780 | O | 758 | O | 773 | O | 792 | O |
| | | Baie de Seine Occidentale | - | France | SPA | 44-45 | - | - | 600 | O | 612 | O | 645 | O | 625 | O | 645 | O | 661 | O |
| | | Baie du Mont Saint Michel | - | France | SPA | 752-760 | - | - | 694 | O | 705 | O | 740 | O | 719 | O | 738 | O | 755 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 300-320 | - | - | 704 | O | 713 | O | 752 | O | 731 | O | 746 | O | 765 | O |
| | | Chausay | - | France | SPA | 890-2000 | - | - | 675 | O | 685 | O | 721 | O | 701 | O | 718 | O | 736 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 228 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| | | Iles de la Colombiere, de la Nelliere et des Haches | - | France | SPA | - | - | - | 727 | O | 736 | O | 774 | O | 753 | O | 769 | O | 788 | O |
| | | Ilot du Trevors | - | France | SPA | 3-4 | - | - | 809 | O | 815 | O | 864 | O | 841 | O | 847 | O | 870 | O |
| | | Ilots Notre-Dame et Chevret | - | France | SPA | 2 | - | - | 728 | O | 738 | O | 775 | O | 754 | O | 771 | O | 789 | O |
| | | Landes et dunes de la Hague | - | France | SPA | 21-27 | - | - | 604 | O | 613 | O | 653 | O | 631 | O | 649 | O | 668 | O |
| | | Littoral Seino-Marin | - | France | SPA | 3 | - | - | 509 | O | 529 | O | 549 | O | 532 | O | 561 | O | 571 | O |
| | | Ouessant-Molene | - | France | SPA | 700 | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| | | Tregor Goelo | - | France | SPA | - | - | - | 717 | O | 725 | O | 768 | O | 746 | O | 758 | O | 779 | O |
| | | Ringkobing Fjord | - | Denmark | SPA, RAMSAR | - | - | - | 392 | O | 406 | O | 329 | O | 370 | O | 386 | O | 351 | O |
| **Arctic Skua *Stercorarius*** | **63** | Crussa Field and the Heoggs | - | UK | SSSI | - | 39 | 16 | 653 | O | 625 | O | 639 | O | 630 | O | 626 | O | 627 | O |

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| ***parasiticus*** | | Doomy and Whitemaw Hill | - | UK | SSSI | - | 42 | 18 | 552 | O | 525 | O | 554 | O | 539 | O | 510 | O | 519 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 110 | 78 | 65 | 552 | O | 524 | O | 545 | O | 533 | O | 504 | O | 510 | O |
| | | Fetlar | 20 | UK | SPA, SSSI | 130 | 96 | 40 | 650 | O | 622 | O | 634 | O | 626 | O | 599 | O | 601 | O |
| | | Foula | 1 | UK | SPA, SSSI | 133 | 107 | 50 | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |
| | | Hill of Colvadale and Sobul | - | UK | SSSI | - | 45 | 19 | 653 | O | 625 | O | 639 | O | 630 | O | 619 | O | 621 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 59 | 70 | 12 | 527 | O | 501 | O | 537 | O | 519 | O | 487 | O | 499 | O |
| | | Noss (Noss SPA) | - | UK | SSSI | - | 9 | 4 | 607 | O | 579 | O | 594 | O | 584 | O | 557 | O | 560 | O |
| | | Papa Stour | - | UK | SSSI | - | 47 | 20 | 638 | O | 611 | O | 628 | O | 618 | O | 590 | O | 594 | O |
| | | Papa Westray | 28 | UK | SPA, SSSI | 150 | 64 | 27 | 570 | O | 542 | O | 572 | O | 557 | O | 526 | O | 535 | O |
| | | Ronas Hill-North Roe | - | UK | SSSI | - | 90 | 38 | 656 | O | 628 | O | 644 | O | 634 | O | 607 | O | 610 | O |
| | | Rousay | 14 | UK | SPA, SSSI | 130 | 115 | 48 | 555 | O | 528 | O | 559 | O | 544 | O | 512 | O | 522 | O |
| | | West Westray | 16 | UK | SPA, SSSI | 78 | 84 | 38 | 565 | O | 538 | O | 569 | O | 553 | O | 522 | O | 532 | O |
| | | Koster | - | Sweden | SPA | - | - | - | 700 | O | 696 | O | 636 | O | 675 | O | 666 | O | 636 | O |
| | | Nordre Alvs Esturarium | - | Sweden | SPA | 6-10 | - | - | 670 | O | 673 | O | 604 | O | 645 | O | 646 | O | 612 | O |
| | | Salofjorden | - | Sweden | SPA | - | - | - | 666 | O | 669 | O | 600 | O | 641 | O | 641 | O | 608 | O |
| | | Tanumskusten | - | Sweden | SPA | 10-20 | - | - | 693 | O | 690 | O | 628 | O | 668 | O | 661 | O | 630 | O |
| | | Vrangoskargarden | - | Sweden | SPA | 6-10 | - | - | 660 | O | 665 | O | 595 | O | 636 | O | 639 | O | 605 | O |
| **Great skua** ***Catharacta skua*** | **86** | Fair Isle | 17 | UK | SPA, SSSI | 110 | 143 | 227 | 552 | O | 524 | O | 545 | O | 533 | O | 504 | O | 510 | O |
| | | Fetlar | 20 | UK | SPA, SSSI | 508 | 593 | 687 | 650 | O | 622 | O | 634 | O | 626 | O | 599 | O | 601 | O |
| | | Foula | 1 | UK | SPA, SSSI | 2,270 | 2,293 | 2,656 | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 788 | 1,061 | 848 | 671 | O | 643 | O | 656 | O | 648 | O | 621 | O | 623 | O |

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| | | Hoy | 3 | UK | SPA, SSSI | 1,900 | 1,973 | 1,346 | 527 | O | 501 | O | 537 | O | 519 | O | 487 | O | 499 | O |
| | | Noss | 19 | UK | SPA, SSSI | 420 | 432 | 365 | 607 | O | 579 | O | 594 | O | 584 | O | 557 | O | 560 | O |
| | | Ronas Hill – North Roe and Tingon | 5 | UK | SPA, RAMSAR, SSSI | 130 | 214 | 248 | 656 | O | 628 | O | 644 | O | 634 | O | 607 | O | 610 | O |
| **Lesser black-backed gull** ***Larus fuscus*** | **141** | Alde-Ore Estuary | 29 | UK | SPA, RAMSAR, SSSI | 21,700 | 5,790 | 2,833 | 278 | O | 300 | O | 318 | O | 301 | O | 332 | O | 340 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 1,500 | 4,003 | 2,013 | 300 | O | 280 | O | 340 | O | 308 | O | 270 | O | 302 | O |
| | | Hallands Vadero | - | Sweden | SPA | 15 | - | - | 673 | O | 686 | O | 609 | O | 651 | O | 663 | O | 628 | O |
| | | Lista Wetlands System | - | Norway | RAMSAR | - | - | - | 482 | O | 478 | O | 429 | O | 455 | O | 410 | O | 329 | O |
| | | Duinen en Lage Land Texel | - | Netherlands | SPA | 14,000 | - | - | 249 | O | 270 | O | 230 | O | 249 | O | 287 | O | 271 | O |
| | | Duinen Vlieland | - | Netherlands | SPA | 2,500 | - | - | 247 | O | 268 | O | 225 | O | 247 | O | 283 | O | 266 | O |
| | | Waddenzee | - | Netherlands | SPA, RAMSAR | 19,000 | - | - | 246 | O | 267 | O | 225 | O | 246 | O | 284 | O | 266 | O |
| | | Zwanenwater | - | Netherlands | SPA, RAMSAR | 110 | - | - | 270 | O | 292 | O | 259 | O | 273 | O | 312 | O | 300 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 23,063 | - | - | 298 | O | 322 | O | 260 | O | 290 | O | 325 | O | 299 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 7,285 | - | - | 366 | O | 389 | O | 310 | O | 348 | O | 374 | O | 340 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 2,037 | - | - | 362 | O | 386 | O | 313 | O | 347 | O | 377 | O | 345 | O |
| | | Baie de Morlaix | - | France | SPA | 160 | - | - | 757 | O | 764 | O | 810 | O | 788 | O | 796 | O | 819 | O |
| | | Baie de Saint-Brieuc-Est | - | France | SPA | 10 | - | - | 731 | O | 740 | O | 780 | O | 758 | O | 773 | O | 792 | O |

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| | | Baie du Mont Saint Michel | - | France | SPA | 90 - 100 | - | - | 694 | O | 705 | O | 740 | O | 719 | O | 738 | O | 755 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 2-3 | - | - | 704 | O | 713 | O | 752 | O | 731 | O | 746 | O | 765 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 638 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| | | Falaise du Bessin Occidental | - | France | SPA | 35 | - | - | 617 | O | 630 | O | 662 | O | 642 | O | 663 | O | 678 | O |
| | | Ilot du Trevors | - | France | SPA | 60 | - | - | 809 | O | 815 | O | 864 | O | 841 | O | 847 | O | 870 | O |
| | | Ilots Notre-Dame et Chevret | - | France | SPA | 3 | - | - | 728 | O | 738 | O | 775 | O | 754 | O | 771 | O | 789 | O |
| | | Ouessant-Molene | - | France | SPA | 4 700 – 4800 | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| | | Tregor Goelo | - | France | SPA | - | - | - | 717 | O | 725 | O | 768 | O | 746 | O | 758 | O | 779 | O |
| **Herring gull *Larus argentatus*** | **61** | Alde-Ore Estuary | 29 | UK | SPA, RAMSAR, SSSI | 6,050 | 825 | - | 278 | O | 300 | O | 318 | O | 301 | O | 332 | O | 340 | O |
| | | Buchan Ness to Collieston Coast | 10 | UK | SPA, SSSI | 4,292 | 3,126 | 3,079 | 354 | O | 328 | O | 370 | O | 350 | O | 319 | O | 334 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 9,400 | 3,049 | 3,393 | 484 | O | 458 | O | 498 | O | 479 | O | 447 | O | 460 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 6,600 | 7,319 | 5,027 | 300 | O | 280 | O | 340 | O | 308 | O | 270 | O | 302 | O |
| | | Flamborough Head and Bempton Cliffs | - | UK | SSI | 1,110 | 721 | 711 | 130 | O | 130 | O | 195 | O | 164 | O | 159 | O | 188 | O |
| | | Fowlsheugh | 8 | UK | SPA, SSSI | 3,190 | 267 | 259 | 329 | O | 304 | O | 354 | O | 330 | O | 297 | O | 317 | O |
| | | St Abb's Head to Fast Castle | 27 | UK | SPA, SSSI | 1,160 | 584 | 647 | 264 | O | 245 | O | 308 | O | 275 | O | 243 | O | 275 | O |
| | | Troup, Pennan and Lions Heads | 9 | UK | SPA, SSSI | 4,200 | 1,951 | 1,597 | 393 | O | 367 | O | 407 | O | 388 | O | 356 | O | 370 | O |
| | | Hallands Vadero | - | Sweden | SPA | 8,000 | - | - | 673 | O | 686 | O | 609 | O | 651 | O | 663 | O | 628 | O |
| | | Duinen en Lage Land Texel | - | Netherlands | SPA | 7,631 | - | - | 249 | O | 270 | O | 230 | O | 249 | O | 287 | O | 271 | O |
| | | Grevelingen | - | Netherlands | SPA, | 1,156 | - | - | 343 | O | 366 | O | 356 | O | 355 | O | 396 | O | 393 | O |

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| | | | | | RAMSAR | | | | | | | | | | | | | | | | |
| | | Oosterschelde | - | Netherlands | SPA, RAMSAR | 1,767 | - | - | 350 | O | 374 | O | 365 | O | 363 | O | 404 | O | 402 | O |
| | | Veerse Meere | - | Netherlands | SPA, RAMSAR | 1,728 | - | - | 359 | O | 382 | O | 376 | O | 373 | O | 414 | O | 413 | O |
| | | Voordelta | - | Netherlands | SPA, RAMSAR | 11,484 | - | - | 323 | O | 346 | O | 334 | O | 334 | O | 375 | O | 371 | O |
| | | Zwanenwater | - | Netherlands | SPA, RAMSAR | 1,087 | - | - | 270 | O | 292 | O | 259 | O | 273 | O | 312 | O | 300 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 22,949 | - | - | 298 | O | 322 | O | 260 | O | 290 | O | 325 | O | 299 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 12,119 | - | - | 366 | O | 389 | O | 310 | O | 348 | O | 374 | O | 340 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 217 | - | - | 362 | O | 386 | O | 313 | O | 347 | O | 377 | O | 345 | O |
| | | Baie de Morlaix | - | France | SPA | 2,460 | - | - | 757 | O | 764 | O | 810 | O | 788 | O | 796 | O | 819 | O |
| | | Baie de Saint-Brieuc-Est | - | France | SPA | 310 | - | - | 731 | O | 740 | O | 780 | O | 758 | O | 773 | O | 792 | O |
| | | Baie de Seine Occidentale | - | France | SPA | 1880 - 2145 | - | - | 600 | O | 612 | O | 645 | O | 625 | O | 645 | O | 661 | O |
| | | Baie du Mont Saint Michel | - | France | SPA | 90 - 100 | - | - | 694 | O | 705 | O | 740 | O | 719 | O | 738 | O | 755 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 340 - 360 | - | - | 704 | O | 713 | O | 752 | O | 731 | O | 746 | O | 765 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 2,788 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| | | Falaise du Bessin Occidental | - | France | SPA | 369 | - | - | 617 | O | 630 | O | 662 | O | 642 | O | 663 | O | 678 | O |
| | | Ilot du Trevors | - | France | SPA | 196 | - | - | 809 | O | 815 | O | 864 | O | 841 | O | 847 | O | 870 | O |

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| | | Ilots Notre-Dame et Chevret | - | France | SPA | 6 | - | - | 728 | O | 738 | O | 775 | O | 754 | O | 771 | O | 789 | O |
| | | Littoral Seino-Marin | - | France | SPA | 1,125 | - | - | 509 | O | 529 | O | 549 | O | 532 | O | 561 | O | 571 | O |
| | | Ouessant-Molene | - | France | SPA | 1000 – 1100 | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| | | Tregor Goelo | - | France | SPA | - | - | - | 717 | O | 725 | O | 768 | O | 746 | O | 758 | O | 779 | O |
| **Great black-backed gull** ***Larus marinus*** | **60** | Calf of Eday | 15 | UK | SPA, SSSI | 938 | 675 | 314 | 552 | O | 525 | O | 554 | O | 539 | O | 508 | O | 518 | O |
| | | Copinsay | 13 | UK | SPA, SSSI | 490 | 400 | 186 | 518 | O | 491 | O | 522 | O | 507 | O | 475 | O | 485 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 800 | 167 | 175 | 484 | O | 458 | O | 498 | O | 479 | O | 447 | O | 460 | O |
| | | Eilean Hoan (North Sutherland Coastal Islands) | - | UK | SSSI | - | 390 | 181 | 550 | O | 524 | O | 567 | O | 547 | O | 514 | O | 529 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 570 | 469 | 28 | 527 | O | 501 | O | 537 | O | 519 | O | 487 | O | 499 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 2 | - | - | 298 | O | 322 | O | 260 | O | 290 | O | 325 | O | 299 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 14 | - | - | 366 | O | 389 | O | 310 | O | 348 | O | 374 | O | 340 | O |
| | | Baie de Morlaix | - | France | SPA | 170 | - | - | 757 | O | 764 | O | 810 | O | 788 | O | 796 | O | 819 | O |
| | | Baie de Saint-Brieuc-Est | - | France | SPA | 4 | - | - | 731 | O | 740 | O | 780 | O | 758 | O | 773 | O | 792 | O |
| | | Baie de Seine Occidentale | - | France | SPA | 231 -400 | - | - | 600 | O | 612 | O | 645 | O | 625 | O | 645 | O | 661 | O |
| | | Baie du Mont Saint Michel | - | France | SPA | 138 – 140 | - | - | 694 | O | 705 | O | 740 | O | 719 | O | 738 | O | 755 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 6 | - | - | 704 | O | 713 | O | 752 | O | 731 | O | 746 | O | 765 | O |
| | | Chausay | - | France | SPA | 340 – 750 | - | - | 675 | O | 685 | O | 721 | O | 701 | O | 718 | O | 736 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 72 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |

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| | | Ilot du Trevors | - | France | SPA | 5 – 6 | - | - | 809 | O | 815 | O | 864 | O | 841 | O | 847 | O | 870 | O |
| | | Littoral Seino-Marin | - | France | SPA | 29 | - | - | 509 | O | 529 | O | 549 | O | 532 | O | 561 | O | 571 | O |
| | | Ouessant-Molene | - | France | SPA | 1000 – 1100 | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| | | Tregor Goelo | - | France | SPA | - | - | - | 717 | O | 725 | O | 768 | O | 746 | O | 758 | O | 779 | O |
| **Black-headed gull *Choricocephalus ridibundus*** | **26** | Alde-Ore Estuary | 29 | UK | SPA, RAMSAR, SSSI | 1,582 | 209 | - | 278 | O | 300 | O | 318 | O | 301 | O | 332 | O | 340 | O |
| | | Coquet Island | 30 | UK | SPA, SSSI | 2,100 | 2,210 | - | 209 | O | 195 | O | 262 | O | 224 | O | 196 | O | 234 | O |
| | | North Solent | - | UK | SSSI | - | 6,125 | - | 469 | O | 478 | O | 519 | O | 497 | O | 520 | O | 540 | O |
| | | The Wash | - | UK | SSSI | - | 636 | - | 202 | O | 211 | O | 255 | O | 232 | O | 244 | O | 264 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 25,895 | - | - | 298 | O | 322 | O | 260 | O | 290 | O | 325 | O | 299 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 33,765 | - | - | 366 | O | 389 | O | 310 | O | 348 | O | 374 | O | 340 | O |
| | | Basses Vallees du Contentin et Baie des Veys | - | France | SPA | 30 -100 | - | - | 611 | O | 622 | O | 657 | O | 637 | O | 654 | O | 672 | O |
| **Common gull Larus canus** | **50** | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 6,427 | - | - | 298 | O | 322 | O | 260 | O | 290 | O | 325 | O | 299 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 4,178 | - | - | 366 | O | 389 | O | 310 | O | 348 | O | 374 | O | 340 | O |
| **Mediterranean gull *Ichthyaetus melanocephalus*** | **20** | Dungeness to Pett Level | 34 | UK | SPA, RAMSAR, SSSI | 2 | - | - | 441 | O | 458 | O | 437 | O | 418 | O | 469 | O | 479 | O |

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| | | North Norfolk Coast | 35 | UK | SPA, RAMSAR, SSSI | 2 | - | - | 198 | O | 212 | O | 243 | O | 223 | O | 245 | O | 259 | O |
| | | Poole Harbour | 31 | UK | SPA, RAMSAR, SSSI | 5 | - | - | 509 | O | 516 | O | 562 | O | 539 | O | 549 | O | 570 | O |
| | | Solent and Southampton Water | 32 | UK | SPA, RAMSAR, SSSI | 2 | - | - | 469 | O | 478 | O | 519 | O | 497 | O | 511 | O | 530 | O |
| | | The Swale | 33 | UK | SPA, RAMSAR, SSSI | 12 | - | - | 370 | O | 388 | O | 411 | O | 393 | O | 420 | O | 431 | O |
| | | Krammer-Volkerak | - | Netherlands | SPA, RAMSAR | 310 | - | - | 361 | O | 384 | O | 371 | O | 372 | O | 413 | O | 409 | O |
| | | Niewkoopse Plassen | - | Netherlands | SPA | 9 | - | - | 335 | O | 357 | O | 331 | O | 341 | O | 381 | O | 371 | O |
| | | Westerschelde & Saeftinghe | - | Netherlands | SPA, RAMSAR | 41 | - | - | 362 | O | 385 | O | 382 | O | 376 | O | 418 | O | 417 | O |
| | | Zoommeer | - | Netherlands | SPA | - | - | - | 379 | O | 403 | O | 390 | O | 391 | O | 432 | O | 428 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 3 | - | - | 298 | O | 322 | O | 260 | O | 290 | O | 325 | O | 299 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 1 | - | - | 366 | O | 389 | O | 310 | O | 348 | O | 374 | O | 340 | O |
| | | Basses Vallees du Contentin et Baie des Veys | - | France | SPA | 0-3 | - | - | 611 | O | 622 | O | 657 | O | 637 | O | 654 | O | 672 | O |
| | | Estuaires picards: Baie de Somme et d'Authie | - | France | SPA | 28 | - | - | 476 | O | 498 | O | 513 | O | 497 | O | 531 | O | 539 | O |
| | | Marais arriere-littoraux Picards | - | France | SPA | 0-2 | - | - | 482 | O | 504 | O | 519 | O | 503 | O | 536 | O | 543 | O |

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| | | Platier d'Oye | - | France | SPA | 1-130 | - | - | 406 | O | 428 | O | 440 | O | 426 | O | 461 | O | 466 | O |
| | | Het Zwin | - | Belgium | SPA | 15 | - | - | 377 | O | 400 | O | 399 | O | 392 | O | 434 | O | 433 | O |
| | | Kustbroedvogels te Zeebrugge-Heist | - | Belgium | SPA | 90 | - | - | 375 | O | 399 | O | 400 | O | 391 | O | 433 | O | 433 | O |
| **Black-legged kittiwake *Rissa tridactyla*** | **231** | Brighton to Newhaven Cliffs | - | UK | SSSI | - | 1,002 | 890 | 396 | O | 415 | O | 419 | O | 425 | O | 496 | O | 511 | O |
| | | Buchan Ness to Collieston Coast | 10 | UK | SPA, SSSI | 30,452 | 14,091 | 14,133 | 354 | O | 328 | O | 370 | O | 350 | O | 319 | O | 334 | O |
| | | Calf of Eday | 15 | UK | SPA, SSSI | 1,717 | 765 | 341 | 552 | O | 525 | O | 554 | O | 539 | O | 508 | O | 518 | O |
| | | Cape Wrath | - | UK | SPA | 9,700 | 10,344 | 4,606 | 574 | O | 548 | O | 592 | O | 572 | O | 539 | O | 555 | O |
| | | Copinsay | 13 | UK | SPA, SSSI | 9,550 | 4,256 | 1,895 | 518 | O | 491 | O | 522 | O | 507 | O | 475 | O | 485 | O |
| | | Dover to Kingsdown Cliffs | - | UK | SSSI | - | 1,229 | 1,091 | 461 | O | 480 | O | 487 | O | 508 | O | 444 | O | 452 | O |
| | | Dunbar Coast | - | UK | SSSI | - | 1,191 | 530 | 296 | O | 278 | O | 339 | O | 306 | O | 273 | O | 318 | O |
| | | Durham Coast and Marsden Bay | - | UK | SSSI | - | - | 2,543 | 185 | I | 175 | I | 246 | O | 207 | I | 186 | I | 225 | I |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 32,500 | 39,890 | 40,140 | 484 | O | 458 | O | 498 | O | 479 | O | 447 | O | 460 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 18,160 | 8,204 | 1,438 | 552 | O | 524 | O | 545 | O | 533 | O | 504 | O | 510 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 6,236 | 5,364 | 3,776 | 223 | I | 205 | I | 269 | O | 235 | O | 204 | I | 239 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 8,400 | 6,991 | 3,884 | 300 | O | 280 | O | 340 | O | 308 | O | 270 | O | 302 | O |
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | 83,370 | 42,908 | 44,520[#] | 130 | I | 130 | I | 195 | I | 164 | I | 159 | I | 188 | I |
| | | Foula | - | UK | SPA | 3,840 | 1,934 | 480 | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |
| | | Fowlsheugh | 8 | UK | SPA, SSSI | 36,650 | 18,000 | 9,337 | 329 | O | 304 | O | 354 | O | 330 | O | 297 | O | 317 | O |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 922 | 635 | 283 | 671 | O | 643 | O | 656 | O | 648 | O | 621 | O | 623 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 3,000 | 3,362 | 397 | 527 | O | 501 | O | 537 | O | 519 | O | 487 | O | 499 | O |

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| | | Marwick Head | 36 | UK | SPA, SSSI | 7,700 | 6,048 | 10,147 | 561 | O | 534 | O | 568 | O | 551 | O | 519 | O | 530 | O |
| | | North Caithness Cliffs | 12 | UK | SPA, SSSI | 13,100 | 6,146 | 2,737 | 503 | O | 476 | O | 512 | O | 495 | O | 463 | O | 475 | O |
| | | Noss | 19 | UK | SPA, SSSI | 7,020 | 2,395 | 507 | 607 | O | 579 | O | 594 | O | 584 | O | 557 | O | 560 | O |
| | | Rousay | 14 | UK | SPA, SSSI | 4,900 | 3,102 | 1,381 | 555 | O | 528 | O | 559 | O | 544 | O | 512 | O | 522 | O |
| | | St Abb's Head to Fast Castle | 27 | UK | SPA, SSSI | 21,170 | 18,499 | 16,222 | 264 | O | 245 | O | 308 | O | 275 | O | 243 | O | 275 | O |
| | | Sumburgh Head | 18 | UK | SPA, SSSI | 1,366 | 877 | 549 | 581 | O | 554 | O | 571 | O | 561 | O | 532 | O | 537 | O |
| | | Troup, Pennan and Lions Heads | 9 | UK | SPA, SSSI | 31,660 | 18,482 | 14,896 | 393 | O | 367 | O | 407 | O | 388 | O | 356 | O | 370 | O |
| | | West Westray | 16 | UK | SPA, SSSI | 23,900 | 12,286 | 5,471 | 565 | O | 538 | O | 569 | O | 553 | O | 522 | O | 532 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 65 | - | - | 704 | O | 713 | O | 752 | O | 731 | O | 746 | O | 765 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 178 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| | | Falaise du Bessin Occidental | - | France | SPA | 1,600 | - | - | 617 | O | 630 | O | 662 | O | 642 | O | 663 | O | 678 | O |
| | | Littoral Seino-Marin | - | France | SPA | 414 | - | - | 509 | O | 529 | O | 549 | O | 532 | O | 561 | O | 571 | O |
| **Arctic tern *Sterna paradisea*** | **24** | Auskerry | 21 | UK | SPA, SSSI | 780 | 32 | - | 530 | O | 503 | O | 533 | O | 518 | O | 487 | O | 497 | O |
| | | Coquet Island | 30 | UK | SPA, SSSI | 700 | 833 | - | 209 | O | 195 | O | 262 | O | 224 | O | 196 | O | 234 | O |
| | | Dalsetter | - | UK | SSSI | - | 4,000 | - | 653 | O | 625 | O | 639 | O | 630 | O | 544 | O | 548 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 1,100 | 1,254 | - | 552 | O | 524 | O | 545 | O | 533 | O | 504 | O | 510 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 2,840 | 2,016 | - | 223 | O | 205 | O | 269 | O | 235 | O | 204 | O | 239 | O |
| | | Fetlar | 20 | UK | SPA, SSSI | 1,065 | 93 | - | 650 | O | 622 | O | 634 | O | 626 | O | 599 | O | 601 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 540 | 908 | 265 | 300 | O | 280 | O | 340 | O | 308 | O | 270 | O | 302 | O |
| | | Foula | 1 | UK | SPA, SSSI | 1,500 | 950 | - | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mousa | 22 | UK | SPA, SSSI | 1,000 | 101 | - | 596 | O | 569 | O | 585 | O | 575 | O | 547 | O | 551 | O |
| | | Papa Stour | 37 | UK | SPA, SSSI | 850 | 1,172 | - | 638 | O | 611 | O | 628 | O | 618 | O | 590 | O | 594 | O |
| | | Papa Westray | 28 | UK | SPA, SSSI | 1,700 | 850 | - | 570 | O | 542 | O | 572 | O | 557 | O | 526 | O | 535 | O |
| | | Pentland Firth Islands | 60 | UK | SPA, SSSI | 1,000 | 13 | - | 510 | O | 483 | O | 518 | O | 501 | O | 469 | O | 480 | O |
| | | Rousay | 14 | UK | SPA, SSSI | 790 | - | - | 555 | O | 528 | O | 559 | O | 544 | O | 512 | O | 522 | O |
| | | Stroma (North Caithness Cliffs SPA) | - | UK | SSSI | - | 546 | - | 503 | O | 476 | O | 512 | O | 495 | O | 478 | O | 490 | O |
| | | Sumburgh Head | 18 | UK | SPA, SSSI | 700 | 305 | - | 581 | O | 554 | O | 571 | O | 561 | O | 532 | O | 537 | O |
| | | West Westray | 16 | UK | SPA, SSSI | 1,140 | - | - | 565 | O | 538 | O | 569 | O | 553 | O | 522 | O | 532 | O |
| | | Falsterbo-Foteviken | - | Sweden | SPA | 90 – 100 | - | - | 665 | O | 684 | O | 605 | O | 645 | O | 666 | O | 631 | O |
| | | Gamla Kopstad | - | Sweden | SPA | - | - | - | 673 | O | 682 | O | 608 | O | 650 | O | 657 | O | 623 | O |
| | | Koster | - | Sweden | SPA | 50 | - | - | 700 | O | 696 | O | 636 | O | 675 | O | 666 | O | 636 | O |
| | | Morups Tange | - | Sweden | SPA | 1 | - | - | 675 | O | 684 | O | 610 | O | 652 | O | 660 | O | 626 | O |
| | | Skalderviken | - | Sweden | SPA | 0-1 | - | - | 678 | O | 691 | O | 614 | O | 655 | O | 670 | O | 635 | O |
| | | Ven | - | Sweden | SPA | - | - | - | 672 | O | 688 | O | 610 | O | 651 | O | 668 | O | 633 | O |
| | | Lauwersmeer | - | Netherlands | SPA, RAMSAR | 5 | - | - | 299 | O | 322 | O | 265 | O | 294 | O | 329 | O | 306 | O |
| | | Waddenzee | - | Netherlands | SPA, RAMSAR | 1 500 | - | - | 246 | O | 267 | O | 225 | O | 246 | O | 284 | O | 266 | O |
| | | Hamburgisches Wattenmeer | - | Germany | SPA, RAMSAR | 100 | - | - | 399 | O | 423 | O | 353 | O | 386 | O | 417 | O | 386 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 720 | - | - | 298 | O | 322 | O | 260 | O | 290 | O | 325 | O | 299 | O |

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| | | NSG Rantumbecken | - | Germany | SPA | 42 | - | - | 389 | O | 412 | O | 333 | O | 371 | O | 398 | O | 363 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 4 323 | - | - | 366 | O | 389 | O | 310 | O | 348 | O | 374 | O | 340 | O |
| | | Untereider | - | Germany | SPA | 70 | - | - | 430 | O | 454 | O | 380 | O | 415 | O | 444 | O | 412 | O |
| | | Ouessant-Molene | - | France | SPA | - | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| | | Agger Tange | - | Denmark | SPA | 200 | - | - | 432 | O | 436 | O | 366 | O | 407 | O | 411 | O | 377 | O |
| | | Alborg Bugt, nordlige del | - | Denmark | SPA | 200 | - | - | 553 | O | 561 | O | 488 | O | 529 | O | 535 | O | 501 | O |
| | | Draby Vig | - | Denmark | SPA | 40 – 75 | - | - | 472 | O | 477 | O | 406 | O | 448 | O | 451 | O | 417 | O |
| | | Fano | - | Denmark | SPA | 47 – 113 | - | - | 395 | O | 413 | O | 334 | O | 374 | O | 394 | O | 360 | O |
| | | Glomstrup Vig, Agero, Munkholm og Katholm Odde, Lindholm og Rotholme | - | Denmark | SPA | 25 - 60 | - | - | 439 | O | 445 | O | 374 | O | 415 | O | 419 | O | 385 | O |
| | | Harboore Tange, Plet Enge og Gjeller So | - | Denmark | SPA, RAMSAR | 8 | - | - | 400 | O | 358 | O | 429 | O | 424 | O | 404 | O | 370 | O |
| | | Hirsholmene | - | Denmark | SPA | 25 – 50 | - | - | 593 | O | 596 | O | 528 | O | 569 | O | 570 | O | 536 | O |
| | | Horsens Fjord og Endelave | - | Denmark | SPA | 450 | - | - | 504 | O | 519 | O | 441 | O | 482 | O | 498 | O | 463 | O |
| | | Kysten fra Aggersund til Bygholm Vejle | - | Denmark | SPA | 100 – 105 | - | - | 497 | O | 501 | O | 432 | O | 473 | O | 475 | O | 441 | O |
| | | Laeso, sydlige del | - | Denmark | SPA | 200 | - | - | 593 | O | 599 | O | 527 | O | 569 | O | 574 | O | 540 | O |
| | | Logstor Bredning, Livo, Feggesund og Skarrehage | - | Denmark | SPA | 15 – 20 | - | - | 477 | O | 481 | O | 411 | O | 452 | O | 455 | O | 421 | O |
| | | Magerodde og Karby Odde | - | Denmark | SPA | 35 - 40 | - | - | 448 | O | 454 | O | 383 | O | 424 | O | 428 | O | 394 | O |
| | | Mando | - | Denmark | SPA | 101 – 189 | - | - | 406 | O | 425 | O | 346 | O | 386 | O | 408 | O | 374 | O |

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| | | Nissum Fjord | - | Denmark | SPA, RAMSAR | 200 | - | - | 408 | O | 416 | O | 343 | O | 384 | O | 393 | O | 358 | O |
| | | Nordre Ronner | - | Denmark | SPA | 0 – 50 | - | - | 608 | O | 612 | O | 542 | O | 583 | O | 586 | O | 552 | O |
| | | Ostlige Vejler | - | Denmark | SPA | 28 – 102 | - | - | 492 | O | 495 | O | 426 | O | 467 | O | 469 | O | 435 | O |
| | | Randers og Mariager Fjorde og Alborg Bugt, sydlige del | - | Denmark | SPA | 210 | - | - | 537 | O | 546 | O | 472 | O | 514 | O | 522 | O | 488 | O |
| | | Ringkobing Fjord | - | Denmark | SPA, RAMSAR | 74 - 104 | - | - | 392 | O | 406 | O | 329 | O | 370 | O | 386 | O | 351 | O |
| | | Romo | - | Denmark | SPA | 170 | - | - | 400 | O | 421 | O | 342 | O | 381 | O | 405 | O | 371 | O |
| | | Sejro Bugt og Nekselo | - | Denmark | SPA | 20 – 30 | - | - | 573 | O | 590 | O | 511 | O | 552 | O | 570 | O | 535 | O |
| | | Skallingen og Langli | - | Denmark | SPA | 80 – 100 | - | - | 385 | O | 401 | O | 323 | O | 363 | O | 382 | O | 347 | O |
| | | Stavns Fjord | - | Denmark | SPA | 50 | - | - | 544 | O | 559 | O | 481 | O | 522 | O | 538 | O | 503 | O |
| | | Vadehavet | - | Denmark | SPA, RAMSAR | 230 – 320 | - | - | 376 | O | 392 | O | 314 | O | 355 | O | 373 | O | 338 | O |
| | | Veno, Veno Sund | - | Denmark | SPA | 23 | - | - | 443 | O | 450 | O | 378 | O | 419 | O | 425 | O | 391 | O |
| | | Vestlige Vejler, Arup Holm og Hovsor Ron | - | Denmark | SPA | 15 – 20 | - | - | 479 | O | 483 | O | 414 | O | 455 | O | 457 | O | 423 | O |
| | | Vidan, Tondermarksen og Saltvandssoen | - | Denmark | SPA | 3-41 | - | - | 411 | O | 434 | O | 354 | O | 393 | O | 418 | O | 384 | O |
| | | Het Zwin | - | Belgium | SPA | 1 | - | - | 377 | O | 400 | O | 399 | O | 392 | O | 434 | O | 433 | O |
| **Common tern** ***Sterna hirundo*** | **15** | Breydon Water | - | UK | SPA, RAMSAR, SSSI | 155 | - | - | 227 | O | 249 | O | 266 | O | 249 | O | 281 | O | 289 | O |
| | | Coquet Island | 30 | UK | SPA, SSSI | 740 | 1,034 | - | 209 | O | 195 | O | 262 | O | 224 | O | 196 | O | 234 | O |

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| | | Cromarty Firth | 42 | UK | SPA, RAMSAR, SSSI | 294 | 222 | - | 471 | O | 447 | O | 496 | O | 473 | O | 439 | O | 459 | O |
| | | Dungeness to Pett Level | 34 | UK | SPA, RAMSAR, SSSI | 266 | 109 | - | 441 | O | 458 | O | 437 | O | 418 | O | 469 | O | 479 | O |
| | | Dun's Dish | - | UK | SSSI | - | - | - | 354 | O | 328 | O | 370 | O | 350 | O | 305 | O | 328 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 230 | 127 | - | 223 | O | 205 | O | 269 | O | 235 | O | 204 | O | 239 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 334 | 303 | 131 | 300 | O | 280 | O | 340 | O | 308 | O | 270 | O | 302 | O |
| | | Foulness | 38 | UK | SPA, RAMSAR, SSSI | 220 | - | - | 339 | O | 358 | O | 381 | O | 363 | O | 390 | O | 401 | O |
| | | Inner Moray Firth | 41 | UK | SPA, RAMSAR, SSSI | 310 | - | - | 460 | O | 436 | O | 486 | O | 462 | O | 428 | O | 449 | O |
| | | North Norfolk Coast | 35 | UK | SPA, RAMSAR, SSSI | 460 | 412 | - | 198 | O | 212 | O | 243 | O | 223 | O | 245 | O | 259 | O |
| | | Poole Harbour | 31 | UK | SPA, RAMSAR, SSSI | 155 | 168 | - | 509 | O | 516 | O | 562 | O | 539 | O | 549 | O | 570 | O |
| | | Solent and Southampton Water | 32 | UK | SPA, RAMSAR, SSSI | 267 | 35 | - | 469 | O | 478 | O | 519 | O | 497 | O | 511 | O | 530 | O |
| | | Stroma | - | UK | SSSI | - | - | - | 503 | O | 476 | O | 512 | O | 495 | O | 478 | O | 490 | O |
| | | The Wash | 39 | UK | SPA, RAMSAR, SSSI | 152 | 64 | - | 202 | O | 211 | O | 255 | O | 232 | O | 244 | O | 264 | O |

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| | | Ythan Estuary, Sands of Forvie and Meikle Loch | 40 | UK | SPA, RAMSAR, SSSI | 265 | 31 | - | 354 | O | 328 | O | 372 | O | 352 | O | 319 | O | 334 | O |
| | | Angelholms kronopark | - | Sweden | SPA | <5 | - | - | 686 | O | 700 | O | 623 | O | 664 | O | 678 | O | 643 | O |
| | | Balgo | - | Sweden | SPA | - | - | - | 669 | O | 676 | O | 603 | O | 645 | O | 651 | O | 617 | O |
| | | Galtaback-Lynga strandanger | - | Sweden | SPA | 14 | - | - | 676 | O | 684 | O | 611 | O | 652 | O | 660 | O | 625 | O |
| | | Galto lera-Alga lera | - | Sweden | SPA | - | - | - | 706 | O | 703 | O | 642 | O | 681 | O | 673 | O | 643 | O |
| | | Getterons fagelreservat | - | Sweden | SPA | 22 | - | - | 674 | O | 682 | O | 609 | O | 650 | O | 657 | O | 623 | O |
| | | Hallands Vadero | - | Sweden | SPA | 15-20 | - | - | 673 | O | 686 | O | 609 | O | 651 | O | 663 | O | 628 | O |
| | | Haron | - | Sweden | SPA | - | - | - | 672 | O | 673 | O | 606 | O | 647 | O | 645 | O | 613 | O |
| | | Koster | - | Sweden | SPA | - | - | - | 700 | O | 696 | O | 636 | O | 675 | O | 666 | O | 636 | O |
| | | Kungsbackfjorden | - | Sweden | SPA | - | - | - | 666 | O | 672 | O | 600 | O | 642 | O | 646 | O | 612 | O |
| | | Lommaomradet | - | Sweden | SPA | 0-2 | - | - | 692 | O | 710 | O | 631 | O | 672 | O | 691 | O | 656 | O |
| | | Lundakrabuten | - | Sweden | SPA | 5-10 | - | - | 682 | O | 698 | O | 620 | O | 661 | O | 678 | O | 643 | O |
| | | Nidingen | - | Sweden | SPA | - | - | - | 661 | O | 667 | O | 595 | O | 637 | O | 642 | O | 608 | O |
| | | Nordre als estuarium | - | Sweden | SPA | - | - | - | 670 | O | 673 | O | 604 | O | 645 | O | 646 | O | 612 | O |
| | | Pater Noster-skargarden | - | Sweden | SPA | - | - | - | 664 | O | 666 | O | 598 | O | 639 | O | 639 | O | 606 | O |
| | | Salofjorden | - | Sweden | SPA | - | - | - | 666 | O | 669 | O | 600 | O | 641 | O | 641 | O | 608 | O |
| | | Tanumskusten | - | Sweden | SPA | - | - | - | 693 | O | 690 | O | 628 | O | 668 | O | 661 | O | 630 | O |
| | | Tylon | - | Sweden | SPA | - | - | - | 688 | O | 700 | O | 624 | O | 666 | O | 677 | O | 642 | O |
| | | Ven | - | Sweden | SPA | 5 | - | - | 672 | O | 688 | O | 610 | O | 651 | O | 668 | O | 633 | O |
| | | Vrangoskargarden | - | Sweden | SPA | - | - | - | 660 | O | 665 | O | 595 | O | 636 | O | 639 | O | 605 | O |

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| | | Eemeer & Gooimeer Zuidover | - | Netherlands | SPA | 570 | - | - | 336 | O | 358 | O | 326 | O | 340 | O | 379 | O | 366 | O |
| | | Grevelingen | - | Netherlands | SPA, RAMSAR | 420 | - | - | 343 | O | 366 | O | 356 | O | 355 | O | 396 | O | 393 | O |
| | | Haringvliet | - | Netherlands | SPA | 2,300 | - | - | 333 | O | 356 | O | 343 | O | 344 | O | 385 | O | 381 | O |
| | | Ijsselmeer | - | Netherlands | SPA, RAMSAR | 2,100 | - | - | 270 | O | 299 | O | 257 | O | 278 | O | 315 | O | 298 | O |
| | | Ilperveld, Varkensland en Twiske | - | Netherlands | SPA | 180 | - | - | 309 | O | 331 | O | 301 | O | 313 | O | 353 | O | 341 | O |
| | | Krammer-Volkerak | - | Netherlands | SPA, RAMSAR | 220 | - | - | 361 | O | 384 | O | 371 | O | 372 | O | 413 | O | 409 | O |
| | | Markemeer & Ijmeer | - | Netherlands | SPA, RAMSAR | 630 | - | - | 302 | O | 323 | O | 289 | O | 304 | O | 313 | O | 321 | O |
| | | Oosterschelde | - | Netherlands | SPA, RAMSAR | 820 | - | - | 350 | O | 374 | O | 365 | O | 363 | O | 404 | O | 402 | O |
| | | Waddenzee | - | Netherlands | SPA, RAMSAR | 5,300 | - | - | 246 | O | 267 | O | 225 | O | 246 | O | 284 | O | 266 | O |
| | | Westerschelde & Saeftinghe | - | Netherlands | SPA, RAMSAR | 1,600 | - | - | 362 | O | 385 | O | 382 | O | 376 | O | 418 | O | 417 | O |
| | | Zoommeer | - | Netherlands | SPA | 4 | - | - | 379 | O | 403 | O | 390 | O | 391 | O | 432 | O | 428 | O |
| | | Hamburgisches Wattenmeer | - | Germany | SPA, RAMSAR | 500 | - | - | 399 | O | 423 | O | 353 | O | 386 | O | 417 | O | 386 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 2,696 | - | - | 298 | O | 322 | O | 260 | O | 290 | O | 325 | O | 299 | O |
| | | Ostfriesische Meere | - | Germany | SPA | 2 | - | - | 358 | O | 382 | O | 319 | O | 350 | O | 384 | O | 357 | O |

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| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 2,902 | - | - | 366 | O | 389 | O | 310 | O | 348 | O | 374 | O | 340 | O |
| | | Rheiderland | - | Germany | SPA | 1 | - | - | 368 | O | 391 | O | 330 | O | 360 | O | 395 | O | 369 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 100 | - | - | 362 | O | 386 | O | 313 | O | 347 | O | 377 | O | 345 | O |
| | | Untereider | - | Germany | SPA | 3 | - | - | 430 | O | 454 | O | 380 | O | 415 | O | 444 | O | 412 | O |
| | | Baie de Morlaix | - | France | SPA | 75 | - | - | 757 | O | 764 | O | 810 | O | 788 | O | 796 | O | 819 | O |
| | | Basses Vallees du Contentin et Baie des Veys | - | France | SPA | 0 – 1 | - | - | 611 | O | 622 | O | 657 | O | 637 | O | 654 | O | 672 | O |
| | | Chausay | - | France | SPA | 48 | - | - | 675 | O | 685 | O | 721 | O | 701 | O | 718 | O | 736 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 5 – 10 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| | | Iles de la Colombiere, de la Nelliere et des Haches | - | France | SPA | 100 – 120 | - | - | 727 | O | 736 | O | 774 | O | 753 | O | 769 | O | 788 | O |
| | | Ilot du Trevors | - | France | SPA | 0 – 10 | - | - | 809 | O | 815 | O | 864 | O | 841 | O | 847 | O | 870 | O |
| | | Ilots Notre-Dame et Chevret | - | France | SPA | 100 | - | - | 728 | O | 738 | O | 775 | O | 754 | O | 771 | O | 789 | O |
| | | Marais Audomarois | - | France | SPA | 0 – 1 | - | - | 431 | O | 454 | O | 465 | O | 451 | O | 487 | O | 491 | O |
| | | Ouessant-Molene | - | France | SPA | 110 – 130 | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| | | Platier d'Oye | - | France | SPA | 0 – 2 | - | - | 406 | O | 428 | O | 440 | O | 426 | O | 461 | O | 466 | O |
| | | Tregor Goelo | - | France | SPA | 150 – 260 | - | - | 717 | O | 725 | O | 768 | O | 746 | O | 758 | O | 779 | O |
| | | Agger Tange | - | Denmark | SPA | 40 | - | - | 432 | O | 436 | O | 366 | O | 407 | O | 411 | O | 377 | O |
| | | Harboore Tange, Plet Enge og Gjeller So | - | Denmark | SPA, RAMSAR | - | - | - | 400 | O | 358 | O | 429 | O | 424 | O | 404 | O | 370 | O |
| | | Hirsholmene | - | Denmark | SPA | 25 – 50 | - | - | 593 | O | 596 | O | 528 | O | 569 | O | 570 | O | 536 | O |

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| | | Kysing Fjorde | - | Denmark | SPA | 0 - 6 | - | - | 521 | O | 535 | O | 458 | O | 599 | O | 514 | O | 479 | O |
| | | Laeso, sydlige del | - | Denmark | SPA | 200 | - | - | 593 | O | 599 | O | 527 | O | 569 | O | 574 | O | 540 | O |
| | | Mando | - | Denmark | SPA | 25 - 143 | - | - | 406 | O | 425 | O | 346 | O | 386 | O | 408 | O | 374 | O |
| | | Nissum Fjord | - | Denmark | SPA, RAMSAR | 50 | - | - | 408 | O | 416 | O | 343 | O | 384 | O | 393 | O | 358 | O |
| | | Nordre Ronner | - | Denmark | SPA | 20 | - | - | 608 | O | 612 | O | 542 | O | 583 | O | 586 | O | 552 | O |
| | | Ostlige Vejler | - | Denmark | SPA | 0 – 40 | - | - | 492 | O | 495 | O | 426 | O | 467 | O | 469 | O | 435 | O |
| | | Oveso | - | Denmark | SPA | 1 – 3 | - | - | 449 | O | 453 | O | 383 | O | 424 | O | 426 | O | 393 | O |
| | | Randers og Mariager Fjorde og Alborg Bugt, sydlige del | - | Denmark | SPA | 10 | - | - | 537 | O | 546 | O | 472 | O | 514 | O | 522 | O | 488 | O |
| | | Ringkobing Fjord | - | Denmark | SPA, RAMSAR | 2-12 | - | - | 392 | O | 406 | O | 329 | O | 370 | O | 386 | O | 351 | O |
| | | Romo | - | Denmark | SPA | 40 – 50 | - | - | 400 | O | 421 | O | 342 | O | 381 | O | 405 | O | 371 | O |
| | | Skallingen og Langli | - | Denmark | SPA | - | - | - | 385 | O | 401 | O | 323 | O | 363 | O | 382 | O | 347 | O |
| | | Vadehavet | - | Denmark | SPA, RAMSAR | 25 - 35 | - | - | 376 | O | 392 | O | 314 | O | 355 | O | 373 | O | 338 | O |
| | | Vestlige Vejler, Arup Holm og Hovsor Ron | - | Denmark | SPA | 1 – 31 | - | - | 479 | O | 483 | O | 414 | O | 455 | O | 457 | O | 423 | O |
| | | Vidan, Tondermarksen og Saltvandssoen | - | Denmark | SPA | 1 - 125 | - | - | 411 | O | 434 | O | 354 | O | 393 | O | 418 | O | 384 | O |
| | | Het Zwin | - | Belgium | SPA | 370 | - | - | 377 | O | 400 | O | 399 | O | 392 | O | 434 | O | 433 | O |
| | | Kustbroedvogels te Zeebrugge-Heist | - | Belgium | SPA | 3 052 | - | - | 375 | O | 399 | O | 400 | O | 391 | O | 433 | O | 433 | O |
| | | SBZ / ZPS 3 | - | Belgium | SPA | - | - | - | 371 | O | 395 | O | 396 | O | 387 | O | 428 | O | 429 | O |

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| **Sandwich tern *Sterna sandvicensis*** | **49** | Alde-Ore Estuary | 29 | UK | SPA, RAMSAR, SSSI | 169 | 4 | - | 278 | O | 300 | O | 318 | O | 301 | O | 332 | O | 340 | O |
| | | Chichester and Langstone Harbours | 43 | UK | SPA, RAMSAR, SSSI | 158 | 88 | - | 465 | O | 475 | O | 512 | O | 491 | O | 508 | O | 526 | O |
| | | Coquet Island | 30 | UK | SPA, SSSI | 1,590 | 1,725 | - | 209 | O | 195 | O | 262 | O | 224 | O | 196 | O | 234 | O |
| | | Dungeness | - | UK | SSSI | - | - | - | 441 | O | 458 | O | 437 | O | 418 | O | 469 | O | 479 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 2,070 | 1,442 | - | 223 | O | 205 | O | 269 | O | 235 | O | 204 | O | 239 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 440 | 300 | - | 300 | O | 280 | O | 340 | O | 308 | O | 270 | O | 302 | O |
| | | Foulness | 38 | UK | SPA, RAMSAR, SSSI | 320 | 0 | - | 339 | O | 358 | O | 381 | O | 363 | O | 390 | O | 401 | O |
| | | Loch of Strathbeg | 44 | UK | SPA, RAMSAR, SSSI | 280 | 0 | - | 376 | O | 349 | O | 388 | O | 370 | O | 337 | O | 351 | O |
| | | North Norfolk Coast | 35 | UK | SPA, RAMSAR, SSSI | 3 457 | 4,275 | - | 198 | O | 212 | O | 243 | O | 223 | O | 245 | O | 259 | O |
| | | Solent and Southampton Water | 32 | UK | SPA, RAMSAR, SSSI | 231 | 49 | - | 469 | O | 478 | O | 519 | O | 497 | O | 511 | O | 530 | O |
| | | Stroma | - | UK | SSSI | - | - | - | 503 | O | 476 | O | 512 | O | 495 | O | 478 | O | 490 | O |
| | | Ythan Estuary, Sands of Forvie and Meikle Loch | 40 | UK | SPA, RAMSAR, SSSI | 1,125 | 524 | - | 354 | O | 328 | O | 372 | O | 352 | O | 319 | O | 334 | O |
| | | Bjarekusten | - | Sweden | SPA | - | - | - | 678 | O | 690 | O | 614 | O | 655 | O | 668 | O | 633 | O |

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| | | Kungsbackafjorden | - | Sweden | SPA | - | - | - | 666 | O | 672 | O | 600 | O | 642 | O | 646 | O | 612 | O |
| | | Lundakrabukten | - | Sweden | SPA | 0-1 | - | - | 682 | O | 698 | O | 620 | O | 661 | O | 678 | O | 643 | O |
| | | Sejro Bugt og Nekselo | - | Sweden | SPA | 45 | - | - | 573 | O | 590 | O | 511 | O | 552 | O | 570 | O | 535 | O |
| | | Skalderviken | - | Sweden | SPA | 0-1 | - | - | 678 | O | 691 | O | 614 | O | 655 | O | 670 | O | 635 | O |
| | | Ven | - | Sweden | SPA | - | - | - | 672 | O | 688 | O | 610 | O | 651 | O | 668 | O | 633 | O |
| | | Grevelingen | - | Netherlands | SPA, RAMSAR | 3,200 | - | - | 343 | O | 366 | O | 356 | O | 355 | O | 396 | O | 393 | O |
| | | Haringvliet | - | Netherlands | SPA | - | - | - | 333 | O | 356 | O | 343 | O | 344 | O | 385 | O | 381 | O |
| | | Oosterschelde | - | Netherlands | SPA, RAMSAR | - | - | - | 350 | O | 374 | O | 365 | O | 363 | O | 404 | O | 402 | O |
| | | Waddenzee | - | Netherlands | SPA, RAMSAR | 14,000 | - | - | 246 | O | 267 | O | 225 | O | 246 | O | 284 | O | 266 | O |
| | | Westerschelde & Saeftinghe | - | Netherlands | SPA, RAMSAR | 3 000 | - | - | 362 | O | 385 | O | 382 | O | 376 | O | 418 | O | 417 | O |
| | | Hamburgisches Wattenmeer | - | Germany | SPA, RAMSAR | 300 | - | - | 399 | O | 423 | O | 353 | O | 386 | O | 417 | O | 386 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 3,185 | - | - | 298 | O | 322 | O | 260 | O | 290 | O | 325 | O | 299 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 5,423 | - | - | 366 | O | 389 | O | 310 | O | 348 | O | 374 | O | 340 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 150 | - | - | 362 | O | 386 | O | 313 | O | 347 | O | 377 | O | 345 | O |
| | | Baie de Morlaix | - | France | SPA | 920 | - | - | 757 | O | 764 | O | 810 | O | 788 | O | 796 | O | 819 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | - | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |

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| | | Iles de la Colombiere, de la Nelliere et des Haches | - | France | SPA | 60 | - | - | 727 | O | 736 | O | 774 | O | 753 | O | 769 | O | 788 | O |
| | | Ilot du Trevors | - | France | SPA | 0 – 10 | - | - | 809 | O | 815 | O | 864 | O | 841 | O | 847 | O | 870 | O |
| | | Platier d'Oye | - | France | SPA | 370-750 | - | - | 406 | O | 428 | O | 440 | O | 426 | O | 461 | O | 466 | O |
| | | Tregor Goelo | - | France | SPA | 0 – 20 | - | - | 717 | O | 725 | O | 768 | O | 746 | O | 758 | O | 779 | O |
| | | Agger Tange | - | Denmark | SPA | 150 – 300 | - | - | 432 | O | 436 | O | 366 | O | 407 | O | 411 | O | 377 | O |
| | | Hirsholmene | - | Denmark | SPA | 1,400 | - | - | 593 | O | 596 | O | 528 | O | 569 | O | 570 | O | 536 | O |
| | | Horsens Fjord og Endelave | - | Denmark | SPA | 300 | - | - | 504 | O | 519 | O | 441 | O | 482 | O | 498 | O | 463 | O |
| | | Laeso, sydlige del | - | Denmark | SPA | 0 - 300 | - | - | 593 | O | 599 | O | 527 | O | 569 | O | 574 | O | 540 | O |
| | | Nissum Fjord | - | Denmark | SPA, RAMSAR | 1,650 | - | - | 408 | O | 416 | O | 343 | O | 384 | O | 393 | O | 358 | O |
| | | Nordre Ronner | - | Denmark | SPA | 100 | - | - | 608 | O | 612 | O | 542 | O | 583 | O | 586 | O | 552 | O |
| | | Ringkobing Fjord | - | Denmark | SPA, RAMSAR | 900 | - | - | 392 | O | 406 | O | 329 | O | 370 | O | 386 | O | 351 | O |
| | | Romo | - | Denmark | SPA | - | - | - | 400 | O | 421 | O | 342 | O | 381 | O | 405 | O | 371 | O |
| | | Skallingen og Langli | - | Denmark | SPA | 0 – 1529 | - | - | 385 | O | 401 | O | 323 | O | 363 | O | 382 | O | 347 | O |
| | | Stavns Fjord | - | Denmark | SPA | 0 – 65 | - | - | 544 | O | 559 | O | 481 | O | 522 | O | 538 | O | 503 | O |
| | | Vadehavet | - | Denmark | SPA, RAMSAR | - | - | - | 376 | O | 392 | O | 314 | O | 355 | O | 373 | O | 338 | O |
| | | Kustbroedvogels te Zeebrugge-Heist | - | Belgium | SPA | 4,067 | - | - | 375 | O | 399 | O | 400 | O | 391 | O | 433 | O | 433 | O |
| | | SBZ 1 /ZPS 1 | - | Belgium | SPA, RAMSAR | - | - | - | 384 | O | 408 | O | 415 | O | 403 | O | 442 | O | 444 | O |
| | | SBZ 2 /ZPS 2 | - | Belgium | SPA, RAMSAR | - | - | - | 372 | O | 395 | O | 401 | O | 389 | O | 429 | O | 430 | O |

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| | | SBZ 3 / ZPS 3 | - | Belgium | SPA | - | - | - | 371 | O | 395 | O | 396 | O | 387 | O | 428 | O | 429 | O |
| | | Vlaamse Banken | - | Belgium | SPA, RAMSAR | - | - | - | 350 | O | 373 | O | 382 | O | 368 | O | 425 | O | 427 | O |
| | | Vlakte van de Raan | - | Belgium | SPA | - | - | - | 354 | O | 378 | O | 377 | O | 370 | O | 411 | O | 411 | O |
| **Little tern *Sternula albifrons*** | **6** | Alde-Ore Estuary | 29 | UK | SPA, RAMSAR, SSSI | 48 | 82 | - | 278 | O | 300 | O | 318 | O | 301 | O | 332 | O | 340 | O |
| | | Benacre to Easton Bavents | 53 | UK | SPA, SSSI | 53 | 0 | - | 251 | O | 273 | O | 289 | O | 273 | O | 305 | O | 312 | O |
| | | Blackwater Estuary | 48 | UK | SPA, RAMSAR, SSSI | 36 | 88 | - | 325 | O | 343 | O | 368 | O | 349 | O | 375 | O | 387 | O |
| | | Chesil Beach and the Fleet | 45 | UK | SPA, RAMSAR, SSSI | 55 | 56 | - | 537 | O | 544 | O | 592 | O | 569 | O | 576 | O | 599 | O |
| | | Chichester and Langstone Harbours | 43 | UK | SPA, RAMSAR, SSSI | 100 | 130 | - | 465 | O | 475 | O | 512 | O | 491 | O | 508 | O | 526 | O |
| | | Colne Estuary | 49 | UK | SPA, RAMSAR, SSSI | 38 | 20 | - | 320 | O | 338 | O | 362 | O | 343 | O | 370 | O | 381 | O |
| | | Dungeness to Pett Level | 34 | UK | SPA, RAMSAR, SSSI | 35 | 11 | - | 441 | O | 458 | O | 437 | O | 418 | O | 469 | O | 479 | O |
| | | Firth of Tay and Eden Estuary | 59 | UK | SPA | 25 | 0 | - | 325 | O | 303 | O | 361 | O | 331 | O | 298 | O | 326 | O |
| | | Foulness | 38 | UK | SPA, RAMSAR, SSSI | 24 | 18 | - | 339 | O | 358 | O | 381 | O | 363 | O | 390 | O | 401 | O |

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| | | Gibraltar Point | 54 | UK | SPA, RAMSAR, SSSI | 23 | 32 | - | 199 | O | 208 | O | 251 | O | 228 | O | 241 | O | 260 | O |
| | | Great Yarmouth-North Denes | 52 | UK | SPA, SSSI | 220 | 285 | - | 212 | O | 233 | O | 252 | O | 234 | O | 279 | O | 286 | O |
| | | Hamford Water | 50 | UK | SPA, RAMSAR, SSSI | 55 | 105 | - | 308 | O | 328 | O | 349 | O | 331 | O | 360 | O | 370 | O |
| | | Humber Flats, Marshes and Coast | 55 | UK | SPA, RAMSAR, SSSI | 63 | 63 | - | 156 | O | 162 | O | 216 | O | 192 | O | 212 | O | 239 | O |
| | | Lindisfarne | 58 | UK | SPA, RAMSAR, SSSI | 38 | 0 | - | 223 | O | 205 | O | 269 | O | 235 | O | 212 | O | 247 | O |
| | | Medway Estuary and Marshes | 47 | UK | SPA, RAMSAR, SSSI | 28 | 14 | - | 367 | O | 384 | O | 409 | O | 391 | O | 416 | O | 428 | O |
| | | Minsmere-Walberswick | 51 | UK | SPA, RAMSAR, SSSI | 28 | 47 | - | 259 | O | 282 | O | 300 | O | 283 | O | 313 | O | 321 | O |
| | | North Norfolk Coast | 35 | UK | SPA, RAMSAR, SSSI | 377 | 287 | - | 198 | O | 212 | O | 243 | O | 223 | O | 245 | O | 259 | O |
| | | Northumbria Coast | 57 | UK | SPA, RAMSAR, SSSI | 40 | 13 | - | 185 | O | 175 | O | 246 | O | 207 | O | 186 | O | 225 | O |
| | | Pagham Harbour | 46 | UK | SPA, RAMSAR, SSSI | 12 | - | - | 468 | O | 478 | O | 515 | O | 494 | O | 511 | O | 529 | O |

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| | | Solent and Southampton Water | 32 | UK | SPA, RAMSAR, SSSI | 49 | 4 | - | 469 | O | 478 | O | 519 | O | 497 | O | 511 | O | 530 | O |
| | | Teesmouth and Cleveland Coast | 56 | UK | SPA, RAMSAR, SSSI | 37 | 1 | - | 172 | O | 164 | O | 235 | O | 197 | O | 178 | O | 215 | O |
| | | Thanet Coast | - | UK | SSSI | - | 4 | - | 441 | O | 458 | O | 437 | O | 418 | O | 422 | O | 431 | O |
| | | The Lagoons | - | UK | SSSI | - | 49 | - | 156 | O | 162 | O | 216 | O | 192 | O | 196 | O | 220 | O |
| | | The Wash | 39 | UK | SPA, RAMSAR, SSSI | 33 | 4 | - | 202 | O | 211 | O | 255 | O | 232 | O | 244 | O | 264 | O |
| | | Ythan Estuary, Sands of Forvie and Meikle Loch | 40 | UK | SPA, RAMSAR, SSSI | 41 | 58 | - | 354 | O | 328 | O | 372 | O | 352 | O | 319 | O | 334 | O |
| | | Balgo | - | Sweden | SPA | 0-5 | - | - | 669 | O | 676 | O | 603 | O | 645 | O | 651 | O | 617 | O |
| | | Batafjorden | - | Sweden | SPA | - | - | - | 673 | O | 680 | O | 607 | O | 649 | O | 654 | O | 620 | O |
| | | Falsterbo-Foteviken | - | Sweden | SPA | 50-70 | - | - | 665 | O | 684 | O | 605 | O | 645 | O | 666 | O | 631 | O |
| | | Galtaback-Lynga strandanger | - | Sweden | SPA | 23 | - | - | 676 | O | 684 | O | 611 | O | 652 | O | 660 | O | 625 | O |
| | | Gamla Kopstad | - | Sweden | SPA | 2 | - | - | 673 | O | 682 | O | 608 | O | 650 | O | 657 | O | 623 | O |
| | | Getterons fagelreservat | - | Sweden | SPA | 2 | - | - | 674 | O | 682 | O | 609 | O | 650 | O | 657 | O | 623 | O |
| | | Grimsholmen | - | Sweden | SPA | - | - | - | 684 | O | 694 | O | 619 | O | 661 | O | 670 | O | 636 | O |
| | | Loddeans mynning | - | Sweden | SPA | 40,940 | - | - | 682 | O | 698 | O | 620 | O | 661 | O | 685 | O | 650 | O |
| | | Lommaomradet | - | Sweden | SPA | 0-5 | - | - | 692 | O | 710 | O | 631 | O | 672 | O | 691 | O | 656 | O |
| | | Lundakrabukten | - | Sweden | SPA | 41,187 | - | - | 682 | O | 698 | O | 620 | O | 661 | O | 678 | O | 643 | O |

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| | | Morups Tange | - | Sweden | SPA | 2 | - | - | 675 | O | 684 | O | 610 | O | 652 | O | 660 | O | 626 | O |
| | | Skalderviken | - | Sweden | SPA | 1 | - | - | 678 | O | 691 | O | 614 | O | 655 | O | 670 | O | 635 | O |
| | | Duinen en Lage Land Texel | - | Netherlands | SPA | 28 | - | - | 249 | O | 270 | O | 230 | O | 249 | O | 287 | O | 271 | O |
| | | Duinen Terschelling | - | Netherlands | SPA | 8 | - | - | 249 | O | 272 | O | 224 | O | 248 | O | 284 | O | 265 | O |
| | | Grevelingen | - | Netherlands | SPA, RAMSAR | 28 | - | - | 343 | O | 366 | O | 356 | O | 355 | O | 396 | O | 393 | O |
| | | Haringvliet | - | Netherlands | SPA | 110 | - | - | 333 | O | 356 | O | 343 | O | 344 | O | 385 | O | 381 | O |
| | | Krammer-Volkerak | - | Netherlands | SPA, RAMSAR | 3 | - | - | 361 | O | 384 | O | 371 | O | 372 | O | 413 | O | 409 | O |
| | | Nordzeekustzome | - | Netherlands | SPA, RAMSAR | 1 | - | - | 239 | O | 260 | O | 216 | O | 239 | O | 275 | O | 257 | O |
| | | Oosterschelde | - | Netherlands | SPA, RAMSAR | 36 | - | - | 350 | O | 374 | O | 365 | O | 363 | O | 404 | O | 402 | O |
| | | Waddenzee | - | Netherlands | SPA, RAMSAR | 160 | - | - | 246 | O | 267 | O | 225 | O | 246 | O | 284 | O | 266 | O |
| | | Westerschelde & Saeftinghe | - | Netherlands | SPA, RAMSAR | 110 | - | - | 362 | O | 385 | O | 382 | O | 376 | O | 418 | O | 417 | O |
| | | Hamburgisches Wattenmeer | - | Germany | SPA, RAMSAR | 12 | - | - | 399 | O | 423 | O | 353 | O | 386 | O | 417 | O | 386 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 163 | - | - | 298 | O | 322 | O | 260 | O | 290 | O | 325 | O | 299 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 383 | - | - | 366 | O | 389 | O | 310 | O | 348 | O | 374 | O | 340 | O |
| | | Bancs des Flandres | - | France | SPA | 350 | - | - | 373 | O | 395 | O | 406 | O | 392 | O | 428 | O | 433 | O |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | - | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| | | Ouessant-Molene | - | France | SPA | 25 – 30 | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| | | Platier d'Oye | - | France | SPA | 0 – 4 | - | - | 406 | O | 428 | O | 440 | O | 426 | O | 461 | O | 466 | O |
| | | Tregor Goelo | - | France | SPA | 33 | - | - | 717 | O | 725 | O | 768 | O | 746 | O | 758 | O | 779 | O |
| | | Agger Tange | - | Denmark | SPA | 22 | - | - | 432 | O | 436 | O | 366 | O | 407 | O | 411 | O | 377 | O |
| | | Fano | - | Denmark | SPA | 20 – 30 | - | - | 395 | O | 413 | O | 334 | O | 374 | O | 394 | O | 360 | O |
| | | Glomstrup Vig, Agero, Munkholm og Katholm Odde, Lindholm og Rotholme | - | Denmark | SPA | 1 | - | - | 439 | O | 445 | O | 374 | O | 415 | O | 419 | O | 385 | O |
| | | Harboore Tange, Plet Enge og Gjeller So | - | Denmark | SPA, RAMSAR | - | - | - | 400 | O | 358 | O | 429 | O | 424 | O | 404 | O | 370 | O |
| | | Horsens Fjord og Endelave | - | Denmark | SPA | - | - | - | 504 | O | 519 | O | 441 | O | 482 | O | 498 | O | 463 | O |
| | | Laeso, sydlige del | - | Denmark | SPA | 0 – 300 | - | - | 593 | O | 599 | O | 527 | O | 569 | O | 574 | O | 540 | O |
| | | Logstor Bredning, Livo, Feggesund og Skarrehage | - | Denmark | SPA | 7 | - | - | 477 | O | 481 | O | 411 | O | 452 | O | 455 | O | 421 | O |
| | | Magerodde og Karby Odde | - | Denmark | SPA | - | - | - | 448 | O | 454 | O | 383 | O | 424 | O | 428 | O | 394 | O |
| | | Mando | - | Denmark | SPA | - | - | - | 406 | O | 425 | O | 346 | O | 386 | O | 408 | O | 374 | O |
| | | Nissum Fjord | - | Denmark | SPA, RAMSAR | 40 – 50 | - | - | 408 | O | 416 | O | 343 | O | 384 | O | 393 | O | 358 | O |
| | | Randers og Mariager Fjorde og Alborg Bugt, sydlige del | - | Denmark | SPA | 4 | - | - | 537 | O | 546 | O | 472 | O | 514 | O | 522 | O | 488 | O |
| | | Romo | - | Denmark | SPA | 8 – 12 | - | - | 400 | O | 421 | O | 342 | O | 381 | O | 405 | O | 371 | O |
| | | Skallingen og Langli | - | Denmark | SPA | 10 – 15 | - | - | 385 | O | 401 | O | 323 | O | 363 | O | 382 | O | 347 | O |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Stavns Fjord | - | Denmark | SPA | - | - | - | 544 | O | 559 | O | 481 | O | 522 | O | 538 | O | 503 | O |
| | | Vadehavet | - | Denmark | SPA, RAMSAR | 5 – 20 | - | - | 376 | O | 392 | O | 314 | O | 355 | O | 373 | O | 338 | O |
| | | Veno, Veno Sund | - | Denmark | SPA | 0 - 2 | - | - | 443 | O | 450 | O | 378 | O | 419 | O | 425 | O | 391 | O |
| | | Vestlige Vejler, Arup Holm og Hovsor Ron | - | Denmark | SPA | - | - | - | 479 | O | 483 | O | 414 | O | 455 | O | 457 | O | 423 | O |
| | | Vidan, Tondermarksen og Saltvandssoen | - | Denmark | SPA | - | - | - | 411 | O | 434 | O | 354 | O | 393 | O | 418 | O | 384 | O |
| | | Het Zwin | - | Belgium | SPA | 10 | - | - | 377 | O | 400 | O | 399 | O | 392 | O | 434 | O | 433 | O |
| | | Kustbroedvogels te Zeebrugge-Heist | - | Belgium | SPA | 425 | - | - | 375 | O | 399 | O | 400 | O | 391 | O | 433 | O | 433 | O |
| | | SBZ / ZPS 3 | - | Belgium | SPA | - | - | - | 371 | O | 395 | O | 396 | O | 387 | O | 428 | O | 429 | O |
| | | Vlaamse Banken | - | Belgium | SPA, RAMSAR | - | - | - | 350 | O | 373 | O | 382 | O | 368 | O | 425 | O | 427 | O |
| **Roseate tern** ***Sterna dougalli*** | **17** | Coquet Island | 30 | UK | SPA, SSSI | 31 | - | - | 209 | O | 195 | O | 262 | O | 224 | O | 196 | O | 234 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 3 | - | - | 223 | O | 205 | O | 269 | O | 235 | O | 204 | O | 239 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 8 | - | - | 300 | O | 280 | O | 340 | O | 308 | O | 270 | O | 302 | O |
| | | North Norfolk Coast | 35 | UK | SPA, RAMSAR, SSSI | 2 | - | - | 198 | O | 212 | O | 243 | O | 223 | O | 245 | O | 259 | O |
| | | Solent and Southampton Water | 32 | UK | SPA, RAMSAR, SSSI | 2 | - | - | 469 | O | 478 | O | 519 | O | 497 | O | 511 | O | 530 | O |
| | | Baie de Morlaix | - | France | SPA | 70 | - | - | 757 | O | 764 | O | 810 | O | 788 | O | 796 | O | 819 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | - | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| | | Iles de la Colombiere, de la Nelliere et des | - | France | SPA | 100 – 120 | - | - | 727 | O | 736 | O | 774 | O | 753 | O | 769 | O | 788 | O |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Haches | | | | | | | | | | | | | | | | | | |
| | | Ilot du Trevors | - | France | SPA | 0-10 | - | - | 809 | O | 815 | O | 864 | O | 841 | O | 847 | O | 870 | O |
| | | Ilots Notre-Dame et Chevret | - | France | SPA | 1 | - | - | 728 | O | 738 | O | 775 | O | 754 | O | 771 | O | 789 | O |
| | | Ouessant-Molene | - | France | SPA | - | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| | | Het Zwin | - | Belgium | SPA | 1 | - | - | 377 | O | 400 | O | 399 | O | 392 | O | 434 | O | 433 | O |
| **Gull-billed tern *Gelochelidon nilotica*** | **-** | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 53 | - | - | 366 | O | 389 | O | 310 | O | 348 | O | 374 | O | 340 | O |
| | | Fano | - | Denmark | SPA | 0 – 2 | - | - | 395 | O | 413 | O | 334 | O | 374 | O | 394 | O | 360 | O |
| | | Mando | - | Denmark | SPA | 0 – 6 | - | - | 406 | O | 425 | O | 346 | O | 386 | O | 408 | O | 374 | O |
| | | Romo | - | Denmark | SPA | 0 – 8 | - | - | 400 | O | 421 | O | 342 | O | 381 | O | 405 | O | 371 | O |
| | | Skallingen og Langli | - | Denmark | SPA | - | - | - | 385 | O | 401 | O | 323 | O | 363 | O | 382 | O | 347 | O |
| | | Vadehavet | - | Denmark | SPA, RAMSAR | 0 – 2 | - | - | 376 | O | 392 | O | 314 | O | 355 | O | 373 | O | 338 | O |
| **Common guillemot *Uria aalge*** | **340** | Buchan Ness to Collieston Coast | 10 | UK | SPA, SSSI | 8,640 | 19,691 | 12,928 | 354 | O | 328 | I | 370 | O | 350 | O | 319 | I | 334 | I |
| | | Calf of Eday | 15 | UK | SPA, SSSI | 8,472 | 1,715 | 932 | 552 | O | 525 | O | 554 | O | 539 | O | 508 | O | 518 | O |
| | | Cape Wrath | - | UK | SPA | 9,179 | 27,359 | 14,862 | 574 | O | 548 | O | 592 | O | 572 | O | 539 | O | 555 | O |
| | | Copinsay | 13 | UK | SPA, SSSI | 19,732 | 12,512 | 9,166 | 518 | O | 491 | O | 522 | O | 507 | O | 475 | O | 485 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 71,489 | 105,552 | 106,520 | 484 | O | 458 | O | 498 | O | 479 | O | 447 | O | 460 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 21,641 | 26,302 | 13,066 | 552 | O | 524 | O | 545 | O | 533 | O | 504 | O | 510 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 23,499 | 20,986 | 32,145 | 223 | I | 205 | I | 269 | I | 235 | I | 204 | I | 239 | I |
| | | Forth Islands | 7 | UK | SPA, SSSI | 16,000 | 24,112 | 14,585 | 300 | I | 280 | I | 340 | I | 308 | I | 270 | I | 302 | I |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | 16,150 | 31,238 | 41,607[#] | 130 | I | 130 | I | 195 | I | 164 | I | 159 | I | 188 | I |
| | | Foula | 1 | UK | SPA, SSSI | 25,125 | 27,805 | 15,104 | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |
| | | Fowlsheugh | 8 | UK | SPA, SSSI | 37,822 | 41,761 | 30,096 | 329 | I | 304 | I | 354 | O | 330 | I | 297 | I | 317 | I |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 16,750 | 9,233 | 5,016 | 671 | O | 643 | O | 656 | O | 648 | O | 621 | O | 623 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 13,400 | 16,310 | 6,046 | 527 | O | 501 | O | 537 | O | 519 | O | 487 | O | 499 | O |
| | | Marwick Head | 36 | UK | SPA, SSSI | 25,259 | 21,955 | 11,926 | 561 | O | 534 | O | 568 | O | 551 | O | 519 | O | 530 | O |
| | | North Caithness Cliffs | 12 | UK | SPA, SSSI | 25,661 | 26,050 | 47,003 | 503 | O | 476 | O | 512 | O | 495 | O | 463 | O | 475 | O |
| | | Noss | 19 | UK | SPA, SSSI | 26,110 | 30,671 | 14,784 | 607 | O | 579 | O | 594 | O | 584 | O | 557 | O | 560 | O |
| | | Rousay | 14 | UK | SPA, SSSI | 7,102 | 3,783 | 2,055 | 555 | O | 528 | O | 559 | O | 544 | O | 512 | O | 522 | O |
| | | St Abb's Head to Fast Castle | 27 | UK | SPA, SSSI | 21,273 | 27,326 | 29,308 | 264 | I | 245 | I | 308 | I | 275 | I | 243 | I | 275 | I |
| | | Sule Skerry and Sule Stack | - | UK | SPA | 6,298 | 7,633 | 4,146 | 592 | O | 566 | O | 606 | O | 587 | O | 555 | O | 568 | O |
| | | Sumburgh Head | 18 | UK | SPA, SSSI | 10,720 | 10,269 | 3,323 | 581 | O | 554 | O | 571 | O | 561 | O | 532 | O | 537 | O |
| | | Troup, Pennan and Lions Heads | 9 | UK | SPA, SSSI | 29,882 | 30,320 | 10,938 | 393 | O | 367 | O | 407 | O | 388 | O | 356 | O | 370 | O |
| | | West Westray | 16 | UK | SPA, SSSI | 28,240 | 14,982 | 8,139 | 565 | O | 538 | O | 569 | O | 553 | O | 522 | O | 532 | O |
| | | Hallands Vardero | - | Sweden | SPA | 8 | - | - | 673 | O | 686 | O | 609 | O | 651 | O | 663 | O | 628 | O |
| | | Rott-Hastein Kjor | - | Norway | RAMSAR | - | - | - | 482 | O | 478 | O | 429 | O | 455 | O | 460 | O | 426 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 2,477 | - | - | 362 | O | 386 | O | 313 | I | 347 | O | 377 | O | 345 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 236 – 249 | - | - | 704 | O | 713 | O | 752 | O | 731 | O | 746 | O | 765 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 12 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| **Razorbill *Alca torda*** | **312** | Cape Wrath | - | UK | SPA | 1,206 | 2,005 | 1,645 | 574 | O | 548 | O | 592 | O | 572 | O | 539 | O | 555 | O |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Collieston to Whinnyfold Coast | - | UK | SSSI | - | 245 | 201 | 354 | O | 328 | O | 370 | O | 350 | O | 320 | O | 336 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 10,586 | 11,818 | 11,946 | 484 | O | 458 | O | 498 | O | 479 | O | 447 | O | 460 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 2,278 | 2,411 | 915 | 552 | O | 524 | O | 545 | O | 533 | O | 504 | O | 510 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | - | 262 | 390 | 223 | I | 205 | I | 269 | I | 235 | I | 204 | I | 239 | I |
| | | Forth Islands | 7 | UK | SPA, SSSI | 1,400 | 3,104 | 3,162 | 300 | I | 280 | I | 340 | O | 308 | I | 270 | I | 302 | I |
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | 5,133 | 5,659 | 10,570[#] | 130 | I | 130 | I | 195 | I | 164 | I | 159 | I | 188 | I |
| | | Foula | 1 | UK | SPA, SSSI | 4,154 | 2,814 | 2,308 | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |
| | | Fowlsheugh | 8 | UK | SPA, SSSI | 3,886 | 4,263 | 3,524 | 329 | O | 304 | I | 354 | O | 330 | O | 297 | I | 317 | O |
| | | North Caithness Cliffs | 12 | UK | SPA, SSSI | 2,680 | 1,274 | 1,652 | 503 | O | 476 | O | 512 | O | 495 | O | 463 | O | 475 | O |
| | | St Abb's Head to Fast Castle | 27 | UK | SPA, SSSI | 1,461 | 2,191 | 2,115 | 264 | I | 245 | I | 308 | I | 275 | I | 243 | I | 275 | I |
| | | Troup, Pennan and Lions Heads | 9 | UK | SPA, SSSI | 3,216 | 3,237 | 1,743 | 393 | O | 367 | O | 407 | O | 388 | O | 356 | O | 370 | O |
| | | West Westray | 16 | UK | SPA, SSSI | 1,304 | 784 | 643 | 565 | O | 538 | O | 569 | O | 553 | O | 522 | O | 532 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 16 | - | - | 362 | O | 386 | O | 313 | O | 347 | O | 377 | O | 345 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 10 | - | - | 704 | O | 713 | O | 752 | O | 731 | O | 746 | O | 765 | O |
| | | Chausay | - | France | SPA | 11 – 17 | - | - | 675 | O | 685 | O | 721 | O | 701 | O | 718 | O | 736 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 19 - 23 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| | | Ouessant-Molene | - | France | SPA | 4 | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |
| **Atlantic puffin *Fratercula Arctica*** | **105** | Cape Wrath | - | UK | SPA | 5,900 | 1,602 | 936 | 574 | O | 548 | O | 592 | O | 572 | O | 539 | O | 555 | O |
| | | Coquet Island | 30 | UK | SPA, SSSI | 11,400 | 17,208 | 15,812 | 209 | O | 195 | O | 262 | O | 224 | O | 196 | O | 234 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 1,750 | 268 | 274 | 484 | O | 458 | O | 498 | O | 479 | O | 447 | O | 460 | O |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Fair Isle | 17 | UK | SPA, SSSI | 23,000 | 54,000 | 7,278 | 552 | O | 524 | O | 545 | O | 533 | O | 504 | O | 510 | O |
| | | Farne Islands | 26 | UK | SPA | 34,710 | 55,367 | 36,835 | 223 | O | 205 | O | 269 | O | 235 | O | 204 | O | 239 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 14,000 | 69,715 | 62,178 | 300 | O | 280 | O | 340 | O | 308 | O | 270 | O | 302 | O |
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | 3,743 | 2,613 | 490[#] | 130 | O | 130 | O | 195 | O | 164 | O | 159 | O | 188 | O |
| | | Foula | 1 | UK | SPA, SSSI | 48,000 | 22,500 | 13,142 | 623 | O | 596 | O | 616 | O | 605 | O | 575 | O | 581 | O |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 55,000 | 26,923 | 15,726 | 671 | O | 643 | O | 656 | O | 648 | O | 621 | O | 623 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 3,500 | 413 | 417 | 527 | O | 501 | O | 537 | O | 519 | O | 487 | O | 499 | O |
| | | North Caithness Cliffs | 12 | UK | SPA, SSSI | 1,750 | 5,848 | 7,071 | 503 | O | 476 | O | 512 | O | 495 | O | 463 | O | 475 | O |
| | | Noss | 19 | UK | SPA, SSSI | 2,348 | 1,892 | 802 | 607 | O | 579 | O | 594 | O | 584 | O | 557 | O | 560 | O |
| | | Sule Skerry and Sule Stack | - | UK | SPA | 46,900 | 59,471 | 34,737 | 592 | O | 566 | O | 606 | O | 587 | O | 555 | O | 568 | O |
| | | Rott-Hastein Kjor | - | Norway | RAMSAR | - | - | - | 482 | O | 478 | O | 429 | O | 455 | O | 460 | O | 426 | O |
| | | Baie de Morlaix | - | France | SPA | 3 | - | - | 757 | O | 764 | O | 810 | O | 788 | O | 796 | O | 819 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 150 – 210 | - | - | 719 | O | 727 | O | 772 | O | 750 | O | 759 | O | 781 | O |
| | | Ouessant-Molene | - | France | SPA | 4 | - | - | 821 | O | 828 | O | 877 | O | 854 | O | 859 | O | 883 | O |

**Table A1.2** Protected sites for which seabirds are designated features within the North Sea region considered in the Ornithology Technical Report and their distances to the Dogger Bank Teesside A and B, Dogger Bank Teesside C and D and Dogger Bank Creyke Beck A and B export cable corridor areas. Also shown is whether the breeding populations of each species at each site should be screened in (I) or out (O) of the EIA process during the breeding season, based on whether or not each project is within the maximum foraging range of each species from the site (see EIA methodology for more details).

| Species | Foraging Range (km) | Site | | | | | | | Dogger Bank Teesside A + B Export Cable Corridor Area | | Dogger Bank Teesside C + D Export Cable Corridor Area | | Dogger Bank Creyke Beck A + B Export Cable Corridor Area | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Name of site** | **SPA No** | **Country** | **Site designation** | **Pop. (pairs) citation** | **Pop. (pairs) 2000** | **Pop. (pairs) 2011** | | | | | | |
| **Red-throated diver *Gavia stellata*** | **9** | Caithness and Sutherland Peatlands | 4 | UK | SPA, SSSI | 89 | - | - | 429 | O | 423 | O | 481 | O |
| | | Foula | 1 | UK | SPA, SSSI | 11 | - | - | 607 | O | 586 | O | 616 | O |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 26 | - | - | 663 | O | 641 | O | 666 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 58 | - | - | 482 | O | 470 | O | 517 | O |
| | | Ronas Hill – North Roe and Tingon | 5 | UK | SPA, RAMSAR, SSSI | 56 | - | - | 645 | O | 623 | O | 650 | O |
| | | Rousay | - | UK | SSSI | - | - | - | 520 | O | 505 | O | 546 | O |
| **Black-throated Diver *Gavia arctica*** | **2** | Caithness and Sutherland Peatlands | - | UK | SPA, SSSI | 26 | - | - | 429 | O | 423 | O | 481 | O |
| **Northern fulmar *Fulmarus*** | **400** | Buchan Ness to Collieston Coast | 10 | UK | SPA, SSSI | 1,765 | 1,976 | 1,389 | 310 | I | 296 | I | 345 | I |
| | | Calf of Eday | 15 | UK | SPA, SSSI | 1,955 | 1,842 | 1,968 | 522 | O | 504 | O | 543 | O |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***glacialis*** | | Cape Wrath | - | UK | SPA | 2,300 | 2,107 | 2,251 | 501 | O | 496 | O | 561 | O |
| | | Copinsay | 13 | UK | SPA, SSSI | 1,615 | 5,891 | 1,638 | 485 | O | 468 | O | 509 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 15,000 | 14,075 | 15,039 | 421 | O | 413 | O | 473 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 35,210 | 20,424 | 29,649 | 536 | O | 515 | O | 545 | O |
| | | Fetlar | 20 | UK | SPA, SSSI | 9,500 | 8,672 | 9,266 | 642 | O | 620 | O | 645 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 798 | 1,561 | 564 | 182 | I | 178 | I | 271 | I |
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | - | 846 | 1,447[#] | 57 | I | 71 | I | 6 | I |
| | | Foula | 1 | UK | SPA, SSSI | 46,800 | 21,106 | 22,552 | 607 | O | 586 | O | 616 | O |
| | | Fowlsheugh | 8 | UK | SPA, SSSI | 1,170 | 352 | 193 | 264 | I | 254 | I | 314 | I |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 19,539 | 14,647 | 15,650 | 663 | O | 641 | O | 666 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 35,000 | 26,455 | 28,267 | 482 | O | 470 | O | 517 | O |
| | | Hunstanton Cliffs | - | UK | SSSI | - | 65 | 91 | 198 | I | 210 | I | 125 | I |
| | | North Berwick Coast | - | UK | SSSI | - | 509 | 544 | 199 | I | 180 | I | 279 | I |
| | | North Caithness Cliffs | 12 | UK | SPA, SSSI | 14,700 | 22,291 | 23,819 | 458 | O | 446 | O | 493 | O |
| | | Noss | 19 | UK | SPA, SSSI | 6,350 | 5,169 | 5,248 | 597 | O | 575 | O | 601 | O |
| | | Rousay | 14 | UK | SPA, SSSI | 1,240 | 895 | 956 | 520 | O | 505 | O | 546 | O |
| | | Sumburgh Head | 18 | UK | SPA, SSSI | 2,542 | 2,444 | 233 | 569 | O | 548 | O | 575 | O |
| | | Troup, Pennan and Lions Heads | 9 | UK | SPA, SSSI | 4,400 | 2,900 | 1,795 | 349 | I | 335 | I | 383 | I |
| | | West Westray | 16 | UK | SPA, SSSI | 1,400 | 3,544 | 3,786 | 531 | O | 515 | O | 556 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Weybourne Cliffs | - | UK | SSSI | - | 17 | 18 | 207 | I | 226 | I | 144 | I |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 92 | - | - | 421 | O | 420 | O | 401 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 30 -35 | - | - | 642 | O | 643 | O | 588 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 100 | - | - | 639 | O | 639 | O | 592 | O |
| | | Falaise du Bessin Occidental | - | France | SPA | 140 | - | - | 578 | O | 579 | O | 514 | O |
| | | Littoral Seino-Marin | - | France | SPA | 41 | - | - | 512 | O | 517 | O | 439 | O |
| | | Ouessant-Molene | - | France | SPA | 100 | - | - | 726 | O | 726 | O | 688 | O |
| | | Recifs et lands de la Hague | - | France | SPA | - | - | - | 543 | O | 544 | O | 489 | O |
| | | Tregor Goelo | - | France | SPA | 10 | - | - | 639 | O | 639 | O | 592 | O |
| **European storm petrel *Hydrobates pelagicus*** | **65** | Auskerry | 21 | UK | SPA, SSSI | 3,600 | 994 | - | 500 | O | 482 | O | 522 | O |
| | | Eilean nan Ron | - | UK | SSSI | - | 448 | - | 484 | O | 477 | O | 539 | O |
| | | Foula (Foula SPA) | - | UK | SSSI | - | - | - | 607 | O | 586 | O | 616 | O |
| | | Lamb Hoga (Fetlar SPA) | - | UK | SSSI | - | - | - | 642 | O | 620 | O | 645 | O |
| | | Mousa | 22 | UK | SPA, SSSI | 4,750 | 6,800 | - | 585 | O | 563 | O | 590 | O |
| | | Sule Skerry | - | UK | SSSI | 1,000 | 309 | - | 532 | O | 525 | O | 582 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 40-49 | - | - | 639 | O | 639 | O | 592 | O |
| | | Ouessant-Molene | - | France | SPA | 560-360 | - | - | 726 | O | 726 | O | 688 | O |
| **Leach's storm petrel *Oceanodroma*** | **92** | Foula | 1 | UK | SPA, SSSI | 50 | 15 | - | 607 | O | 586 | O | 616 | O |
| | | Ramna Stacks and Gruney | 23 | UK | SPA, SSSI | 20 | 20 | - | 661 | O | 639 | O | 663 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***leucorhoa*** | | Sule Skerry and Sule Stack | - | UK | SPA | 5 | 0 | - | 532 | O | 525 | O | 582 | O |
| **Northern gannet *Morus bassanus*** | **229**** | Fair Isle | 17 | UK | SPA, SSSI | 1,166 | 1,123 | 4,085 | 536 | O | 515 | O | 545 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 21,600 | 43,648 | 55,482 | 182 | I | 178 | I | 271 | I |
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | 2,501 | 2,548 | 8,469[#] | 57 | I | 71 | I | 6 | I |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 16,400 | 14,541 | 17,763 | 663 | O | 641 | O | 666 | O |
| | | Noss | 19 | UK | SPA, SSSI | 6,860 | 8,017 | 9,767 | 597 | O | 575 | O | 601 | O |
| | | Sule Skerry and Sule Stack | - | UK | SPA, SSSI | 5,900 | 5,137 | 6,275 | 532 | O | 525 | O | 582 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 114 | - | - | 421 | O | 420 | O | 401 | O |
| | | Chausay | - | France | SPA | - | - | - | 623 | O | 624 | O | 564 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 19,526 | - | - | 639 | O | 639 | O | 592 | O |
| **Great cormorant *Phalacrocorax carbo*** | **25** | Abberton Reservoir | 25 | UK | SPA, RAMSAR, SSSI | 490 | 370 | - | 324 | O | 333 | O | 251 | O |
| | | Blackwater Estuary | - | UK | SSSI | - | - | - | 328 | O | 338 | O | 256 | O |
| | | Calf of Eday | 15 | UK | SPA, SSSI | 223 | 138 | - | 522 | O | 504 | O | 543 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 230 | 235 | - | 421 | O | 413 | O | 473 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 194 | 238 | - | 119 | O | 113 | O | 191 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 200 | 213 | - | 182 | O | 178 | O | 271 | O |
| | | Duinen Vlieland | - | Netherlands | SPA | 870 | - | - | 297 | O | 307 | O | 273 | O |

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| | | Veerse Meere | - | Netherlands | SPA, RAMSAR | 490 | - | - | 396 | O | 415 | O | 364 | O |
| | | Voornes Duin | - | Netherlands | SPA | 1,100 | - | - | 376 | O | 393 | O | 353 | O |
| | | Zwanenwater | - | Netherlands | SPA, RAMSAR | 790 | - | - | 316 | O | 329 | O | 293 | O |
| | | Baie de Morlaix | - | France | SPA | 130-140 | - | - | 672 | O | 672 | O | 628 | O |
| | | Baie de Saint-Brieuc-Est | - | France | SPA | 35 | - | - | 666 | O | 666 | O | 612 | O |
| | | Baie de Seine Occidentale | - | France | SPA | 406-660 | - | - | 557 | O | 558 | O | 494 | O |
| | | Baie du Mont Saint Michel | - | France | SPA | 220-230 | - | - | 644 | O | 645 | O | 584 | O |
| | | Chausay | - | France | SPA | 230-235 | - | - | 623 | O | 624 | O | 564 | O |
| | | Ilot du Trevors | - | France | SPA | 37 | - | - | 714 | O | 714 | O | 676 | O |
| | | Littoral Seino-Marin | - | France | SPA | 55 | - | - | 512 | O | 517 | O | 439 | O |
| | | Marais Audomarois | - | France | SPA | 105-270 | - | - | 459 | O | 479 | O | 395 | O |
| | | Ouessant-Molene | - | France | SPA | 90-110 | - | - | 726 | O | 726 | O | 688 | O |
| | | Tregor Goelo | - | France | SPA | - | - | - | 639 | O | 639 | O | 592 | O |
| | | Aebelo og kysten ved Naera | - | Denmark | SPA | 2,114 | - | - | 554 | O | 546 | O | 535 | O |
| | | Harboore Tange, Plet Enge og Gjeller So | - | Denmark | SPA, RAMSAR | 1,000 | - | - | 471 | O | 458 | O | 457 | O |
| | | Horsens Fjord og Endelave | - | Denmark | SPA | 900 | - | - | 558 | O | 549 | O | 540 | O |
| | | Hov Vig | - | Denmark | SPA | 1,086 | - | - | 666 | O | 658 | O | 649 | O |

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| | | Lille Vildmose | - | Denmark | SPA | 2,149 | - | - | 595 | O | 582 | O | 580 | O |
| | | Stavns Fjord | - | Denmark | SPA | 2,100 | - | - | 598 | O | 589 | O | 580 | O |
| **European shag *Phalacrocorax aristotelis*** | **15** | Buchan Ness to Collieston Coast | 10 | UK | SPA, SSSI | 1,045 | 415 | - | 310 | O | 296 | O | 345 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 2,300 | 1,051 | - | 421 | O | 413 | O | 473 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 1,100 | 663 | - | 536 | O | 515 | O | 545 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 994 | 1,280 | - | 119 | O | 113 | O | 191 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 2,400 | 1,048 | - | 182 | O | 178 | O | 271 | O |
| | | Flamborough Head and Bempton Cliffs | - | UK | SPA, SSSI | - | 24 | 0 | 57 | O | 71 | O | 6 | I |
| | | Foula | 1 | UK | SPA, SSSI | 2,400 | 2,300 | - | 607 | O | 586 | O | 616 | O |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 450 | 191 | - | 663 | O | 641 | O | 666 | O |
| | | St Abb's Head to Fast Castle | 27 | UK | SPA, SSSI | 560 | 323 | - | 159 | O | 155 | O | 235 | O |
| | | Sule Skerry | - | UK | SSSI | - | 777 | - | 532 | O | 525 | O | 582 | O |
| | | Sumburgh Head | - | UK | SSSI | - | 270 | - | 569 | O | 548 | O | 575 | O |
| | | Baie de Morlaix | - | France | SPA | 365 | - | - | 672 | O | 672 | O | 628 | O |
| | | Baie de Saint-Brieuc-Est | - | France | SPA | 35 | - | - | 666 | O | 666 | O | 612 | O |
| | | Baie de Seine Occidentale | - | France | SPA | 44-45 | - | - | 557 | O | 558 | O | 494 | O |
| | | Baie du Mont Saint Michel | - | France | SPA | 752-760 | - | - | 644 | O | 645 | O | 584 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 300-320 | - | - | 642 | O | 643 | O | 588 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Chausay | - | France | SPA | 890-2000 | - | - | 623 | O | 624 | O | 564 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 228 | - | - | 639 | O | 639 | O | 592 | O |
| | | Iles de la Colombiere, de la Nelliere et des Haches | - | France | SPA | - | - | - | 668 | O | 668 | O | 612 | O |
| | | Ilot du Trevors | - | France | SPA | 3-4 | - | - | 714 | O | 714 | O | 676 | O |
| | | Ilots Notre-Dame et Chevret | - | France | SPA | 2 | - | - | 672 | O | 673 | O | 615 | O |
| | | Landes et dunes de la Hague | - | France | SPA | 21-27 | - | - | 546 | O | 546 | O | 487 | O |
| | | Littoral Seino-Marin | - | France | SPA | 3 | - | - | 512 | O | 517 | O | 439 | O |
| | | Ouessant-Molene | - | France | SPA | 700 | - | - | 726 | O | 726 | O | 688 | O |
| | | Tregor Goelo | - | France | SPA | - | - | - | 639 | O | 639 | O | 592 | O |
| | | Ringkobing Fjord | - | Denmark | SPA, RAMSAR | - | - | - | 446 | O | 437 | O | 429 | O |
| **Arctic Skua *Stercorarius parasiticus*** | **63** | Crussa Field and the Heoggs | - | UK | SSSI | - | 39 | 16 | 667 | O | 646 | O | 663 | O |
| | | Doomy and Whitemaw Hill | - | UK | SSSI | - | 42 | 18 | 521 | O | 504 | O | 545 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 110 | 78 | 29 | 536 | O | 515 | O | 545 | O |
| | | Fetlar | 20 | UK | SPA, SSSI | 130 | 96 | 40 | 642 | O | 620 | O | 645 | O |
| | | Foula | 1 | UK | SPA, SSSI | 133 | 107 | 50 | 607 | O | 586 | O | 616 | O |
| | | Hill of Colvadale and Sobul | - | UK | SSSI | - | 45 | 19 | 660 | O | 639 | O | 663 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 59 | 70 | 29 | 482 | O | 470 | O | 517 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Noss (Noss SPA) | - | UK | SSSI | - | 9 | 4 | 597 | O | 575 | O | 601 | O |
| | | Papa Stour | - | UK | SSSI | - | 47 | 20 | 625 | O | 604 | O | 632 | O |
| | | Papa Westray | 28 | UK | SPA, SSSI | 150 | 64 | 27 | 539 | O | 522 | O | 561 | O |
| | | Ronas Hill-North Roe | - | UK | SSSI | - | 90 | 38 | 645 | O | 623 | O | 650 | O |
| | | Rousay | 14 | UK | SPA, SSSI | 130 | 115 | 48 | 520 | O | 505 | O | 546 | O |
| | | West Westray | 16 | UK | SPA, SSSI | 78 | 84 | 35 | 531 | O | 515 | O | 556 | O |
| | | Koster | - | Sweden | SPA | - | - | - | 738 | O | 721 | O | 727 | O |
| | | Nordre Alvs Esturarium | - | Sweden | SPA | 6-10 | - | - | 715 | O | 701 | O | 701 | O |
| | | Salofjorden | - | Sweden | SPA | - | - | - | 711 | O | 696 | O | 697 | O |
| | | Tanumskusten | - | Sweden | SPA | 10-20 | - | - | 733 | O | 716 | O | 721 | O |
| | | Vrangoskargarden | - | Sweden | SPA | 6-10 | - | - | 707 | O | 693 | O | 693 | O |
| **Great skua** ***Catharacta skua*** | **86** | Fair Isle | 17 | UK | SPA, SSSI | 110 | 143 | 227 | 536 | O | 515 | O | 545 | O |
| | | Fetlar | 20 | UK | SPA, SSSI | 508 | 593 | 687 | 642 | O | 620 | O | 645 | O |
| | | Foula | 1 | UK | SPA, SSSI | 2,270 | 2,293 | 2,656 | 607 | O | 586 | O | 616 | O |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 788 | 1,061 | 1,229 | 663 | O | 641 | O | 666 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 1,900 | 1,973 | 2,285 | 482 | O | 470 | O | 517 | O |
| | | Noss | 19 | UK | SPA, SSSI | 420 | 432 | 365 | 597 | O | 575 | O | 601 | O |
| | | Ronas Hill – North Roe and Tingon | 5 | UK | SPA, RAMSAR, SSSI | 130 | 214 | 248 | 645 | O | 623 | O | 650 | O |

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| **Lesser black-backed gull *Larus fuscus*** | **141** | Alde-Ore Estuary | 29 | UK | SPA, RAMSAR, SSSI | 21,700 | 5,790 | 2,833 | 298 | O | 317 | O | 235 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 1,500 | 4,003 | 1,749 | 182 | O | 178 | O | 271 | O |
| | | Hallands Vadero | - | Sweden | SPA | 15 | - | - | 726 | O | 716 | O | 709 | O |
| | | Lista Wetlands System | - | Norway | RAMSAR | - | - | - | 482 | O | 465 | O | 474 | O |
| | | Duinen en Lage Land Texel | - | Netherlands | SPA | 14,000 | - | - | 301 | O | 310 | O | 274 | O |
| | | Duinen Vlieland | - | Netherlands | SPA | 2,500 | - | - | 297 | O | 307 | O | 273 | O |
| | | Waddenzee | - | Netherlands | SPA, RAMSAR | 19,000 | - | - | 295 | O | 305 | O | 271 | O |
| | | Zwanenwater | - | Netherlands | SPA, RAMSAR | 110 | - | - | 316 | O | 329 | O | 293 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 23,063 | - | - | 356 | O | 360 | O | 332 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 7,285 | - | - | 424 | O | 420 | O | 405 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 2,037 | - | - | 421 | O | 420 | O | 401 | O |
| | | Baie de Morlaix | - | France | SPA | 160 | - | - | 672 | O | 672 | O | 628 | O |
| | | Baie de Saint-Brieuc-Est | - | France | SPA | 10 | - | - | 666 | O | 666 | O | 612 | O |
| | | Baie du Mont Saint Michel | - | France | SPA | 90 - 100 | - | - | 644 | O | 645 | O | 584 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 2-3 | - | - | 642 | O | 643 | O | 588 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 638 | - | - | 639 | O | 639 | O | 592 | O |
| | | Falaise du Bessin Occidental | - | France | SPA | 35 | - | - | 578 | O | 579 | O | 514 | O |
| | | Ilot du Trevors | - | France | SPA | 60 | - | - | 714 | O | 714 | O | 676 | O |
| | | Ilots Notre-Dame et Chevret | - | France | SPA | 3 | - | - | 672 | O | 673 | O | 615 | O |
| | | Ouessant-Molene | - | France | SPA | 4 700 – 4800 | - | - | 726 | O | 726 | O | 688 | O |
| | | Tregor Goelo | - | France | SPA | - | - | - | 639 | O | 639 | O | 592 | O |
| **Herring gull *Larus argentatus*** | **61** | Alde-Ore Estuary | 29 | UK | SPA, RAMSAR, SSSI | 6,050 | 825 | - | 298 | O | 317 | O | 235 | O |
| | | Buchan Ness to Collieston Coast | 10 | UK | SPA, SSSI | 4,292 | 3,126 | - | 310 | O | 296 | O | 345 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 9,400 | 3,049 | - | 421 | O | 413 | O | 473 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 6,600 | 7,319 | - | 182 | O | 178 | O | 271 | O |
| | | Flamborough Head and Bempton Cliffs | - | UK | SSI | 1,110 | 721 | 1,421[#] | 57 | I | 71 | O | 6 | I |
| | | Fowlsheugh | 8 | UK | SPA, SSSI | 3,190 | 267 | - | 264 | O | 254 | O | 314 | O |
| | | St Abb's Head to Fast Castle | 27 | UK | SPA, SSSI | 1,160 | 584 | - | 159 | O | 155 | O | 235 | O |
| | | Troup, Pennan and Lions Heads | 9 | UK | SPA, SSSI | 4,200 | 1,951 | - | 349 | O | 335 | O | 383 | O |
| | | Hallands Vadero | - | Sweden | SPA | 8,000 | - | - | 726 | O | 716 | O | 709 | O |
| | | Duinen en Lage Land Texel | - | Netherlands | SPA | 7,631 | - | - | 301 | O | 310 | O | 274 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Grevelingen | - | Netherlands | SPA, RAMSAR | 1,156 | - | - | 382 | O | 400 | O | 356 | O |
| | | Oosterschelde | - | Netherlands | SPA, RAMSAR | 1,767 | - | - | 389 | O | 407 | O | 359 | O |
| | | Veerse Meere | - | Netherlands | SPA, RAMSAR | 1,728 | - | - | 396 | O | 415 | O | 364 | O |
| | | Voordelta | - | Netherlands | SPA, RAMSAR | 11,484 | - | - | 364 | O | 381 | O | 341 | O |
| | | Zwanenwater | - | Netherlands | SPA, RAMSAR | 1,087 | - | - | 316 | O | 329 | O | 293 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 22,949 | - | - | 356 | O | 360 | O | 332 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 12,119 | - | - | 424 | O | 420 | O | 405 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 217 | - | - | 421 | O | 420 | O | 401 | O |
| | | Baie de Morlaix | - | France | SPA | 2,460 | - | - | 672 | O | 672 | O | 628 | O |
| | | Baie de Saint-Brieuc-Est | - | France | SPA | 310 | - | - | 666 | O | 666 | O | 612 | O |
| | | Baie de Seine Occidentale | - | France | SPA | 1880 - 2145 | - | - | 557 | O | 558 | O | 494 | O |
| | | Baie du Mont Saint Michel | - | France | SPA | 90 - 100 | - | - | 644 | O | 645 | O | 584 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 340 - 360 | - | - | 642 | O | 643 | O | 588 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 2,788 | - | - | 639 | O | 639 | O | 592 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Falaise du Bessin Occidental | - | France | SPA | 369 | - | - | 578 | O | 579 | O | 514 | O |
| | | Ilot du Trevors | - | France | SPA | 196 | - | - | 714 | O | 714 | O | 676 | O |
| | | Ilots Notre-Dame et Chevret | - | France | SPA | 6 | - | - | 672 | O | 673 | O | 615 | O |
| | | Littoral Seino-Marin | - | France | SPA | 1,125 | - | - | 512 | O | 517 | O | 439 | O |
| | | Ouessant-Molene | - | France | SPA | 1000 – 1100 | - | - | 726 | O | 726 | O | 688 | O |
| | | Tregor Goelo | - | France | SPA | - | - | - | 639 | O | 639 | O | 592 | O |
| **Great black-backed gull** ***Larus marinus*** | **60** | Calf of Eday | 15 | UK | SPA, SSSI | 938 | 675 | 314 | 522 | O | 504 | O | 543 | O |
| | | Copinsay | 13 | UK | SPA, SSSI | 490 | 400 | 186 | 485 | O | 468 | O | 509 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 800 | 167 | 78 | 421 | O | 413 | O | 473 | O |
| | | Eilean Hoan (North Sutherland Coastal Islands) | - | UK | SSSI | - | 390 | 181 | 483 | O | 477 | O | 539 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 570 | 469 | 218 | 482 | O | 470 | O | 517 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 2 | - | - | 356 | O | 360 | O | 332 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 14 | - | - | 424 | O | 420 | O | 405 | O |
| | | Baie de Morlaix | - | France | SPA | 170 | - | - | 672 | O | 672 | O | 628 | O |
| | | Baie de Saint-Brieuc-Est | - | France | SPA | 4 | - | - | 666 | O | 666 | O | 612 | O |
| | | Baie de Seine Occidentale | - | France | SPA | 231 -400 | - | - | 557 | O | 558 | O | 494 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Baie du Mont Saint Michel | - | France | SPA | 138 – 140 | - | - | 644 | O | 645 | O | 584 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 6 | - | - | 642 | O | 643 | O | 588 | O |
| | | Chausay | - | France | SPA | 340 – 750 | - | - | 623 | O | 624 | O | 564 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 72 | - | - | 639 | O | 639 | O | 592 | O |
| | | Ilot du Trevors | - | France | SPA | 5 – 6 | - | - | 714 | O | 714 | O | 676 | O |
| | | Littoral Seino-Marin | - | France | SPA | 29 | - | - | 512 | O | 517 | O | 439 | O |
| | | Ouessant-Molene | - | France | SPA | 1000 – 1100 | - | - | 726 | O | 726 | O | 688 | O |
| | | Tregor Goelo | - | France | SPA | - | - | - | 639 | O | 639 | O | 592 | O |
| **Black-headed gull *Choricocephalus ridibundus*** | **26** | Alde-Ore Estuary | 29 | UK | SPA, RAMSAR, SSSI | 1,582 | 209 | - | 298 | O | 317 | O | 235 | O |
| | | Coquet Island | 30 | UK | SPA, SSSI | 2,100 | 2,210 | - | 87 | O | 82 | O | 168 | O |
| | | North Solent | - | UK | SSSI | - | 6,125 | - | 421 | O | 422 | O | 362 | O |
| | | The Wash | - | UK | SSSI | - | 636 | - | 181 | O | 190 | O | 106 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 25,895 | - | - | 356 | O | 360 | O | 332 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 33,765 | - | - | 424 | O | 420 | O | 405 | O |
| | | Basses Vallees du Contentin et Baie des Veys | - | France | SPA | 30 -100 | - | - | 563 | O | 563 | O | 501 | O |

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| **Common gull Larus canus** | **50** | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 6,427 | - | - | 356 | O | 360 | O | 332 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 4,178 | - | - | 424 | O | 420 | O | 405 | O |
| **Mediterranean gull *Ichthyaetus melanocephalus*** | **20** | Dungeness to Pett Level | 34 | UK | SPA, RAMSAR, SSSI | 2 | - | - | 420 | O | 425 | O | 346 | O |
| | | North Norfolk Coast | 35 | UK | SPA, RAMSAR, SSSI | 2 | - | - | 195 | O | 209 | O | 124 | O |
| | | Poole Harbour | 31 | UK | SPA, RAMSAR, SSSI | 5 | - | - | 436 | O | 436 | O | 384 | O |
| | | Solent and Southampton Water | 32 | UK | SPA, RAMSAR, SSSI | 2 | - | - | 409 | O | 410 | O | 352 | O |
| | | The Swale | 33 | UK | SPA, RAMSAR, SSSI | 12 | - | - | 371 | O | 377 | O | 297 | O |
| | | Krammer-Volkerak | - | Netherlands | SPA, RAMSAR | 310 | - | - | 401 | O | 418 | O | 377 | O |
| | | Niewkoopse Plassen | - | Netherlands | SPA | 9 | - | - | 379 | O | 394 | O | 369 | O |
| | | Westerschelde & Saeftinghe | - | Netherlands | SPA, RAMSAR | 41 | - | - | 398 | O | 417 | O | 362 | O |

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| | | Zoommeer | - | Netherlands | SPA | - | - | - | 419 | O | 436 | O | 392 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 3 | - | - | 356 | O | 360 | O | 332 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 1 | - | - | 424 | O | 420 | O | 405 | O |
| | | Basses Vallees du Contentin et Baie des Veys | - | France | SPA | 0-3 | - | - | 563 | O | 563 | O | 501 | O |
| | | Estuaires picards: Baie de Somme et d'Authie | - | France | SPA | 28 | - | - | 492 | O | 500 | O | 419 | O |
| | | Marais arriere-littoraux Picards | - | France | SPA | 0-2 | - | - | 500 | O | 511 | O | 429 | O |
| | | Platier d'Oye | - | France | SPA | 1-130 | - | - | 432 | O | 451 | O | 366 | O |
| | | Het Zwin | - | Belgium | SPA | 15 | - | - | 412 | O | 431 | O | 374 | O |
| | | Kustbroedvogels te Zeebrugge-Heist | - | Belgium | SPA | 90 | - | - | 410 | O | 429 | O | 368 | O |
| **Black-legged kittiwake *Rissa tridactyla*** | **231** | Brighton to Newhaven Cliffs | - | UK | SSSI | - | 1,002 | 890 | 424 | O | 426 | O | 355 | O |
| | | Buchan Ness to Collieston Coast | 10 | UK | SPA, SSSI | 30,452 | 14,091 | 14,133 | 310 | O | 296 | O | 345 | O |
| | | Calf of Eday | 15 | UK | SPA, SSSI | 1,717 | 765 | 341 | 522 | O | 504 | O | 543 | O |
| | | Cape Wrath | - | UK | SPA | 9,700 | 10,344 | 4,606 | 501 | O | 496 | O | 561 | O |
| | | Copinsay | 13 | UK | SPA, SSSI | 9,550 | 4,256 | 1,895 | 485 | O | 468 | O | 509 | O |
| | | Dover to Kingsdown Cliffs | - | UK | SSSI | - | 1,229 | 1,091 | 405 | O | 417 | O | 334 | O |

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| | | Dunbar Coast | - | UK | SSSI | - | 1,191 | 530 | 184 | I | 180 | I | 265 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 32,500 | 39,890 | 17,764 | 421 | O | 413 | O | 473 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 18,160 | 8,204 | 1,438 | 536 | O | 515 | O | 545 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 6,236 | 5,364 | 3,976 | 119 | I | 113 | I | 191 | I |
| | | Forth Islands | 7 | UK | SPA, SSSI | 8,400 | 6,991 | 3,884 | 182 | I | 178 | I | 271 | O |
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | 83,370 | 42,908 | 44,520[#] | 57 | I | 71 | I | 6 | I |
| | | Foula | - | UK | SPA | 3,840 | 1,934 | 480 | 607 | O | 586 | O | 616 | O |
| | | Fowlsheugh | 8 | UK | SPA, SSSI | 36,650 | 18,000 | 9,454 | 264 | O | 254 | O | 314 | O |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 922 | 635 | 283 | 663 | O | 641 | O | 666 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 3,000 | 3,362 | 1,497 | 482 | O | 470 | O | 517 | O |
| | | Marwick Head | 36 | UK | SPA, SSSI | 7,700 | 6,048 | 2,693 | 519 | O | 506 | O | 551 | O |
| | | North Caithness Cliffs | 12 | UK | SPA, SSSI | 13,100 | 6,146 | 2,737 | 458 | O | 446 | O | 493 | O |
| | | Noss | 19 | UK | SPA, SSSI | 7,020 | 2,395 | 507 | 597 | O | 575 | O | 601 | O |
| | | Rousay | 14 | UK | SPA, SSSI | 4,900 | 3,102 | 1,381 | 520 | O | 505 | O | 546 | O |
| | | St Abb's Head to Fast Castle | 27 | UK | SPA, SSSI | 21,170 | 18,499 | 4,688 | 159 | I | 155 | I | 235 | O |
| | | Sumburgh Head | 18 | UK | SPA, SSSI | 1,366 | 877 | 549 | 569 | O | 548 | O | 575 | O |
| | | Troup, Pennan and Lions Heads | 9 | UK | SPA, SSSI | 31,660 | 18,482 | 17,171 | 349 | O | 335 | O | 383 | O |
| | | West Westray | 16 | UK | SPA, SSSI | 23,900 | 12,286 | 5,471 | 531 | O | 515 | O | 556 | O |

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| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 65 | - | - | 642 | O | 643 | O | 588 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 178 | - | - | 639 | O | 639 | O | 592 | O |
| | | Falaise du Bessin Occidental | - | France | SPA | 1,600 | - | - | 578 | O | 579 | O | 514 | O |
| | | Littoral Seino-Marin | - | France | SPA | 414 | - | - | 512 | O | 517 | O | 439 | O |
| **Arctic tern *Sterna paradisea*** | **24** | Auskerry | 21 | UK | SPA, SSSI | 780 | 32 | - | 500 | O | 482 | O | 522 | O |
| | | Coquet Island | 30 | UK | SPA, SSSI | 700 | 833 | - | 87 | O | 82 | O | 168 | O |
| | | Dalsetter | - | UK | SSSI | - | 4,000 | - | 580 | O | 558 | O | 586 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 1,100 | 1,254 | - | 536 | O | 515 | O | 545 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 2,840 | 2,016 | - | 119 | O | 113 | O | 191 | O |
| | | Fetlar | 20 | UK | SPA, SSSI | 1,065 | 93 | - | 642 | O | 620 | O | 645 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 540 | 908 | - | 182 | O | 178 | O | 271 | O |
| | | Foula | 1 | UK | SPA, SSSI | 1,500 | 950 | - | 607 | O | 586 | O | 616 | O |
| | | Mousa | 22 | UK | SPA, SSSI | 1,000 | 101 | - | 585 | O | 563 | O | 590 | O |
| | | Papa Stour | 37 | UK | SPA, SSSI | 850 | 1,172 | - | 625 | O | 604 | O | 632 | O |
| | | Papa Westray | 28 | UK | SPA, SSSI | 1,700 | 850 | - | 539 | O | 522 | O | 561 | O |
| | | Pentland Firth Islands | 60 | UK | SPA, SSSI | 1,000 | 13 | - | 469 | O | 455 | O | 500 | O |
| | | Rousay | 14 | UK | SPA, SSSI | 790 | - | - | 520 | O | 505 | O | 546 | O |
| | | Stroma (North Caithness Cliffs SPA) | - | UK | SSSI | - | 546 | - | 473 | O | 461 | O | 507 | O |
| | | Sumburgh Head | 18 | UK | SPA, SSSI | 700 | 305 | - | 569 | O | 548 | O | 575 | O |

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| | | West Westray | 16 | UK | SPA, SSSI | 1,140 | - | - | 531 | O | 515 | O | 556 | O |
| | | Falsterbo-Foteviken | - | Sweden | SPA | 90 – 100 | - | - | 722 | O | 714 | O | 703 | O |
| | | Gamla Kopstad | - | Sweden | SPA | - | - | - | 723 | O | 711 | O | 707 | O |
| | | Koster | - | Sweden | SPA | 50 | - | - | 738 | O | 721 | O | 727 | O |
| | | Morups Tange | - | Sweden | SPA | 1 | - | - | 726 | O | 714 | O | 710 | O |
| | | Skalderviken | - | Sweden | SPA | 0-1 | - | - | 731 | O | 722 | O | 714 | O |
| | | Ven | - | Sweden | SPA | - | - | - | 727 | O | 719 | O | 709 | O |
| | | Lauwersmeer | - | Netherlands | SPA, RAMSAR | 5 | - | - | 354 | O | 360 | O | 330 | O |
| | | Waddenzee | - | Netherlands | SPA, RAMSAR | 1 500 | - | - | 295 | O | 305 | O | 271 | O |
| | | Hamburgisches Wattenmeer | - | Germany | SPA, RAMSAR | 100 | - | - | 458 | O | 458 | O | 436 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 720 | - | - | 356 | O | 360 | O | 332 | O |
| | | NSG Rantumbecken | - | Germany | SPA | 42 | - | - | 447 | O | 443 | O | 428 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 4 323 | - | - | 424 | O | 420 | O | 405 | O |
| | | Untereider | - | Germany | SPA | 70 | - | - | 489 | O | 487 | O | 468 | O |
| | | Ouessant-Molene | - | France | SPA | - | - | - | 726 | O | 726 | O | 688 | O |
| | | Agger Tange | - | Denmark | SPA | 200 | - | - | 479 | O | 465 | O | 464 | O |

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| | | Alborg Bugt, nordlige del | - | Denmark | SPA | 200 | - | - | 602 | O | 590 | O | 587 | O |
| | | Draby Vig | - | Denmark | SPA | 40 – 75 | - | - | 519 | O | 506 | O | 504 | O |
| | | Fano | - | Denmark | SPA | 47 – 113 | - | - | 451 | O | 443 | O | 432 | O |
| | | Glomstrup Vig, Agero, Munkholm og Katholm Odde, Lindholm og Rotholme | - | Denmark | SPA | 25 - 60 | - | - | 487 | O | 474 | O | 472 | O |
| | | Harboore Tange, Plet Enge og Gjeller So | - | Denmark | SPA, RAMSAR | 8 | - | - | 471 | O | 458 | O | 457 | O |
| | | Hirsholmene | - | Denmark | SPA | 25 – 50 | - | - | 639 | O | 625 | O | 625 | O |
| | | Horsens Fjord og Endelave | - | Denmark | SPA | 450 | - | - | 558 | O | 549 | O | 540 | O |
| | | Kysten fra Aggersund til Bygholm Vejle | - | Denmark | SPA | 100 – 105 | - | - | 544 | O | 530 | O | 538 | O |
| | | Laeso, sydlige del | - | Denmark | SPA | 200 | - | - | 641 | O | 628 | O | 626 | O |
| | | Logstor Bredning, Livo, Feggesund og Skarrehage | - | Denmark | SPA | 15 – 20 | - | - | 523 | O | 509 | O | 509 | O |
| | | Magerodde og Karby Odde | - | Denmark | SPA | 35 - 40 | - | - | 496 | O | 482 | O | 481 | O |
| | | Mando | - | Denmark | SPA | 101 – 189 | - | - | 462 | O | 456 | O | 444 | O |
| | | Nissum Fjord | - | Denmark | SPA, RAMSAR | 200 | - | - | 458 | O | 446 | O | 442 | O |
| | | Nordre Ronner | - | Denmark | SPA | 0 – 50 | - | - | 655 | O | 641 | O | 640 | O |
| | | Ostlige Vejler | - | Denmark | SPA | 28 – 102 | - | - | 538 | O | 524 | O | 523 | O |

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| | | Randers og Mariager Fjorde og Alborg Bugt, sydlige del | - | Denmark | SPA | 210 | - | - | 588 | O | 576 | O | 572 | O |
| | | Ringkobing Fjord | - | Denmark | SPA, RAMSAR | 74 - 104 | - | - | 446 | O | 437 | O | 429 | O |
| | | Romo | - | Denmark | SPA | 170 | - | - | 457 | O | 452 | O | 438 | O |
| | | Sejro Bugt og Nekselo | - | Denmark | SPA | 20 – 30 | - | - | 628 | O | 620 | O | 610 | O |
| | | Skallingen og Langli | - | Denmark | SPA | 80 – 100 | - | - | 440 | O | 432 | O | 422 | O |
| | | Stavns Fjord | - | Denmark | SPA | 50 | - | - | 598 | O | 589 | O | 580 | O |
| | | Vadehavet | - | Denmark | SPA, RAMSAR | 230 – 320 | - | - | 431 | O | 423 | O | 413 | O |
| | | Veno, Veno Sund | - | Denmark | SPA | 23 | - | - | 492 | O | 479 | O | 476 | O |
| | | Vestlige Vejler, Arup Holm og Hovsor Ron | - | Denmark | SPA | 15 – 20 | - | - | 525 | O | 512 | O | 511 | O |
| | | Vidan, Tondermarksen og Saltvandssoen | - | Denmark | SPA | 3-41 | - | - | 469 | O | 464 | O | 450 | O |
| | | Het Zwin | - | Belgium | SPA | 1 | - | - | 412 | O | 431 | O | 374 | O |
| **Common tern** ***Sterna hirundo*** | **15** | Breydon Water | - | UK | SPA, RAMSAR, SSSI | 155 | - | - | 251 | O | 273 | O | 193 | O |
| | | Coquet Island | 30 | UK | SPA, SSSI | 740 | 1,034 | - | 87 | O | 82 | O | 168 | O |
| | | Cromarty Firth | 42 | UK | SPA, RAMSAR, SSSI | 294 | 222 | - | 390 | O | 385 | O | 455 | O |

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| | | Dungeness to Pett Level | 34 | UK | SPA, RAMSAR, SSSI | 266 | 109 | - | 420 | O | 425 | O | 346 | O |
| | | Dun's Dish | - | UK | SSSI | - | - | - | 256 | O | 249 | O | 316 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 230 | 127 | - | 119 | O | 113 | O | 191 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 334 | 303 | - | 182 | O | 178 | O | 271 | O |
| | | Foulness | 38 | UK | SPA, RAMSAR, SSSI | 220 | - | - | 347 | O | 357 | O | 274 | O |
| | | Inner Moray Firth | 41 | UK | SPA, RAMSAR, SSSI | 310 | - | - | 376 | O | 371 | O | 443 | O |
| | | North Norfolk Coast | 35 | UK | SPA, RAMSAR, SSSI | 460 | 412 | - | 195 | O | 209 | O | 124 | O |
| | | Poole Harbour | 31 | UK | SPA, RAMSAR, SSSI | 155 | 168 | - | 436 | O | 436 | O | 384 | O |
| | | Solent and Southampton Water | 32 | UK | SPA, RAMSAR, SSSI | 267 | 35 | - | 409 | O | 410 | O | 352 | O |
| | | Stroma | - | UK | SSSI | - | - | - | 473 | O | 461 | O | 507 | O |
| | | The Wash | 39 | UK | SPA, RAMSAR, SSSI | 152 | 64 | - | 181 | O | 190 | O | 106 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ythan Estuary, Sands of Forvie and Meikle Loch | 40 | UK | SPA, RAMSAR, SSSI | 265 | 31 | - | 306 | O | 292 | O | 343 | O |
| | | Angelholms kronopark | - | Sweden | SPA | <5 | - | - | 740 | O | 730 | O | 722 | O |
| | | Balgo | - | Sweden | SPA | - | - | - | 718 | O | 705 | O | 702 | O |
| | | Galtaback-Lynga strandanger | - | Sweden | SPA | 14 | - | - | 726 | O | 714 | O | 710 | O |
| | | Galto lera-Alga lera | - | Sweden | SPA | - | - | - | 745 | O | 729 | O | 734 | O |
| | | Getterons fagelreservat | - | Sweden | SPA | 22 | - | - | 724 | O | 711 | O | 708 | O |
| | | Hallands Vadero | - | Sweden | SPA | 15-20 | - | - | 726 | O | 716 | O | 709 | O |
| | | Haron | - | Sweden | SPA | - | - | - | 716 | O | 701 | O | 702 | O |
| | | Koster | - | Sweden | SPA | - | - | - | 738 | O | 721 | O | 727 | O |
| | | Kungsbackfjorden | - | Sweden | SPA | - | - | - | 714 | O | 701 | O | 699 | O |
| | | Lommaomradet | - | Sweden | SPA | 0-2 | - | - | 748 | O | 740 | O | 730 | O |
| | | Lundakrabuten | - | Sweden | SPA | 5-10 | - | - | 737 | O | 729 | O | 719 | O |
| | | Nidingen | - | Sweden | SPA | - | - | - | 709 | O | 696 | O | 694 | O |
| | | Nordre als estuarium | - | Sweden | SPA | - | - | - | 715 | O | 701 | O | 701 | O |
| | | Pater Noster-skargarden | - | Sweden | SPA | - | - | - | 709 | O | 694 | O | 233 | O |
| | | Salofjorden | - | Sweden | SPA | - | - | - | 711 | O | 696 | O | 697 | O |
| | | Tanumskusten | - | Sweden | SPA | - | - | - | 733 | O | 716 | O | 721 | O |
| | | Tylon | - | Sweden | SPA | - | - | - | 740 | O | 730 | O | 724 | O |

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| | | Ven | - | Sweden | SPA | 5 | - | - | 727 | O | 719 | O | 709 | O |
| | | Vrangoskargarden | - | Sweden | SPA | - | - | - | 707 | O | 693 | O | 693 | O |
| | | Eemeer & Gooimeer Zuidover | - | Netherlands | SPA | 570 | - | - | 382 | O | 395 | O | 378 | O |
| | | Grevelingen | - | Netherlands | SPA, RAMSAR | 420 | - | - | 382 | O | 400 | O | 356 | O |
| | | Haringvliet | - | Netherlands | SPA | 2,300 | - | - | 374 | O | 391 | O | 351 | O |
| | | Ijsselmeer | - | Netherlands | SPA, RAMSAR | 2,100 | - | - | 325 | O | 337 | O | 302 | O |
| | | Ilperveld, Varkensland en Twiske | - | Netherlands | SPA | 180 | - | - | 354 | O | 368 | O | 350 | O |
| | | Krammer-Volkerak | - | Netherlands | SPA, RAMSAR | 220 | - | - | 401 | O | 418 | O | 377 | O |
| | | Markemeer & Ijmeer | - | Netherlands | SPA, RAMSAR | 630 | - | - | 281 | O | 301 | O | 219 | O |
| | | Oosterschelde | - | Netherlands | SPA, RAMSAR | 820 | - | - | 389 | O | 407 | O | 359 | O |
| | | Waddenzee | - | Netherlands | SPA, RAMSAR | 5,300 | - | - | 295 | O | 305 | O | 271 | O |
| | | Westerschelde & Saeftinghe | - | Netherlands | SPA, RAMSAR | 1,600 | - | - | 398 | O | 417 | O | 362 | O |
| | | Zoommeer | - | Netherlands | SPA | 4 | - | - | 419 | O | 436 | O | 392 | O |
| | | Hamburgisches Wattenmeer | - | Germany | SPA, RAMSAR | 500 | - | - | 458 | O | 458 | O | 436 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 2,696 | - | - | 356 | O | 360 | O | 332 | O |
| | | Ostfriesische Meere | - | Germany | SPA | 2 | - | - | 415 | O | 419 | O | 392 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 2,902 | - | - | 424 | O | 420 | O | 405 | O |
| | | Rheiderland | - | Germany | SPA | 1 | - | - | 424 | O | 429 | O | 401 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 100 | - | - | 421 | O | 420 | O | 401 | O |
| | | Untereider | - | Germany | SPA | 3 | - | - | 489 | O | 487 | O | 468 | O |
| | | Baie de Morlaix | - | France | SPA | 75 | - | - | 672 | O | 672 | O | 628 | O |
| | | Basses Vallees du Contentin et Baie des Veys | - | France | SPA | 0 – 1 | - | - | 563 | O | 563 | O | 501 | O |
| | | Chausay | - | France | SPA | 48 | - | - | 623 | O | 624 | O | 564 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 5 – 10 | - | - | 639 | O | 639 | O | 592 | O |
| | | Iles de la Colombiere, de la Nelliere et des Haches | - | France | SPA | 100 – 120 | - | - | 668 | O | 668 | O | 612 | O |
| | | Ilot du Trevors | - | France | SPA | 0 – 10 | - | - | 714 | O | 714 | O | 676 | O |
| | | Ilots Notre-Dame et Chevret | - | France | SPA | 100 | - | - | 672 | O | 673 | O | 615 | O |
| | | Marais Audomarois | - | France | SPA | 0 – 1 | - | - | 459 | O | 479 | O | 395 | O |
| | | Ouessant-Molene | - | France | SPA | 110 – 130 | - | - | 726 | O | 726 | O | 688 | O |
| | | Platier d'Oye | - | France | SPA | 0 – 2 | - | - | 432 | O | 451 | O | 366 | O |

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| | | Tregor Goelo | - | France | SPA | 150 – 260 | - | - | 639 | O | 639 | O | 592 | O |
| | | Agger Tange | - | Denmark | SPA | 40 | - | - | 479 | O | 465 | O | 464 | O |
| | | Harboore Tange, Plet Enge og Gjeller So | - | Denmark | SPA, RAMSAR | - | - | - | 471 | O | 458 | O | 457 | O |
| | | Hirsholmene | - | Denmark | SPA | 25 – 50 | - | - | 639 | O | 625 | O | 625 | O |
| | | Kysing Fjorde | - | Denmark | SPA | 0 - 6 | - | - | 575 | O | 565 | O | 557 | O |
| | | Laeso, sydlige del | - | Denmark | SPA | 200 | - | - | 641 | O | 628 | O | 626 | O |
| | | Mando | - | Denmark | SPA | 25 - 143 | - | - | 462 | O | 456 | O | 444 | O |
| | | Nissum Fjord | - | Denmark | SPA, RAMSAR | 50 | - | - | 458 | O | 446 | O | 442 | O |
| | | Nordre Ronner | - | Denmark | SPA | 20 | - | - | 655 | O | 641 | O | 640 | O |
| | | Ostlige Vejler | - | Denmark | SPA | 0 – 40 | - | - | 538 | O | 524 | O | 523 | O |
| | | Oveso | - | Denmark | SPA | 1 – 3 | - | - | 495 | O | 481 | O | 480 | O |
| | | Randers og Mariager Fjorde og Alborg Bugt, sydlige del | - | Denmark | SPA | 10 | - | - | 588 | O | 576 | O | 572 | O |
| | | Ringkobing Fjord | - | Denmark | SPA, RAMSAR | 2-12 | - | - | 446 | O | 437 | O | 429 | O |
| | | Romo | - | Denmark | SPA | 40 – 50 | - | - | 457 | O | 452 | O | 438 | O |
| | | Skallingen og Langli | - | Denmark | SPA | - | - | - | 440 | O | 432 | O | 422 | O |
| | | Vadehavet | - | Denmark | SPA, RAMSAR | 25 - 35 | - | - | 431 | O | 423 | O | 413 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Vestlige Vejler, Arup Holm og Hovsor Ron | - | Denmark | SPA | 1 – 31 | - | - | 525 | O | 512 | O | 511 | O |
| | | Vidan, Tondermarksen og Saltvandssoen | - | Denmark | SPA | 1 - 125 | - | - | 469 | O | 464 | O | 450 | O |
| | | Het Zwin | - | Belgium | SPA | 370 | - | - | 412 | O | 431 | O | 374 | O |
| | | Kustbroedvogels te Zeebrugge-Heist | - | Belgium | SPA | 3 052 | - | - | 410 | O | 429 | O | 368 | O |
| | | SBZ / ZPS 3 | - | Belgium | SPA | - | - | - | 406 | O | 425 | O | 363 | O |
| **Sandwich tern *Sterna sandvicensis*** | **49** | Alde-Ore Estuary | 29 | UK | SPA, RAMSAR, SSSI | 169 | 4 | - | 298 | O | 317 | O | 235 | O |
| | | Chichester and Langstone Harbours | 43 | UK | SPA, RAMSAR, SSSI | 158 | 88 | - | 418 | O | 419 | O | 355 | O |
| | | Coquet Island | 30 | UK | SPA, SSSI | 1,590 | 1,725 | - | 87 | O | 82 | O | 168 | O |
| | | Dungeness | - | UK | SSSI | - | - | - | 420 | O | 425 | O | 346 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 2,070 | 1,442 | - | 119 | O | 113 | O | 191 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 440 | 300 | - | 182 | O | 178 | O | 271 | O |
| | | Foulness | 38 | UK | SPA, RAMSAR, SSSI | 320 | 0 | - | 347 | O | 357 | O | 274 | O |
| | | Loch of Strathbeg | 44 | UK | SPA, RAMSAR, SSSI | 280 | 0 | - | 337 | O | 321 | O | 366 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | North Norfolk Coast | 35 | UK | SPA, RAMSAR, SSSI | 3 457 | 4,275 | - | 195 | O | 209 | O | 124 | O |
| | | Solent and Southampton Water | 32 | UK | SPA, RAMSAR, SSSI | 231 | 49 | - | 409 | O | 410 | O | 352 | O |
| | | Stroma | - | UK | SSSI | - | - | - | 473 | O | 461 | O | 507 | O |
| | | Ythan Estuary, Sands of Forvie and Meikle Loch | 40 | UK | SPA, RAMSAR, SSSI | 1,125 | 524 | - | 306 | O | 292 | O | 343 | O |
| | | Bjarekusten | - | Sweden | SPA | - | - | - | 731 | O | 721 | O | 714 | O |
| | | Kungsbackafjorden | - | Sweden | SPA | - | - | - | 714 | O | 701 | O | 699 | O |
| | | Lundakrabukten | - | Sweden | SPA | 0-1 | - | - | 737 | O | 729 | O | 719 | O |
| | | Sejro Bugt og Nekselo | - | Sweden | SPA | 45 | - | - | 628 | O | 620 | O | 610 | O |
| | | Skalderviken | - | Sweden | SPA | 0-1 | - | - | 731 | O | 722 | O | 714 | O |
| | | Ven | - | Sweden | SPA | - | - | - | 727 | O | 719 | O | 709 | O |
| | | Grevelingen | - | Netherlands | SPA, RAMSAR | 3,200 | - | - | 382 | O | 400 | O | 356 | O |
| | | Haringvliet | - | Netherlands | SPA | - | - | - | 374 | O | 391 | O | 351 | O |
| | | Oosterschelde | - | Netherlands | SPA, RAMSAR | - | - | - | 389 | O | 407 | O | 359 | O |
| | | Waddenzee | - | Netherlands | SPA, RAMSAR | 14,000 | - | - | 295 | O | 305 | O | 271 | O |

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| | | Westerschelde & Saeftinghe | - | Netherlands | SPA, RAMSAR | 3 000 | - | - | 398 | O | 417 | O | 362 | O |
| | | Hamburgisches Wattenmeer | - | Germany | SPA, RAMSAR | 300 | - | - | 458 | O | 458 | O | 436 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 3,185 | - | - | 356 | O | 360 | O | 332 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 5,423 | - | - | 424 | O | 420 | O | 405 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 150 | - | - | 421 | O | 420 | O | 401 | O |
| | | Baie de Morlaix | - | France | SPA | 920 | - | - | 672 | O | 672 | O | 628 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | - | - | - | 639 | O | 639 | O | 592 | O |
| | | Iles de la Colombiere, de la Nelliere et des Haches | - | France | SPA | 60 | - | - | 668 | O | 668 | O | 612 | O |
| | | Ilot du Trevors | - | France | SPA | 0 – 10 | - | - | 714 | O | 714 | O | 676 | O |
| | | Platier d'Oye | - | France | SPA | 370-750 | - | - | 432 | O | 451 | O | 366 | O |
| | | Tregor Goelo | - | France | SPA | 0 – 20 | - | - | 639 | O | 639 | O | 592 | O |
| | | Agger Tange | - | Denmark | SPA | 150 – 300 | - | - | 479 | O | 465 | O | 464 | O |
| | | Hirsholmene | - | Denmark | SPA | 1,400 | - | - | 639 | O | 625 | O | 625 | O |
| | | Horsens Fjord og Endelave | - | Denmark | SPA | 300 | - | - | 558 | O | 549 | O | 540 | O |
| | | Laeso, sydlige del | - | Denmark | SPA | 0 - 300 | - | - | 641 | O | 628 | O | 626 | O |

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| | | Nissum Fjord | - | Denmark | SPA, RAMSAR | 1,650 | - | - | 458 | O | 446 | O | 442 | O |
| | | Nordre Ronner | - | Denmark | SPA | 100 | - | - | 655 | O | 641 | O | 640 | O |
| | | Ringkobing Fjord | - | Denmark | SPA, RAMSAR | 900 | - | - | 446 | O | 437 | O | 429 | O |
| | | Romo | - | Denmark | SPA | - | - | - | 457 | O | 452 | O | 438 | O |
| | | Skallingen og Langli | - | Denmark | SPA | 0 – 1529 | - | - | 440 | O | 432 | O | 422 | O |
| | | Stavns Fjord | - | Denmark | SPA | 0 – 65 | - | - | 598 | O | 589 | O | 580 | O |
| | | Vadehavet | - | Denmark | SPA, RAMSAR | - | - | - | 431 | O | 423 | O | 413 | O |
| | | Kustbroedvogels te Zeebrugge-Heist | - | Belgium | SPA | 4,067 | - | - | 410 | O | 429 | O | 368 | O |
| | | SBZ 1 /ZPS 1 | - | Belgium | SPA, RAMSAR | - | - | - | 415 | O | 435 | O | 359 | O |
| | | SBZ 2 /ZPS 2 | - | Belgium | SPA, RAMSAR | - | - | - | 404 | O | 424 | O | 355 | O |
| | | SBZ 3 / ZPS 3 | - | Belgium | SPA | - | - | - | 406 | O | 425 | O | 363 | O |
| | | Vlaamse Banken | - | Belgium | SPA, RAMSAR | - | - | - | 399 | O | 427 | O | 347 | O |
| | | Vlakte van de Raan | - | Belgium | SPA | - | - | - | 389 | O | 409 | O | 352 | O |
| **Little tern *Sternula albifrons*** | **6** | Alde-Ore Estuary | 29 | UK | SPA, RAMSAR, SSSI | 48 | 82 | - | 298 | O | 317 | O | 235 | O |
| | | Benacre to Easton Bavents | 53 | UK | SPA, SSSI | 53 | 0 | - | 275 | O | 296 | O | 216 | O |

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| | | Blackwater Estuary | 48 | UK | SPA, RAMSAR, SSSI | 36 | 88 | - | 328 | O | 338 | O | 256 | O |
| | | Chesil Beach and the Fleet | 45 | UK | SPA, RAMSAR, SSSI | 55 | 56 | - | 449 | O | 450 | O | 406 | O |
| | | Chichester and Langstone Harbours | 43 | UK | SPA, RAMSAR, SSSI | 100 | 130 | - | 418 | O | 419 | O | 355 | O |
| | | Colne Estuary | 49 | UK | SPA, RAMSAR, SSSI | 38 | 20 | - | 324 | O | 335 | O | 252 | O |
| | | Dungeness to Pett Level | 34 | UK | SPA, RAMSAR, SSSI | 35 | 11 | - | 420 | O | 425 | O | 346 | O |
| | | Firth of Tay and Eden Estuary | 59 | UK | SPA | 25 | 0 | - | 224 | O | 220 | O | 299 | O |
| | | Foulness | 38 | UK | SPA, RAMSAR, SSSI | 24 | 18 | - | 347 | O | 357 | O | 274 | O |
| | | Gibraltar Point | 54 | UK | SPA, RAMSAR, SSSI | 23 | 32 | - | 178 | O | 188 | O | 104 | O |
| | | Great Yarmouth-North Denes | 52 | UK | SPA, SSSI | 220 | 285 | - | 249 | O | 271 | O | 194 | O |
| | | Hamford Water | 50 | UK | SPA, RAMSAR, SSSI | 55 | 105 | - | 320 | O | 336 | O | 251 | O |

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| | | Humber Flats, Marshes and Coast | 55 | UK | SPA, RAMSAR, SSSI | 63 | 63 | - | 104 | O | 108 | O | 38 | O |
| | | Lindisfarne | 58 | UK | SPA, RAMSAR, SSSI | 38 | 0 | - | 121 | O | 116 | O | 198 | O |
| | | Medway Estuary and Marshes | 47 | UK | SPA, RAMSAR, SSSI | 28 | 14 | - | 364 | O | 369 | O | 290 | O |
| | | Minsmere-Walberswick | 51 | UK | SPA, RAMSAR, SSSI | 28 | 47 | - | 281 | O | 301 | O | 219 | O |
| | | North Norfolk Coast | 35 | UK | SPA, RAMSAR, SSSI | 377 | 287 | - | 195 | O | 209 | O | 124 | O |
| | | Northumbria Coast | 57 | UK | SPA, RAMSAR, SSSI | 40 | 13 | - | 20 | O | 18 | O | 103 | O |
| | | Pagham Harbour | 46 | UK | SPA, RAMSAR, SSSI | 12 | - | - | 424 | O | 425 | O | 360 | O |
| | | Solent and Southampton Water | 32 | UK | SPA, RAMSAR, SSSI | 49 | 4 | - | 409 | O | 410 | O | 352 | O |
| | | Teesmouth and Cleveland Coast | 56 | UK | SPA, RAMSAR, SSSI | 37 | 1 | - | 2 | I | 0 | I | 85 | O |

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| | | Thanet Coast | - | UK | SSSI | - | 4 | - | 380 | O | 399 | O | 310 | O |
| | | The Lagoons | - | UK | SSSI | - | 49 | - | 119 | O | 131 | O | 45 | O |
| | | The Wash | 39 | UK | SPA, RAMSAR, SSSI | 33 | 4 | - | 181 | O | 190 | O | 106 | O |
| | | Ythan Estuary, Sands of Forvie and Meikle Loch | 40 | UK | SPA, RAMSAR, SSSI | 41 | 58 | - | 306 | O | 292 | O | 343 | O |
| | | Balgo | - | Sweden | SPA | 0-5 | - | - | 718 | O | 705 | O | 702 | O |
| | | Batafjorden | - | Sweden | SPA | - | - | - | 721 | O | 709 | O | 706 | O |
| | | Falsterbo-Foteviken | - | Sweden | SPA | 50-70 | - | - | 722 | O | 714 | O | 703 | O |
| | | Galtaback-Lynga strandanger | - | Sweden | SPA | 23 | - | - | 726 | O | 714 | O | 710 | O |
| | | Gamla Kopstad | - | Sweden | SPA | 2 | - | - | 723 | O | 711 | O | 707 | O |
| | | Getterons fagelreservat | - | Sweden | SPA | 2 | - | - | 724 | O | 711 | O | 708 | O |
| | | Grimsholmen | - | Sweden | SPA | - | - | - | 735 | O | 724 | O | 719 | O |
| | | Loddeans mynning | - | Sweden | SPA | 40,940 | - | - | 743 | O | 735 | O | 725 | O |
| | | Lommaomradet | - | Sweden | SPA | 0-5 | - | - | 748 | O | 740 | O | 730 | O |
| | | Lundakrabukten | - | Sweden | SPA | 41,187 | - | - | 737 | O | 729 | O | 719 | O |
| | | Morups Tange | - | Sweden | SPA | 2 | - | - | 726 | O | 714 | O | 710 | O |
| | | Skalderviken | - | Sweden | SPA | 1 | - | - | 731 | O | 722 | O | 714 | O |
| | | Duinen en Lage Land Texel | - | Netherlands | SPA | 28 | - | - | 301 | O | 310 | O | 274 | O |

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| | | Duinen Terschelling | - | Netherlands | SPA | 8 | - | - | 297 | O | 308 | O | 278 | O |
| | | Grevelingen | - | Netherlands | SPA, RAMSAR | 28 | - | - | 382 | O | 400 | O | 356 | O |
| | | Haringvliet | - | Netherlands | SPA | 110 | - | - | 374 | O | 391 | O | 351 | O |
| | | Krammer-Volkerak | - | Netherlands | SPA, RAMSAR | 3 | - | - | 401 | O | 418 | O | 377 | O |
| | | Nordzeekustzome | - | Netherlands | SPA, RAMSAR | 1 | - | - | 288 | O | 298 | O | 264 | O |
| | | Oosterschelde | - | Netherlands | SPA, RAMSAR | 36 | - | - | 389 | O | 407 | O | 359 | O |
| | | Waddenzee | - | Netherlands | SPA, RAMSAR | 160 | - | - | 295 | O | 305 | O | 271 | O |
| | | Westerschelde & Saeftinghe | - | Netherlands | SPA, RAMSAR | 110 | - | - | 398 | O | 417 | O | 362 | O |
| | | Hamburgisches Wattenmeer | - | Germany | SPA, RAMSAR | 12 | - | - | 458 | O | 458 | O | 436 | O |
| | | Niedersachsiches Wattenmeer un andrezendes Kustenmeer | - | Germany | SPA | 163 | - | - | 356 | O | 360 | O | 332 | O |
| | | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 383 | - | - | 424 | O | 420 | O | 405 | O |
| | | Bancs des Flandres | - | France | SPA | 350 | - | - | 399 | O | 418 | O | 334 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | - | - | - | 639 | O | 639 | O | 592 | O |

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| | | Ouessant-Molene | - | France | SPA | 25 – 30 | - | - | 726 | O | 726 | O | 688 | O |
| | | Platier d'Oye | - | France | SPA | 0 – 4 | - | - | 432 | O | 451 | O | 366 | O |
| | | Tregor Goelo | - | France | SPA | 33 | - | - | 639 | O | 639 | O | 592 | O |
| | | Agger Tange | - | Denmark | SPA | 22 | - | - | 479 | O | 465 | O | 464 | O |
| | | Fano | - | Denmark | SPA | 20 – 30 | - | - | 451 | O | 443 | O | 432 | O |
| | | Glomstrup Vig, Agero, Munkholm og Katholm Odde, Lindholm og Rotholme | - | Denmark | SPA | 1 | - | - | 487 | O | 474 | O | 472 | O |
| | | Harboore Tange, Plet Enge og Gjeller So | - | Denmark | SPA, RAMSAR | - | - | - | 471 | O | 458 | O | 457 | O |
| | | Horsens Fjord og Endelave | - | Denmark | SPA | - | - | - | 558 | O | 549 | O | 540 | O |
| | | Laeso, sydlige del | - | Denmark | SPA | 0 – 300 | - | - | 641 | O | 628 | O | 626 | O |
| | | Logstor Bredning, Livo, Feggesund og Skarrehage | - | Denmark | SPA | 7 | - | - | 523 | O | 509 | O | 509 | O |
| | | Magerodde og Karby Odde | - | Denmark | SPA | - | - | - | 496 | O | 482 | O | 481 | O |
| | | Mando | - | Denmark | SPA | - | - | - | 462 | O | 456 | O | 444 | O |
| | | Nissum Fjord | - | Denmark | SPA, RAMSAR | 40 – 50 | - | - | 458 | O | 446 | O | 442 | O |
| | | Randers og Mariager Fjorde og Alborg Bugt, sydlige del | - | Denmark | SPA | 4 | - | - | 588 | O | 576 | O | 572 | O |
| | | Romo | - | Denmark | SPA | 8 – 12 | - | - | 457 | O | 452 | O | 438 | O |

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| | | Skallingen og Langli | - | Denmark | SPA | 10 – 15 | - | - | 440 | O | 432 | O | 422 | O |
| | | Stavns Fjord | - | Denmark | SPA | - | - | - | 598 | O | 589 | O | 580 | O |
| | | Vadehavet | - | Denmark | SPA, RAMSAR | 5 – 20 | - | - | 431 | O | 423 | O | 413 | O |
| | | Veno, Veno Sund | - | Denmark | SPA | 0 - 2 | - | - | 492 | O | 479 | O | 476 | O |
| | | Vestlige Vejler, Arup Holm og Hovsor Ron | - | Denmark | SPA | - | - | - | 525 | O | 512 | O | 511 | O |
| | | Vidan, Tondermarksen og Saltvandssoen | - | Denmark | SPA | - | - | - | 469 | O | 464 | O | 450 | O |
| | | Het Zwin | - | Belgium | SPA | 10 | - | - | 412 | O | 431 | O | 374 | O |
| | | Kustbroedvogels te Zeebrugge-Heist | - | Belgium | SPA | 425 | - | - | 410 | O | 429 | O | 368 | O |
| | | SBZ / ZPS 3 | - | Belgium | SPA | - | - | - | 406 | O | 425 | O | 363 | O |
| | | Vlaamse Banken | - | Belgium | SPA, RAMSAR | - | - | - | 399 | O | 427 | O | 347 | O |
| **Roseate tern** ***Sterna dougalli*** | **17** | Coquet Island | 30 | UK | SPA, SSSI | 31 | - | - | 87 | O | 82 | O | 168 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 3 | - | - | 119 | O | 113 | O | 191 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 8 | - | - | 182 | O | 178 | O | 271 | O |
| | | North Norfolk Coast | 35 | UK | SPA, RAMSAR, SSSI | 2 | - | - | 195 | O | 209 | O | 124 | O |
| | | Solent and Southampton Water | 32 | UK | SPA, RAMSAR, SSSI | 2 | - | - | 409 | O | 410 | O | 352 | O |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Baie de Morlaix | - | France | SPA | 70 | - | - | 672 | O | 672 | O | 628 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | - | - | - | 639 | O | 639 | O | 592 | O |
| | | Iles de la Colombiere, de la Nelliere et des Haches | - | France | SPA | 100 – 120 | - | - | 668 | O | 668 | O | 612 | O |
| | | Ilot du Trevors | - | France | SPA | 0-10 | - | - | 714 | O | 714 | O | 676 | O |
| | | Ilots Notre-Dame et Chevret | - | France | SPA | 1 | - | - | 672 | O | 673 | O | 615 | O |
| | | Ouessant-Molene | - | France | SPA | - | - | - | 726 | O | 726 | O | 688 | O |
| | | Het Zwin | - | Belgium | SPA | 1 | - | - | 412 | O | 431 | O | 374 | O |
| **Gull-billed tern *Gelochelidon nilotica*** | **-** | Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | - | Germany | SPA, RAMSAR | 53 | - | - | 424 | O | 420 | O | 405 | O |
| | | Fano | - | Denmark | SPA | 0 – 2 | - | - | 451 | O | 443 | O | 432 | O |
| | | Mando | - | Denmark | SPA | 0 – 6 | - | - | 462 | O | 456 | O | 444 | O |
| | | Romo | - | Denmark | SPA | 0 – 8 | - | - | 457 | O | 452 | O | 438 | O |
| | | Skallingen og Langli | - | Denmark | SPA | - | - | - | 440 | O | 432 | O | 422 | O |
| | | Vadehavet | - | Denmark | SPA, RAMSAR | 0 – 2 | - | - | 431 | O | 423 | O | 413 | O |
| **Common guillemot *Uria aalge*** | **340** | Buchan Ness to Collieston Coast | 10 | UK | SPA, SSSI | 8,640 | 19,691 | 13,975 | 310 | I | 296 | I | 345 | O |
| | | Calf of Eday | 15 | UK | SPA, SSSI | 8,472 | 1,715 | 932 | 522 | O | 504 | O | 543 | O |
| | | Cape Wrath | - | UK | SPA | 9,179 | 27,359 | 14,862 | 501 | O | 496 | O | 561 | O |

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| | | Copinsay | 13 | UK | SPA, SSSI | 19,732 | 12,512 | 9,166 | 485 | O | 468 | O | 509 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 71,489 | 105,552 | 57,337 | 421 | O | 413 | O | 473 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 21,641 | 26,302 | 13,066 | 536 | O | 515 | O | 545 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | 23,499 | 20,986 | 32,145 | 119 | I | 113 | I | 191 | I |
| | | Forth Islands | 7 | UK | SPA, SSSI | 16,000 | 24,112 | 14,585 | 182 | I | 178 | I | 271 | I |
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | 16,150 | 31,238 | 41,607[#] | 57 | I | 71 | I | 6 | I |
| | | Foula | 1 | UK | SPA, SSSI | 25,125 | 27,805 | 15,104 | 607 | O | 586 | O | 616 | O |
| | | Fowlsheugh | 8 | UK | SPA, SSSI | 37,822 | 41,761 | 33,873 | 264 | I | 254 | I | 314 | I |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 16,750 | 9,233 | 5,016 | 663 | O | 641 | O | 666 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 13,400 | 16,310 | 8,860 | 482 | O | 470 | O | 517 | O |
| | | Marwick Head | 36 | UK | SPA, SSSI | 25,259 | 21,955 | 11,926 | 519 | O | 506 | O | 551 | O |
| | | North Caithness Cliffs | 12 | UK | SPA, SSSI | 25,661 | 26,050 | 14,151 | 458 | O | 446 | O | 493 | O |
| | | Noss | 19 | UK | SPA, SSSI | 26,110 | 30,671 | 14,784 | 597 | O | 575 | O | 601 | O |
| | | Rousay | 14 | UK | SPA, SSSI | 7,102 | 3,783 | 2,055 | 520 | O | 505 | O | 546 | O |
| | | St Abb's Head to Fast Castle | 27 | UK | SPA, SSSI | 21,273 | 27,326 | 22,231 | 159 | I | 155 | I | 235 | I |
| | | Sule Skerry and Sule Stack | - | UK | SPA | 6,298 | 7,633 | 4,146 | 532 | O | 525 | O | 582 | O |
| | | Sumburgh Head | 18 | UK | SPA, SSSI | 10,720 | 10,269 | 3,323 | 569 | O | 548 | O | 575 | O |
| | | Troup, Pennan and Lions Heads | 9 | UK | SPA, SSSI | 29,882 | 30,320 | 10,938 | 349 | O | 335 | I | 383 | O |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | West Westray | 16 | UK | SPA, SSSI | 28,240 | 14,982 | 8,139 | 531 | O | 515 | O | 556 | O |
| | | Hallands Vardero | - | Sweden | SPA | 8 | - | - | 726 | O | 716 | O | 709 | O |
| | | Rott-Hastein Kjor | - | Norway | RAMSAR | - | - | - | 518 | O | 495 | O | 514 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 2,477 | - | - | 421 | O | 420 | O | 401 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 236 – 249 | - | - | 642 | O | 643 | O | 588 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 12 | - | - | 639 | O | 639 | O | 592 | O |
| **Razorbill *Alca torda*** | **312** | Cape Wrath | - | UK | SPA | 1,206 | 2,005 | 1,645 | 501 | O | 496 | O | 561 | O |
| | | Collieston to Whinnyfold Coast | - | UK | SSSI | - | 245 | 201 | 311 | I | 296 | I | 347 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 10,586 | 11,818 | 9,695 | 421 | O | 413 | O | 473 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 2,278 | 2,411 | 915 | 536 | O | 515 | O | 545 | O |
| | | Farne Islands | 26 | UK | SPA, SSSI | - | 262 | 390 | 119 | I | 113 | I | 191 | I |
| | | Forth Islands | 7 | UK | SPA, SSSI | 1,400 | 3,104 | 2,259 | 182 | I | 178 | I | 271 | I |
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | 5,133 | 5,659 | 10,570[#] | 57 | I | 71 | I | 6 | I |
| | | Foula | 1 | UK | SPA, SSSI | 4,154 | 2,814 | 2,308 | 607 | O | 586 | O | 616 | O |
| | | Fowlsheugh | 8 | UK | SPA, SSSI | 3,886 | 4,263 | 3,103 | 264 | I | 254 | I | 314 | O |
| | | North Caithness Cliffs | 12 | UK | SPA, SSSI | 2,680 | 1,274 | 1,045 | 458 | O | 446 | O | 493 | O |
| | | St Abb's Head to Fast Castle | 27 | UK | SPA, SSSI | 1,461 | 2,191 | 1,130 | 159 | I | 155 | I | 235 | I |
| | | Troup, Pennan and Lions Heads | 9 | UK | SPA, SSSI | 3,216 | 3,237 | 2,011 | 349 | O | 335 | O | 383 | O |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | West Westray | 16 | UK | SPA, SSSI | 1,304 | 784 | 643 | 531 | O | 515 | O | 556 | O |
| | | Seevogelschutzgebiet Helgoland | - | Germany | SPA | 16 | - | - | 421 | O | 420 | O | 401 | O |
| | | Cap d'Erquy – Cap Frehel | - | France | SPA | 10 | - | - | 642 | O | 643 | O | 588 | O |
| | | Chausay | - | France | SPA | 11 – 17 | - | - | 623 | O | 624 | O | 564 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 19 - 23 | - | - | 639 | O | 639 | O | 592 | O |
| | | Ouessant-Molene | - | France | SPA | 4 | - | - | 726 | O | 726 | O | 688 | O |
| **Atlantic puffin *Fratercula Arctica*** | **105** | Cape Wrath | - | UK | SPA | 5,900 | 1,602 | 936 | 501 | O | 496 | O | 561 | O |
| | | Coquet Island | 30 | UK | SPA, SSSI | 11,400 | 17,208 | 15,812 | 87 | I | 82 | I | 168 | O |
| | | East Caithness Cliffs | 11 | UK | SPA, SSSI | 1,750 | 268 | 156 | 421 | O | 413 | O | 473 | O |
| | | Fair Isle | 17 | UK | SPA, SSSI | 23,000 | 54,000 | 7,278 | 536 | O | 515 | O | 545 | O |
| | | Farne Islands | 26 | UK | SPA | 34,710 | 55,367 | 36,835 | 119 | O | 113 | O | 191 | O |
| | | Forth Islands | 7 | UK | SPA, SSSI | 14,000 | 69,715 | 62,678 | 182 | O | 178 | O | 271 | O |
| | | Flamborough Head and Bempton Cliffs | 24 | UK | SPA, SSSI | 3,743 | 2,613 | 490[#] | 57 | I | 71 | I | 6 | I |
| | | Foula | 1 | UK | SPA, SSSI | 48,000 | 22,500 | 13,142 | 607 | O | 586 | O | 616 | O |
| | | Hermaness, Saxa Vord and Valla Field | 2 | UK | SPA, SSSI | 55,000 | 26,923 | 15,726 | 663 | O | 641 | O | 666 | O |
| | | Hoy | 3 | UK | SPA, SSSI | 3,500 | 413 | 241 | 482 | O | 470 | O | 517 | O |
| | | North Caithness Cliffs | 12 | UK | SPA, SSSI | 1,750 | 5,848 | 3,416 | 458 | O | 446 | O | 493 | O |
| | | Noss | 19 | UK | SPA, SSSI | 2,348 | 1,892 | 802 | 597 | O | 575 | O | 601 | O |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sule Skerry and Sule Stack | - | UK | SPA | 46,900 | 59,471 | 34,737 | 532 | O | 525 | O | 582 | O |
| | | Rott-Hastein Kjor | - | Norway | RAMSAR | - | - | - | 518 | O | 495 | O | 514 | O |
| | | Baie de Morlaix | - | France | SPA | 3 | - | - | 672 | O | 672 | O | 628 | O |
| | | Cote de Granit Rose-Sept Iles | - | France | SPA | 150 – 210 | - | - | 639 | O | 639 | O | 592 | O |
| | | Ouessant-Molene | - | France | SPA | 4 | - | - | 726 | O | 726 | O | 688 | O |

*The above UK SPAs comprise the following SSSIs: [1]Foula, [2]Hermaness and Saxa Vord, [3]Hoy, [4]Orkney & Stenness Hills, West Mainland Moorlands, Keelylang Hill & Swartabeck Burn, Glinns Moss & Durkadale, [5]Ronas Hill – North Roe, Tingon, Papa Stour, [6]NA, [7]Bass Rock, Forth Islands, Inchmickery, Isle of May, [8]Fowlsheugh, [9]Gamrie & Pennan Coast, [10]Collieston to Whinnyfold Coast, Bullers of Buchan, [11]Berriedale Cliffs, Castle of Old Wick to Craig Hammel, Craig Hammel to Sgaps Geo, Dunbeath to Sgaps Geo, [12]Duncansby Head, Dunnet Head, Holborn Head, Red Point Coast, Stroma, [13]Copinsay, [14]Rousay, [15]Calf of Eday, [16]West Westray, [17]Fair Isle, [18]Sumburgh Head,[19]Noss, [20]Lamb Hoga, North Fetlar, Trona Mires, [21]Auskerry, [22]Mousa, [23]Ramna Stacks and Gruney, [24]Flamborough Head, [25]Abberton Reservoir, [26]Farne Islands, [27]St. Abb's Head to Fast Castle, [28]Holm of Papa Westray, North Hill, [29]Alde-Ore Estuary, [30]Coquet Island, [31]Arne, Holton and Sandford Sands, Poole Harbour, Studland and Godlingston Heaths, the Moors, Wareham Meadows, [32]Brading Marshes to St. Helen's Ledges, Eling and Bury Marshes, Hurst Castle and Lymington River Estuary, Hythe to Calshot Marshes, King's Quay Shore, Lee-on-The-Solent to Itchen Estuary, Lincegrove and Hackett's Marshes, Lower Test Valley, Lymington River Reed Beds, Medina Estuary, Newtown Harbour, North Solent Ryde Sands and Wootton Creek, Sowley Pond, Thorness Bay, Titchfield Haven, Upper Hamble Estuary and Woods, Whitecliff Bay and Bembridge Ledges, Yar Estuary, [33]The Swale, [34]Camber Sands and Rye Saltings, Dungeness, Pett Level, Rye Harbour, [35]North Norfolk Coast, [36]Marwick Head, [37]Papa Stour, [38]Foulness, [39]The Wash, [40]Meikle Loch and Kippet Hills, Ythan Estuary and Sands of Forvie, [41]Beauly Firth, Longman & Castle Stuart Bays, Munlochy Bay, Whiteness Head, [42]Lower River Conon, Cromarty Firth, Rosemarkie to Shandwick, [43]Chichester Harbour, Langstone Harbour, [44]Loch of Strathbeg, [45]Chesil and the Fleet, [46]Pagham Harbour, [47]Medway Estuary and Marshes, [48]Blackwater Estuary, [49]Colne Estuary, [50]Hamford Water, [51]Minsmere – Walberswick Heaths and Marshes, [52]Great Yarmouth North Denes, Winterton – Horsey Dunes, [53]Benacre to Easton Bavents, [54]Gibraltar Point, [55]Humber Flats and Marshes: Barton and Barrow Clay Pits, Humber Flats and Marshes: Pyewipe and Cleethorpes Coast, Humber Flats and Marshes: Spurn Head to Saltend Flats, Humber Flats and Marshes: The Grues, Humber Flats and Marshes: Upper Humber, North Lincolnshire Coast, [56]Cowpen Marsh, Durham Coast, Redcar Rocks, Seal Sands, Seaton Dunes and Common, South Gare and Coatham Sands, Tees and Hartlepool Foreshore and Wetlands, [57]Durham Coast, Lindisfarne, Newton Links, Northumberland Shore, [58]Lindisfarne, [59]Barry Links, Eden Estuary, Inner Tay, Monifieth Bay, Tayport to Tentsmuir Coast, [60]Pentland Firth Islands.

** For northern gannet, a mean maximum foraging range was used, however, information from recent tracking studies was used to scope sites in (above the mean maximum), where direct connectivity has been demonstrated (e.g. Wakefield et al. 2013).

[#] Note, 2008-2011 (2008-2012 for northern gannet) population estimates have been used to incorporate a potential 2km seaward extension to the Flamborough Head and Bempton cliffs SPA, which is currently under consultation.

A1.9 For each of the projects and export cable corridor areas, Tables A1.3 and A1.4 detail the following species and their associated protected sites that were screened in.

**Table A1.3** Special Protection Areas and qualifying receptor species that were in foraging range of Dogger Bank Teesside A (Ta), Dogger Bank Teesside B (Tb), Dogger Bank Creyke Beck A (Ca), Dogger Bank Creyke Beck B (Cb), Dogger Bank Teesside C (Tc) and Dogger Bank Teesside D (Td).

| **Site** | **Northern fulmar** | **Northern gannet** | **Black-legged kittiwake** | **Common guillemot** | **Razorbill** |
|---|---|---|---|---|---|
| Buchan Ness to Collieston Coast, | Ta, Tb, Ca, Cb, Tc, Td | | | Cb, Tc, Td | |
| Durham Coast and Marsden Bay | | | Tb, Ca, Cb, Tc, Td | | |
| Farne Islands | | | Ca, Cb, Tc | Ta, Tb, Ca, Cb, Tc, Td | Ta, Tb, Ca, Cb, Tc, Td |
| Flamborough Head and Bempton Cliffs | Ta, Tb, Ca, Cb, Tc, Td | Ta, Tb, Ca, Cb, Tc, Td | Ta, Tb, Ca, Cb, Tc, Td | Ta, Tb, Ca, Cb, Tc, Td | Ta, Tb, Ca, Cb, Tc, Td |
| Forth Islands | Ta, Tb, Ca, Cb, Tc, Td | Cb, Tc | | Ta, Tb, Ca, Cb, Tc, Td | Tb, Ca, Cb, Tc, Td |
| Fowlsheugh | Ta, Tb, Ca, Cb, Tc, Td | | | Tb, Ca, Cb, Tc, Td | Cb, Tc |
| Hunstanton Cliffs | Ta, Tb, Ca, Cb, Tc, Td | | | | |
| North Berwick Coast | Ta, Tb, Ca, Cb, Tc, Td | | | | |
| Seevogelschutzgebiet Helgoland | Ta, Tb, Ca, Cb, Tc, Td | Ta, Tb, Ca, Cb, Tc, Td | | Ta | |
| St Abb's Head to Fast Castle | | | | Ta, Tb, Ca, Cb, Tc, Td | Ta, Tb, Ca, Cb, Tc, Td |
| Troup, Pennan and Lions Heads | Tb, Ca, Cb, Tc, Td | | | | |
| Weybourne Cliffs | Ta, Tb, Ca, Cb, Tc, Td | | | | |

**Table A1.4** Special Protection Areas and qualifying receptor species that were in foraging range of the export cable routes of Dogger Bank Teesside A and B (TaTb), Dogger Bank Creyke Beck A and B (CaCb) and Dogger Bank Teesside C and D (TcTd).

| Site | Northern fulmar | Northern gannet | European Shag | Black-legged kittiwake | Herring gull | Little tern | Common guillemot | Razorbill | Puffin |
|---|---|---|---|---|---|---|---|---|---|
| Buchan Ness to Collieston Coast, | TaTb, CaCb, TcTd | | | | | | TaTb, TcTd | | |
| Collieston to Whinnyfold Coast | | | | | | | | TaTb, TcTd | |
| Coquet Island | | | | | | | | | TaTb, TcTd |
| Dunbar Coast | | | | TaTb, TcTd | | | | | |
| Durham Coast and Marsden Bay | | | | TaTb, CaCb, TcTd | | | | | |
| Farne Islands | | | | TaTb, CaCb, TcTd | | | TaTb, CaCb, TcTd | TaTb, CaCb, TcTd | |
| Flamborough Head and Bempton Cliffs | TaTb, CaCb, TcTd | TaTb, CaCb, TcTd | CaCb | TaTb, CaCb, TcTd | TaTb, CaCb | | TaTb, CaCb, TcTd | TaTb, CaCb, TcTd | TaTb, CaCb, TcTd |
| Forth Islands | TaTb, CaCb, TcTd | TaTb, CaCb, TcTd | | TaTb, TcTd | | | TaTb, CaCb, TcTd | TaTb, CaCb, TcTd | |
| Fowlsheugh | TaTb, CaCb, TcTd | | | | | | TaTb, CaCb, TcTd | TaTb, TcTd | |
| Hunstanton Cliffs | TaTb, CaCb, TcTd | | | | | | | | |
| North Berwick Coast | TaTb, CaCb, TcTd | | | | | | | | |
| Seevogelschutzgebiet Helgoland | | TaTb, CaCb, TcTd | | | | | | | |
| St Abb's Head to Fast Castle | | | | TaTb, TcTd | | | TaTb, CaCb, TcTd | TaTb, CaCb, TcTd | |
| Teesmouth and Cleveland Coast | | | | | | TaTb, TcTd | | | |
| Troup, Pennan and Lions Heads | TaTb, CaCb, TcTd | | | | | | TcTd | | |
| Weybourne Cliffs | TaTb, CaCb, TcTd | | | | | | | | |

## APPENDIX 2 Special Protection Areas for marine birds outside the breeding season

A2.1 In addition to the protected sites at which they are breeding features (Appendix 1), a number of the marine bird species considered in this assessment are also included as winter or passage features of further Special Protection Areas in the wider Greater North Sea OSPAR Region considered in this assessment. The table below provides a summary of these.

**Table A2.1** Special Protection Areas for marine birds outside the breeding season.

| Country | SPA | Winter | Passage | Distance to Dogger Bank Creyke Beck A | Distance to Dogger Bank Creyke Beck B | Distance to Dogger Bank Teesside A | Distance to Dogger Bank Teesside B | Distance to Dogger Bank Teesside C | Distance to Dogger Bank Teesside D |
|---|---|---|---|---|---|---|---|---|---|
| **Great Britain** | Outer Thames Estuary | Red-throated Diver | | 223 | 246 | 260 | 244 | 277 | 283 |
| | Teesmouth and Cleveland Coast | | Sandwich Tern | 173 | 164 | 236 | 197 | 177 | 215 |
| **France** | Baie de Saint-Brieuc-Est | Lesser Black-backed Gull, Razorbill, Black-headed Gull, Common Gull | | 731 | 740 | 780 | 759 | 772 | 791 |
| | Baie de Seine occidentale | Herring Gull, Common Guillemot | Mediterranean Gull, Northern Gannet, Black-legged Kittiwake, Little Gull | 600 | 613 | 645 | 625 | 644 | 660 |
| | Baie du Mont St. Michel | | Common Tern, Little Tern, Sandwich Tern, Little Gull, Balearic Shearwater | 694 | 705 | 740 | 719 | 737 | 754 |
| | Bancs des Flandres | Red-throated Diver, Black-throated Diver, Common Guillemot, Razorbill, Northern Gannet, Black-legged Kittiwake, Northern Fulmar | Common Tern, Little Tern, Sandwich Tern, Black Tern, Red-throated Diver, Common Guillemot, Razorbill, Black-legged Kittiwake, Little Gull | 373 | 396 | 406 | 392 | 427 | 432 |
| | Basses Vallees du contentin et baie des veys | Common Gull | Common Tern, Little Tern, Sandwich Tern, Black Tern, Herring Gull, Northern Gannet, Common Gull | 611 | 622 | 657 | 637 | 653 | 671 |
| | Cap d'Erquy - Cap Frehel | | Northern Gannet, Balearic Shearwater | 704 | 714 | 752 | 731 | 745 | 764 |
| | Estuaires picards: Baie de Somme et d'Authie | | Common Tern, Sandwich Tern | 478 | 500 | 515 | 499 | 530 | 538 |

| Country | SPA | Winter | Passage | Distance to Dogger Bank Creyke Beck A | Distance to Dogger Bank Creyke Beck B | Distance to Dogger Bank Teesside A | Distance to Dogger Bank Teesside B | Distance to Dogger Bank Teesside C | Distance to Dogger Bank Teesside D |
|---|---|---|---|---|---|---|---|---|---|
| | Falaise du bessin occidentale | Red-throated Diver, Common Guillemot, Razorbill, Great Cormorant, European Shag | | 618 | 630 | 662 | 642 | 661 | 677 |
| | Landes et Dunes de la Hague | Mediterranean Gull, Red-throated Diver, Black-throated Diver, Great Northern Diver | Common Tern, Little Tern, Black Tern | 607 | 616 | 656 | 634 | 648 | 667 |
| | Littoral Seino-Marin | | Mediterranean Gull, Common Tern, Sandwich Tern, Arctic Tern, Red-throated Diver, Black-throated Diver, Great Northern Diver, Black-legged Kittiwake, European Storm-petrel, Leach's Storm-petrel, Arctic Skua, Great Skua, Pomarine Skua, | 510 | 530 | 549 | 532 | 560 | 570 |
| | Marais arriere-littoraux Picards | | Mediterranean Gull | 483 | 505 | 519 | 503 | 535 | 542 |
| | Marais Audomarais | | Little Tern, Sandwich Tern, Black Tern, Whiskered Tern | 432 | 454 | 465 | 451 | 486 | 490 |
| **Belgium** | Bancs des Flandres | Red-throated Diver, Black-throated Diver, Common Guillemot, Razorbill, Northern Gannet, Black-legged Kittiwake | Mediterranean Gull, Common Tern, Little Tern, Sandwich Tern, Arctic Tern, Black Tern, Northern Gannet, Black-legged Kittiwake, Little Gull, Leach's Storm-petrel, Arctic Skua, Great Skua, Pomarine Skua | 373 | 396 | 406 | 392 | 427 | 432 |
| | SBZ 1/ZPS 1 | Red-throated Diver, Black-throated Diver, Common Guillemot | Common Tern, Sandwich Tern, Little Gull | 385 | 408 | 415 | 403 | 441 | 443 |

| Country | SPA | Winter | Passage | Distance to Dogger Bank Creyke Beck A | Distance to Dogger Bank Creyke Beck B | Distance to Dogger Bank Teesside A | Distance to Dogger Bank Teesside B | Distance to Dogger Bank Teesside C | Distance to Dogger Bank Teesside D |
|---|---|---|---|---|---|---|---|---|---|
| | SBZ 2/ZPS 2 | Red-throated Diver, Black-throated Diver, Common Guillemot | Common Tern, Sandwich Tern, Little Gull | 372 | 395 | 401 | 389 | 428 | 429 |
| | SBZ 3/ZPS 3 | | Common Tern, Little Tern, Sandwich Tern, Little Gull | 372 | 395 | 396 | 387 | 428 | 428 |
| **Netherlands** | Voordelta | | Red-throated Diver | 324 | 347 | 334 | 334 | 375 | 370 |
| | Noordzeekustzone | | Red-throated Diver | 239 | 260 | 216 | 239 | 275 | 257 |
| **Germany** | S-H Wattenmeer und angrenzende Kutengebiete | Herring Gull, Common Gull | Herring Gull, Black-headed Gull, Common Gull | 367 | 390 | 311 | 349 | 374 | 340 |
| | Seevogelshutzgebiet Helgoland | Red-throated Diver, Black-throated Diver | | 363 | 387 | 313 | 348 | 376 | 344 |
| | Ostliche Deutsche Bucht | Red-throated Diver, Black-throated Diver | Lesser Black-backed Gull, Common Guillemot, Razorbill, Black-legged Kittiwake, Black-headed Gull, Common Gull, Little Gull | 322 | 342 | 262 | 302 | 324 | 290 |
| | Sylter Ausenriff | Red-throated Diver, Black-throated Diver, Great Black-backed Gull, Lesser Black-backed Gull | Common Tern, Sandwich Tern, Arctic Tern, Common Guillemot, Northern Gannet, Black-legged Kittiwake, Common Gull, Little Gull | 263 | 286 | 207 | 245 | 270 | 237 |
| | Borkrum Riffgrund | Red-throated Diver, Black-throated Diver, Great Black-backed Gull | Common Tern, Sandwich Tern, Arctic Tern, Lesser Black-backed Gull, Common Guillemot, Northern Gannet, Black-legged Kittiwake, Common Gull, Little Gull, Northern Fulmar | 266 | 290 | 224 | 256 | 289 | 261 |
| | Dogger Bank | | Lesser Black-backed Gull, Common Guillemot, Northern Gannet, Black-legged Kittiwake | 129 | 128 | 67 | 104 | 102 | 67 |

| Country | SPA | Winter | Passage | Distance to Dogger Bank Creyke Beck A | Distance to Dogger Bank Creyke Beck B | Distance to Dogger Bank Teesside A | Distance to Dogger Bank Teesside B | Distance to Dogger Bank Teesside C | Distance to Dogger Bank Teesside D |
|---|---|---|---|---|---|---|---|---|---|
| | Sydlige Nordso | Red-throated Diver, Black-throated Diver, Common Guillemot, Razorbill, Little Gull | | 307 | 321 | 243 | 284 | 300 | 265 |
| **Denmark** | Vestlige Vejler, Arup Holm og Hovsor Ron | Great Cormorant | | 480 | 484 | 414 | 455 | 456 | 422 |
| | Batafjorden | | Red-necked Phalarope | 673 | 680 | 608 | 649 | 654 | 620 |
| **Sweden** | Bjarekusten | Black-throated Diver | | 678 | 691 | 615 | 656 | 668 | 633 |
| | Falsterbo-Foteviken | Black-throated Diver | Common Tern, Little Tern, Sandwich Tern, Caspian Tern, Arctic Tern | 666 | 684 | 606 | 646 | 666 | 631 |
| | Loddeans Mynning | | Common Tern, Little Tern, Sandwich Tern, Arctic Tern, Black Tern | 689 | 705 | 627 | 668 | 685 | 650 |
| | Lommaomradet | | Caspian Tern, Black Tern | 693 | 710 | 632 | 673 | 691 | 656 |

## APPENDIX 3 Stakeholder comments and responses.

Stakeholder comments, and subsequent changes made to the Ornithological technical report, are from the Creyke Beck consultation process. Any changes made following the Dogger Bank Creyke Beck project consultation process are apporopriate for Dogger Bank Teesside projects given that the methodology used in both assessments is the same. Therefore, any discussion evolving on particular issues, involved simple updates to the Teesside A and B assessment to reflect those comments and discussions from the Creyke Beck A and B consultation.

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
|---|---|---|---|---|
| IPC | Scoping Opinion for Proposed Dogger Bank Offshore Wind Farm | Ornithology – The Commission advises that due to the proximity of several internationally designated sites to Dogger Bank together with the scale of the proposals, the potential impacts on birds should be comprehensively assessed. The Commission refers the applicant to the detailed comments from JNCC/NE regarding ornithology and advises that these comments should be addressed in the assessment or a full explanation provided as to why the recommendations were not considered appropriate. | The assessment of potential impacts to the features of designated sites has been integral to the assessment. The JNCC/NE comments are noted and responses to these provided below. | Chapters 4 to 7 |
| IPC | Scoping Opinion for Proposed Dogger Bank Offshore Wind Farm | Ornithology – The Commission agrees with the applicant that cumulative impacts should be assessed and appropriate mitigation measures identified in the ES. | Both cumulative impacts and mitigation measures are considered in the assessment. | Chapters 4, 6 |
| IPC | Scoping Opinion for Proposed Dogger Bank Offshore Wind Farm | Noise and vibration levels along the foreshore potentially affecting birds and marine mammals should be assessed. | The issue of noise is considered in the assessment of disturbance to intertidal birds. | Chapters 4, 5 |
| JNCC / NE | Scoping Opinion for Proposed Dogger Bank Offshore Wind Farm | Existing environment Offshore waters – Whilst Tranche A is well outside the foraging range of many species of relevance to coastal SPA populations during the breeding season, it may be an area of importance to these populations pre and post breeding (and not limited to the migration period as suggested). | The importance of the area to the features of designated sites is considered for all periods of the year. | Chapters 4 to 7 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
|---|---|---|---|---|
| JNCC / NE | Scoping Opinion for Proposed Dogger Bank Offshore Wind Farm | Existing environment The Crown Estate & Forewind Studies – The data from both studies suggest that auk species (guillemot and razorbill) are of key significance to this site. This emphasises the need to ensure that the current and future survey methodologies are able to calculate robust population estimates for these two species.<br>Table 6.2: We would like clarification if 'peak count' and 'monthly total' are the same? Are these raw counts?<br>Table 6.3: We would like clarification how the 'relative abundance calculated' was calculated? | Details of the methodology used to calculate population estimates have been developed over the course of the work, in consultation with stakeholders. A meeting to discuss the combined boat and aerial survey methodology was held between Forewind Ltd, the surveyors, Gardline Ltd and Hi-Def Surveying Ltd and the Joint Nature Conservation Committee (JNCC) in April 2010. As a result of this, a review of the methodology was instigated, led on by the British Trust for Ornithology (BTO). A follow-up meeting was held in November 2010 with stakeholder representation from JNCC and the Royal Society for the Protection of Birds (RSPB) to report initial results from this, covering i. A review of survey data collection protocols; ii. A review of the survey approach and whether this was sufficient to provide a robust characterisation of the populations of seabirds present in the Zone and tranche areas within this; iii. Identification of the key species for assessment and the likely effects for these species; and iv. A review of potential methodologies for assessing effects on migratory species. The report on this review, which details stakeholder discussion, was completed in April 2011 (Austin *et al.* 2011). | Chapter 2 |
| JNCC / NE | Scoping Opinion for Proposed Dogger Bank Offshore Wind Farm | Potential Impacts Disturbance and Displacement – Please note that birds may also respond to the visual cues of WTGs (as well as noise). In terms of disturbance/ displacement of prey species, we encourage a collaborative approach to this assessment, in conjunction with the work on Fish and Shellfish impacts | The effects on fish and shellfish are also considered in the assessment, especially in relation to the potential for habitat loss / changes. | Chapter 4 to 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Scoping Opinion for Proposed Dogger Bank Offshore Wind Farm | Potential Impacts Barrier effects – The barrier effect does not necessarily entail the wind farm being a 'physical obstacle' as such, instead the bird perceives the wind farm area as something to avoid. This avoidance behaviour leads to changes in flight paths, and hence potentially increased energetic requirements. It is questionable if the perception of the wind farm as a barrier would be worsened in high winds or reduced visibility. In fact flocks of waterfowl in the Kalmar Sound, Sweden (Pettersson, 2005) flew nearer to the wind farm before exhibiting avoidance behaviour in poor visibility and night time conditions, than in clear conditions, which may have resulted in less deviation from their intended flight path. However, the energetic consequences of this difference are undetermined. It is acknowledged that weather may have an influence on migration altitude, and that altitude varies considerably both within and between species. For many migrant species there is no existing data on migration altitude, particularly over the sea and as such, we require further evidence to support this assumption. | The assessment of barrier effects draws on the methodology of Maclean *et al.* (2009) which defines sensitivity based on the tolerance of the species to the increased energetic costs associated with barrier effects. It is acknowledged that there is no existing data on migration altitude for many migrant species, and thus we follow the precautionary approach outlined in Wright *et al.* (2012) on this issue. | Chapter 4 to 6 |
| JNCC / NE | Scoping Opinion for Proposed Dogger Bank Offshore Wind Farm | Potential Impacts Collision risk – Whilst body size and wing loading may be factors that contribute to estimating the sensitivity of a species to collision with turbines, other factors may also be relevant (e.g. predator vigilance, foraging technique). Furthermore, the risk of collision is a function of exposure and sensitivity; hence species may be sensitive to collision, but not exposed to this risk doe to avoidance of the wind farm site. | The risk of birds to collision is assessed through the consideration of avoidance rates. Results for a range of avoidance rates are presented, with a worst case scenario of 98 % avoidance taken through to the impact assessment, with the exception of Northen Gannet where 99% is considered worst case for the impact assessment as justified in section 4.3.82. The species-specific sensitivity of receptors to collision primarily reflects the tolerance of the species' populations to the mortality associated with collisions and is considered through two approaches. | Chapter 4 to 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Scoping Opinion for Proposed Dogger Bank Offshore Wind Farm | EIA process – JNCC would like to highlight that the initial survey protocol was presented to us, but it is not clear that our recommendations have been taken on board. We are encouraged that Forewind are in consultation with us (and others) regarding the survey methodologies. We acknowledge that the location of the site offers challenging conditions, and are keen to work with Forewind to ensure the surveys are fit for purpose and the data gathered is informative. It is important to recognise that the process is an iterative one, whereas data is gathered adjustments/ amendments to methodologies may be beneficial. It is also important to note that boat and aerial surveys may not be sufficient to provide information on certain ornithological issues, such as migratory/ passage species and connectivity between protected sites and Tranche A. Complimentary survey methods may be necessary to inform these issues (such as tracking, radar etc), and we would welcome early engagement with JNCC and other relevant stakeholders to work towards a suitable approach. | Details of the methodology used to calculate population estimates have been developed over the course of the work, in consultation with stakeholders (see above). Consideration of the potential connectivity between the development area and protected sites draws on recent information on the potential foraging ranges of species and specific tracking studies. | Chapters 2, 4 |
| RSPB | Geographical scope assumptions | Suggest you compare with SMP data to assess whether applying the 3x pairs or nests to derive number of individuals is appropriate for all species, thinking for example Arctic Tern which has undergone substantial decline. | The SMP approach is used to determine the breeding size of a colony when not all adult birds may be present at the time of survey. The assumption that the overall number of individuals in the population is three times the number of pairs/nests follows Stroud *et al.* (2004), Wetlands International (2006) and Kober *et al.* (2010). Nevertheless, where possible, we consider site-specific data on the numbers of adults and birds in non-adult plumage in apportioning impacts determined for the wind farm projects to protected sites. | Chapters 4 to 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| RSPB | Geographical scope assumptions | The proposed approach is acceptable and overcomes the reservations associated with how the simple matrix approach is often applied i.e. rather formulaic "tick-box" rather than using it to assist in risk assessment. Did you consider the approach proposed by Maclean *et al.* 2009, with a view to applying any of its recommendations?<br><br>Providing a measure of confidence in the site-level predictions is a useful adjunct to the assessment procedure. | The assessment methodology draws from both the guidance provided by IEEM (2006, 2010) and Maclean *et al.* (2009). The IEEM approach advocates a detailed characterisation of ecological effects and their potential impacts such that it can be clearly be determined whether or not impacts are likely to be ecologically significant and at what scale. Further marine guidance is supplied in a more recent IEEM document together with a worked example (IEEM 2010). The IEEM guidance provides a more detailed description of the effect (including its spatial extent, its timing and frequency, its duration, whether the effect would be direct or indirect, the reversibility of the impact, whether the impact is positive or negative and the confidence in predictions). Following Maclean *et al.* (2009), the guidance provided by IEEM is combined with a matrix approach to ensure that results are compatible with those throughout the Environmental Statement. We particularly draw from Maclean *et al.* (2009) in considering species-specific sensitivities (which reflect adaptability, tolerance and recoverability) | Chapter 4 |
| RSPB | Geographical scope assumptions | For reference, we have now produced kernel densities for gannets from the tracking data for Bempton. Where available, 95% kernel estimates encompass the area of active use and our preliminary analysis has indicated relatively little variation between 2010 and 2011 in these values, although the 50% and 75% kernels are larger in 2011. The progress report should be available soon; it is with DECC. We will be undertaking a third season of satellite tracking, and incorporating these data in a comparative analysis of the three years' data | This report is referenced in the consideration of the potential connectivity between the development area and protected sites. | Chapters 4, 5 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| RSPB | Geographical scope assumptions | Emerging tracking data from Bass Rock (e.g. Kubetzki *et al.* 2009, Fort *et al.* 2012) and Bempton are starting to shed light on post-breeding movements for gannet. Two particular points emerge from these studies. Firstly, there are individually different strategies which are similar for Bass and Bempton. Some individuals remain in the North Sea, some take a northward route around the north of Scotland and then south along the west coast of Ireland before continuing south, and some reach the Mediterranean and/or NW Africa. This brings them into contact/close proximity with many different proposed wind farms, raising considerations of spatial extent for assessment of cumulative effects for this receptor. Secondly, the results from tracking gannets indicate there is a difference in areas used in the early post-breeding period and into the winter. | These papers are referenced in the consideration of the potential connectivity between the development area and protected sites. | Chapters 4, 5 |
| RSPB | Geographical scope assumptions | Your proposed weighting is a pragmatic approach, unless there is other/published information, that provides a better measure, so for example see Frederiksen *et al.* (2012) analysis of data from multiple kittiwake colonies; Kubetzki *et al.* 2009 and Fort *et al.* 2012 for gannet, as mentioned above. | These papers are referenced in the consideration of the potential connectivity between the development area and protected sites. Greater confidence is given to the apportioning of impacts where published information exists. | Chapters 4, 5 |
| RSPB | Ecological scope assumptions | It would be helpful to include authorship on these reports, in particular this helps with identifying the Part 1 Burton & Thaxter 2012 report. | The geographical scope assumptions and ecological scope assumptions are provided at the end of this appendix, though it should be noted that these are draft documents and the final methodologies have been developed on the basis of the comments received. | This appendix |
| RSPB | Ecological scope assumptions | See also Petersen *et al.* 2006. Also see Pearce-Higgins *et al.* 2012 indicating greater impacts during construction which persist post-construction for several species of upland breeding bird – whilst this study applies to onshore wind farms, it presents interesting and possibly wider-reaching implications. Behavioural Displacement should also mention that boat traffic in the area will increase during operation through maintenance and repair visits. This used to amount to five visits per turbine per year (two maintenance visits and three unscheduled repair visits. I mention this in case later they suggest that birds will habituate to turbines. | Although this is an onshore reference, this point is noted. The effects of disturbance during construction are considered separately to that of disturbance / displacement during operation. | Chapter 4 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| RSPB | Ecological scope assumptions | It will be difficult to assign proportions of populations to individual SPAs | The point here related to how impacts would be related to a wider national and biogeographic context. A methodology for apportioning impacts to protected sites is also outlined. | Chapter 4 |
| RSPB | Ecological scope assumptions | Presumably, you have checked the SEA for any survey data in the area surrounding the Dogger Bank R3 zone? | The SEA provides limited further information on the bird populations in the Dogger Bank zone which is referenced in the baseline, along with other sources of information. | Chapter 2 |
| RSPB | Ecological scope assumptions | Caution re different requirements and pressures for breeding and non-breeding (migration/winter) birds. Note also that Furness & Wade (2012) have produced an updated sensitivity assessment for Marine Scotland and that, whilst the focus is primarily Scotland, this report covers more species relevant to the UK than covered by Garthe & Hüppop. | The determination of species sensitivities draws from a number of sources, including Maclean *et al.* (2009) (which itself draws from Garthe & Hüppop 2004) and Furness & Wade (2012). | Chapter 4 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| RSPB | Ecological scope assumptions | Displacement and mortality rates require justification. The information presented here does not provide quantitative justification. Where information is available to support more realistic receptor- specific values, this is likely to be more acceptable. | The rates used in the work have been re-reviewed and greater support provided for the final rates chosen. The determination of appropriate displacement rates draws from a review of the literature and recent monitoring studies (Appendix 4), assessments of species' sensitivity to disturbance and recent guidance from NE/JNCC (2012) – see review in Appendix 4 and section 4 methods. There is a lack of empirical evidence regarding the mortality consequences as a result of displacement from offshore wind farms. Consequently, the determination of mortality rates draws from assessments of species sensitivities to habitat loss, which may be viewed as a proxy for the proportion of the species' population that might be expected to die following displacement. Mortality rates for different species taken forward are scaled relative to the scores for sensitivity to habitat loss as given by Furness & Wade (2012) – see section 4 methods. Given the uncertainty in displacement and mortality rates, as proposed by NE/JNCC (2012), we also present tabulated summaries for each species of the numbers of birds estimated to be displaced that are then estimated to die based on a range of alternative displacement and mortality rates from 0 to 100%.<br><br>Following consultation on the draft Environmental Statement, a study was commissioned by Forewind to review any additional information that may be used to inform the likely mortality rate, particularly for auk species. This additional review, conducted by MacArthur Green Limited, can be found at Appendix 11B of the ES and has been utilised to determine the final mortality rates used in the assessment as outlined in section 4. | Chapter 4 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| RSPB | Ecological scope assumptions | Interesting that your take-home message from Krijgsveld *et al.* 2011 for terns differs from mine, so I went back to the report and there is some apparent contradiction. They comment that terns were regularly seen within OWEZ flying and foraging during migration (too far from breeding colonies to see breeding birds), but c60% outside wind farm. Visual observations did not indicate strong avoidance, they attribute the high % at the edge of the wind farm to the high fish resource (p176). It would be worth seeking further clarification from Bureau Waardenburg. | There is indeed some apparent contradiction in the Krijgsveld *et al.* (2011) report and clarification was sought on this issue by the BTO in the recent SOSS-02 work, and this has informed the assessment of displacement rates here. | Chapter 4 |
| RSPB | Ecological scope assumptions | I do not see the justification in the information presented in Appendix C for the quantified % displacement/attraction/mortality figures you suggest here. This is a key component of your proposed assessment methodology, so understanding your logic and agreeing the approach are fundamental. This applies to Tables 1 & 2 as well. | See above | Chapter 4 |
| RSPB | Ecological scope assumptions | Does the modelled flight height data (3.3.26, iii) take account of seasonal variation? By this I mean are there biases in the source data and hence in the modelled data that need to be addressed? | No, modelled flight height data do not directly take account of seasonality, although the SOSS-02 work suggested that flight heights did not differ with distance from the coast (and thus with distance from breeding colonies). Collision risk is assessed on a monthly basis and to produce seasonal estimates of collision mortality such impacts on protected sites can be apportioned differentially between the breeding season and other months. | Chapter 4 |
| RSPB | Ecological scope assumptions | Caution re applying higher avoidance rates (than 98%) for species/groups that show greater displacement. Collision and displacement are not mutually exclusive other than there cannot be a simultaneous risk, but there may be seasonal/age/condition variation in vulnerability to collision/displacement – see e.g. Dahl *et al.* 2012, although another onshore study (of white-tailed eagles), this study clearly indicates this point. | A 98 % avoidance rate is used as a worst case scenario for all species in the impact assessment with the exception of Northen Gannet where justification is detailed in section 4.3.82, although results for a range of avoidance rates are also presented for comparison at the start of each respective EIA sections (Tables 5.3, 5.10, 5.17, and 6.3). | Chapters 4 to 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| RSPB | Ecological scope assumptions | Keep abreast of the RUK/NERC project to develop guiding principles for cumulative impact assessment (Paul Reynolds, RUK). | This is noted, although the study in question was on-going at the time of writing https://ke.services.nerc.ac.uk/Marine/Members/Lists/MREKEP%20funded%20proposals/DispForm.aspx?ID=9).<br><br>Following the Consultation on draft Creyke Beck ES, the guiding principles have been formally released and the Forewind CIA strategy aligns with these guiding principles. | Chapter 4 |
| RSPB | Ecological scope assumptions | Displacement may have consequences for breeding productivity and survival and so the implications for population trajectory may be just as valid as for collision, albeit more subtle than the direct mortality associated with collision, especially removal of adults given that adult survival is the key parameter in several population models developed for seabirds, e.g. gannet (WWT/Macarthur Green/RPS for SOSS-04). | This is a valid point, but not one that it is possible to take into account in a quantitative manner at the present time. A recent Scottish government funded project has begun to explore the population-level consequences of displacement through impacts on the fitness (survival, fecundity) of seabirds (McDonald *et al.* 2012), available at: http://www.scotland.gov.uk/Resource/0040/00404982.pdf [last accessed 30/07/2012]. Please also note the review, conducted by MacArthur Green Limited, can be found at Appendix 11B of the ES. | |
| JNCC / NE | Geographical scope assumptions | Generally the document takes a pragmatic approach to assessment of potential impacts on seabirds. We do have some specific comments and questions, in particular in relation to the proposed approach of assessing displacement and the estimation of associated mortality rates. These are outlined below. In general, we would like to highlight that the level of uncertainty associated with the assumptions made for the assessment and modelling studies should be fully discussed in the EIA, based on the nature of the evidence used and how this evidence was used to determine impact significance | Details regarding the consideration of displacement and associated mortality rates are provided below. Confidence in predictions is assessed as recommended by IEEM (2006, 2010) guidelines. | Chapter 4 |
| JNCC / NE | Geographical scope assumptions | Following review of the documents, we assume that the presented approach is for EIA only and that a separate Habitats Regulations Assessment document exists or will be produced? Similarly the documents seem to relate exclusively to the offshore component of the development. Will there be parallel documents to support the cable route and landfall impact assessments? | A separate Habitats Regulations Assessment is being provided. A baseline characterisation and impact assessment for the cable route and intertidal landfall is provided in this technical report. | Chapters 2 to 5 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Geographical scope assumptions | Section 2.2 - Any evidence to support the assumption that 100% of birds within the transect strips are usually detected by the aerial surveys should be provided. For example, were lenses etc selected and changed according to conditions? On different days, with different light conditions and sea states, birds may be more or less easily detected in images and videos. The detection rate could also vary between observers. What measures were taken to ensure detection was 100%? | [Comment supplied by HiDef] HiDef apply the most rigorous quality assurance across the aerial survey techniques. These compare very well and in many respects far superior to those possible with visual survey methods primarily because there is a permanent video record of the sightings which can be revisited many times by multiple ornithologists. HiDef apply a strict and stringent quality assurance process on both the detection and identification phases of the process. HiDef's reviewers, who undergo the object detection, are required to achieve at least 90% detection at the audit stage. Detection rates are reported to clients on a survey by survey basis ensuring complete transparency. Through the survey program at Dogger Bank and elsewhere HiDef are routinely achieving detection rates of about 98%. These detection efficiencies have persisted in a wide range of survey conditions, including light conditions and sea state. Further evidence that the detection is of that order of magnitude comes from comparisons that have been carried out with other data sets, and that the numbers of these birds detected during the surveys 'make sense' come from the scoter comparison survey in Carmarthen Bay (Buckland *et al.* 2011); a survey of mainly scoter, red-throated divers and other species in Liverpool Bay (unpublished JNCC report); and a survey of Scapa Flow in March 2012 (unpublished HiDef report). HiDef would be pleased to talk through how these reports support the belief of the efficiency of their survey method. Furthermore, HiDef has completed two calibration surveys with boat-based surveys. The data resulting from these surveys are part-owned by HiDef's clients, but should these be of interest, it may be possible to approach these clients to consider whether this data could be shared. | Chapters 2 & 3 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Geographical scope assumptions | Is digital aerial surveying appropriate for assessing numbers of little auk? Digital detection of little auks has been raised as an issue in the past. Is there sufficient evidence to be confident that detection rates are acceptable of this species? With relatively large numbers being recorded on the site during boat based surveys, over 900 observations in some months, analysis of boat data might give more accurate results. | [Comment supplied by HiDef] HiDef's survey methods are fully capable of detecting little auks. This capability has been substantially enhanced with the implementation of a new generation of camera technology and analysis software which has delivered 95% detection rate to species on industrial scale trials at Dogger Bank.<br>While little auk numbers may reach 900 during a survey, a proportion of these will not be classed as being 'in transect' because of flux effects of flying birds – abundance estimates and species proportions should always be assessed based upon birds 'in transect' only. HiDef have certainly detected plenty of little auks during the Dogger Bank surveys using the old cameras, but this has been confounded by the large numbers of auks that were not identified to species level. During November 2011, for example, generally a peak period for little auks in the western North Sea, HiDef detected 1137 auk species, and 69 small auks. Of these, 29 were identified to species level, and 23 of these 29 were little auks – approximately equal numbers of these were classed as auk species and small auk. While this doesn't provide conclusive proof that HiDef are achieving 90% + little auk detection, it suggests that HiDef are not experiencing problems with the small auks, using a camera system that they are about to upgrade to one with superior resolution, colour rendition and noise reduction. | Chapters 2 & 3 |
| JNCC / NE | Geographical scope assumptions | Caution must also be shown towards estimates of other auk species using the methods described if detection of little auks is an issue as the accurate proportioning of auks depends on the assumption of close to 100% detection of auk sp. If there is uncertainty regarding little auk detection then further detail should be provided on how auk species population estimates will be addressed. | [Comment supplied by HiDef] HiDef have no argument with this point, though see above. | Chapters 2 & 3 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Geographical scope assumptions | Section 2.3 - It should be noted that when using this 'importance' approach that some species are likely to be incorrectly screened out. Passage migrants, including skuas and terns, waders and wildfowl, may pass through the site once only but with a total passage over a number of days. Thus the peak snapshot on any given day may not reflect the true site importance, as usage may be spread over a longer period. This issue of flux for migrants should be considered when judging site importance. | Consideration is given to the turnover of passage migrants both in the baseline characterisation and identification of key receptors, and in the assessment of significant impacts. | Chapters 2 to 6 |
| JNCC / NE | Geographical scope assumptions | It should also be noted that Skov *et al.* (1995) reports data now at least 17 years old and is at a gross scale. For instance, in Skov *et al.* (1995) the Outer Thames is estimated to hold 230 red-throated divers when the Outer Thames Estuary SPA is designated for >6,000 birds, based on more recent survey data. It is also compiled from disparate data sources. Whilst it is sensible to base regional comparisons on published data some extra information may be required where later results substantially change the picture | This is noted. | Chapter 2 |
| JNCC / NE | Geographical scope assumptions | Section 2.4 - It is not strictly true that the gull estimates include no birds that 'frequent offshore waters' as some may do so but roost closer to land. However the point is taken and seems precautionary. | Again this is noted, though the main point is that birds frequenting waters further offshore will not have been included in this survey and the calculation of national population estimates. | Chapter 2 |
| JNCC / NE | Geographical scope assumptions | Section 2.5 - For SPA populations it is important to present designated population sizes of the qualifying feature. This information can be found on the JNCC website (http://jncc.defra.gov.uk/page-162) or in the case of Scottish SPAs via the Sitelink website (http://gateway.snh.gov.uk/sitelink/index.jsp). For SPAs in England and Wales, if differences exist between the SPA review and the original Natura data form please contact the relevant SNCB (respectively NE and CCW) for guidance. | This guidance has been followed in the baseline characterisation and impact assessment. See also below. | Chapters 4 to 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Geographical scope assumptions | It is also important to present current population estimates. It is likely that up to date population estimates will be available for most SPAs with features demonstrating connectivity with Dogger Bank. Please present current population estimates, and indicate when and where these are derived from. | This guidance has been followed in the baseline characterisation and impact assessment. Apportioning of impacts has been based on the most recent data available. Where available, data for UK sites were taken from the JNCC Seabird Monitoring Programme Online Database available at: http://jncc.defra.gov.uk/page-4460 [last accessed 30/07/2013] for the most recent year between 2007 and 2011. If no data were available for UK sites from this source for these years, data were obtained from the Seabird 2000 survey (which ran from 1998-2002) and numbers adjusted using country (Scotland, England) Seabird Monitoring Programme trends, available at: http://jncc.defra.gov.uk/page-3201 [last accessed 30/07/2013] to provide a value for 2011. Where data for sites were not available from the Seabird Monitoring Programme more recently than the Seabird 2000 survey, we used the most recent year between 2007 and 2011. More recent population estimates were later supplied directly by Natural England for the Flamborough Head and Bempton Cliffs SPA, and by JNCC for Scottish SPAs, thus superseding the process outlined above for those sites. For non-UK sites, data were taken from citation information available through Natura 2000 (http://natura2000.eea.europa.eu/ and http://www.ramsar.wetlands.org/Database/Searchforsites/tabid/765/Default.aspx [last accessed 31/07/2013]). While up-to-date population estimates were used to best apportion effects, the proportion of the site population estimated to be impacted was also applied to the citation population for information. | Chapters 4 to 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Geographical scope assumptions | For those sites where data are not available assessing recent trends in seabird numbers could provide more accurate population estimates. Data from the Seabird Monitoring Programme will provide information on trends for some relevant species, see http://jncc.defra.gov.uk/page-3201. The data for most of the seabird population estimates cited in Baker *et al.* (2006) is derived from Seabird 2000 census, so in some instances may be as much as 14 years old. | This guidance has been followed in the baseline characterisation and impact assessment. See also above. | Chapters 4 to 6 |
| JNCC / NE | Geographical scope assumptions | If trends are applied to derive more up to date population estimates for UK birds these numbers should then be taken into consideration regarding biogeographic population estimates. | It is over and above this work, and would be against the work of established groups (e.g. Wetlands International, AEWA), to propose new biogeographic population estimates. We have though used the most up-to-date estimates available, e.g. using Wetlands International (2012) where appropriate. | Chapters 4 to 6 |
| JNCC / NE | Geographical scope assumptions | Section 2.5 - Wetlands International (2006) indicate that correction factors for breeding seabirds account for immature birds bolstering the population post-fledgling. The report states that 'individual numbers usually peak after the breeding season due to first year recruitment and suffer high and variable mortality over the non-breeding season ...' Careful thought should be given to appropriate thresholds at different times of year. When breeding is underway the population threshold may more reasonably be number of pairs x 2 (not three), accepting that there is an unknown proportion of non-breeding immature birds also in the population but not accounted for in the population estimate. | Again it would be over and above this work, and against protocol, to propose different biogeographic population estimates for different times of year. However, we have taken this point into particular consideration in the assessment of numbers of migrants likely to pass through the project areas. | Chapters 4 to 6 |
| JNCC / NE | Geographical scope assumptions | Section 2.7 - We would like to stress that there is currently no national population threshold for white-billed diver. It would perhaps be precautionary to adopt a threshold of 50 birds for the non-breeding population of this species, as per SPA guidelines (Stroud *et al.*, 2001). | This guidance has been followed. | Chapters 4 to 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Geographical scope assumptions | Section 2.11 - Listed components of seabird assemblages (Stage 1.3) should be assessed separately, in the same way as features selected at Stages 1.1 and 1.2. Species listed as components of assemblages are included, in most cases, as their populations meet the 1% national population threshold. Occasionally, listed features do not meet this threshold as their national populations are very large, but are listed as they comprise 10% of the assemblage (Stroud *et al.*, 2001). | This guidance has been followed. | Chapters 4 to 6 |
| JNCC / NE | Geographical scope assumptions | Section 2.12 - It is encouraging to see this issue being addressed and we look forward to seeing the outcome of the review. It would be of interest to note any seasonal differences in auk 'availability' that arise due to differences in foraging behaviours at different times of year. If feeding events of gannets are captured would a similar process be used? | The results of this review are provided as an appendix and taken into consideration in the assessment of significant impacts. | Chapters 4 to 6 / Appendix 4. |
| JNCC / NE | Geographical scope assumptions | Section 3.1 - The approach discussed here is sound but note that IEEM (2010) is a more recent reference that is specifically tailored to the marine environment. This should be checked for differences with IEEM (2006) as the later document is more likely to be directly relevant. | This guidance has been followed. | Chapters 4 to 6 |
| JNCC / NE | Geographical scope assumptions | Section 3.2 - Again, the approach proposed here is sound, but more information on how sensitivity will be quantified would be welcomed, especially with regard to each of the four factors mentioned (i.e. adaptability, tolerance, recoverability and value). A full explanation of the metrics involved in assessing each of the four factors would also be welcomed. We would also welcome clarification as to how the four mentioned factors will be combined to reach the final conclusion of receptor sensitivity. The magnitude and sensitivity scores which contribute to the final impact assessment should be presented for each of the receptors included in the assessment. Furthermore, it would be useful to present and discuss the level of uncertainty / confidence associated with each significance assessment based on the nature of evidence used and how this evidence was used to determine impact significance. | The assessment methodology draws from both the guidance provided by IEEM (2006, 2010) and Maclean *et al.* (2009). Greater detail on the magnitude and sensitivity scores used in the assessment is provided in the methods (section 4), together with details of the levels of confidence associated with the assessment of different effects and the apportioning of impacts in the methodology. | Chapters 4 to 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Geographical scope assumptions | Section 3.3 - Some indication of the outcomes that each category triggers when using the matrix would be welcomed, i.e. the proposed mitigation for effects of major, medium and low significance. | Further discussion of mitigation and the relevant levels of significance is provided. | Chapter 4 |
| JNCC / NE | Geographical scope assumptions | Section 3.3.1 - The proposed approach is welcomed. | No comment | |
| JNCC / NE | Geographical scope assumptions | Section 3.3.2 - It is not wholly clear why assessments will be carried out at the 'suite of sites' level, unless this is to contextualise individual site level impacts? | There is no simple definition of region for this assessment. Thus, as well as considering the significance of impacts at the level of individual protected sites, we have considered the significance of impacts for the suite as a whole across the Greater North Sea OSPAR region. The suite of sites is also useful for HRA purposes, as it is difficult to demonstrate connectivity of birds (especially non-breeders) to individual sites. | Chapters 4 to 6 |
| JNCC / NE | Geographical scope assumptions | Section 3.3.2 - We would like clarification where population estimates for individual sites will come from. Most seabird SPA population estimates are out of date, and deriving up to date population estimates from sources such as the Seabird Monitoring Programme is problematic. However, data from the Seabird Monitoring Programme also provide trend data, which when applied to numbers from the last complete census in 2000 might give more robust population estimates, especially if regional rather than national trends are available. For more information on this issues please see SPA data report on Marine Scotland Interactive website http://www.scotland.gov.uk/Topics/marine/science/MSInteractive/Themes/SpecialProtectedAreas. Please also see comments for paragraph 2.5. | See above | |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Geographical scope assumptions | Section 3.3.2 - Although its use is widely accepted, apportioning 1/3 of a population to non-breeding birds is crude. It is a method originally intended for wintering estimates of waders so its application to seabird populations may not be particularly useful. For some species, such as gannets and gulls, where age classes can be identified boat survey data could inform the apportioning of non-breeding birds in a more accurate and site specific manner. Further we recommend interrogating the literature to identify species specific non-breeding proportions, or examining the potential of population models to inform the proportion of non-breeders present within a (closed) population. | This suggestion has been followed. For gulls and northern gannet, it was possible to derive estimates of this proportion from boat-survey observations of birds in breeding and juvenile plumages which have been applied in the assessment and in the apportioning of impacts. For other species, we have retained the assumption that, for species for which the wind farm project is within foraging range of birds from breeding colony protected sites, one third of the total number of birds present during the breeding season will be non-breeders, as this follows the protocol used by, for example, Stroud *et al.* (2004) and Kober *et al.* (2010). | |
| JNCC / NE | Geographical scope assumptions | Section 3.3.3 - Is the argument that the presence of non-breeders at the colony means that colony estimates are too low, or that the presence of non-breeders within the wind farm site means the impact will be less? If the latter, non-breeders are an equally important component of the wider population, as impacts to this demographic group may translate to reduced future breeding success, and thus integrity of the protected site, of the colony as a whole. | We have assumed that a proportion of the birds present in the project areas during the breeding season will be non-breeders. The potential impacts on these birds are apportioned to protected sites surrounding the North Sea in the same manner as for seabirds outwith the breeding season, thus capturing potential impacts on the population as a whole. | Chapters 4 to 6 |
| JNCC / NE | Geographical scope assumptions | Seabird Monitoring Programme data can also inform estimates of breeding seabirds away from protected sites, at least in the UK. | This is noted, though we have not directly used SMP data for this purpose. | |
| JNCC / NE | Geographical scope assumptions | Section 3.3.4 - In light of recent tracking projects, does foraging range data exist suggesting connectivity of Fulmar to any colonies? | We present a table showing where studies have shown connectivity for particular species between the sites that they are features of and the Dogger Bank Zone. | Chapter 4 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Geographical scope assumptions | Section 3.3.6 - The zonal approach outlined in Wright *et al.* (2012) for predicting the number of migrant birds passing through the site may risk: a) overestimating numbers of birds whose main flux is outwith the windfarm area; and b) underestimating numbers of birds whose main flux is within, or incorporates, the windfarm area. Further development of this model, taking into account methods proposed by APEM, would be welcome. | This is agreed, though further development of this work was not considered possible within the timeframe for this work. As noted in Wright *et al.* (2012) there is little evidence to suggest whether or not migration may be concentrated within corridors within overall migration zones, although this is probable for some species. However, it should also be noted that it cannot be assumed that birds fly directly to or from the protected sites that they are features of and adopting such an approach may lead to potential impacts being overlooked. | Chapters 4 to 6 |
| JNCC / NE | Geographical scope assumptions | Section 3.3.9 - Estimates of changes in latitude post-ringing or estimated rate of dispersal may serve to inform which sites birds originate from, depending on time of year and species | We have referenced recently published studies, which inform on the potential breeding origins of birds that use the Dogger Bank Zone in the non-breeding seasons. | Chapter 4 |
| JNCC / NE | Geographical scope assumptions | Table 1 - We recommend using 'biological seasonality' here for all species such as breeding or non breeding season, as used in Table 2. | This suggestion has been followed. | Chapter 4 |
| JNCC / NE | Geographical scope assumptions | Table 2 - Fuller definition of seasonality would be useful here. Spring passage periods for skuas would be useful, as would defining seasonality of use for species present in the development area during the non-breeding season such as white-billed diver (perhaps using information from Cramp *et al.* (1977-1994)2). Also, some justification for the seasonal definitions used in the table would be useful. | The seasonal definitions used follow Kober *et al.* (2010) except where the populations indicated by surveys suggest that a longer breeding period should be considered. The seasonal definitions are primarily used so as to be able to differentiate between birds that may occur in the project areas during the breeding season as breeders and non-breeders and hence apportion impacts for these birds appropriately. For this purpose, there is no need to define passage periods, though note that relatively few skuas were recorded during spring compared to autumn. | Chapter 4 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Ecological scope assumptions | Section 1.2 - IEEM (2010) is a more recent reference that is specifically tailored to the marine environment. This should be checked for differences with IEEM (2006) as the later document is more likely to be directly relevant. Maclean *et al.* (2009) is also highly relevant. | The assessment methodology draws from both the guidance provided by IEEM (2006, 2010) and Maclean *et al.* (2009). The IEEM approach advocates a detailed characterisation of ecological effects and their potential impacts such that it can be clearly determined whether or not impacts are likely to be ecologically significant and at what scale. Further marine guidance is supplied in a more recent IEEM document together with a worked example (IEEM 2010). The IEEM guidance provides a more detailed description of the effect (including its spatial extent, its timing and frequency, its duration, whether the effect would be direct or indirect, the reversibility of the impact, whether the impact is positive or negative and the confidence in predictions). Following Maclean *et al.* (2009), the guidance provided by IEEM is combined with a matrix approach to ensure that results are compatible with those throughout the Environmental Statement. We particularly draw from Maclean *et al.* (2009) in considering species-specific sensitivities (which reflect adaptability, tolerance and recoverability). | Chapter 4 |
| JNCC / NE | Ecological scope assumptions | Section 3.1.2 - The approach proposed here is sound, but more information on how sensitivity will be quantified would be welcomed, especially with regard to each of the four factors mentioned (i.e. adaptability, tolerance, recoverability and value). A full explanation of the metrics involved in assessing each of the four factors would also be welcomed. | See above | Chapter 4 |
| JNCC / NE | Ecological scope assumptions | Section 3.1.3 - What are the responses triggered by each category of outcome by the matrix? | Impacts of Negligible or Minor significance are considered to be of relatively limited concern, whereas Moderate or Major impacts are considered 'significant' in terms of EIA regulations. Where Moderate or Major residual impacts are determined following the use of realistic worst case scenarios, the potential for other defined scenarios (e.g. for collision risk) to mitigate impacts is discussed. | Chapters 4, 7 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Ecological scope assumptions | Section 3.3.1 - As stated in the report disturbance might also occur throughout the lifespan of the development with maintenance and survey vessel traffic. This should be considered in the assessment. | Disturbance / displacement effects are considered for both the construction / decommissioning and operation periods. Note that disturbance/displacement is not considered as an annual effect (i.e. like collision risk), but as a single habitat loss effect. | Chapters 4 to 6 |
| JNCC / NE | Ecological scope assumptions | Section 3.3.2 - Clarification would be welcomed on the statement 'the distance over which a receptor is displaced and the duration of the displacement will determine the severity'. Besides the distance and duration the severity of displacement should also consider the contrast in habitat quality between the original site and the site the receptor moves to. If the statement is referring to barrier effects however, it makes a bit more sense. | This has been clarified in the methodology text. | Chapter 4 |
| JNCC / NE | Ecological scope assumptions | Section 3.3.6 - It is stated that 'previous EIAs have used precautionary worst case scenarios of 100% displacement and 100% mortality following displacement from the wind farm area, and up to 50% displacement from a surrounding buffer with 100% mortality.' It would be useful to state which previous EIAs have used the stated displacement and mortality rates, and for which species. It would also be helpful to provide justification as to why these rates were used in past EIAs. | Details regarding the consideration of displacement and associated mortality rates are provided below. | Chapters 4 to 6 |
| JNCC / NE | Ecological scope assumptions | Section 3.3.7 - It will be necessary to consider the effect of turnover on the number of individuals likely to be affected, and the relevant population scales. This is a significant issue; if individuals are only likely to be present in an area for a few days then the effect to the individual is decreased, however the proportion of the population affected is increased. This requires further examination when addressing assessment of displacement. | Consideration is given to the turnover especially of passage migrants both in the baseline characterisation and identification of key receptors, and in the assessment of significant impacts. | Chapters 2 to 6 |
| JNCC / NE | Ecological scope assumptions | For HRA it will be necessary to consider the impact of additional mortality as a result of displacement on populations from individual protected sites. | Impacts have been apportioned to protected sites for all key effects where possible (see comments above regarding methodology) | Chapters 4 to 6 |
| JNCC / NE | Ecological scope assumptions | Section 3.3.8 - It should be noted that, while informative, radar studies only inform behaviour of birds in flight. | This is noted | Chapter 4 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Ecological scope assumptions | Section 3.3.9 - We welcome this approach. | No comment | Chapter 4 |
| JNCC / NE | Ecological scope assumptions | Section 3.3.10 - Vulnerability is a product of sensitivity and exposure; parts of this and subsequent sections may be better worded using the term sensitivity. | This has been clarified in the methodology text. | Chapter 4 |
| JNCC / NE | Ecological scope assumptions | Again we note that 'avoidance rates' refer to birds in flight. | This has been clarified in the methodology text. | Chapter 4 |
| JNCC / NE | Ecological scope assumptions | Sensitive receptors will include those that are displaced into areas of suitable habitat but already occupied at comparatively high densities by other birds. Density-dependent effects may then come into play, potentially leading to deleterious impacts on the displaced population, and/or the wider population now at higher density. | This is agreed. There is a lack of empirical evidence regarding the mortality consequences as a result of displacement from offshore wind farms. Consequently, the determination of mortality rates draws from assessments of species sensitivities to habitat loss, which may be viewed as a proxy for the proportion of the species' population that might be expected to die following displacement. Mortality rates for different species taken forward are derived from the scores for sensitivity to habitat loss as given by Furness & Wade (2012) – see section 4 methods. Given the uncertainty in displacement and mortality rates, as proposed by NE/JNCC (2012), we also present (in Appendix 10) tabulated summaries for each species of the numbers of birds estimated to be displaced that are then estimated to die based on a range of alternative displacement and mortality rates from 0 to 100%. | Chapter 4 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Ecological scope assumptions | Section 3.3.11/Table 2 - Appendix C provides a summary of the evidence sources that have been referred to in order to inform displacement rates. However, there is limited information here to support the application of the displacement / mortality figures. References to empirical studies are limited to two offshore wind farm cases (Petersen *et al.*, 2006; Krijgsveld *et al.*, 2011), neither of which is in the UK. | The determination of appropriate displacement rates now draws from a wider review of the literature and recent monitoring studies (Appendix 4), assessments of species' sensitivity to disturbance and recent guidance from NE/JNCC (2012) – see review in Appendix 4 and section 4 methods. There is a lack of empirical evidence regarding the mortality consequences as a result of displacement from offshore wind farms. Consequently, the determination of mortality rates draws from assessments of species sensitivities to habitat loss, which may be viewed as a proxy for the proportion of the species' population that might be expected to die following displacement. Mortality rates for different species taken forward are derived from the scores for sensitivity to habitat loss as given by Furness & Wade (2012) – see section 4 methods. Given the uncertainty in displacement and mortality rates, as proposed by NE/JNCC (2012), we also present tabulated summaries for each species of the numbers of birds estimated to be displaced that are then estimated to die based on a range of alternative displacement and mortality rates from 0 to 100% (Appendix 10 of the Ornithological report).<br><br>Following consultation on the draft Environmental Statement, a study was commissioned by Forewind to review any additional information that may be used to inform the likely mortality rate, particularly for auk species. This additional review, conducted by MacArthur Green Limited, can be found at Appendix 11B of the ES and has been utilised to determine the final mortality rates used in the assessment as outlined in section 4. | Chapters 4 to 6 |
| JNCC / NE | Ecological scope assumptions | In most cases, where species are known to be sensitive to displacement, a truly precautionary rate will be 100%, however, as noted in Section 3.3.12, JNCC recommend modelling a range of displacement rates. | See above | Chapters 4 to 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Ecological scope assumptions | The basis for assigning mortality rates requires further expansion. We would welcome further engagement with Forewind on this particular issue and the range of displacement rates to be included in the modelling. | See above | Chapters 4 to 6 |
| JNCC / NE | Ecological scope assumptions | Tables 1-3 - Why use 90% displacement for these species instead of the precautionary 100%? Also, why use the same for species for which there are no data (i.e. skuas) where 100% would be more precautionary?<br>o Divers: Assessments of offshore wind farm developments in the Thames Estuary have assumed 94-100% displacement of (red-throated) divers (e.g. Kentish Flats extension http://infrastructure.planningportal.gov.uk/projects/south-east/kentish-flats-extension/?ipcsection=app). We do not therefore agree that 90% is precautionary, and advise that 100% displacement should be used. The authors themselves state that divers 'may completely avoid wind farms post-construction up to up to 4 km'. Mortality figures also are not consistent with assessments elsewhere.<br>o Auks, seaducks and gannets: There is insufficient evidence presented to suggest that a figure of 90% displacement for these species is precautionary.<br>o Terns: 90% displacement of terns is inconsistent with experience at other UK OWFs, where issues tend to revolve around collision risk to birds continuing to forage within the wind farm footprint.<br>o Kittiwake and other gulls: Given the acknowledged potential attractive effects of some wind farms to gulls, it is hard to follow how a displacement value of 25% has been arrived at. Collision risk would seem to be more of an issue. | See above | Chapters 4 to 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Ecological scope assumptions | Does the suggested approach of deriving displacement and mortality rates considers the possibility that birds may become accustomed to the site, and as such displacement rates might decrease over time? Also, as demonstrated at Horns Rev, it might be the case that a population leaves the area and then returns, apparently independent of any activity or development. If there is evidence that this occurs for certain species, presumably this should be reflected by reducing the likely mortality that will occur (when considered as a mean over the lifespan of the project). If no clear evidence exists then this should not be included in assigning mortality rates. | See above for consideration of displacement and mortality rates. While there may be the potential for species to habituate to this effect, the evidence base for this is limited (see review in Appendix 4) and for the purposes of this assessment a worst case scenario assumed that displacement will occur at the same level throughout the lifetime of the projects. | Chapters 4 to 6 |
| JNCC / NE | Ecological scope assumptions | Section 3.3.14 - Is there any evidence that mortality from displacement is higher in the breeding season? In the non-breeding season, birds might be stressed for other reasons (e.g. temperature) and there could be differences in prey availability and abundance. Furthermore, energy expenditure when travelling further to alternative food resources might counteract the increased ability to range more widely, competition may increase for some species due to immigration, or the population will comprise first winter birds probably experiencing already high levels of mortality. In the breeding season, adults may be expected to abandon nests if stressed due to displacement (i.e. productivity may change but survival might not). It seems a very large assumption to predict up to 50% less mortality in the non-breeding season based solely on ability to range. This needs to be based on sound evidence. | See above for consideration of displacement and mortality rates. No differentiation is made between the breeding season and non-breeding season in this respect. | Chapters 4 to 6 |
| JNCC / NE | Ecological scope assumptions | Section 3.3.19 - As outlined above, the zonal approach outlined in Wright *et al.* (2012) for predicting the number of migrant birds passing through the site may risk: a) overestimating numbers of birds whose main flux is outwith the windfarm area; and b) underestimating numbers of birds whose main flux is within (or incorporates) the windfarm area. Further development of this model, taking into account methods proposed by APEM, would be welcome. | See above | Chapters 4 to 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Chapter / section |
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| JNCC / NE | Ecological scope assumptions | Section 3.3.20 - Are there no barrier effects on far-ranging species such as kittiwake, gannet and fulmar? This needs further consideration / justification. Speakman *et al.* (2009) identified energetic impacts of wind farms during foraging / commuting flights, and if as suggested Dogger Bank is within foraging range of breeding colonies then this impact will perhaps be the greater. | The Teesside and Creyke Beck projects are in potential foraging range for a number of seabird species for the sites that they are breeding features of and barrier effects are considered for each of these. | |
| JNCC / NE | Ecological scope assumptions | Section 3.3.23 -Turnover needs to be considered. | Consideration is given to the turnover especially of passage migrants both in the baseline characterisation and identification of key receptors, and in the assessment of significant impacts. | Chapters 2 to 6 |
| JNCC / NE | Ecological scope assumptions | Section 3.3.24 - Further information on why using the modelling data is preferable (option iii) is required. | This has been clarified in the methodology text. | Chapter 4 |
| JNCC / NE | Ecological scope assumptions | Section 3.3.25 - The use of the SOSS modelled bird flight heights should be compared with the flight heights determined from the site-specific boat surveys, and, if available, digital aerial surveys. Any discrepancies between the modelled and site specific flight heights should be provided and the use of the modelled heights over the site specific data justified. As recommended in Cook *et al.* 2011: 'For collision risk modelling, it is recommended that consideration should be given to results using both the site-specific and the modelled flight height data presented here.' | We have used option 3 from Band (2012) in assessing flight heights for the assessment of collision risk and clarify the justification for this in the methodology. However, we also present results for the other options as recommended by the guidance. | Chapters 4 to 6 |
| JNCC / NE | Ecological scope assumptions | Section 3.3.26 - Please clarify the statement 'However, we express caution in this approach since there can be no simultaneous effect of both collision and displacement as they are not mutually exclusive.' At a population level, for some species they are not mutually exclusive, i.e. the same population could experience impacts arising from both displacement (reduced productivity/increased mortality) and collision (increased mortality). | This has been amended in the methodology text. | Chapter 4 |
| JNCC / NE | Ecological scope assumptions | Section 3.3.26 - We encourage the use of valid empirical data, suitably analysed to inform the selection of appropriate avoidance rates; however, if data is lacking, as acknowledged, the default avoidance rate should be 98% (as per SNH guidance). | This is noted. We have assumed a worst case scenario for the assessment of collision risk using a 98 % avoidance rate (except for Northern Gannet where 99% is used), though also present scenarios using rates of 99% and 99.5 % for comparison. | Chapters 4 to 6 |

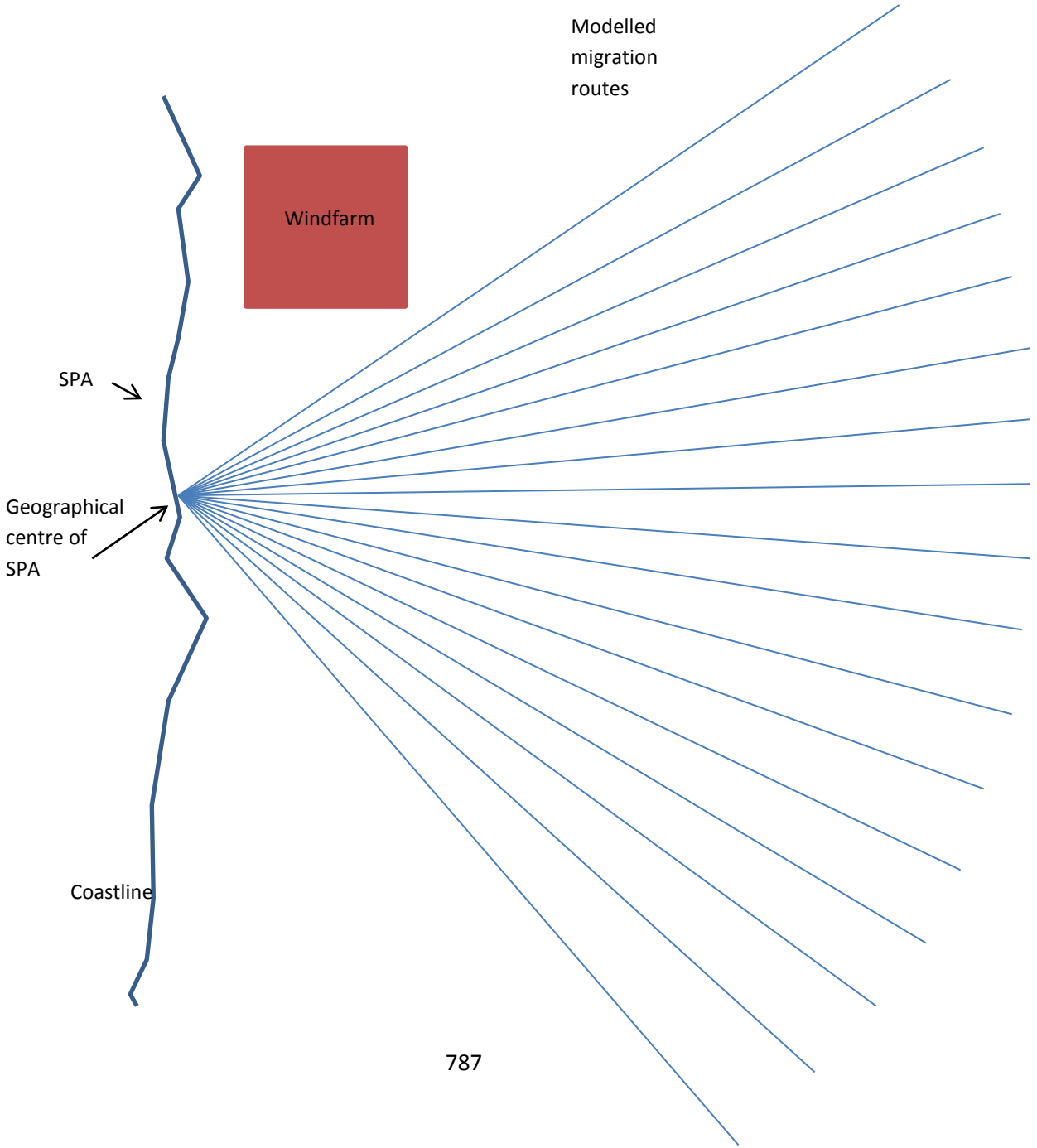
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| JNCC / NE | Ecological scope assumptions | Section 3.3.31 - Will additional mortality due to increased collisions of attracted birds be taken into account? | The potential for attraction is considered in assessing the significance of collision risk. | Chapters 4 to 6 |
| JNCC / NE | Ecological scope assumptions | Section 3.4 - When establishing appropriate cumulate scales for birds during the breeding season, foraging ranges should be used to inform which projects/plans should be included. | This guidance is followed (see comments above regarding apportioning of impacts) | Chapters 4 to 6 |
| NE | HRA Screening (for Creyke Beck projects) | APPORTIONING EFFECTS TO BREEDING COLONIES<br>As promised, here is more information on Natural England's advice to the Examining Authority in relation to the Galloper case, including apportioning of effect to breeding colonies.<br>http://infrastructure.planningportal.gov.uk/projects/eastern/galloper-offshore-wind-farm/?ipcsection=hearings<br>Click through to 'Showing 51 to 60 of 108 entries' and then '121029 EN010003 NE Written Summary of Biodiversity Hearing Submissions'.<br>This is the summary of the Galloper Hearing, and pages 16 – 24 deal with the approach to apportioning. | This point is noted. Through further discussion with Stakeholders (at the Draft ES stage), agreement was reached over the approach to apportioning adopted in the final ES As is noted in the evidence supplied in relation to the Galloper case, the decline in density with distance from a breeding colony is likely to be most pronounced in near-shore foragers. It should thus be noted that the Dogger Bank projects are beyond the breeding season foraging range of several species. Further, the projects are only in the foraging range of a relatively few breeding colonies in most instances (and in some cases only one or two sites). | Chapters 4 to 6 |
| NE | HRA Screening (for Creyke Beck projects) | APPROACH TO MIGRANT WATERBIRDS ASSOCIATED WITH UK SPAs<br>This represents NE / JNCC's best advice at this time, and should be considered interim; we plan to draw together an advice note on this topic in due course, but recognising the urgent need to advice Forewind on this case we offer the following:<br>· NE & JNCC advocate the use of the SOSS migration modelling tool (Wright *et al.* 2012), or suitable alternative (e.g. APEM 2012) to assess the effects of OWF developments on protected migrant waterbirds.<br>· Features of all SPAs in Great Britain that Wright *et al.* (2012) predict to pass through a corridor containing the OWF footprint should initially be screened in to assessment. | While these comments were received in relation to the HRA screening for the Creyke Beck projects, this is also of pertinence for other projects in the Dogger Bank zone. As proposed, the methodology of Wright *et al.* (2012) has been followed, and features of all SPAs in Great Britain that Wright *et al.* (2012) predict to pass through a corridor containing the OWF footprint screened in. | Chapters 4 to 6 |

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| NE | HRA Screening (for Creyke Beck projects) | APPROACH TO MIGRANT WATERBIRDS continued<br>· To avoid addition errors in estimating SPA populations, the wintering estimate of the species in question (Musgrove *et al.* 2012) should be used. The migratory proportion of the wintering population should first be estimated, and then multiplied by the proportion of the species thought to be within the SPA network (Stroud *et al.* 2001) to give the abundance of 'SPA birds' migrating through the corridor. A similar approach can be taken for migrant breeding birds, using estimates in Musgrove *et al.* 2013. [Note that knowledge of changes in wintering waterbird distribution, e.g. from WeBS reports, may be useful to inform the current relevance of Stroud *et al.* 2001; for instance, birds may be known to have declined or increased at certain sites, potentially shifting the balance of birds within and without protected sites]. If it is justified to use a sub-section of the SPA network, this should be clearly explained. The number of migrants and proportion of birds associated with protected sites will need to be adjusted accordingly.<br>· The value predicted to result in mortality from collision (using appropriate models and parameters) should be expressed as a proportion of the SPA total estimate. As we do not recommend any weighting to specific SPAs, except where this is justified and explained clearly, the effect will be felt at the same level across the network. The exception to this is if there is known difference in migratory routes, where the SPA network may be divided into smaller sub-sections, or if there are any SPAs which appear to be at greater risk – perhaps those in greatest proximity to the OWF. In this instance it may be appropriate to model migration at the individual SPA level. | We have not estimated the proportion of the population within the SPA network but instead we have calculated risk to migrants based on the entire UK or GB or GB & Ireland population as appropriate. This will still give exactly the same answer as the method suggested in terms of the proportion of the population at risk (which can be applied to each SPA as suggested), but the absolute numbers will be slightly higher than they would had we multiplied populations by the proportion of the species thought to be within the SPA network. Our method is therefore more precautionary than that recommended by NE. We think our method is preferable as using the proportion of the population thought to be within the SPA network (as suggested by NE) will underestimate the numbers of 'SPA birds' affected due to turnover which is known to occur in most migratory species as individual birds move through SPAs.<br>We have expressed the value predicted to result in mortality from collision as a proportion of the UK or GB or GB & Ireland population as appropriate (as described above). This gives exactly the same proportion as would have been calculated for the proportion of the SPA total estimate had we used the method suggested by NE. | Chapters 4 to 6 |

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| NE | HRA Screening (for Creyke Beck projects) | APPROACH TO MIGRANT WATERBIRDS continued<br>The exercise should be repeated for all OWFs lying within the corridor established by Wright *et al.* (2012), to establish cumulative effect.<br>· Once the proportion of birds interacting is understood, this can be scaled to SPA abundance, and this value can be fed into the Band (2012) collision risk model. | Cumulative collision risk for migrants has been calculated for the Teesside A and B, Creyke Beck A and B and Teesside C and D projects within the Dogger Bank zone.<br>Cumulative assessment is also undertaken at the scale of the wider North Sea region, although following the overall Forewind Cumulative Impact Assessment, only projects and plans for which there is medium to high confidence data and project information are included. In the case of theassessment of cumulative collision risk for migrants, figures are available for only a small proportion of those species likely to cross the overall suite of wind farm projects in the North Sea region, for which assessment is now possible through the work of Wright *et al.* (2012). Further, the numbers of other projects for which estimates are provided for migrants are very few, and thus the sites for which data were available only represent a very small proportion of the overall suite in the North Sea region. For those species whose migration zones overlap with the Teesside A and B, Creyke Beck A and B and Teesside C and D projects, indicative figures of the percentages of these migration zones that overlap with the overall suite of wind farm projects considered in the cumulative assessment in the North Sea region are also shown. | Chapters 4 to 6 |

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| | | · Where the exercise reveals a specific indication that non-trivial numbers of birds are predicted to interact with OWFs, it may be appropriate to consider further the impacts at individual SPAs, by re-analysis of model output to focus on migration routes of birds arriving at a single point location (SPA) from across a wide front. | We have not done this because there are no species for which non-trivial numbers of birds are predicted to interact. However, we do not think that the method suggested is appropriate anyway because many migratory species will not migrate direct to SPAs but will instead migrate to the UK then move along the coast to the relevant SPAs. In cases where there is a wind farm very close to a particular SPA, if the wind farm is very close to the coast but slightly offset from the SPA in question, it is quite likely that using this method could significantly underestimate the numbers of birds likely to pass through the wind farm. We therefore think it is not appropriate to treat birds migrating to SPAs as migrating to/from a single geographical point. A diagram is provided below (Figure A3.1) to illustrate how this could happen – in this example no SPA birds would be predicted to pass through a wind farm very close to the SPA; this is unrealistic, some inevitably would. Models need to allow for birds moving along the coast. | Chapters 4 to 6 |

**Figure A3.1** Example of the potential problems of assuming that migrant birds migrate directly to or from protected areas.



| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE | HRA Screening (for Creyke Beck projects) | POPULATION FIGURES FOR THE PROPOSED EXTENSION TO THE FLAMBOROUGH SPA.<br>Review of the Flamborough Head and Bempton Cliffs Special Protection Area<br>Natural England has recently reviewed the current site boundary, interest features and reference populations of the Flamborough Head and Bempton Cliffs SPA to determine whether any changes are needed to meet the requirements of the Habitats Regulations, taking scientific advice from JNCC. It is likely that in the near future Natural England will propose the re-classification of the SPA following a formal consultation process, and that this reclassification will propose changes to the SPA boundary so that additional seabirds breeding on the cliffs at Filey Brigg are incorporated within the SPA.<br>This means that the site boundary, interest features (i.e. whether seabird species qualify in their own right, are named components of the assemblage, or are just part of the seabird assemblage) and reference populations for the SPA have the potential to change in the near future. Natural England advises that for the purposes of the Dogger Bank ES and HRA, these potential changes should be reflected in the assessment of this proposal's impacts on the SPA.<br>We therefore recommend the use of the following population data, which include seabirds from the proposed terrestrial extension at Filey Brigg, as the most up-to-date population estimates for the Flamborough Head & Bempton Cliffs SPA:<br>Fulmar – 1,447 pairs or 2,894 breeding adults (2008-2011)<br>Gannet – 8,469 pairs or 16,938 breeding adults (2008-2012) - but note that in 2012 there were 11,061 pairs (Aitken *et al.* 2012)<br>Kittiwake – 44,520 pairs or 89,041 breeding adults (2008-2011)<br>Guillemot – 41,607 pairs or 83,214 breeding adults (2008-2011)<br>Puffin – 490 pairs or 980 breeding adults (2008-2011)<br>Herring gull – 711 pairs or 1,421 breeding adults (2008-2011)<br>Razorbill - 10,570 pairs or 21,140 breeding adults (2008-2011)<br>These data indicate that gannet, kittiwake, guillemot and razorbill would be considered as SPA features in their own right, and that fulmar would, with over 2,000 individuals present, become a named component of the seabird assemblage. Herring gull and puffin (along with shag and cormorant) would also form part of the seabird assemblage but no longer be named components of it. | While these comments were received in relation to the HRA screening for the Dogger Bank Creyke Beck projects, this is also of pertinence for other projects in the Dogger Bank zone. The population estimates suggested for the Flamborough Head and Bempton Cliffs SPA have thus been used in this assessment. | Chapters 4 to 6 / Appendix 1 |

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| RSPB | Consultation on draft ES | The justification for using Option 3 of the SOSS-2 model (Band) is slightly buried, in an annex to the Ornithological Technical Report (OTR). Perhaps this could have been given greater prominence. The RSPB considers that the use of this Option is justified in this case, but that the justification is difficult to locate. | Justification for the use of option 3 added to in section 4.3 (originally provided in appendix so brought out to make clearer).<br><br>Option 3 allows variation in turbine design (i.e. in their size and height above sea level) to be more accurately incorporate into the assessment of collision risk. Furthermore, collision risk is not spread evenly within the rotor swept area as is assumed by Options 1 & 2. Using Option 3 allows us to take this into account. | Section 4 |
| RSPB | Consultation on draft ES | In Table 4.15 of the OTR, the figure given for proportion of Kittiwake at collision risk height is misquoted. | The value is not misquoted but reflects the proportion in the specific modelled rotor swept area rather than that given for a generic turbine in the Cook *et al.* (2012) report. The footnote has been amended to reflect this and the figure adjusted to reflect new worst case scenario of 6 MW turbines a minimum of 26m above highest astronomic tide. | Section 4 |
| RSPB | Consultation on draft ES | In assessing the potential cumulative impacts, the RSPB consider that the models used in other schemes ought to be taken into account. Some of the data are from other older models and calculated using different avoidance rates. The implications are that using a higher avoidance rate (for example as in the Neart na Gaoithe assessment) will produce a greatly reduced modelled mortality, whereas the use of older collision risk models will generate a higher modelled mortality. This may affect the outcome of the assessment of cumulative impacts. | No attempt was made to standardise estimates using the same assumptions as presented in this assessment, as, based on the information presented on other assessments, this would have only be possible in some cases. The assumptions used in deriving displacement and collision risk estimates in other assessments are highlighted in tabulated summaries where these differ from those used in this assessment. | Section 6 |
| RSPB | Consultation on draft ES | Paragraph 4.3.14 OTR: the limited available evidence for common guillemot is ambiguous as to the likelihood of displacement, necessitating that the full range of % displacement values are assessed, as you have done. These documented cases at wind farms augment the approach used by Furness *et al* (2012). There may be good, biological reasons for the observed variation or study methods may have contributed; either way this wide range makes assessment of risk of displacement for guillemot more challenging. | As per JNCC/NE guidance, predicted impacts of displacement, for each project and species, based on a range of displacement and mortality rates are provided in Appendix 10. | Section 4 |

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| RSPB | Consultation on draft ES | Paragraph 4.3.18 OTR: whilst acknowledging that the Krijgsveld *et al.* 2011 study is one of the best around, it is just one study, relating to relatively small inshore wind farm(s). Whilst this study presents empirical data, it is not clear how indicative it might be of likely displacement by breeding gannets, given the prevalence of gannets during migration. In view of the contrast between this study and the Furness *et al* rankings, it is appropriate to consider a range of putative displacement effects for gannet, including 25% as per Table 4.8. | For northern gannet, evidence suggests that although the species might not be highly sensitive to disturbance in general (e.g. ship and helicopter traffic) the species may show strong macro-avoidance of offshore wind farms (Krijgsveld *et al.* 2010, 2011). Hence, following the recent NE/JNCC (2012) guidance, we now apply a 75% displacement rate for this species. As per JNCC/NE guidance, predicted impacts of displacement, for each project and species, based on a range of displacement and mortality rates are provided in Appendix 10. | Section 4 |
| RSPB | Consultation on draft ES | Paragraph 4.3.22 OTR: it is unclear on what basis you have derived the % displacement values for buffers; ie the average of 50% displacement, please clarify. | Evidence from studies in Denmark (Petersen 2005, Petersen *et al.* 2004, 2006) indicates that while birds may also be displaced from buffer areas around wind farms as well as the wind farm itself, the proportions of birds displaced tend to be relatively less in these buffer areas. Thus a linear decline in the proportion of birds displaced is assumed (e.g. for species for which a 2km buffer is applied): 0-1km, 75% of the displacement rate for the wind farm; 1-2km, 25% of the displacement rate for the wind farm. This more accurately reflects the change in displacement than applying 50% of the displacement of the wind farm for the whole buffer as a gradated change is anticipated through the buffer as distance from the wind farm increases. | Section 4 |
| RSPB | Consultation on draft ES | Paragraph 4.3.27 OTR: we do not know what the mortality implications of displacement might be and therefore, as per the NE/JNCC guidance, it seems appropriate to assess the range of possible % mortality to determine sensitivity to variation in this value. | As per JNCC/NE guidance, predicted impacts of displacement, for each project and species, based on a range of displacement and mortality rates are provided in Appendix 10. | Section 4 |
| RSPB | Consultation on draft ES | Paragraph 4.3.42 OTR: whilst acknowledging the logic of applying 50% of bird numbers displaced during operation to construction and decommissioning, to reflect progressive decreases and increases, it is worthwhile considering recent published research albeit for an onshore study (Pearce-Higgins *et al.* 2012) which indicates that, at least for some species, displacement effects may be initiated during construction and to varying degrees persist during operation. In other words, the greatest effect coincided with construction and for the species most affected showed no diminution (Pearce-Higgins, J. W., L. Stephen, A. Douse, and R. H. W. Langston. 2012. Greater impacts of wind projects on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. Journal of Applied Ecology 49:386–394.). | A paragraph has been inserted to note that as the assessment of displacement considers how many birds will be lost to the population in the long-term, due to the effective loss of habitat associated with this effect, the impacts predicted during construction and decommissioning are encompassed by those predicted for the operational period and are not additive. | Section 4 |

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| RSPB | Consultation on draft ES | Table 2.1 OTR: Is distance travelled in Sept 2010 an error? | No, due to technical problems, only a single day of survey effort was possible in September 2010. | Section 2 |
| RSPB | Consultation on draft ES – HRA report | It has been assumed that the numbers of birds displaced during construction and decommissioning will be 50% of those during operation, based on the expectation that displacement will increase during construction and progressively reduce during decommissioning (4.3.42). Disturbance will be an on-going effect through construction and decommissioning phases of the project (4.3.44). The inference of displacement is that, in the first year, a given number of GU will be displaced and lost to the population, leading to fewer returning in the second year, whereupon further displacement and mortality occur, and so on. How is the ongoing effect incorporated throughout the operational life of the wind farm? | A paragraph has been inserted to note that, as the assessment of displacement considers how many birds will be lost to the population in the long-term due to the effective loss of habitat associated with this effect, the impacts predicted during construction and decommissioning are encompassed by those predicted for the operational period and are not additive. | |
| RSPB | Consultation on draft ES – HRA report | Please clarify the derivation of the numbers presented separately for construction/decommissioning and operation (Appendix 11A Tables 5.1, 5.8 & 5.15). It is unclear whether these include the 2km buffer? | The values for construction/decommissioning simply represent 50% of the values for operation (inclusive of the buffer), as it assumed that the average spatial extent of the wind farm project during construction/decommissioning will be half that during the operational phase. Values are the total displacement from the project areas and buffers. | |
| RSPB | Consultation on draft ES – HRA report | Taking guillemot as an example, how do numbers presented in the displacement matrices (Tables A10.8 and A10.19 etc), attribute development phases and take account of breeding and non-breeding seasons? | The values presented in Appendix 10 are for the operational period only; those for construction/decommissioning would be 50% of these values. The values sum displacement for the breeding and non-breeding seasons. Separation of the values can be supplied as spreadsheets. | |
| RSPB | Consultation on draft ES – HRA report | The HRA presents an assessment of displacement on SPAs separately for construction/decommissioning and operational phases, but does not bring these together in terms of effects on SPAs. Clarification would be helpful. At present, the risk of LSE arising from Creyke Beck A&B alone for guillemot at Flamborough Head & Bempton Cliffs cannot be ruled out. | A paragraph has been inserted to note that, as the assessment of displacement considers how many birds will be lost to the population in the long-term due to the effective loss of habitat associated with this effect, the impacts predicted during construction and decommissioning are encompassed by those predicted for the operational period and are not additive. | |

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| NE/JNCC | Consultation on draft ES | In general, the draft ornithological chapter and associated documents provide a thorough assessment of ornithological issues and take an appropriately precautionary approach to potential impacts. However, we are not convinced that the right balance has always been struck between the levels of information in the draft ES and the Technical Appendix: there are occasions where it is difficult to assess the conclusions of the draft ES without extensive cross-referencing with the Technical Appendix. Please see our more detailed comments on this issue below.<br>Please note that due to the quantity of technical information presented, it has not always been possible to determine if some of the issues that are raised below have already been addressed elsewhere within the documents. Therefore, in addition to the more detailed issues raised below, we suggest that greater cross-referencing between sections along with a greater use of summary tables would be beneficial, particularly for numerical data e.g. Assessment Sections and Appendices 6 and 7. | A summary header table of results for collision and displacement is now provided at the start of each species account in the assessment sections of the technical report. Separate consideration has been given to the level of detail needed in the ES chapter. | All |
| NE/JNCC | Consultation on draft ES | Whilst JNCC and Natural England agree largely with the approach taken by Forewind in separating the technical details from Summary Chapter 11 and presenting them in a Technical Appendix, we believe that Chapter 11 has been oversimplified in the process. This makes it exceptionally challenging to clearly gain an overall impression of any potential issues for this proposal. Chapter 11 should provide sufficient tabulated numerical information to inform assessments at site, national and biogeographic population scales. | Consideration has been given to the level of detail needed in the ES chapter. | All |
| NE/JNCC | Consultation on draft ES | The Technical Appendix would also benefit from additional tabulation of numerical data. The results of the overall impacts on individual species to any of the effects should be presented in tabular format instead of the current presentation which separates the impacts into different tables and spread throughout the text. For example, the Technical Appendix presents tabulated information with multiple avoidance rates but does not distinguish seasons, however, within the text summary for each species a number has been provided for each season for each year. | A summary header table of results for collision and displacement is now provided at the start of each species account in the assessment sections of the technical report. The effects of habitat loss or change and barrier effects are assessed in a qualitative or semi-quantitative manner and hence results are given in the text only. Further information has also been added to existing tables (e.g. on seasonal collision risk estimates) to provide a more complete correspondence to the text. | Sections 5 & 6 |

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| NE/JNCC | Consultation on draft ES | Additionally, whilst it is helpful to see data presented on month-by-month and year-by-year basis (as it clearly highlights inter-annual differences), JNCC request that the baseline species population estimates are presented as a mean of two years (2010 & 2011), in addition to individual years (which could perhaps be presented in an Appendix). The purpose of collecting more than one year's data is to account for year on year variability, by not then presenting this data in a collated format (for example, monthly, breeding and non-breeding season peak means), easier assessment of the potential impacts in later chapters has been hindered. Furthermore, for comparative purposes the Dogger Bank baseline population estimates need to be presented in a similar format to the ESAS data set to enable easier, less-time consuming 'ground-truthing' of the data. | Mean monthly population estimates for the project areas have been added to the tables in the species accounts in section 3.<br><br>For ease of comparison with previous ESAS data, annual mean values have also been presented. Monthly values could also be compared to data from Skov *et al.* (1995), as presented in Table 3.7. However, for ground-truthing purposes it should be noted that the ESAS estimates are based on far less intensive surveys of the study area and are at least 10 years out of date. | Section 3 |
| NE/JNCC | Consultation on draft ES | Assessment should be carried out based on mean seasonal figures (but see NE/JNCC guidance on Displacement for specific advice on displacement mean of peaks). If, as appears to be the case here, assessment is carried out based on only one of the two years of data collection, then this needs to be clearly, and consistently stated in the assessment sections. If the higher of the two years has been used, then a precautionary approach will have been taken, however this is not in line with the approach taken by the majority of OWF sites, or advised by JNCC/Natural England. Unless there is a clear justification, we query whether this level of precaution is required, for the purposes of EIA at least. | Assessment has been based on mean figures across the two years throughout as suggested.<br><br>Mean rather than peak population estimates for each season are used to better reflect overall usage of the project areas and buffers and in order that the impacts associated with displacement can be properly considered cumulatively. | Section 5 & 6 |

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| NE/JNCC | Consultation on draft ES | In the case of mortality, the use of the metric '% of total population affected' is not sufficient. It is preferable to contextualise the effect via considering the percent change to baseline mortality (using appropriate survival rates). EU guidance (EU Guidance document on hunting under Council Directive 79/409/EEC on the conservation of wild birds "The Birds Directive") suggests that a good basis for concluding additional mortality is not significant would be a less than 1% increase in background mortality, though in the case of some declining populations, this may not be sufficiently precautionary. | Consideration of the impact of the effect of collision in terms of the potential increase in background annual adult mortality is provided for all species at all spatial scales.<br><br>With respect to thresholds, it is felt that the application of the thresholds proposed for the assessment of magnitude in relation to the size of a reference population to the percentage increase in background mortality is inappropriate, not least because there is the potential for an increase in background mortality of over 100%. In order that there is consistency in the outcomes of the assessments of significance of the effect of collision based on consideration of the proportion of the population impacted or the percentage increase in background mortality, an alternative classification of magnitude is thus proposed for the latter.<br><br>With respect to displacement, it should be re-iterated that the mortality rates considered here represent the proportion of those birds predicted to be displaced that might be expected to be lost to the population in the long-term. No attempt is made to assess this effect in relation to changes in background annual mortality that would be required to bring the population to the new lower equilibrium, as a number of uncertainties are likely to determine how long this will take to happen and thus the changes in annual mortality required. | Sections 4 - 6 |
| NE/JNCC | Consultation on draft ES | Perhaps as a result of the impact-by-impact approach taken to assessing ornithology impacts in the draft ES and AA report, neither document quantitatively considers multiple impacts on a single receptor. This has the potential to result in under-estimation of impacts. For example, black-legged kittiwake is assessed as experiencing impacts due to construction displacement, operational displacement, collision mortality and barrier effects (none of which are necessarily mutually exclusive) yet the potential combination of these impacts is only considered qualitatively (TA: Table 5.21). Whilst JNCC and Natural England appreciate this may need to include a qualitative element, where numbers of birds predicted to be affected by an impact is provided, these numbers should be presented (both in terms of % population, and changes to baseline mortality rates). This issue is relevant to both the consideration of impacts at the SPA and National levels. | Further consideration of the multiple impacts from different effects on key receptors is provided in the summary section of the technical report. As is noted, this needs to be considered qualitatively due to the qualitative nature of the assessments of some effects and the inherent differences between the more quantitative assessment of the key effects of displacement and collision. | Sections 7 |

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| NE/JNCC | Consultation on draft ES | Finally, at any stage where assessment results are provided, a clear explanation must be provided alongside regarding what an impact has been assessed against e.g. population size, year, buffer distance etc. | A summary header table of results for collision and displacement is now provided at the start of each species account in the assessment sections of the technical report, providing information on reference populations and key assumptions. Detail of reference populations for protected sites are provided in Appendix 9. | Sections 5 & 6 |
| NE/JNCC | Consultation on draft ES | We welcome the use of Natural England/JNCC's joint interim advice note on seabird displacement (*"Presenting information to inform assessment of the potential magnitude and consequences of displacement of seabirds in relation of Offshore Windfarm Developments"*) in the draft ES, and the provision of displacement matrices in Appendix 10 of the Ornithology Technical Report.<br><br>JNCC and Natural England seek clarification regarding whether the Appendix 10 matrices incorporate the different displacement rates proposed for two bands around the OWF within the draft ES have been populated, given that the draft ES applies different displacement rates for two bands around the proposal when considering the impacts of the proposal. Our interim advice note does not distinguish for different rates of displacement across the OWF and buffer, so it would be useful to know how these different displacement rates have affected the matrices. | Yes, the values in the matrices represent the total displacement across the project area and buffers and incorporate the different displacement rates for the two bands around the project area. The methods are stated in 4.3.26, however, an additional insertion has also been made in Appendix 10 to clarify this point. Separation of the values for the different buffer bands can be supplied as spreadsheets. | Appendix 10 |
| NE/JNCC | Consultation on draft ES | We also note that the Tables only shade in a single value on the basis of these figures. As recommended in the interim advice note, we recommend that a range of potential values are shaded to foreground the levels of uncertainty being dealt with: cells which are considered to represent the more realistic scenarios should be colour coded with increasing intensity. | Given the uncertainty regarding displacement and mortality rates, it is felt imprudent to give any further level of confidence to any particular range of values for displacement rates. As per JNCC/NE guidance, predicted impacts of displacement, for each project and species, based on a range of displacement and mortality rates are provided in Appendix 10. For mortality rates, we follow the guidance and highlight cells in light green for higher confidence, and dark green for most confidence (Appendix 10). Note however that for auks, while a negligible or zero value for mortality may be concluded from Furness *et al.* (2013), precaution has been retained by using a 5% value (highlighted using a bold border to cells in Appendix 10. | Appendix 10 |

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| NE/JNCC | Consultation on draft ES | We note that Forewind are undertaking a review of OWF monitoring to determine whether the displacement rates brought forward in the draft ES and associated documents are appropriate. We look forward to discussing the review once it has been conducted. Regarding northern gannet, as set out in our interim guidance note this species has shown macro-avoidance responses to OWFs and therefore should not be considered as of low sensitivity to displacement. The proposed review could usefully identify an evidence-based displacement figure for this species (which seems likely to be closer to 75%). | For northern gannet, evidence suggests that although the species might not be highly sensitive to disturbance in general (e.g. ship and helicopter traffic) the species may show strong macro-avoidance of offshore wind farms (Krijgsveld *et al.* 2010, 2011). Hence, following the recent NE/JNCC (2012) guidance, we now apply a 75% displacement rate for this species. | |
| NE/JNCC | Consultation on draft ES | This review could also usefully assess the timing of OWF monitoring to see whether there is any evidence to support the assumption that construction phase displacement can be assessed as 50% of operational displacement. JNCC and Natural England have some reservations with this assumption, as some potential displacement variables such as boat traffic will not progress evenly from 0 to 100% during the construction phase. It would be helpful if the predicted levels of boat traffic at different stages of construction could be quantified to see whether they provide any further justification for the 50% figure. | The number of trips required per turbine will be the same and thus it is believed probable that the boat traffic associated with construction will be relatively even across the period. In light of the uncertainty of the exact construction plan that will be applied and the potential variables within this that could occur dependant on a large number of factors, it was felt that the application of 50% most accurately applies the ramp up of construction activities and operational wind turbines from nothing at day 1 of construction to fully operational on the final day of construction. | |
| NE/JNCC | Consultation on draft ES | TA:179-180. We seek an explanation as to why previous JNCC/Natural England's advice to Dogger Bank Creyke Beck (19th September 2012), concerning the use of a 25% displacement rate for gulls and kittiwakes, when collision risk is more likely to be a problem, has been ignored. | With respect to gulls, while some studies suggest that avoidance may occur, the relative evidence for either displacement or attraction is weak, and there is considerable variability in the apparent displacement / attraction rates noted by the review provided in Appendix 4. Hence, following this advice, we have applied a 0% displacement rate for these species. | |
| NE/JNCC | Consultation on draft ES | In the absence of empirical data, the use of Furness & Wade (2012) and Maclean *et al.* (2009) to derive displacement mortality rates from species-specific sensitivity appears to be a pragmatic approach. However, in the context of a large number of OWFs being proposed in the North Sea, JNCC and Natural England are somewhat concerned that those species with Very Low sensitivity to displacement effects are automatically assigned a mortality figure of 0% i.e. no potential impact at all. A more precautionary figure is likely to be more appropriate for those species where attraction into OWF has not been observed, particularly for northern gannet given the observed rates of macro-avoidance. | Following revisions after the Draft ES, and a subsequent independent review of displacement mortality (Furness 2013), all gulls, skuas, and fulmar, are considered as having no impact for displacement (i.e. 0%), and have therefore have been scoped out of the assessment for disturbance/displacement. For gannet, mortality at the project level is also considered as zero but as also noted here, and in Furness (2013), the cumulative impact of multiple sites for species with very high habitat flexibility warrants a precautionary approach, hence gannet is assigned a mortality rate of 5% following displacement. Auks are also assigned a mortality of 5% following the Furness (2013) review - (see sections 4.3.33 and 4.3.34 for details). | |

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| NE/JNCC | Consultation on draft ES | Regarding cumulative impacts, JNCC and Natural England fully appreciate the difficulty of assessing cumulative displacement effects given the different ways that OWF ES have presented data on displacement effects, and the limited level of apportioning to designated sites. This will hopefully improve once our interim guidance note is more widely adopted. In the meantime, we hope to work with Forewind and other OWF developers to develop a realistic approach to the quantification and assessment of displacement, including in-combination effects. The latter might include consideration of the scale impacts on habitat availability in the wider North Sea. We would welcome further engagement on this subject during the final pre-application period. | This is noted. The review carried out in Furness (2013) for displacement and mortality has assessed habitat availability in the North Sea and covers these points in detail, which is in turn reflected in the revised approach adopted (see text above). | |
| NE/JNCC | Consultation on draft ES | A5.3. It should be clarified that the application of correction factors are only necessary for aerial-based surveys. Boat-based surveys, as slower moving, are unlikely to miss a large proportion of birds underwater, as they re-surface in the time taken for the boat to pass and the observer to record their presence in a survey. | Correction factors are applied to final population estimates that are produced from the numbers recorded by aerial surveys. Data from boat surveys are used solely to inform on the likely species of birds not identified by the aerial surveys. | Appendix 5 |
| NE/JNCC | Consultation on draft ES | A5.5. Although this methodology follows similar attempts made elsewhere, further discussions are required in order to explain the thinking behind it. Our understanding is that, at any given time a realistic figure for the number of birds using the project area is needed. In other words, the birds that may be present in the area at the time of the survey that are not observed need quantifying. This does not mean the total time spent underwater on leaving the colony needs quantifying. This would lead to an under-estimate of birds, as a high proportion of an individual's foraging trip would be spent in transit to foraging sites (which by their very nature, are not within the project site). Any birds observed within the project area can be assumed to be foraging (unless they display specific behaviour to the contrary - e.g. rafting). It would seem simplest to obtain rates for percentage of time underwater when foraging and multiply the count by this factor. In our opinion, if something other than this is attempted, we believe that a greater explanation of the theoretics behind such an approach will be merited. | The baseline population estimates were derived from a model that combined information on birds recorded on the water and in flight. The underwater correction was therefore applied to the overall population estimates (separate estimates of birds on the water only were not produced). The time underwater was consequently considered as a proportion of the species' overall time budget including time spent flying.<br><br>It was not possible under our modelling approach to also separate out birds that were foraging from those just resting on the surface, hence use of a proportion of "time underwater when foraging", i.e. the "dive-pause ratio" (Thaxter *et al.* 2010) was also not possible. Application of this ratio to the baseline population estimates would have lead to an overestimate.<br><br>With regard to transit time between the colony and foraging locations at sea, only a small proportion of the foraging trip for guillemots and razorbills is flight (Thaxter *et al.* 2009, 2010). We also note that there was no direct tracking information available that would have informed the time allocation proportions of birds in the Dogger Bank zone.<br><br>The methodology applied is considered to most accurately reflect the number of birds underwater during survey and hence give the most realistic correction for population estimates. | Appendix 5 |

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| NE/JNCC | Consultation on draft ES | A5.9. We would suggest that, whilst many studies do not provide sufficient detail on time spent underwater, such data may be available and held by the authors (and not included due to the lack of relevance to the specific study). Authors could be approached for pers. comm. information not necessarily published in the study, but which may still be provided on request. We agree with the conclusion that "*Sea-surface pauses between dives are a related function of diving activity, but nonetheless should not strictly be included when correcting for birds missed from surveys at sea.*" | We have reviewed the available information in the literature as is standard practice in meta-analysis, but given the constraints of the work, it has not been possible to undertake the wider review of datasets within the scope of this work. | Appendix 5 |
| NE/JNCC | Consultation on draft ES | We believe that further thinking and explanation are needed to determine the appropriateness of the current correction factor; why does time spent underwater need to be converted into a temporal metric (i.e. a percentage of 24 hours) rather than simply a percentage of time spent foraging? | Time spent underwater per 24 hours was presented in this Appendix in line with how foraging information was presented in the literature – this also includes time spent at the nest (as stated in the text). The final correction factor uses "% underwater / feeding trip" therefore excluding time spent at the nest. The correction factor does not need converting to 24 hours. | Appendix 5 |
| NE/JNCC | Consultation on draft ES | A5.15. Any application of this calculation (i.e. time spent underwater as a percentage of foraging trip) to site-based abundance estimates, automatically incorporates some component of transit time. As birds are being attached to estimates for the project site only (as opposed to all birds available within the 'transit area') this will automatically lead to an under-estimation of the percentage time spent underwater, when calculated relative to the abundance of birds in the project site (as per our comments above). | This point is covered in the comment above under A5.5. | Appendix 5 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | A5.19. We note the following differences and suggestions regarding the final figures suggested for percentage of time spent underwater :<br><br>• Common guillemot - we calculate this to be 23.75% of time spent underwater per trip (excluding flight time) (based only on Thaxter *et al.* 2010). Assuming birds fly direct to foraging location, this represents percentage time spent underwater versus time on the surface (including surface pauses). Clearly this should only be applied to abundance estimates from aerial surveys (excluding birds in flight).<br><br>• Razorbill - We calculate this to be 17.4%, omitting time in flight (based on Thaxter *et al*. 2010). Potentially some issues with rounding up/down of decimal places, lifting figures directly from Table 1 in Thaxter *et al.* (2010).<br><br>• Atlantic puffin – We suggest this value is recalculated based on our comments on the other auk figures above.<br><br>• White-billed diver - This seems very high. Polach & Ciach (2007) present dive data for Red-throated divers (RTD) and Black-throated divers (BTD). It should be noted that time spent underwater differed considerably between adults and immatures. If we just consider adult birds, their study presents data on time spent 'diving' (which appears to be different from time spent underwater - i.e. includes surface pauses). Calculating time spent on the surface as a proportion of overall time spent diving in this study produced estimates for RTD of 69% and BTD of 52%. | The recalculation of estimates in Thaxter *et al.* 2010 removing flight time is not applicable to our combined in-air and on-sea estimates given reasons stated above. We note the comments for divers. There are several imperfections in using any single figures from this study. The use of 69% would be precautionary but is very similar to the value we already present, and will not change the final impact assessment for white-billed diver. | Appendix 5 |
| NE/JNCC | Consultation on draft ES | A5.20. Clear presentation of the formula is required so that it will be possible to review what the calculations were applied to i.e. Was the time spent underwater multiplied by the total at-sea abundance estimates and then were the two added together? | A formula has now been inserted. | Appendix 5 |
| NE/JNCC | Consultation on draft ES | JNCC and Natural England note that the 'Proportion at CRH' values provided in Table 4.15 of the ornithological differ from the '% at PCH' values given in Cook *et al* (2012). We assume that the Cook *et al* spreadsheet has been *used* to calculate alternative values due to the proposed turbines having a different rotor swept area from the 20m – 150m standard used in the main table of figures– but seek confirmation of whether this is the case. | This is the case. A footnote to this effect has been added to the table, which has been updated to reflect the fact that the worst case scenario is now 6MW with a minimum clearance of 26m above highest astronomic tide. | Section 4 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | We also note that using Option 1 of the Band model produces significantly higher rates of collision when compared with Option 3 (Option 1 is a magnitude higher in many cases). We also note that the observed PCH for northern gannet and black-legged kittiwake are at the upper limits of the range of values derived from Cook *et al*. Given the discrepancy between the outputs from the two options, JNCC and Natural England consider that there is potentially significant uncertainty regarding the CRM values used in the ES and HRA. We believe that presentation of both Option 1 and Option 3 within the impact assessment will be required. Provision of results in this format will subsequently aid the cumulative impact assessment and is discussed further below. | Justification for the use of option 3 added in section 4.3.<br><br>Option 3 allows variation in turbine design (i.e. in their size and height above sea level) to be more accurately incorporate into the assessment of collision risk. Furthermore, collision risk is not spread evenly within the rotor swept area as is assumed by Options 1 & 2. Using Option 3 allows us to take this into account. | Section 4 & 5 |
| NE/JNCC | Consultation on draft ES | It should be noted that Option 3 is based on modelled data collected largely from inshore wind farms, there is uncertainty regarding whether flight height distributions can be extrapolated to offshore sites such as Dogger Bank.<br><br>Furthermore, the input data for the modelled distributions derives from boat-based data only. While we accept that this was the best available data for this process, consideration should be given to detectability issues, as birds higher (further) from the observer may be more likely to be missed, yet are not distance corrected. This is an issue for any boat-based data set, but the effect this has on flight heights, when modelled to simulate flight height distributions with the rotor swept area (option 3) may be of greater significance. It would be informative if this could be considered and addressed within the report. | Additional discussion has been added in this section. Whilst Option 3 is based on modelled data largely collected from onshore wind farms, it also incorporates data from Dogger Bank. Analyses of the modelled distributions suggested that distance to shore did not exert a strong influence on the recorded flight heights of birds (see Cook *et al*. 2012). Additionally, the proportions of birds within the band collected during boat-based surveys were within the 95% CIs of the modelled distribution.<br><br>To minimise the probability of missing birds, data were limited to those collected during snapshot counts 300m either side of the boat. Whilst we recognise there is a potential to miss birds flying at greater altitudes, this is an equal issue with all boat-based survey data. | Section 4 |
| NE/JNCC | Consultation on draft ES | JNCC and Natural England understand that the digital aerial data collection method employed by Forewind enables calculation of flight heights. We suggest that it would be informative to produce a flight height distribution from this data to compare with that of the modelled data presented in Cook *et al.* | The data on flight heights potentially available through the HiDef aerial surveys has much potential, though at the present time, it was felt that further evaluation of the accuracy and precision of the data was probably required before they might be confidently used. In addition, it would also take considerable extra time to revisit the data collected from 2010 to apply the methodology to calculate flight heights for the survey period as this was only developed towards the end of the data collection for Dogger Bank Creyke Beck. Each image would need to be revisited for aerial surveys for the two years used to inform this assessment. | Section 4 |
| NE/JNCC | Consultation on draft ES | JNCC and Natural England would welcome provision of the completed Band model CRM spreadsheets in an Appendix to the ornithology technical report so these can be reviewed with respect to the final ES. | This information can be supplied as spreadsheets | |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | JNCC and Natural England note the omission of a number of consented or proposed OWF within the North Sea from the list of projects screened in to the cumulative impact assessment (CIA). Please see our detailed comments below: judging from Appendix 8 of Appendix 11a, this appears in part to be due to the screening out of projects beyond the foraging range of seabird colony SPAs, whereas cumulative impacts need also to be considered with respect to impacts on seabirds outside of the breeding season, which would bring more remote OWF within the North Sea into scope. If, in some cases other projects have been excluded due to apparent unavailability of data, further attempts to obtain this data should be made and where problems continue to persist then further advice should be sought from JNCC and Natural England. | Further projects have been included in the CIA list following the publication of recent reports. Cumulative impacts are considered for projects beyond the foraging range of seabird colony SPAs, and have been used to inform assessment at national and biogeographic scales. However, it is exceptional to find other examples where impacts out of the breeding season have been apportioned back to protected sites. | Section 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | The CIA should also incorporate the impacts of operational OWF, due to the potential for existing projects to have ongoing effects (yet to be reflected in the baseline) on long-lived but slow-to-mature seabird populations. In addition, projects that can reasonably be foreseen to come forward during the lifespan of Dogger Bank Creyke Beck should feature in the CIA, although we appreciate that limited seabird data regarding these projects is currently available. Nevertheless, there is a real need to produce a realistic worst-case scenario of potential cumulative impacts over the lifetime of the project, even if impact assessment of future projects is qualitative. | Following the Forewind CIA strategy as previously consulted on with stakeholders including JNCC and NE, it is not considered appropriate to include operational wind farms within the cumulative impact assessment. This is only the case where a project has been operational for the full period over which the baseline data was collected. Where a project was under construction at the start of the surveys and where data allows, projects have been included in the CIA. Whilst the point is noted that impacts of operational wind farms may not yet be being experienced there is no way to tell whether this is the case or whether in fact the contrary is true and the full impacts are already being experienced. Further, for these projects it is often the case that the assessment in the ES is based on a worst case which has not, in reality, been built and hence the impacts anticipated would not be expected to be as predicted in the ES for that project, and would in fact be lesser. It would be a strategic level activity to revisit all now operational wind farms and calculate the actual predicted impact based on the operational wind farm and outside the scope of work for one developer. Hence it is considered that inclusion of these projects would give unrealistic results which are worse than the realistic worst case scenario and may inaccurately assume that impacts for these projects are not already being experienced at the relevant species or site level. As a result, Forewind have not included operational projects in the CIA and feel that to add these impacts to those outlined in the CIA would present an unrealistic worst case scenario which risks overestimating impacts on receptors.<br><br>In addition, and in line with the Forewind CIA strategy, projects which are reasonably foreseeable have been included where data on the project and environmental information are suitable to allow a meaningful assessment. For example, this has included an assessment of the Teesside A and B projects as part of the CIA. However, where confidence in environmental or project data is low, it is not considered appropriate to include these projects within the CIA as this would give highly unrealistic results based on Rochdale envelopes. The inclusion of such uncertain data could lead to either under- or over-estimates of impacts, and would not aid the decision making process. | Section 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | More generally, JNCC and Natural England advise careful checking of recent publically-available documentation from other OWF in order to identify as comprehensive a set of figures from these as is possible. We fully recognise the difficulty of carrying out cumulative impact assessments on the basis of data which is either not comparable or altogether lacking. Nevertheless, what information is available in the draft ES and AA report already indicates potentially significant cumulative impacts on a number of species at the designated site scale. We also note discrepancies between cumulative figures presented within this ES and figures presented within other North Sea OWFs (e.g. see East Anglia ES). Again, we would welcome further engagement on this subject during the final pre-application period. | Forewind's intention is to provide a meaningful cumulative assessment to inform the stakeholders and decision makers in relation to the project in question. To this end, Forewind have undertaken a thorough screening process to identify projects where confidence in project and environmental data is high enough to allow an assessment to take place. This process ensured that the Dogger Bank Teesside A and B projects are included in the assessment presented here. However, whilst Forewind are also aware of other Round 3 projects which are coming forwards, these have had to be screened out due to the low confidence in project and environmental data meaning that any CIA would not result in a conclusion which could be used to inform the decision for Dogger Bank Creyke Beck<br><br>Please also note that it is not clear where the collision value for northern gannet for Hornsea has been derived from in the East Anglia One ES. A further discrepancy relates to the collision value for lesser black-backed gull at Greater Gabbard and again it is unclear as to where the value in the East Anglia One ES has been derived from. | |
| NE/JNCC | Consultation on draft ES | JNCC further note that cumulative impacts, within the ES and Technical Appendix should be assessed and presented in terms of the significance to a range of population levels – regional, national and biogeographic. Instead, assessments are made against SPA populations, these are primarily relevant to the HRA report. | Cumulative impacts, as with those at the project levels, are assessed against a range of population levels (protected site, national and biogeographic). | Section 5 & 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | In relation to CIA of collision risk, we reiterate our request above concerning the provision of Option 1 results for assessment. As most other offshore wind farm sites to date have utilised either Option 1 or Option 2, it would not be appropriate to undertake a CIA using Option 3 in Dogger Bank and Option 1/Option 2 from others as Option 3 figures in Dogger Bank are of a magnitude smaller than when using Option 1. | Full results based on the use of Option 1 of the Band model are provided in Appendix 7 for comparative purposes.<br><br>No attempt was made to standardise estimates using the same assumptions as presented in this assessment, as, based on the information presented on other assessments, although this would have likely reduced the numbers of birds impacted, this would only have been possible in some cases. The assumptions used in deriving displacement and collision risk estimates in other assessments are highlighted in tabulated summaries where these differ from those used in this assessment. Given the greater understanding and refinement that Option 3 provides in predicting collision impacts using the Band model. It is evident that the use of Option 1 for Dogger Bank would greatly overestimate impacts. Therefore, inclusion of Option 3 numbers for Dogger Bank Projects with Option 1 from sites elsewhere, represents a more realistic case reflecting current opinion for Dogger Bank, whilst retaining precaution in the CIA. | Section 6 |
| NE/JNCC | Consultation on draft ES | As with other sections, the CIA within the Technical Appendix would benefit from results per species being presented in a tabular format. Furthermore, the tables presented (Table 6.8, 6.9, 6.0) should provide totals for each species, per season/year. Additive effects should also be summed where numbers are available, as per our comments above. | Tabulated information is presented for the key effects of collision and displacement in Tables 6.8 and 6.9, which now include totals inclusive of values for the Teesside A and B, Creyke Beck A and B and Teesside C and D projects. | Section 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | Despite the difficulties that a CIA on barrier effect may present, an attempt at assessing the likely cumulative effect should be undertaken. | There is considerable uncertainty regarding the assessment of barrier effects posed by offshore wind farms. Assessment of the potential cumulative effects for seabirds from their breeding colonies has not been attempted (and is considered unfeasible) because of: i. The difficulties in assessing the magnitude of the potential impacts of this effect; ii. The complexities in the numbers of potential projects affecting birds foraging from different colonies (see Appendix 8); and iii. The potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al.* 2009), and thus are problematic to quantify. Likewise, no attempt was made to assess in a quantified manner the cumulative impact of the potential barrier effects posed by the Teesside A and B, Creyke Beck A and B and Teesside C and D projects projects and other wind farm projects within the North Sea on the 46 species' populations of terrestrial or waterbird migrants that are UK SPA features whose migration zones (defined by Wright *et al*. 2012) overlap with the Teesside A and B project areas. | Section 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | We note that concerns over the CIA approach, CRM and presentation of impacts need to be addressed, and request that species data is presented in an alternative format (i.e. percentage increase of baseline mortality at relevant population scales). However, based on the data provided, JNCC have initial concerns regarding the following species at both National and possibly Biogeographic population levels:<br><br>- Gannet – cumulatively with other plans and projects at North Sea level (collision)<br><br>- Black-legged kittiwake - cumulatively with other plans and projects at North Sea level (collision)<br><br>- Lesser black-backed gull - cumulatively with other plans and projects at North Sea level (collision)<br><br>- Great black-backed gull - cumulatively with other plans and projects at North Sea level (collision)<br><br>- Common guillemot – cumulatively with other plans and projects at North Sea level (displacement)<br><br>- Razorbill – cumulatively with other plans and projects at North Sea level (displacement) | This is noted. | Section 5 & 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | 6.3.40. We note that the additional mortality of 5,572 birds per year to a national population of 437092 individuals, for a long lived species is a significant increase in baseline mortality. Taking baseline mortality as 8.1% (Wanless *et al* 2006), then the natural mortality for this population would equal 3540 per year. The additional mortality of 5572 birds is over 150% increase in baseline mortality at a national level (and a 50% increase at a biogeographic level). These are way and beyond acceptable levels of additional mortality.<br><br>Wanless, S., Frederiksen, M.,Harris,M.P. and Freeman,S.N. 2006. Survival of gannets *Morus bassanus* in Britain and Ireland, 1959-2002. Bird Study 53, 79-85.<br><br>In this response, JNCC have not presented similar calculations for the other listed species, but this should be presented in the final ES. We request the same is presented for both Creyke Beck projects alone and cumulatively with Teeside and all other relevant wind farms. As noted above, results should be tabulated; there is an overreliance on text-based presentation of results. We acknowledge that, there is a level of uncertainty regarding the confidence of cumulative assessments, and would welcome further engagement with Forewind on this subject. | Consideration of the impact of the effect of collision in terms of the potential increase in background annual adult mortality is provided for all species at all spatial scales. With respect to the specific comment regarding gannet, we note that there appears to be a decimal place issue in the % value quoted. | Section 5 & 6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | In a number of migrant seabird species accounts (e.g. skuas), the issue of turnover is acknowledged. In the absence of any attempt to quantify turnover, the population estimates provided are likely to significantly underestimate the number of migrant seabirds either transiting the OWF or 'stopping over' for short periods, particularly if peak periods of movement have been missed. This in turn is likely to lead to an underestimation of the significance of the OWF at the regional or national scales, and therefore which species have been scoped in for further assessment. Whilst arctic and great skuas have already been scoped into CRM, adequately quantifying turnover for species such as pomarine skua and little gull may increase the significance levels of these populations and thereby justify more detailed assessment of these species. Whilst JNCC and Natural England appreciate that the potential migratory seabird population for a given area of sea is difficult to quantify, without further exploration of alternative methods we question whether the approach taken is sufficiently robust for EIA purposes.<br><br>We advise that Forewind review the approach taken to this issue in other OWF ESs, for example East Anglia One. Whilst acknowledging the limitations of this method for OWFs further offshore, there is potential merit in the use of a simple theoretical model of migratory movements to quantify turnover. Furthermore, the APEM migration model has also been used by other OWF developers to produce outputs for migrating seabirds which can then be used in CRM. We would be pleased to explore potential approaches to producing realistic population estimates and associated assessments for migratory seabirds that use or transit Dogger Bank Creyke Beck. | We have reviewed the approach taken to this issue in other OWF ESs, including East Anglia One. The method used there for great skua makes a precautionary assumption that the entire flyway population of this species would pass through the North Sea/Strait of Dover, and that most (90% of) birds are within 60km of the coast (a zone that includes the wind farm). Because of the much greater distance of the Forewind projects from the coast, such an assumption is both inappropriate and would not be precautionary. We also note that the East Anglia One assessment adds together a number of precautionary assumptions. We have concerns that the application of this method for Forewind will present an unrealistic final figure. The proportion of the national and biogeographic populations of great skua likely to migrate through the North Sea is highly uncertain and recent research, for example, has indicated that several breeding populations are likely to take an alternate route to their wintering quarters that spread across the Atlantic (Magnusdottir *et al*. 2012). Even great uncertainty exists regarding the migratory routes of and wintering quarters of Arctic skua.<br><br>For species such as pomarine skua and little gull, we have insufficient knowledge of migratory routes and wintering quarters to be able to make any kind of sensible assumptions about numbers passing through the North Sea to conduct an assessment such as that carried out for great skua (but not for either of these species) in the East Anglia One ES. We therefore suggest that a qualitative assessment that acknowledges turnover but does not attempt to quantify it when we have no data with which to do so is preferable to attempting to quantify bird numbers and presenting a misleading estimate that is likely to be inaccurate and would imply a level of precision that the data cannot support. | Section 3-6 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | TA: 2.1.3 and 2.1.5. JNCC seek clarity regarding the number of surveyors and their roles whilst undertaking boat-based surveys as text within the ES appears to contradict itself. JNCC and Natural England note that data collected during boat-based surveys were also undertaken in sea state 5 or under. Given the ESAS methodology states that surveys should be carried out in conditions less than sea state 5, it would be worth clarifying the proportion of surveys carried out in sea state 5, and if this proportion is significant, assess the implications of this for the accuracy of the survey results in the final. | Amended. Data were collected in sea-state 5, this accounted for ~14 % of the data. However, as stated in paragraph 2.3.2, sea-state was included as a covariate in the distance model when analysing boat-based data. Consequently, decreased detection probability in sea-state 5 will have been accounted for in the model based population estimates. | Section 2 |
| NE/JNCC | Consultation on draft ES | TA: 2.1.6. JNCC seek an explanation as to how the amendment to the recorded flight height bands during the data collection was accounted for during analysis. Furthermore, we query how a surveyor can have no confidence in a flight height band and wonder on how many occasions this occurred and how this data was then handled during analysis. | The population estimates derived in this assessment did not require information regarding the flight heights of birds, simply whether a bird was in flight. With respect to the site-specific flight height information used in generating alternative collision risk estimates using Option 1 of the Band (2012) model, analyses did not consider data from the earliest surveys when confidence in the assessment of flight height bands was lowest. As indicated in paragraph 2.1.6, confidence in the accuracy of assessment of flight heights will decrease the further from the vessel and reference masts that the flying bird are observed. | Section 2 |
| NE/JNCC | Consultation on draft ES | TA: 2.2.2 and Table 2.1. JNCC are unclear how a variable percentage agreement can be provided for more than 20% of the boat based surveys considering only 20% of the data were purported to be quality checked. | Text has been added to section 2.2 to clarify this. | Section 2 |
| NE/JNCC | Consultation on draft ES | TA 2.3 We request further explanation of how separate abundance and/or density estimates for birds in flight and birds on the water can be derived from the modelled data? This has implications for both collision risk modelling, and availability correction for diving birds. | Baseline population estimates were derived from a model that combined information on birds recorded on the water and in flight. However, it was possible to generate separate estimates of birds in flight only for use in collision risk analyses. As the underwater correction was applied to the overall population estimates (and separate estimates of birds on the water only were not produced), the time underwater was considered as a proportion of the species' overall time budget including time spent flying. | Section 2 |
| NE/JNCC | Consultation on draft ES | TA: 2.3.1. JNCC could find no evidence as to how this decreased detection rate has been accounted for in the assessment of impacts. Please can Forewind provide further information. | Detection probabilities were included in the modelling of boat-based data to account for potential missed birds. These data were used to inform on the identities of birds that were unidentified during the aerial surveys on which the population estimates were based. See "model description" and Figure 2.1, specifically "detectability model", for more information. | Section 2 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | TA: 2.3.2. JNCC note that a number of covariates included may be correlated, could an explanation be provided as to if and how this is accounted for within the modelling procedure? Could Forewind expand on why the first two bands were pooled for all species? | We note that some covariates were correlated but not above the 0.7 threshold as is generally used in multivariate analysis of this kind. We found that distance to shore and distance to coast were particularly correlated for some species, and so distance to colony only was included for some species. | Section 2 |
| NE/JNCC | Consultation on draft ES | TA 2.3.11. JNCC query the minimum sample size required to conduct the GAM based modelling procedure. We note that both Arctic and Great Skua were recorded in very small numbers during the surveys, yet were both modelled. | Consideration was given as to the model fit in determining whether this approach was used in generating population estimates. The weakest model was produced for Arctic skua and this is reflected in the confidence limits. | Section 2 |
| NE/JNCC | Consultation on draft ES | TA: 2.3.17. At present it is not clear to JNCC how the population estimates for less numerous birds were derived. We seek a more detailed explanation of which data were used, i.e. were boat and aerial data combined or were data from just one of these methodologies used? | Text added to section 2.3 to clarify these points. | Section 2 |
| NE/JNCC | Consultation on draft ES | TA: 2.7.1. Please note the Avian Population Estimates Panel (APEP) work in Baker 2006, has been superseded by Musgrove 2013. | Population estimates have been updated accordingly. | Section 2 |
| NE/JNCC | Consultation on draft ES | C11: 3.2.5. JNCC and Natural England note that surveys have continued until spring 2012. Data from surveys beyond 2011 must also be presented and used in the final ES. | It is standard practice (Defra 2005) to collect two years of boat based data to inform EIA for impacts on birds from offshore wind farm projects. Whilst survey work is ongoing across the Dogger Bank Zone, the focus is on later projects and data are not yet in a form suitable for inclusion in this assessment. | Section 3-6 |
| NE/JNCC | Consultation on draft ES | C11: 3.2.13. An updated AEWA report was produced in 2012, Natural England recommend that this is used to review the population estimates used. | Population estimates have been updated accordingly | Section 3 |
| NE/JNCC | Consultation on draft ES | C11: Table 3.7. As noted in JNCC / Natural England's interim advice note on displacement, whilst generally of low sensitivity to disturbance, northern gannet has been identified as showing significant macro-avoidance rates to OWF. Therefore we recommend that northern gannet is assessed as of medium or even high sensitivity to displacement. | For northern gannet, evidence suggests that although the species might not be highly sensitive to disturbance in general (e.g. ship and helicopter traffic) the species may show strong macro-avoidance of offshore wind farms (Krijgsveld *et al*. 2010, 2011). Hence, following the recent NE/JNCC (2012) guidance, we now apply a 75% displacement rate for this species. | Section 3 |
| NE/JNCC | Consultation on draft ES | C11: 3.3.15. We seek clarity regarding the percentage displaced figure/s used across the OWF and 4km buffer for diver species. Does the percentage of birds predicted to be displaced decrease in buffer zones beyond the OWF, as per other species, or does it remain constant? | A single precautionary displacement rate has been used for white-billed diver in the project areas and buffer zones due to the small numbers observed and the high sensitivity of this species to this effect. | Section 3 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | C11: Table 3.8. Please note that near 100% displacement and mortality rates equivalent to near 100% of displaced birds have been and continue to be assumed for red-throated diver in OWF casework relating to the Outer Thames Estuary SPA. | As per JNCC/NE guidance, predicted impacts of displacement, for each project and species, based on a range of displacement and mortality rates are provided in Appendix 10. A 100% displacement rate is used for white-billed diver given the likelihood that the species will respond to disturbance in a similar manner as to other diver species. However, there is a lack of evidence to suggest a realistic mortality rate for this or otherspecies. | Section 3 |
| NE/JNCC | Consultation on draft ES | C11: 3.3.19/3.3.21. JNCC and Natural England seek clarification as to whether birds flying below PCH were screened out with regards to barrier effects? If these birds were screened out, an ecological justification for this would be appreciated. Low-flying species seem likely to also undertake macro-avoidance of OWF. | No, this is not the case. All flying birds within the wind farm project areas were considered. | Section 3 |
| NE/JNCC | Consultation on draft ES | C11: 3.3.26/Table 3.10. JNCC and Natural England question whether the magnitude definitions used here are appropriate. It should not be assumed for example that an increase of say 4.5% (i.e. <5%) in background mortality is not significant. Any such assumptions require further justification. | It is felt that the application of the thresholds proposed for the assessment of magnitude in relation to the size of a reference population to the percentage increase in background mortality is inappropriate, not least because there is the potential for an increase in background mortality of over 100%. In order that there is consistency in the outcomes of the assessments of significance of the effect of collision based on consideration of the proportion of the population impacted or the percentage increase in background mortality, an alternative classification of magnitude is thus proposed for the latter. | Section 3 |
| NE/JNCC | Consultation on draft ES | C11: Table 6.2/Table 10.4 – The Durham Coast SSSI is notified for its breeding seabird assemblage, which includes black-legged kittiwake. It is unclear to Natural England why this SSSI is not included in these tables. | This SSSI is now included, with population data for black-legged kittiwake taken from the Seabird Monitoring Programme database. | |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
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| NE/JNCC | Consultation on draft ES | TA: 10.1.13. JNCC and Natural England believe that a broader range of OWFs should be screened into the CIA, including installed projects and those already envisaged for the future (e.g. potential Round 3 projects). Please see our comments above and regarding the draft AA report. | See response above regarding operational wind farms. In addition, please note the Forewind CIA Strategy which can be found as Appendix 5A to the ES which was previously consulted on. Forewind's intention is to provide a meaningful cumulative assessment to inform the stakeholders and decision makers in relation to the project in question. To this end, Forewind have undertaken a thorough screening process to identify projects where confidence in project and environmental data is high enough to allow an assessment to take place. This process ensured that the Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects are included in the assessment presented here. However, whilst Forewind are also aware of other Round 3 projects which are coming forwards, these have had to be screened out due to the low confidence in project and environmental data meaning that any CIA would not result in a conclusion which could be used to inform the decision for Dogger Bank Teesside A and B projects. | Section 6 |
| NE/JNCC | Consultation on draft ES | 4.3.94. Consideration should be given to the impacts of suspended sediments on foraging seabirds. Refer to our comments in Annex N.1. for further details. Furthermore, if a negative impact on the sandeel fishery is identified as a result of increased suspended sediments, then a review of the indirect impacts on seabirds will need to be undertaken. | Text added to section 4.3 to address this point. | Section 4 |
| NE/JNCC | Consultation on draft ES | TA: 4.5.3. JNCC seek further information on how construction vessels will be able to appropriately identify and avoid seabird rafts during sensitive periods and how this will be managed. | A code of conduct will be followed by all vessel operators in line with recommendations from DECC (2011). Sentence inserted at para 4.5.4 where this point is stated. | Section 4 |
| NE/JNCC | Consultation on draft ES | TA: 5. For the purposes of consistency and future CIA, figures should be presented for each species detailing the actual numbers predicted to be impacted by each effect and not presented as percentages of the different population scales. | Tabulated information is presented for the key effects of collision and displacement in Tables 6.8 and 6.9, which now include totals inclusive of values for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects. | Section 5 & 6 |
| NE/JNCC | Consultation on draft ES | TA:5.2.541 and C11:10.2.14. JNCC seek a clearer explanation of the predicted deviated route, in terms of additional distance a species could be expected to fly. Currently the text suggests that the assessment has only been made against the shortest alternative route, which suggests a high-level of cognitive/spatial awareness by an individual. | The deviation around the project or projects will depend on the route, though given the shape of the individual projects is reasonably consistent. The deviation is considered in terms of the shortest possible route across the North Sea in order that the figures provided give a precautionary estimate of the relative increase in the distance travelled. | Section 5 |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
|---|---|---|---|---|
| NE/JNCC | Consultation on draft ES | Chapter 11:10.2.11. The information presented requires further clarification. A series of percentages are presented, however it is not clear what each percentage refers to. In addition we note that the assessment is at a designated sites level, for the purposes of EIA population level impact should be assessed a several scales – e.g. regional, national, biogeographic. | The significance of the predicted impacts of effects are considered throughout at protected site, national and biogeographic scales. | |
| NE/JNCC | Consultation on draft ES | TA: Table 2.1. UK BAP species are 'priority species' not 'Annex I' species. Common starling is also a UK BAP species. | We are not sure what this refers to. Table 2.1 show the monthly boat survey effort. | |
| NE/JNCC | Consultation on draft ES | TA: Tables 3.1, 3.2, 3.3 and 3.4. It would be useful if the table headings could be expanded so as to clearly define the source of data i.e. does Table 3.1 contain the summarised results of boat counts or is it the output of the Distance model? | Table heading amended to clarify data sources. | |
| NE/JNCC | Consultation on draft ES | TA: Figure 3.1 (and repeated for each project, projects combined and for each species). The graphs produced for population estimates would benefit from being more legible and graphs presented for comparative purposes should be presented with identical scales. | Graphs now amended to be on identical scales. | |
| NE/JNCC | Consultation on draft ES | TA: Figure 3.2 (and repeated for each year for each species). JNCC believe that it would not require too much additional work to additionally present the density population estimates in a combined format that incorporates both years' data. In our opinion, this would provide a broader impression of the site usage, accounting for year to year variability. Additionally, providing a map that shows agreement (weak to strong) between years would be helpful. We appreciate that whilst this might not be possible for the Creyke Beck project it should be included for Teesside. | We have updated all tables with average values across the two years of surveys. However in the timescale of revisions, we have not made this alteration for the Dogger Bank Creyke Beck A and B assessment for maps provided, but will be considered for the Dogger Bank Teesside A and B assessment. | |
| NE/JNCC | Consultation on draft ES | TA: 3.3.8/Table 3.6. It would be helpful if the ES briefly detailed how the proposed correction factors to separate out breeding and non-breeding birds were generated. | It is not clear what text this comment refers to. See section 4.2 for details on how proportions of breeding and non-breeding birds were calculated | |
| NE/JNCC | Consultation on draft ES | TA: 4.1.17. Pomarine skua does not breed in the UK | It is not clear what text this comment refers to. Pomarine Skua is not mentioned in Section 4. | |
| NE/JNCC | Consultation on draft ES | Chapter (C)11: 59 and TA: 4.1.30. Currently there are contradictions between these two documents regarding whether the 1% national threshold has or has not been exceeded within the project areas and/or the Dogger Bank zone for Lesser black-backed gull. It would appear that the technical appendix provides the more accurate account. Please adjust accordingly. | This has been resolved for the final application ES chapter. | |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
|---|---|---|---|---|
| NE/JNCC | Consultation on draft ES | TA: 7.4.1. This should read 'migrant waterbirds' not sea birds. | It is not clear what text this comment refers to. | |
| NE/JNCC | Consultation on draft ES | C11: 6, 2.2.4. The reference list on this page needs updating to reflect amendments made elsewhere - Garthe & Huppop (2004) should also list Furness & Wade (2012) and IEEM (2004) should be 2010. | IEEM (2010) already included, Furness & Wade (2012) added | |
| NE/JNCC | Consultation on draft ES | C11: 31, 3.2.13. Check that reference should be Wetlands International 2012. | Wetlands International (2012) references in 2.7.2 & 2.7.3 have been updated to Wetlands International (2013) to reflect most recent waterbird population estimates. | |
| NE/JNCC | Consultation on draft ES | TA: Table of contents . It would be helpful if the table of contents could be expanded to include a schedule of the Appendices for the Technical Appendix, including the tables and figures presented therein. | Addressed | |
| NE/JNCC | Consultation on draft ES | TA: 35, 3.1.8. Boast should read boat | Amended | |
| NE/JNCC | Consultation on draft ES | TA: 4.5.1. Need to replace XX with appropriate chapter number (13?) | Amended | |
| NE/JNCC | Consultation on draft ES | TA: 4.3.90. Need to give appropriate fish chapter reference not XX | Amended | |
| NE/JNCC | Consultation on draft ES | TA, 5.1.9. This section needs expanding to also highlight that birds may be displaced away from areas with boats, as has previously been stated elsewhere i.e. birds are not just positively attracted to boats but also negatively displaced. | These points are fully covered in the methods section 4. | |
| NE/JNCC | Consultation on draft ES | TA: 216-7, Clarify the apparent contradiction in the following text:<br><br>*"That some species...may also be attracted to the wind farm due to changes in fish populations. .... However, given the limited evidence regarding the extent of attraction of birds to offshore wind farms and that any attraction might be balanced by the mostly minor negative impacts predicted for fish for all effects ."* | It is possible that fish may be attracted to a wind farm if benthic food supplies also increase, for instance around the base of turbines. However, it is also likely that fish may be impacted through the many effects discussed in section 4. Minor negative impacts are predicted for fish overall. We therefore see no apparent contradiction in the sentence. | |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
|---|---|---|---|---|
| NE/JNCC | Consultation on draft ES | TA: Appendix 2. We would like to see this Appendix presented in a similar format to Appendix 1, detailing the distance from the development site to the designated sites for migrants. We also believe that Appendix 2 would benefit from being referred to, once it has been revised, within each of the appropriate sections pertaining to migrants and not just within the transboundary chapter. | The distances of the projects to these sites has been added to the appendix. | |
| NE/JNCC | Consultation on draft ES | TA: Appendix 4. Make Figure A4.1 more legible, too busy and too small | Attempted, but with such a spread of information, we were unable to improve upon the current layout. | |
| NE/JNCC | Consultation on draft ES | TA: Appendix 5. A4.5. Where is table S1 – list of projects with post construction monitoring reports? | A list of projects with post construction monitoring reports is now provided in paragraph A4.10 | |
| NE/JNCC | Consultation on draft ES | Appendix 6. Species specific collision risk assessments: For each species, the collision risk graphs for each model would benefit from being presented on identical scales in order to be able to cross compare model predictions. This information should also be presented in tabular format in order to be able to clearly cross-compare between the outputs of the different models. | Collision risk graphs are now presented on identical scales and tables have been added summarising annual collision estimates under each option. | |
| NE/JNCC | Consultation on draft ES | TA: Appendix 10. Check text in each table heading, as currently it suggests that the buffers for all species are 2km, contrary to text earlier on in the Appendix. | A 2 km buffer has been used for all species with the exception of White-billed diver. Results for this species are not presented in the matrix displacement x mortality tabulations owing to the very small number recorded. | |
| NE/JNCC | Consultation on draft ES | Documents not referenced. There are two documents in the Appendix of the Technical Appendix that do not appear to have been referenced anywhere. They appear at the end of Appendix 3: Population estimates and Geographical scope Ecological assumptions? | These earlier draft assumptions documents are provided for reference to comments received during initial stakeholder discussions – see below and above. | |
| Norwegian Ministry of the Environment | Consultation on draft ES | The Norwegian Ministry of the Environment suggests that the impact form this wind farm on possible long range migration routes for birds are assessed in context with the same assessment for other possible wind farm development in relevant distance to seize possible CIA | Due to a lack of information from assessments, no attempt was made to assess in a quantified manner the cumulative impact of the potential barrier effects posed to migrants by the Creyke Beck A and B and Teesside A and B projects and other wind farm projects within the North Sea. This is also in part because the potential cumulative impacts of barrier effects from multiple wind farms are not likely to be additive (King *et al*. 2009) and thus are problematic to quantify. The indicative figures presented in Table 6.12 provide some indication of percentages of species' migration zones that overlap with the overall suite of wind farm projects in the North Sea region considered in the cumulative assessment. | |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
|---|---|---|---|---|
| NE/JNCC | Consultation on draft ES – HRA report | Advice relating to English SPAs – Definition of seabird breeding seasons<br>In the context of the AA report, Natural England has some concerns that the breeding seasons used in the draft ES and associated documents are too narrow for some species, notably northern gannet, black-legged kittiwake, common guillemot and razorbill. Whilst the breeding seasons deployed are broadly appropriate for the North Sea region, colonies within that region are likely to show latitudinal differences. We advise that breeding seasons for key SPA colonies are defined carefully with reference to a range of relevant literature, as these will have a significant bearing on the apportioning of impacts to these sites. The breeding season should be considered as beginning before egg-laying: whilst prospecting visits to colonies in the winter months should not be incorporated into the season used, we would expect the start of the defined breeding season to reflect the peak arrival of breeding birds to their colonies, based on best available evidence. The close of the breeding season should also be chosen carefully with respect to fledging/colony departure, as it will have a significant bearing on the definition of the post-breeding season.<br>As part of this exercise, and also in order to take into account variations in seabird breeding season commencement between years, we recommend that colony-specific data place should be obtained from colony managers where available. Clearly, it would be particularly useful to obtain information on species presence / activity at RSPB Bempton Cliffs both in general and from the years in which baseline surveying took place, as this information would be valuable for the assessment of impacts on the Flamborough Head & Bempton Cliffs SPA.<br>More generally, we advise that there may be value in assessing the field data that has been collected to inform the ES to identify whether there appear to be marked changes in numbers from month to month. This could potentially inform seasonal divisions. So, for example, if abundance of a given seabird species suddenly increases in September, this would give an indication that August might justifiably be considered as part of the breeding season.<br>We fully recognise that ongoing debate about the most appropriate definition of seasons is possible due to variations within colonies and literature. Natural England is commissioning work to bring greater clarity to this important issue, and will provide any associated advice as soon as it becomes available.<br><br>Regarding the definition of an appropriate breeding season for black-legged kittiwake, we advise that there are grounds for considering the breeding season for this species should be extended to incorporate | Seasons were based on Kober *et al.* (2010) in the first instance. Definitions of breeding seasons for key seabird species considered in the assessment are provided in section 2.6. We appreciate the point regarding latitudinal differences between colonies and the expansion of seasons reflects our thinking on these points. The seasons are used within population modelling and subsequently in the impact assessment. As impacts derived from the population estimates were apportioned to a suite of protected sites, it would have been extremely complex to consider specific breeding seasons for different colonies. As suggested, March is now also included as a breeding month for black-legged kittiwake. | |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
|---|---|---|---|---|
| NE/JNCC | Consultation on draft ES – HRA report | Advice relating to English SPAs – Use of maximum foraging ranges when considering impacts on breeding seabird SPAs<br><br>The draft ES and associated documents uses the maximum recorded foraging range when considering breeding season connectivity to seabird colony SPAs, rather than the mean maximum foraging range generally advised by JNCC / Natural England. There are clear merits to taking this approach in the context of Dogger Bank, due to it falling beyond the mean maximum foraging range of several seabird species that are nevertheless present in the breeding season.<br><br>However, when considering species with large maximum foraging ranges, such as northern gannet and auk species, the use of maximum recorded foraging ranges risks potential for impacts to be spread widely across a wide range of seabird colony SPAs, many of which are too distant to account for any meaningful proportion of the birds present at Dogger Bank in the breeding season, based on our knowledge of mean maximum foraging ranges. Use of a mean maximum foraging range approach would screen-in a smaller suite of sites but perhaps those most likely to contribute the bulk of the birds seem at the OWF site.<br><br>Partly in recognition of this issue, our interim advice note, "Natural England and JNCC advice on Habitats Regulations Assessment (HRA) screening for seabirds in the breeding season", proposes a step-wise approach to identifying particular sites, including the assessment of colony-specific data. We note that Forewind have reviewed some available data in Table 4.6 of the Ornithology Technical Report, which we welcome. In the final ES/technical report it may be useful to include information from other SPAs where tagging/tracking has been carried out but breeding season connectivity with the Dogger Bank has not been demonstrated, as this may indicate regional patterns of usage. | We acknowledge the sentence in the NE/JNCC guidance: "The Statutory Nature Conservation Bodies (SNCBs) have tended to advise that the 'mean maximum' range is a suitable metric for HRA. This is because it recognises that different maxima have been estimated or measured for the same species, and the mean maximum range incorporates this variability without relying on single values that might be unrepresentative of all colonies." We are pleased that for some species NE accept maximum foraging ranges may be more appropriate, hence a stepwise approach is taken where existing data suggests mean maximum ranges are not appropriate and maximum ranges should be used instead.<br><br>For common guillmot and razorbill, more recent tracking studies (FAME 2012) have shown that these species may forage considerably further from their colonies than suggested by Thaxter *et al*. (2012) and this, together with the continuing use and concentration of birds in the western part of the Dogger Bank Zone during the breeding season, suggests that birds from breeding colonies do forage at least in this area. A maximum foraging range is thus used for these species, together with black-legged kittiwake, to determine the suite of protected sites that might potentially be impacted by the effects associated with each wind farm project during the breeding season (Table 4.6). With respect to northern gannet, more specific information is available for British, Irish and French breeding colonies (Wakefield *et al.* 2013). This indicates that northern gannets may forage in the zone from both the Flamborough & Bempton Cliffs SPA and Firth of Forth Islands SPA, but not from 10 other colonies considered by this study. Thus the Dogger Bank Zone is considered to be within foraging range of birds from these two sites, while (given the foraging range of these birds) it cannot be discounted that birds from the Seevogelschutzgebiet Helgoland SPA in Germany might also forage within the Zone. | |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
|---|---|---|---|---|
| NE/JNCC | Consultation on draft ES – HRA report | Additionally, in our previous response to the HRA Screening report (February 2013), JNCC and Natural England suggested a review of survey data from the site to identify evidence of auks carrying fish and also their flight direction to provide indicative information regarding whether the auks observed during the breeding season are associated with SPA colonies or are non-breeding individuals. This exercise does not appear to have been carried out (or may not have been possible) – but in the context of limited information being available from auk tracking studies (particularly the lack of data from English colonies) we still consider it has merit.<br><br>Natural England recommends that the stepwise approach in the interim advice note is used to review the SPAs/qualifying features currently screened in for breeding season impacts, and that further effort is made to identify potential evidence to justify the use of the maximum foraging range for those colonies/species. We acknowledge there is limited evidence from tracking/tagging regarding auk species, hence the suggestion of reviewing survey data above.<br><br>Please also see our comments regarding apportioning during the breeding season: the alternative approach to apportioning devised by Natural England, which takes account of central place foraging, has the potential to counteract the risk of impacts being too widely apportioned to distant colonies. | This is a valid point. The survey data from the site was investigated for this issue, finding that little systematic recording existed hence being unsuitable to confirm or deny presence of breeding birds or nearby colonies.<br><br>As noted above, for foraging ranges, we now follow a stepwise approach as suggested by NE/JNCC and follow the recent guidance to use a mean maximum foraging range but scoping in additional sites if direct connectivity has been recorded.<br><br>We note the comment regarding apportioning and provide a response to this where first mentioned. | |

| Consultee | Reason | Detail of response | Details on how comment has been addressed | Section |
|---|---|---|---|---|
| NE/JNCC | Consultation on draft ES – HRA report | Advice relating to Scottish SPAs – JNCC and SNH jointly note that in the context of Scottish developments - JNCC and SNH advise that a mean maximum range should be employed to identify potential connectivity with SPAs in the breeding season. As stated in the comments above, while there may be some merit in extending to a maximum range, for species in which recent tracking work suggests they may forage at larger distances than previously thought, this only applies to a few species (black legged kittiwake, common guillemot, razorbill). Furthermore, again as noted above, this initial screening should then consider other sources of evidence to support whether birds present at Dogger Bank are actively engaged in breeding activities and/or demonstrate connectivity with the SPAs identified (based on for example flight directions, fish carrying behaviour, age). As such, the generic application of a maximum foraging range to screen species in is not supported by JNCC/SNH for Scottish SPAs. The use of mean maximum foraging ranges will decrease the Scottish SPAs screened in due to LSE and currently progressed from LSE and AA. | See above | |
| NE/JNCC | Consultation on draft ES – HRA report | Advice relating to Scottish SPAs – Population estimates<br><br>Please note that SNH and JNCC have recently provided the most up-to-date population counts for a number of SPAs to Marine Scotland Science, these agreed population are available on request from JNCC. JNCC/SNH do not advocate the application of Seabird Monitoring Programme trends to update population estimates for Scottish SPAs. | These estimates have now been used. | |
| NE/JNCC | Consultation on draft ES – HRA report | Seabird SPAs – impacts in the non-breeding season.<br><br>The identification of connectivity between individual breeding season SPA colonies and birds at sea in the non-breeding season, and subsequent quantification of impact is extremely challenging. Currently, JNCC/SNH advise marine proposals in Scottish waters that there is no requirement for impacts to be assessed under HRA to SPAs outwith the breeding season. For example where potential connectivity only exists between the proposed site and seabird species in the non-breeding season. Instead, the assessment of impact at larger populations scales (e.g. national, biogeographic), and for the appropriate season, should be presented as part of the EIA process. | While it is noted that this requirement does not exist, in practical terms, it was necessary to include Scottish sites in the suite of protected sites considered in apportioning impacts. | |

# Draft geographical scope assumptions from 2012 05 14 provided for reference to comments received during initial stakeholder discussions

# Ornithology EIA Methodology for the Dogger Bank Creyke Beck Offshore Wind Farm Projects Part 1 – Population Estimates and Geographical Scope

## 1. INTRODUCTION

1.1 This document provides an overview of:

i. How the numbers of birds estimated to use the Dogger Bank Zone will be put into a wider context and the assumptions used regarding Great Britain and biogeographic population estimates; and

ii. How the significance of impacts will be assessed at different geographical scales, in particular, in relation to suites of protected sites and at the scale of individual protected sites.

1.2 A further document will outline the methodology to be used in determining the magnitudes of impacts from the various effects considered.

## 2. BASELINE DATA ANALYSES – POPULATION ESTIMATES

2.1 "Population" estimates for seabirds using the Dogger Bank Zone, and project areas, will be produced by combining data from the boat-based surveys on the proportions of different species in species groups with the counts of birds from the aerial surveys, using the modelling approach presented in Johnston *et al.* (2012).

2.2 It is assumed that 100% of birds within the transect strips are usually detected by the aerial surveys (though for diving species – divers, auks – this might not always be the case and correction factors will be applied as required) and thus that they provide a more reliable dataset than the boat-based surveys to estimate the populations that occur in the Dogger Bank Zone. However, as identification to species level is not always possible from the aerial surveys, information on the proportions of different species in species groups is used from the boat surveys so that counts of birds from the aerial surveys that are presently assigned to species groups can be apportioned to species.

2.3 These population estimates for the Zone, and project areas, will be compared to the species' Great Britain and biogeographic population sizes to determine if they surpass the respective 1% thresholds for identifying sites of national or international importance (Table 1) and also put into a North Sea regional context (e.g. using data from Skov *et al.* 1995).

2.4 Great Britain populations and thresholds for non-pelagic wintering gulls (Black-headed Gull, Common Gull, Lesser Black-backed Gull, Herring Gull and Great Black-backed Gull) will be taken from Musgrove *et al.* (2011), following Banks *et al.* (2007). It should be noted that these national winter population estimates for gulls come from a survey of terrestrial habitats and inshore waters

(Banks *et al.* 2007) and thus do not include birds that frequent offshore waters and so underestimate the overall national populations. Thus the thresholds for non-pelagic wintering gulls are also minima.

2.5 For seabirds recorded during the summer months, Great Britain (GB) population estimates will be taken from Baker *et al.* (2006). Where GB populations are given as numbers of individuals, thresholds will be taken as 1% of these values; where GB populations are given as numbers of pairs or nests, it is assumed that the overall number of individuals in the population is three times this and the 1% threshold calculated accordingly (following the standard protocol used in Stroud *et al.* 2004 and Wetlands International 2006, and followed by Kober *et al.* 2010).

2.6 In those instances where the Zone is within the foraging range of seabirds from breeding colonies in other countries (see section 3.1.1 below for methodology and sources), population estimates for the Zone, and project areas, will be also compared to the national population estimates for these countries (taken from Tucker & Heath 2004).

2.7 Biogeographic populations and thresholds for divers, terns and gulls will be taken from Wetlands International (2006). For seabirds, biogeographic populations used will follow Kober *et al.* (2010). Where possible biogeographic population estimates for other seabirds will be obtained from a Report on the Conservation Status of Migratory Waterbirds in the Agreement Area of the African-Eurasian Waterbird Agreement (Wetlands International 2008) (e.g. for Great Skua, Razorbill, Little Auk and Atlantic Puffin). For Arctic Skua, numbers will be obtained from Mitchell *et al.* (2004) and numbers of pairs were converted into numbers of individuals as above. For Northern Gannet the population estimate given by Mitchell *et al.* (2004) will be used, with updated numbers for the UK (Wanless *et al.* 2005) and for Norway (Barrett 2006). For Common Guillemot, numbers will be obtained from Mitchell *et al.* (2004) with updated Norwegian numbers (Barrett 2006). For Fulmar and Kittiwake, numbers were also taken from Mitchell *et al.* (2004). Population estimates for Pomarine Skua will be obtained from Furness (1996), with numbers of pairs converted into numbers of individuals as above.

2.8 It is assumed that the biogeographic 1% thresholds calculated based on breeding populations of seabirds are also applicable to the winter; the same assumption is not followed for GB 1% thresholds, as the birds that occur in Great Britain and British waters in winter may not be the same as those that occur in the summer. Thus, as indicated above, separate GB breeding season and GB winter 1% thresholds will be applied in within and outwith defined breeding seasons.

2.9 Definitions of breeding periods, and additional post-breeding moulting periods when birds may still be found in proximity to their colonies, will follow Kober *et al.* (2010), with additional months included in these periods, where the population estimates produced from the surveys suggest that this is appropriate (Table 2).

2.10 Estimates of the numbers of migrants passing through the Dogger Bank Zone will be produced using the methodology outlined in Wright *et al.* (2012), and put into context using the relevant biogeographic populations summarised in that review and any additional information that may be available. In that review biogeographic population estimates for waterbirds were taken from Wetlands International (2006), while for other species biogeographic population estimates are from BirdLife International (2004). The sizes of the British or Irish populations that use the migration zones described are derived from Musgrove *et al.* (2011) for wintering waterbirds in Great Britain, Crowe *et al.* (2008) for wintering waterbirds in Ireland, and from Baker *et al.* (2006) for other species, unless stated otherwise.

## 3. ASSESSMENT METHODOLOGY AND THE GEOGRAPHICAL SCOPE OF THE ASSESSMENT

3.1 The significance of an impact is often graded using a simple matrix approach (e.g. as outlined in Percival *et al.* 1999) considering the sensitivity, or value of a receptor and the magnitude of the impact. As the grades of significance produced using such an approach may be subjectively interpreted, here impacts will be assessed in the context of the predicted baseline conditions and over the lifetime of the development following the guidance provided by the Institute of Ecology and Environmental Management (IEEM 2006). This approach provides a detailed characterisation of ecological effects and their potential impacts such that it can be clearly be determined whether or not impacts are likely to be ecologically significant and at what scale. Effects and their potential impacts will thus be characterised as follows:

- Description of effect
- The spatial extent of the effect;
- The timing and frequency of the effect;
- The duration of the effect;
- Whether the effect would be direct or indirect;
- The reversibility of the impact;
- Whether the impact is positive or negative;
- The magnitude of the impact (i.e. its 'size' or 'amount');
- The confidence in predictions (High, Medium, Low and Very Low).
  (IEEM (2006) suggests a terminology of Certain / near-Certain, Probable, Unlikely and Very Unlikely. However, for the purposes of this assessment we feel that High, Medium, Low and Very Low better captures the ***confidence*** in predictions as opposed to its ***likelihood.***)

3.2 Following the IEEM (2006) guidance, an ecologically significant impact is defined as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area. Thus the assessment of the significance of an effect will reflect the receptor's value, in particular existing designations and its wider conservation status.

3.3 The assessment will thus consider the proportion of birds potentially impacted by an effect at broader regional, national and biogeographic scales, and additionally in relation to suites of protected sites and at the scale of individual protected sites, with an associated assessment of the level of certainty of the effect at this scale. Methods for defining suites of sites and apportioning the magnitude of each impact determined for each wind farm project (or in-combination across the Zone as a whole) to individual protected sites are outlined below:

### 3.1 Breeding seabirds

3.1.1 For breeding seabird species, information on foraging ranges (Thaxter *et al.* 2012) will be used to determine a suite of protected sites that might potentially be impacted by the effects considered. The maximum foraging ranges across all studies reviewed by Thaxter *et al.* (2012) will be used (Table 3), as evidence from tracking studies (e.g. from the Flamborough & Bempton Cliffs SPA) suggests that use of the mean maximum values presented may not adequately encompass all the birds that might utilise feeding areas within the Dogger Bank.

3.1.2 The assessment will then aim to determine the significance of impacts both at the level of the suite of protected sites identified through this review and for each individual site. For the suite of protected sites, the assessment will relate the magnitude of each impact determined for each wind farm project to the combined species' population for the suite as a whole. For individual protected sites, the magnitude of each impact determined for each wind farm project will be apportioned to each protected site based on its population size and its distance from the project area (using an inverse distance squared weighting). For example, the magnitude of an impact at the first site A (m *A*) of i to n sites be would be calculated from the overall magnitude of the impact for the project (m *P*) as follows:

$$\mathrm{m}\,A = \mathrm{m}\,P * (\mathrm{pop}\,A * \left(\frac{1}{\mathrm{dist}\,A * \mathrm{dist}\,A}\right)) / \sum_{i=A}^{n} \left(\mathrm{pop}\,i * \left(\frac{1}{\mathrm{dist}\,i * \mathrm{dist}\,i}\right)\right)$$

where pop is the population at a site and dist the distance from the site to the project.

3.1.3 The calculated magnitude of impact for the site will then be related to the species' population size at the site. Note this is precautionary for at least two reasons. First, it assumes that all the birds present within the wind farm project are breeding birds from the colonies identified, and that the total does not include non-breeders. Second, it assumes that all the birds come from protected sites. (While it is possible to collate data for other colonies in the UK from Seabird 2000 (Mitchell *et al.* 2004) census data, for other countries within species' potential foraging ranges data are typically only available for protected sites.) Further consideration will be given to how to correct for these over-estimates.

3.1.4 Recent tracking projects will be reviewed to demonstrate where there is known connectivity between specific species' colonies and the Dogger Bank Zone. Such species include Gannets from the Flamborough & Bempton Cliffs SPA (Langston & Boggio 2011) and Firth of Forth Islands SPA (e.g. Hamer *et al.* 2000, 2001) and Black-legged Kittiwakes from the Flamborough & Bempton Cliffs SPA (RSPB 2011, FAME 2012). In these instances, for which data exist to attribute some of the birds recorded in the Zone to specific protected sites (e.g. UK SPAs, Ramsar sites or other Natura 2000 sites in Europe), the confidence in predicting an effect on the site will be assessed, as indicated above, as *High* (though it should be recognised that confidence in the scale of the effect may be less). For all other sites for which the wind farm project is identified to be within the species' foraging range, confidence in predictions will be assessed as *Medium*. These assumptions will be further tested through the assessment process and may be revised accordingly.

### 3.2 Seabirds outwith the breeding season and migrants

3.2.1 The seabirds that are present in the Dogger Bank Zone outwith the defined breeding seasons (all the key species listed in Tables 1 and 2), and migrants that pass through the area in autumn and spring, are not constrained to particular protected sites and could potentially originate from sites in a wider geographical area. Consequently, while it will be possible to demonstrate or suggest breeding season connectivity between some specific seabird colonies and the Dogger Bank Zone, in these other instances it is unlikely to be possible to directly link the birds observed in the Zone to specific sites.

**Migrants**

3.2.2 A recent review (Wright *et al.* 2012) defined migration zones for those migratory birds designated as features of UK SPAs (and other Annex 1 species) that are at potential risk from offshore wind farm developments. This review will be used to scope which species might migrate through the Dogger Bank Zone and to define an initial suite of protected sites across the migration zone (including sites within the EC or beyond) which these species are features of. A further exercise will then be undertaken to screen out, on a species-by-species basis, those sites whose features are unlikely to migrate through the Dogger Bank Zone, based on their geographical position and the species' defined migration zone.

3.2.2 As these suites will include sites in several countries, used by the same individuals at different periods of the year, deriving a total population using this suite of sites is not straightforward. Thus, for migrants, the assessment will aim to first determine the significance of impacts at the level of the suite of protected sites within the UK SPA network identified through this review and in relation to the total populations of the species recorded in the EC (BirdLife International 2004). The magnitude of each impact determined for each wind farm project will also be apportioned to each UK SPA identified based on the size of the species' population at the site relative to that in the UK suite as a whole. For example, the magnitude of an impact at the first site A (m *A*) of i to n sites be would be calculated from the overall magnitude of the impact for the project (m *P*) as follows:

$$m\,A\ = m\,P * \ (\mathrm{pop}\ A)/\sum_{i=A}^{n}(\mathrm{pop}\ i)$$

3.2.3 Given the difficulty of directly linking the birds observed in the Zone to specific sites, confidence in predictions at the site-level will be assessed as *Low* or *Very Low*, depending on whether species are dependent on relatively few or many sites.

**Seabirds outwith the breeding season**

3.2.4 Seabirds that are present in the Dogger Bank Zone outwith the defined breeding seasons may potentially originate from protected sites throughout the species' biogeographic ranges. However, apportioning the effects determined for each wind farm project to each protected site on the basis of the size of its population relative to the species' overall biogeographic population may lead to an underestimation of the magnitudes of impacts at some sites, particularly those closest to the Zone. Therefore, greater weighting should be placed on those protected sites closer to the Zone. For those species that breed around the North Sea, it will be assumed that the birds that are present in the Dogger Bank Zone outwith the defined breeding seasons originate from this region.

3.2.5 As for other groups, for seabirds outwith the breeding season the assessment will consider the proportion of birds potentially impacted by an effect at broader regional, national and

biogeographic scales. The magnitude of each impact determined for each wind farm project will also be apportioned to each protected site surrounding the North Sea (see Cook *et al.* 2012) according to the size of the species' population at the site relative to that in the region as a whole.

3.2.6 Given the difficulty of directly linking the birds observed in the Zone outwith the breeding season to specific sites, confidence in predictions at the site-level will be assessed as *Very Low*.

**Table 1.** Great Britain and biogeographic population estimates and 1% thresholds for key seabird species that occur in the Dogger Bank Zone.

| Species | Season | GB population[1] | GB 1% threshold | Biogeographic population[1] | Biogeographic 1% threshold |
|---|---|---|---|---|---|
| White-billed Diver | Winter | - | - | < 10,000 I | 100 |
| Fulmar | Winter | - | - | - | 102,000 |
| | Summer | 498,764 P | 15,000 | 2,700,000-4,100,000 P | 102,000 |
| Gannet | Winter | - | - | - | 12,527 |
| | Summer | 218,546 N | 6,600 | 417,579 P | 12,527 |
| Arctic Skua | Winter | - | - | - | 750 |
| | Summer | 2,136 P | 64 | 75,000 I | 750 |
| Great Skua | Winter | - | - | - | 408 |
| | Summer | 9,634 P | 289 | 40,800 I | 408 |
| Kittiwake | Winter | 914,000 I | 9,100 | - | 82,500 |
| | Summer | 366,832 P | 11,000 | 2,500,000-3,000,000 P | 82,500 |
| Lesser Black-backed Gull[2] | Winter | 124,654 I | 1,200 | 530,000-570,000 I (*graellsii*) | 5,500 |
| | | | | 325,000-440,000 I (*intermedius*) | |
| | Summer | 110,101 P | 3,300 | 530,000-570,000 I (*graellsii*) | 5,500 |
| | | | | 325,000-440,000 I (*intermedius*) | |
| Great Black-backed Gull | Winter | 75,860 I | 760 | 330,000-540,000 I | 4,350 |
| | Summer | 17,084 P | 510 | 330,000-540,000 I | 4,350 |
| Guillemot | Winter | - | - | - | 85,000 |
| | Summer | 1,322,354 I | 13,200 | 2,800,000-2,900,000 P | 85,000 |
| Razorbill | Winter | - | - | - | 19,500 |
| | Summer | 164,492 I | 1,600 | 1,950,000 I | 19,500 |
| Little Auk | Winter | - | - | 37,500,000 I | 375,000 |
| Puffin | Winter | - | - | - | 135,000 |
| | Summer | 579,189 I | 5,800 | 13,500,000 I | 135,000 |

[1] I = individuals; P = pairs; N = nests; [2] threshold for *Larus fuscus graellsii* used here following Holt *et al.* (2011); for other assumptions, see text.

**Table 2.** Key seabird species that occur in the Dogger Bank Zone and defined seasons of interest.

| **Species** | **Scientific name** | **Kober *et al.* (2010)** | | | **Seasonal definitions used here** | | |
|---|---|---|---|---|---|---|---|
| | | **Breeding/summer** | **Additional** | **Winter** | **Breeding/summer** | **Post-breeding[1]** | **Winter[2]** |
| White-billed Diver | *Gavia adamsii* | - | - | - | NOT PRESENT IN BREEDING SEASON[3] | | |
| Northern Fulmar | *Fulmarus glacialis* | Mar-Jul | - | Aug-Feb | Mar-Sep | | Oct-Feb |
| Northern Gannet | *Morus bassanus* | May-Sep | - | Oct-Apr | Apr-Sep | | Oct-Mar |
| Arctic Skua | *Stercorarius parasiticus* | May-Aug | Sep-Nov | - | May-Aug | | Sep-Apr |
| Great Skua | *Stercorarius skua* | May-Aug | - | Sep-Apr | May-Aug | | Sep-Apr |
| Great Black-backed Gull | *Larus marinus* | Apr-Aug | - | Sep-Mar | Apr-Aug | | Sep-Mar |
| Lesser Black-backed Gull | *Larus fuscus* | May-Aug | - | Sep-Apr | May-Aug | | Sep-Apr |
| Black-legged Kittiwake | *Rissa tridactyla* | May-Sep | - | Oct-Apr | Apr-Sep | | Oct-Mar |
| Common Guillemot | *Uria aalge* | May-Jun | Aug-Sep | Oct-Apr | May-Jul | Aug-Sep | Oct-Apr |
| Razorbill | *Alca torda* | May-Jun | Aug-Sep | Oct-Apr | May-Jul | Aug-Sep | Oct-Apr |
| Little Auk | *Alle alle* | - | - | Nov-Mar | NOT PRESENT IN BREEDING SEASON | | |
| Atlantic Puffin | *Fratercula arctica* | Apr-Jul | - | Aug-Mar | Apr-Aug | Sep-Oct | Nov-Mar |

[1] Includes migratory seasons;
[2] Post-breeding seasons are considered for some species where dispersing moulting flocks might be considered to originate from proximate breeding colonies;
[3] Species are not present in the North Sea during the breeding season, as these species only breed in the High Arctic;

Definitions of breeding seasons for other species, where required, will follow Kober *et al.* (2010).

**Table 3.** Maximum foraging ranges for key seabird species for the Dogger Bank Zone that occur in the North Sea during the breeding season (after Thaxter *et al.* 2012 unless stated).

| Species | Scientific name | Maximum foraging range |
|---|---|---|
| Northern Fulmar | *Fulmarus glacialis* | 839 km |
| Northern Gannet | *Morus bassanus* | 644 km |
| Arctic Skua | *Stercorarius parasiticus* | 75 km |
| Great Skua | *Stercorarius skua* | 219 km |
| Great Black-backed Gull | *Larus marinus* | 60 km[1] |
| Lesser Black-backed Gull | *Larus fuscus* | 181 km |
| Black-legged Kittiwake | *Rissa tridactyla* | 231 km[2] |
| Common Guillemot | *Uria aalge* | 200 km |
| Razorbill | *Alca torda* | 95 km |
| Atlantic Puffin | *Fratercula arctica* | 200 km |

[1] Seys *et al.* (2001);
[2] FAME (2012).

Foraging ranges for other species, where required, will follow Thaxter *et al.* (2012).

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# Draft ecological scope assumptions from 2012 06 12 provided for reference to comments received during initial stakeholder discussions

# Ornithology EIA Methodology for the Dogger Bank Creyke Beck Offshore Wind Farm Projects Part 2 – Ecological Assumptions

## 1. INTRODUCTION

1.1 This document provides an overview of:

i. The structure of the EIA;
ii. The effects that are to be considered and;
iii. Specific details of the methodology to be adhered to throughout the EIA process for all projects.

1.2 The impact assessment methodology will follow the guidance provided by the Institute of Ecology and Environmental Management (IEEM 2006). Some specific details of the methodology to be used are outlined below with particular focus on disturbance/displacement effects as these require particular attention before acceptance on methods can be finalised.

1.3 The proposed structure of the Ornithology Technical Report, to be prepared in support of the Environmental Statement is given in Appendix A.

## 2. BASELINE DATA ANALYSES – POPULATION ESTIMATES

2.1 The baseline section of the report has been covered in a previous document and has been circulated to Stakeholders separately (Burton & Thaxter 2012).

## 3. ENVIRONMENTAL IMPACT ASSESSMENT

### 3.1 Offshore Ornithology – Impact Assessment Methodology

3.1.1 The significance of an impact is often graded using a simple matrix approach (e.g. as outlined in Percival *et al.* 1999) considering the sensitivity or value of a receptor and the magnitude of the effect. The levels of significance produced using such an approach are based on categories (e.g. ranging from very high to very low) and may be subjectively interpreted. Here however, impacts will be assessed in the context of the predicted baseline conditions and over the lifetime of the development following the guidance provided by IEEM (2006). This approach provides a detailed characterisation of ecological effects and their potential impacts such that it can be clearly determined whether or not impacts are likely to be

ecologically significant and at what scale. Predicting and characterising ecological impacts will be carried out as follows:

- Description of effect
- The spatial extent of the effect;
- The timing and frequency of the effect;
- The duration of the effect;
- Whether the effect would be direct or indirect[1];
- The reversibility of the impact;
- Whether the impact is positive or negative;
- The magnitude of the impact (i.e. its 'size' or 'amount');
- The confidence in predictions (High, Medium, Low and Very Low)[2].

3.1.2 Following the IEEM (2006) guidance, an ecologically significant impact is defined as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or receptors within a given geographical area. Therefore, the assessment of the significance of an effect will reflect the receptor's value, in particular existing designations and its wider conservation status. The assessment of significance will be conducted as a two stage process firstly valuing the designation status of receptors and their wider conservation status, before assessing specific linkages to sites following methodology outlined in the geographical scope (Burton & Thaxter 2012).

3.1.3 All effects need to be assessed and placed in the context of nearby colonies for seabirds based on the geographical scope outlined in Burton & Thaxter (2012).

**Inter-relationships with other topics**

3.1.4 As per IEEM (2006) guidance, the Impact Assessment will take into consideration the combined residual impact of a number of different activities, as well as transboundary issues.

**Protected sites and transboundary effects**

3.1.5 The Impact Assessment will also take into consideration the effects on protected sites, as detailed in (Burton & Thaxter 2012).

### 3.2. Definitions of worst case scenarios

3.2.1 Impacts will be assessed assuming realistic 'worst case scenarios' developed according to a Rochdale Envelope approach. These are discussed below in relation to specific effects.

### 3.3. Effects

3.3.1 The potential effects of the construction of a wind farm include behavioural response changes by birds resulting in:

[1] Not specifically suggested by IEEM

[2] Note that this differs to the guidance from IEEM (2006) which suggests a terminology of Certain / near-Certain (≥95%), Probable (>50% but <95%), Unlikely (>5% but <50%) and Very Unlikely (<5%). However for the purpose of this assessment we feel that High, Medium, Low and Very Low better capture the **confidence** in predictions as opposed to its **likelihood.**

- Disturbance/displacement of birds from favoured habitats (which could result in mortality), and
- Barrier effects affecting movements of birds; demographic effects arising from a direct result of
- Collision risk (assumed mortality) with above surface structures, and
- Physical habitat change (e.g. habitat loss or gain from creation of resting habitats), and subsequent indirect modification to prey.

**(1) <u>Disturbance and Displacement</u>**

3.3.2 **Disturbance**: During construction and decommissioning, the main effects are likely to be from disturbance such as noise associated with the installation of turbines, and presence of boat traffic. Seabird receptors vary in their reactions to offshore wind turbines, as well as traffic associated with maintenance, construction and decommissioning (Garthe and Hüppop 2004). Such a disturbance reaction could then lead to a knock on effect of displacement.

3.3.3 **Behavioural Displacement** (hereafter "displacement"): This effect is characterised by a bird changing its home range, territory or flight routes and therefore no longer occurring in the wind farm area (see SNH Avoidance Rate information and Guidance Note). Behavioural displacement is also commonly referred to as macro or far field avoidance (Band *et al*. 2011). In contrast, behavioural avoidance refers to evasive action taken by a bird, in the vicinity of the wind farm, which prevents a collision with a turbine and is sometimes also referred to as 'micro' or 'near-field' avoidance. Displacement means that birds will no longer be able to use an area, and therefore this behaviour constitutes "effective habitat loss" (Desholm & Kalhert 2005). Displacement is likely to be most apparent during operation and might occur within the Dogger Bank Zone (hereafter "zone") throughout the year. Birds may also potentially be displaced by boat activity during construction and decommissioning. Populations of displaced birds which are totally dependent on the area (e.g. lacking alternative foraging sites) would be worst affected and would therefore potentially suffer from increased mortality. Furthermore, even if areas elsewhere do exist but are limited in quality or extent, and/or already occupied, then increasing pressure on those areas could lead to increased competition for resources (Goss-Custard 1985; Goss-Custard *et al*. 2002) and hence increased mortality could still be an issue.

3.3.4 In the EIA we will investigate the effect of displacement separate to collision risk. Behavioural displacement is already assumed to be included in the overall "avoidance rates" used in collision risk modelling (Band *et. al.* 2011) and is therefore not easy to disentangle.

3.3.5 It is important, however, to assess possible mortality which could arise through displacement from key habitat. Please note, values in Table 1 for displacement should not be confused with overall avoidance rates used in collision risk modelling.

3.3.6 **Attraction**: During operation, turbines may also provide platforms for perching and roosting birds. Presence of perching opportunities could also extend foraging ranges of some receptors by allowing birds to rest. Lighting around offshore structures, may benefit seabirds in that it may help in nocturnal prey location, but may also increase risk of collision (Sage 1979, Hope-Jones 1980, Tasker *et al*. 1986, Wiese *et al*. 2001). Moreover, boat traffic during construction and decommissioning may also attract scavenging receptors such as gulls and skuas.

**Assessment of Disturbance / Displacement**

3.3.7 Assuming no habituation, previous EIAs have used precautionary worst case scenarios of 100% displacement and 100% mortality following displacement from the wind farm area, and up to 50% displacement from a surrounding buffer with 100% mortality. However, in the context of the Dogger Bank Zone, we consider these values as unrealistic. Therefore to quantify the significance of the effect of displacement on each receptor we will use suggested scenarios based on empirical evidence of displacement and receptor sensitivity to this effect (see section 3.3.11 and Table 1)

3.3.8 Using population estimates derived from Johnston *et al*. 2012)., the proportion of birds likely to be displaced and then lost through mortality will be calculated and expressed in regional, national or biogeographic contexts and in relation to the use of the area by, for example, features of an SPA.

3.3.9 Buffer and buffer distance: Radar studies have suggested that the maximum distances that birds will deviate from a wind farm are up to 4 km (Petersen *et al*. 2004, Petersen 2005, Petersen *et al*. 2006). Petersen *et al*. (2006) reported at Horns Rev and Nysted wind farms, divers and auks showed increased tendency to avoid areas 2-4 km from the wind farm, and northern gannets (hereafter "gannet"), scoters, auks and divers showed the highest levels of avoidance to Egmond aan Zee wind farm, while gulls and cormorants were attracted to it (Krijgsveld *et al*. 2011). Therefore maximum buffers in EIAs tend to be up to 4 km, and others have taken a range of values up to 4 km (Petersen *et al* 2006; RPS 2008). We will follow these studies and use a 4 km buffer for gannet, auks, and divers and given the lack of information on other receptors we take the precautionary approach and also use a 4 km buffer.

3.3.10 Population estimate within the buffer: Baseline surveys have only been carried out for the proposed wind farm area and have not allowed for a buffer. However, using a habitat-based modelling approach has enabled robust population estimates to be produced for all grid squares within the Zone (Johnston *et al.* 2012). Buffers for Projects which coincide with the area of the Zone will already have available population data. However, due to the boundaries of these projects running to the overall Dogger Bank Zone boundary, those final respective buffer edges falling outside the defined zone have no current estimates. Therefore population estimates for squares outside the zone, associated with individual projects, will be generated using the habitat-association models which use available environmental variables and their modelled relationship to density. These values will be added to the other population estimates, to complete the entire buffer for individual projects. Likewise for any buffer around the whole zone, predictive modelling for outside the Dogger Bank will be carried out. The modelling approach represents a robust way of assessing the most likely abundance of receptors for these areas.

***Suggested precautionary scenarios***

3.3.11 Sensitivity of receptors. Different receptors may be more or less sensitive to displacement, and will also be more or less likely to suffer mortality as a result (see Appendix C). Receptors which are more likely to be displaced largely match the ranking given in Garthe and Hüppop (2004) for helicopter and boat-traffic, but will be tempered with known avoidance and the use of wind farm areas post-construction (Petersen *et al*. 2006; Krijgsveld *et al*. 2011; Cook *et al*. 2012). Those species sensitive to disturbance and/or have shown behavioural

avoidance behaviours to wind farms include: auks, divers, and gannet (Petersen *et al*. 2006; Krijgsveld *et al*. 2011; Cook *et al*. 2012). Where data for species is lacking we take a precautionary approach assuming high displacement rates. Receptors more likely to experience mortality once they are displaced, are those which are restricted in some aspect of the use of habitat for instance by having limited foraging ranges (Thaxter *et al*. 2012), by having an inability to switch from a preferred prey source to another (Furness & Tasker 2000), or by showing a restrictive foraging mode (e.g. surface-feeding, Furness & Tasker 2000), and therefore more sensitive to mortality following displacement. Receptors such as terns and kittiwake fall into this second bracket.

3.3.12 Previous discussion with stakeholders has determined that it is appropriate to use a range of receptor-specific displacement and mortality rates. Information from JNCC and SNH (e.g. for some Scottish sites) has shown how some EIAs have considered 0-50% displacement for gulls and 50-100% for auks based on similar types of receptor-sensitivity criteria; those considered for Robin Rigg for instance also fall within these ranges (S.A. Pers. Comm.).

3.3.13 We will use a precautionary approach and following disturbance, we assume a worst-case eventuality of mortality **for a proportion** of those birds displaced. Although the displacement rates are expected to vary, there is no reason to suggest why mortality of displaced birds may differ between the actual wind farm area and the buffer zone.

3.3.14 We will also make a distinction between breeding and non-breeding birds using periods defined in the geographical scope (part 1) of this methodology (Burton & Thaxter 2012). For displacement however, in the absence of data being available we suggest a precautionary approach that birds are likely to react similarly to the wind farm during breeding and non-breeding periods. Likewise where there is a lack of available data for receptors we use precaution and take the more maximal values for displacement. In contrast, mortality risk from displacement may be deemed higher during breeding than non-breeding as they are constrained to foraging within a much more limited range due to their need to attend to their nest and young (see Table 1).

3.3.15 Three values of mortality and displacement are presented for all receptors to capture some variation around the most likely values presented in bold (Table 1). Receptors that are recorded within the zone during non-breeding phases only cannot be attributed values for breeding season displacement/mortality (e.g. divers, sea-ducks and skuas). Based on previous evidence (Appendix C), we suggest **90**% for displacement from the zone for divers, auks, sea-ducks and gannets (see Table 1, 2, Appendix C); terns may also show high levels of avoidance (Appendix C), and so we suggest **90**% displacement from the zone. For skuas, and northern fulmar (hereafter "fulmar") given a lack of data we take **90%** as a precautionary approach and assume that most birds are displaced. For gulls and kittiwake that are less likely to be displaced from the wind farm completely (Appendix C), we suggest **25%** displacement values from the zone. For the buffer (following advice from the recent Forewind meeting and JNCC) we take values that are half that of the zone for all species groups (Table 1). Evidence suggests that gulls and kittiwake may either fly through or forage within wind farms, or even actively perch on above-surface structures. Therefore, within the project area, we will also consider separate 1, **5**, 10**%** attraction rates for kittiwakes and gulls. Values of mortality during breeding were given as **25%** for species more sensitive, such as auks, kittiwake, terns, divers, and sea-ducks and **10%** for less sensitive species (Appendix C). Breeding mortality values were approximately halved to give respective mortality rates

for non-breeding phases. Values of displacement and mortality (Table 1) were combined (Table 2) to produce an overall suggested estimate of the proportion of birds that may be lost under this effect for each receptor grouping (note these estimates are provisional and may be subject to change).

3.3.16 The number of birds of each receptor impacted under each scenario will be expressed in regional, national or biogeographic contexts. Further receptors would also need considering for these effects beyond those presented as examples. We would welcome input on the proposed approach.

**Table 1**. Example suggested scenarios of displacement and mortality for receptor groups important for this EIA for both wind farm and buffer zones during breeding and non-breeding phases (see text and Appendix C for details).

| | Wind farm (%) | | | | Buffer (%) | | | |
|---|---|---|---|---|---|---|---|---|
| | Breeding | | Non-breeding | | Breeding | | Non-breeding | |
| **Receptor Group** | **Displacement**[1] | **Mortality**[2] | **Displacement** | **Mortality** | **Displacement** | **Mortality** | **Displacement** | **Mortality** |
| Auks | 75,**90**,99 | 10,**25**,50 | 75,**90**,99 | 1,**10**,20 | 30,**45**,60 | 10,**25**,50 | 30,**45**,60 | 1,**10**,20 |
| Kittiwake | 0,**25,**50 | 10,**25**,50 | 0,**25,**50 | 1,**10**,20 | 0,**10**,25 | 10,**25**,50 | 0,**10**,25 | 1,**10**,20 |
| Terns | 75,**90**,99[p] | 10,**25**,50 | 75,**90**,99[p] | 1,**10**,20 | 30,**45**,60[p] | 10,**25**,50 | 30,**45**,60[p] | 1,**10**,20 |
| Gannet | 75,**90**,99 | 1,**10**,25 | 75,**90**,99 | 1,**5**,10 | 30,**45**,60 | 1,**10**,25 | 30,**45**,60 | 1,**5**,10 |
| Fulmar | 75,**90**,99[p] | 1,**10**,25 | 75,**90**,99[p] | 1,**5**,10 | 30,**45**,60[p] | 1,**10**,25 | 30,**45**,60[p] | 1,**5**,10 |
| Gulls | 0,**25**,50 | 1,**10**,25 | 0,**25**,50 | 1,**5**,10 | 0,**10**,25[p] | 1,**10**,25 | 0,**1**0,25[p] | 1,**5**,10 |
| Divers | - | - | 75,**90**,99 | 1,**10**,20 | - | - | 30,**45**,60 | 1,**10**,20 |
| Sea-ducks | - | - | 75,**90**,99 | 1,**10**,20 | - | - | 30,**45**,60 | 1,**10**,20 |
| Skuas | - | - | 75,**90**,99[p] | 1,**5**,10 | - | - | 30,**45**,60[p] | 1,**5**,10 |

1. Displacement values are not the same variable as the "avoidance rates" presented within collision risk modelling and cannot be directly combined with them – see text for details;
2. Mortality relates to that suffered by birds that are displaced from the wind farm and is different to that of direct mortality in collision risk modelling – see text for details;

[p] Precautionary approach taken due to lack of data.

**Table 2**. Example suggested proportions of individuals of receptor groups (important for this EIA) lost due to displacement and resultant mortality (minima and maxima given in brackets) given for wind farm and buffer zones during breeding and non-breeding phases (see text and Appendix C for details).

| | Wind farm (%) | | Buffer (%) | |
|---|---|---|---|---|
| **Receptor Group** | **Breeding** | **Non-breeding** | **Breeding** | **Non-breeding** |
| Auks | 23(8-50) | 9(1-20) | 11(3-30) | 5(0-12) |
| Kittiwake | 6(0-25) | 3(0-10) | 3(0-13) | 1(0-5) |
| Terns | 23(8-50) | 9(1-20) | 11(3-30) | 5(0-12) |
| Gannet | 9(1-25) | 5(1-10) | 5(0-15) | 2(0-6) |
| Fulmar | 9(1-25) | 5(1-10) | 5(0-15) | 2(0-6) |

| | | | | |
|---|---|---|---|---|
| Gulls | 3(0-13) | 1(0-5) | 1(0-6) | 1(0-3) |
| Divers | - | 9(1-20) | - | 5(0-12) |
| Seaducks | - | 9(1-20) | - | 5(0-12) |
| Skuas | - | 5(1-10) | - | 2(0-6) |

*Direct habitat disturbance*

3.3.17 Habitat may be disturbed and lost directly, for example due to placement of turbines during construction, or through changes to sediment and current. Cable laying is another activity that may disturb habitat. Alterations to the benthic structure caused by insertion of turbine foundations may result in indirect impacts to birds through changes to invertebrate and fish fauna.

3.3.18 This effect needs no further assumptions, and will be assessed in the EIA following standard IEEM methodology, using information drawn from a number of the other EIA studies (namely benthic ecology, fish ecology and physical processes).

**(2) Barrier Effects (Indirect habitat loss)**

3.3.19 The barrier effect presented by wind farms also constitutes a form of disturbance and an indirect loss of habitat by disrupting the normal flight-lines of birds. However, this effect is considered separately. Barrier effects could lead to an increase in the energetic costs of the daily movements of birds or of migrants (Tulp *et al*. 1999, Pettersson & Stalin 2003; Masden *et al*. 2009, 2010), although Masden *et al*. (2009), in studying migration of Common Eiders at a Danish offshore wind farm, reported curvature of trajectories greatest post-construction and within 500 m of the wind farm, but that this had minimal likely effect on energetics. However, it was noted that cumulative effects could be significant for instance if other wind farms or human developments worked in combination to disrupt routes of birds. Desholm & Kalhert (2005) also reported that migrant wildfowl diverted around the Nysted wind farm, and Tulp *et al*. (1999), found that Common Eiders didn't fly between turbines that were placed 200 m apart in the Kattegat.

**Assessment of Barrier Effects**

3.3.20 The assessment of barrier effects for the Dogger Bank Zone primarily concerns possible effects on migrating birds.

3.3.21 Estimates of the numbers of migrants passing through the zone will be produced using the methodology outlined in Wright *et al.* (2012), and put into context using the relevant biogeographic populations in Wright *et al.* (2012) and any additional information that may be available. In Wright *et al.* (2012) biogeographic population estimates for waterbirds were taken from Wetlands International (2006), while for other receptors biogeographic population estimates are from BirdLife International (2004). The sizes of the British or Irish populations that use the migration zones described are derived from Musgrove *et al.* (2011) for wintering waterbirds in Great Britain, Crowe *et al.* (2008) for wintering waterbirds in Ireland, and from Baker *et al.* (2006) for other receptors, unless stated otherwise.

3.3.22 The assessment of barrier effects and collision risk for migrants will thus follow this guidance, while also referencing outputs produced by APEM through their modelling work that draws on the SOSS guidance.

**(3) Collision Risk**

3.3.23 Collision risk constitutes the direct risk on birds as a result of colliding with a wind turbine, assuming 100% mortality of all bird strikes.

3.3.24 In certain weather and lunar conditions, birds may be attracted to lights and evidence from studies of lighthouses show that this can cause high levels of mortality (Verheijen 1981, Jones & Francis 2003). Clearly any attraction to lighting in the wind farm is likely to increase the risks of collision with the turbine blades and structures. An increase in boat traffic may render those receptors that may be attracted to vessels, such as kittiwakes, gulls, gannets and skuas at risk from additional collision potential. However, there is a lack of evidence to suggest that any additional mortality arising from such collisions will appreciably add to the high background annual mortality rates.

3.3.25 Some effects such as displacement and collision cannot be combined together in a simple manner. In assessment of collision risk, "avoidance" behaviour is incorporated directly in the model encompassing both behavioural displacement and behavioural avoidance (SNH Avoidance Rate Information and Guidance Note, see also Appendix B). Total population estimates within the Project Area are required as input variables for each species, for this EIA produced from population modelling (Johnston *et al*. 2012). Given the consideration of macro-avoidance (and hence behavioural displacement) in CRMs, the starting point of population estimates will always need to be the total population, and so one cannot take a percentage of the population after displacement has been accounted for to feed into a CRM.

**Assessment of Collision Risk**

3.3.26 Collision risk will be assessed using the collision risk guidance produced for offshore use by Band (2011) which updated the onshore model developed by Band *et al*. 2007, the current accepted method for producing collision risk estimates. A recent SOSS project has reviewed information on flight heights and avoidance rates used in the calculation of collision mortality for offshore wind farms (Cook *et al.* 2012) and has outlined guidance on these variables. We will continue to evaluate evidence regarding these rates as it becomes available.

We have investigated three different versions of collision risk:

i. Using site-specific flight height data from boat surveys;
ii. Using modelled flight height data from SOSS but with numbers spread evenly across the diameter of the rotor blade; and
iii. Using modelled flight height data from SOSS and a recently updated version of the Band (2000, updated 2011) model which allows for birds being distributed at different heights across the diameter of the rotor blade.

3.3.27 We will present and use option (iii) as it is the most realistic of the three investigated to date - it uses a novel modelled distribution for flight heights (Cook *et al*. 2012) and also incorporates the variation in risk throughout the rotor sweep – the risk of collision is much reduced the further the bird is situated from the centre of the turbine.

3.3.28 For the effect of displacement, we note that sensitivity to displacement varies between receptors and receptor groups (Table 1). For collision risk, while a range of avoidance rates and a precautionary worst case of 98% will be presented, consideration will be given as to

whether higher avoidance rates may be more likely for some species groups that may show higher displacement (e.g. auks, divers and gannet: Cook *et al*. 2012). It should be noted that there will be broad correlation between displacement and avoidance rates across species groups.

3.3.29 As with other effects, the number of birds of each receptor impacted will be expressed in regional, national or biogeographic contexts and in relation to the use of the area by, for example, features of an SPA. In doing this, consideration will be given to the life history parameters of particular receptors and thus the likely impact of collisions on receptors' populations.

3.3.30 In relation to collision risk, the worst-case scenario will also reflect the combination of the number of turbines and turbine size that maximises the number of collisions expected. This will be informed by trialling of the collision risk model at a tranche level.

**(4) Assessment of Indirect Effects**

3.3.31 Direct alterations to habitat during construction also impact prey and therefore impact seabirds resulting in an indirect effect. For example the placement of turbines, will reduce habitat on the seabed for benthic fauna and fish populations.

3.3.32 Turbine foundations and any scour protection may provide a novel sub-littoral habitat, which may act as an artificial reef attracting the settlement of marine invertebrates and may in turn benefit fish and birds. Individual foundations will only cover a limited area and could result in only a limited extra resource on their own. Nevertheless the cumulative impact of multiple turbines across a large area will potentially render the effect greater.

3.3.33 Noise effects as a result of construction activities, piling, or boat traffic, may also alter the behaviour of prey receptors such as fish. Likewise, electromagnetic effects may impact on the behaviour of prey. The effects on fish will follow the recommendations and conclusions on that topic and be incorporated as a combined effect.

3.3.34 This effect needs no further assumptions, and will be assessed in the EIA following standard IEEM methodology.

**Inter-relationship between effects**

3.3.35 EIA guidance states that effects must be considered for each receptor with significance drawn up, and a combined impact then determined (IEEM 2006); we will follow this guidance in all EIAs. In many cases, quantitative combining of separate effects is not possible, such as displacement and collision risk for reasons stated in 3.3.4 and 3.3.24. The end point in all EIAs is to assess the significance of each effect and then present a combined significance. However, for indirect effects disturbing prey effectively disturbs habitat availability for seabirds, and so assessment of likelihood of significance of one may be related to the other. These will be considered within EIA species accounts.

**Impact Assessment Results**

3.3.36 Results on impacts will be presented for each receptor after assessing which effects are important for that particular receptor. Accounts for each will follow the methodology of IEEM (IEEM 2006) and incorporate the assumptions outlined above, together with the latest population estimates from habitat association modelling (Johnson *et al*. 2012). The exact structure of each receptor account is currently being determined, but it is anticipated that the layout will match the example given in the IEEM (2006) guidance.

**Mitigation Measures and Residual Impacts**

3.3.37 Following IEEM guidance, mitigation measures will be suggested where significant effects are found where these have not already been identified for the direct receptor (see for example Noer *et al*. 2000).

## 3.4. Cumulative Impact Assessment Methodology

3.4.1 Cumulative effects will need to be assessed in relation to all of the main effects outlined above. It is proposed that the methodology for assessing cumulative effects should follow the recommendations of King *et al.* (2009) and will be in line with the Forewind CIA strategy as discussed at the stakeholder workshop in April 2012. However, given the timeframes involved in this project and the anticipated quality of data available to make a robust assessment, a realistic approach will be adhered to. For instance, if quantitative data are not available or are not in a standardised manner making it difficult to combine information across multiple projects for some effects, then we will need to prioritise a qualitative assessment, ascribing the data a level of confidence (High, Medium, Low and Very Low), before final significance is assessed.

3.4.2 In brief summary, these recommendations are divided into two parts: data gathering and cumulative effects:

"Data gathering and analysis currently suffer from a lack of standardisation therefore guidelines are given for selection of receptors for consideration, projects to be included in the assessment and the spatial scale of the bird reference population to be used. An overarching recommendation is for the provision of quantitative data on raw numbers, densities and population estimates for all receptors and that, wherever possible, impacts are assessed in a quantitative rather than a qualitative way.

The cumulative effects of collision risk and displacement should be assessed by summing the impacts from each component project. Where collision mortality is likely to be significant, more detailed population modelling studies may be required. Disturbance and barrier-effects may accrue in a non-linear manner. They should, therefore, firstly be considered in a qualitative manner and, if thought likely to be significant, then a more detailed quantitative study of bird bioenergetics in relation to the effect should be carried-out. In general, all analyses should interpret the significance of mortality in relation to the receptors' background mortality rate to enable its life history parameters and ecology to be taken into account."

3.4.3 The cumulative impact assessment will be undertaken across two scales: first, in relation to the zone as a whole, and second in relation to other wider projects within the Zone. The

projects to be considered in this part of the cumulative impact assessment are outlined in the broader Forewind cumulative impact assessment guidance note.

3.4.4. It should be noted in relation to both the wider cumulative impact assessment work and the need to put the zone population estimates in context, that while there is good information on breeding populations (in the UK and, for example, ICES sub-regions), information on the numbers of birds using the North Sea through the year is limited. Skov *et al.* (1995) reviewed European Seabirds at Sea (ESAS) data to determine the importance of different areas of the North Sea to seabird receptors across the year and, in the absence of a collated review of recent datasets collected from other offshore wind farm zones, this review and the ESAS dataset still provides the best regional context.

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## Appendix A Ornithology Technical Report structure

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**Appendix B. Glossary of avoidance and displacement from SNH Guidance Avoidance Rate Information and Guidance Note:**

"When considering bird interactions with wind farms, the term avoidance has been used in a varied, and sometimes unspecific, range of ways. It has been used to describe a number of specific behavioural responses that are shown by birds when flying near operational wind farms. These may be divided into two very different behavioural responses: behavioural avoidance and behavioural displacement. Another response shown by some receptors of birds is behavioural attraction.

**Behavioural avoidance** is action taken by a bird, when close to a wind farm (that is operational), which prevents a collision. Such behaviour implies that a bird sees a wind turbine or a moving turbine blade, evaluates the potential risk, and takes action to prevent what might be a fatal collision. Such action may be taken early enough so that the bird flies around the edge of the wind farm; or gains altitude to fly over it; or flies a course between or below turbines. In some cases they may, at close quarters, see an oncoming blade and take emergency evasive action.

**Behavioural displacement** operates at a different level, in that a bird may (possibly over time) change its home range, territory, or flight routes between roosting areas and feeding areas, so that its range use (or flight paths) no longer bring the bird into the vicinity of an operational wind farm. In effect behavioural displacement is equivalent to habitat loss, as regardless of its intrinsic suitability, the habitat is no longer available to the bird for whatever purpose it was previously used.

**Avoidance rates**, [within the Band model], make allowance for both of these behavioural responses, and avoidance rates are a numerical expression of these behaviours.

**Behavioural attraction** to wind farms (i.e. birds making more use of the area around a wind farm after construction) has been reported for several bird receptors, including common kestrel and cormorant. The reasons for this behaviour are not clear, but they may be due to changes in habitat management, or the use of wind farm infrastructure for perches or nesting."

**Appendix C. Brief summary examples of general displacement and mortality risk following displacement for receptor groups of high importance in the EIA**

**Auks** are considered low sensitivity to disturbance (Garthe & Hüppop 2004) but behavioural avoidance responses have been noted from wind farms up to 4 km (Petersen *et al*. 2006; Krijgsveld *et al*. 2011) and alcids can sometimes be disturbed by boats hundreds of metres away (Ronconi and Clair 2002, Bellefleur *et al*. 2009) suggesting high displacement. Auks are considered flexible foragers (Furness & Tasker 2000; Garthe & Hüppop 2004) but have a restricted foraging range (Thaxter *et al*. 2012) and specialisation in diet (Furness & Tasker 2000), suggesting a potentially elevated risk of displacement mortality.

**Divers** are among the most sensitive to disturbance in relation to boat and helicopter traffic (Garthe & Hüppop 2004; Schwemmer *et al*. 2011, Topping and Petersen 2011), and may completely avoid wind farms post-construction up to up to 4 km (Petersen *et al*. 2006; Krijgsveld *et al*. 2011), suggesting high displacement. They use limited habitat and specialised prey (Garthe & Hüppop 2004) suggesting potentially higher mortality from displacement.

**Gannets**, appear to show little to no avoidance responses to boats, and may be attracted to boats for feeding opportunities (e.g. in discard usage)[3]. However, gannets have shown strong avoidance behaviour of wind farms (Krijgsveld *et al*. 2011) suggesting higher levels of displacement. These species can forage over vast distances (Thaxter *et al*. 2012) rendering them potentially less likely to experience high breeding failure, and probably unlikely to experience high adult mortality as a result of displacement.

**Terns** have low disturbance to boat and helicopter traffic (Garthe & Hüppop 2004), and appear to show little disturbance to nearby survey boats for visual tracking studies (Perrow *et al*. 2011). However, analysis of flight tracks of Sandwich terns (Krijgsveld *et al*. 2011) suggested scarcity in the wind farm and higher at the edge, seemingly avoiding the wind farm. For precaution, terns may therefore show high levels of displacement. Terns show medium-low flexibility in habitat use, and are surface feeders dependent on Sandeels and are therefore potentially vulnerable to changes in habitat and prey resources (Furness & Tasker 2000), suggesting potential for higher risk of displacement mortality.

**Skuas** and **fulmars** show very low disturbance sensitivity to boat and helicopter traffic, however, limited data on macro-avoidance from radar studies (Petersen *et al*. 2006; Krijgsveld *et al*. 2011) suggests unknown levels of displacement, and therefore needing a precautious approach. Both, however, can cover large distance during breeding (Thaxter *et al*. 2012) and have high habitat flexibility (Garthe & Hüppop 2004) suggesting potentially low mortality as a result of displacement.

**Kittiwakes** have been known to associate with boats[4] and have low sensitivity to boat and helicopter traffic (Garthe & Hüppop 2004). Analysis of flight tracks and panorama scans of kittiwakes (Krijgsveld *et al*. 2011) have also shown little to no avoidance of wind farms, possibly even showing slight signs of attraction. Therefore kittiwakes, as a species of gull, are thought to be less displaced than other receptors. However, different to other gulls, kittiwakes as surface feeders dependent on Sandeels may be sensitive to changes in their food sources (Furness & Tasker 2000) and hence may suffer higher displacement mortality.

**Gulls** are some of the least sensitive species to disturbance by boats and helicopters (Garthe & Hüppop 2004), and have been recorded within wind farms or even attracted to them post-construction (Petersen *et al*. 2006; Krijgsveld *et al*. 2011). Habitat use is also highly flexible (Garthe & Hüppop 2004) suggesting low likelihood of substantial mortality following any displacement.

**Sea-ducks** – Common Scoter, Velvet Scoter, Long-tailed Duck, Goldeneye, and Goosander have all been recorded in low numbers during Dogger Bank surveys and Common Eider, Red-breasted Merganser, and Scaup have also been recorded in ESAS surveys (Skov *et al*. 1995), almost all being during non-breeding phases (ZOC report Ch 5). Velvet Scoter, Common Scoter and Common Eider have high disturbance values assigned by Garthe & Hüppop (2004) and scoters and other sea-ducks in particular have shown strong macro-avoidance to wind farms (Krijgsveld *et al*. 2011) suggesting potentially high displacement. Low habitat flexibility (Garthe & Hüppop 2004) also suggests potential for higher mortality.

[3] http://www.leeds.ac.uk/news/article/767/fishing_discard_ban_could_damage_sea_bird_success
[4] http://www.kensor.net/Papers/discard2.html

## APPENDIX 4 Bird displacement from offshore wind farms: evidence and gaps in knowledge relating to displacement rates, buffer distances and resultant mortality rates

### Part 1: Bird displacement rates from offshore wind farms: a review

#### Introduction

A4.1 Offshore wind farms form a key component of strategies to reduce the consumption of fossil fuels through the use of renewable energy (EC 2008). In Europe, there are presently 1,503 fully installed offshore turbines across 56 wind farms in 10 countries, generating a total of 4.3 GW (EWEA 2012), with plans to expand this to 40 GW by 2020 and 150 GW by 2030.

A4.2 The rapid growth of the offshore wind industry has led to concerns over its impacts on the environment (i.e. Exo *et al.* 2003, Garthe & Hüppop 2004, Fox *et al.* 2006, Hüppop *et al.* 2006). Despite a number of studies that have investigated the post-construction impact of offshore wind farms on birds (Guillemette & Larsen 2002, Desholm & Kahlert 2005, Larsen & Guillemette 2007, Masden *et al.* 2009), the overall evidence with which to assess the magnitude of these impacts remains limited (Stewart *et al.* 2007).

A4.3 Assessing the effect of offshore wind farms on sensitive species is a key requirement of the planning process. Consequently, in an attempt to standardise the information used in impact assessments and to minimise the resultant uncertainty, a number of authors have provided expert reviews of the potential impacts of offshore wind farms and have attempted to rank species by their sensitivity to these impacts (Garthe & Hüppop 2004, Langston 2010, King *et al.* 2009, Furness & Wade 2012). These reviews have considered the main effects that may potentially have an impact on bird populations, i.e. displacement due to the disturbance associated with developments; the barrier effect posed by developments to migrating birds and birds commuting between breeding sites and feeding areas; and collision mortality. In the absence of solid evidence from offshore wind farms, these rankings have typically relied on studies from related fields, for example responses to shipping and other offshore industries.

A4.4 It is now over 20 years since the first European offshore wind farm, Vinedby in Denmark, was built (Percival 2001) and requirements have been put in place for post-construction monitoring of the effects of offshore wind farms on the environment. As part of these post-construction monitoring programmes, a wealth of data has been collected comparing the distribution of birds before and after wind farm construction. These data enable us to consider the extent to which birds may have been displaced by offshore wind farms, allowing us to reflect on potential environmental impacts as the next generation of larger developments is being planned. It also allows consideration of how post-construction monitoring programmes vary between sites and how these can be refined to provide guidance

on best practice and standardised outputs for monitoring displacement at future offshore wind farms.

**Methods**

A4.5 To identify sites for which monitoring data describing displacement may be available, operational offshore wind farms in northern Europe were initially identified from the 4C Offshore website (4C Offshore 2013). Internet searches were then carried out to identify and obtain post-construction monitoring reports and scientific studies from as many of these sites as possible.

A4.6 Each of these reports was then reviewed in order to assess:

i. Whether bird abundance or distribution in the construction or post-construction phases were compared to the pre-construction baseline data;
ii. What methodologies were used to compare bird abundance or distribution data in the different phases;
iii. Whether any changes in bird abundance or distribution were reported as statistically significant;
iv. Whether there was sufficient statistical power to assess changes in bird abundance or distribution;
v. The magnitude of changes in species abundance relative to a baseline year; and
vi. Whether, in the absence of statistical analysis, any conclusions or assumptions can be made on the basis of the information available.

A4.7 We consider how variable apparent displacement rates are between species and sites, and how they may change through time. We also compare the estimates of apparent displacement rates to assessments of species sensitivity to displacement made previously in the literature.

A4.8 Note, we use the terms apparent displacement rates and apparent attraction rates, as studies seldom distinguish changes in bird abundance associated with the construction of the wind farm from those associated with background year-to-year changes in local populations.

A4.9 Several recent studies have suggested possible habituation to turbines and a reduction in the displacement rate from offshore wind farms (Petersen & Fox 2007, Lindeboom *et al.* 2011). We test this using the data obtained during the review process. For four species/species groups we model the percentage change relative to the baseline populations in relation to the operational phase of the wind farm (construction and 1-4 years post-construction, fitted as a factor). These models were fitted for northern gannet, gulls (little gull, black-headed gull, common gull, black-legged kittiwake, lesser black-backed gull, herring gull and great black-backed gull), auks (common guillemot and razorbill) and seaducks (common scoter, long-tailed duck and common eider).

**Results**

A4.10 We obtained assessments of the effect of displacement for 38 species and species groups at 18 offshore wind farms – Barrow, Bligh Bank, Blyth, Burbo Bank, Egmond aan Zee, Gunfleet Sands, Horns Rev, Inner Dowsing, Kentish Flats, Lillgrund, Lynn, North Hoyle, Nysted, Robin Rigg, Scroby Sands, Thorntonbank, Tuno Knob, Uttgrunden – covering periods from construction to 4 years post-construction. We have included sea ducks in this review, as some of the best studies of displacement of marine birds from offshore wind farms relate to sea ducks and excluding them would further limit the evidence base. It is likely reasonable conclusions relating to displacement rates of other marine birds can be drawn from evidence relating to sea ducks, with obvious caveats relating to ecological differences between sea ducks and other marine bird species. Methodology and reporting were highly variable between site and year. In assessing changes in distribution, the following methodologies were used, simple "by eye" comparisons of before and after distributions, comparisons of before and after densities or populations, a comparison using Before-After-Control-Impact (BACI) approaches (Stewart-Oaten *et al.* 1986) and a comparison of selectivity indices before, during and after wind farm construction. Reporting of changes in densities or populations varied from assessing the significance of any changes, quantifying observed changes and a combination of the two.

A4.11 Changes in densities or populations relative to a baseline year were quantified in 33 species or species groups from 15 sites. These changes varied from a 100% reduction in numbers of species such as auks at Gunfleet Sands in the Thames Estuary from before construction to 2 years after the wind farm became operational to a 35-fold increase in the numbers of great black-backed gulls recorded at Horns Rev (Figure 1).

A4.12 Changes varied considerably even within species. The most obvious pattern within the data appears to be that gulls show a lower initial apparent displacement from offshore wind farms and a greater propensity to be attracted inside them (Figure 1). For some other species, such as northern gannet, there may also be a tendency for reduced displacement during the early stages of the operational life of a wind farm (Figure 1).

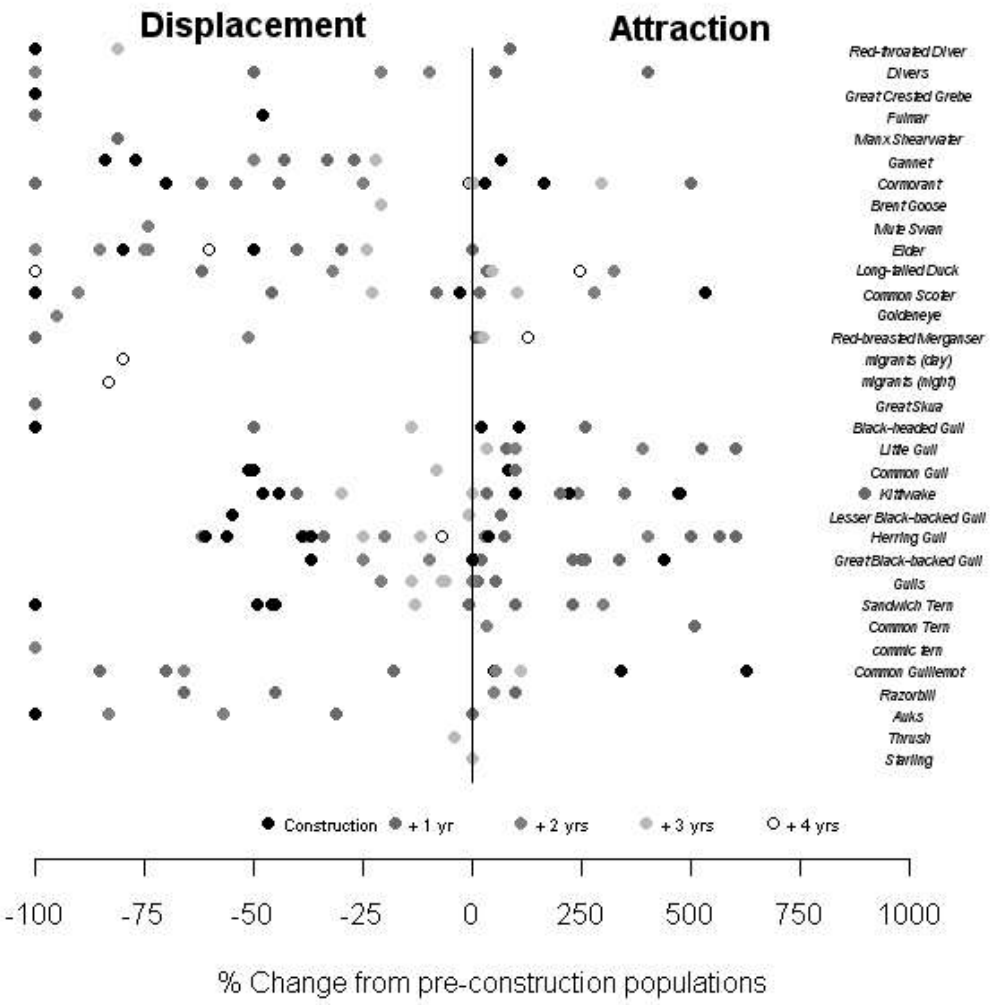



**Figure A4.1** Population change relative to pre-construction for species or species groups within operational offshore wind farms in northern Europe. Note the different scales on the x-axis for% changes < and > 0. Note, some sites are represented more than once for each species, where changes in populations were reported between a baseline year and more than one subsequent period.

A4.13 The significance of recorded changes was not assessed at all sites. In total, the significance of changes was assessed for 141 out of the 296 species-site-phase combinations. Of these a significant positive or negative effect was detected on 33 occasions (Table A4.1). However, the magnitude of these changes was not assessed at all sites. In several instances, where non-significant changes were recorded, or significance of any distributional changes was not assessed, the low statistical power of the data was noted. Here, we have combined data from many studies to make the best possible use of the available evidence.

**Table A4.1** Cases where significant changes in species' abundances were reported in comparison to a baseline year. Period and magnitude of change (where available) are presented in parentheses.

| ***Site*** | **Negative change (phase, magnitude)** | **Positive change (phase, magnitude)** |
|---|---|---|
| *Bligh Bank, UK* | Northern gannet (1 yr post-construction, -33%) | |
| (Vannermann *et al.* 2011) | Common guillemot (1 yr post-construction, -70%) | |
| | Common gull (1 yr post-construction) | |
| *Blyth, UK* | Great cormorant (1 yr post-construction, -44%) | Great black-backed gull (1 yr post-construction, 260%) |
| (Rothery *et al.* 2009) | Common scoter (1 yr post-construction, - 8%) | Sandwich tern (1 yr post-construction, 231%) |
| *Egmond aan Zee, Netherlands* | Northern gannet (1 yr post-construction) | Great cormorant (1 yr post-construction) |
| (Leopold *et al.* 2010) | | |
| *Horns Rev, Denmark* | Divers (1 yr post-construction, - 100%) | |
| (Petersen *et al.* 2004) | | |
| *Lillgrund, Sweden* | Common eider (4 yr post-construction) | |
| | Red-breasted merganser (4 yr post-construction) | |
| | Herring gull (4 yr post-construction) | |
| *Lynn & Inner Dowsing, UK* | Auks (2 yr post-construction, -57%) | |
| *North Hoyle, UK* | Northern gannet (1 yr post-construction) | Common guillemot (2 yr post-construction, 55%) |
| | Common scoter (1 yr post-construction) | Common scoter (3 yr post-construction, 104%) |
| | Razorbill (1 yr post-construction) | |
| | Auks (1 yr post-construction) | |
| | Red-throated diver (3 yr post-construction, -81%) | |
| *Robin Rigg, UK* | Northern gannet (1 yr post-construction, -50%) | |
| | Black-legged kittiwake (1 yr post-construction, -40%) | |
| *Thorntonbank, UK* | Great black-backed gull (2 yr post-construction, -10%) | Little gull (2 yr post-construction, 100%) |
| | | Black-legged kittiwake (2 yr post-construction, 33%) |
| | | Sandwich tern (2 yr post-construction, 300%) |
| | | Common tern (2 yr post-construction, 33%) |
| *Tunø Knob, Denmark* | Common eider (3 yr post-construction, -50%) | |

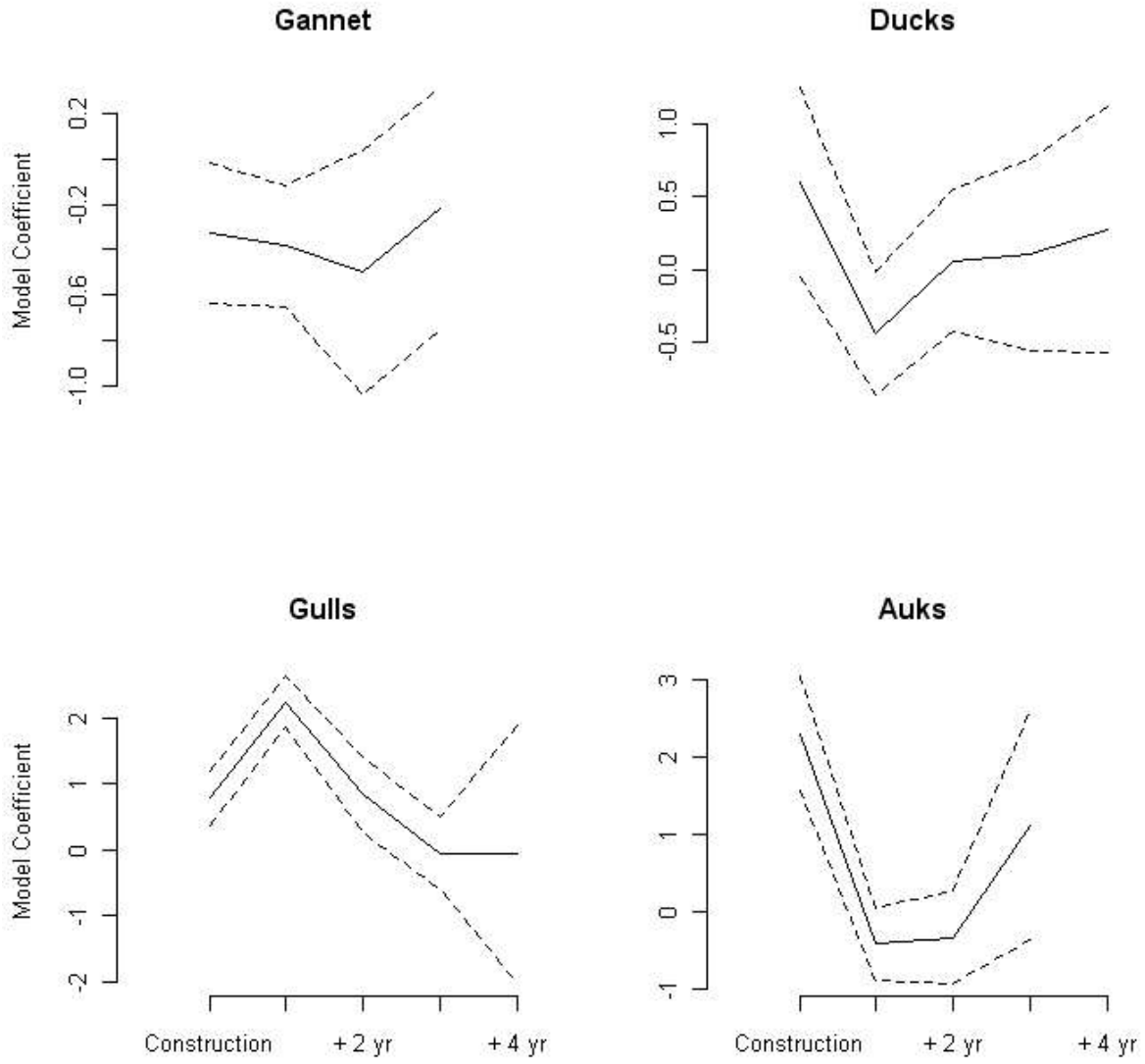



**Figure A4.2** Coefficients from models of change in species' populations relative to the baseline estimate in relation to operational phase of the wind farm. Dashed lines show the standard errors of the model coefficients.

A4.14 Operational phase of the wind farm was not found to significantly affect the apparent displacement rate for birds at offshore wind farms. However, the pattern in the model coefficients for northern gannet, ducks and auks is similar, showing a decline between construction and the first year of operation, followed by a slight increase in subsequent years (Figure A4.2). In contrast, gulls appear to increase in number following construction, before populations stabilise in later years (Figure A4.2). Whilst far from conclusive, these data provide some support for the hypothesis that birds may habituate to the presence of turbines over time and the impact of displacement may decrease. Several recent studies have suggested evidence of habituation to turbines and a reduction in the displacement rate from

offshore wind farms (Petersen & Fox 2007, Lindeboom *et al.* 2011). However, considerable further research would be required to validate these findings.

**Summary**

A4.15 There are a number of provisos regarding the results of the preliminary review presented above. First, many of the studies included in this review have been based on limited data or had insufficient data to draw robust conclusions regarding displacement rates. Second, considerable differences exist in the methods in data collection (the suitability and consistency between years of which has not been reviewed here) and in the treatment and analyses of data. Third, as noted, studies have seldom distinguished changes in bird abundance associated with the construction of the wind farm from those associated with background year-to-year changes in local populations. Hence the changes in abundance record do not necessarily equate to displacement or attraction rates. Fourth, relatively few of the results were reported as statistically significant, while the power of the studies to detect change was often limited (see Maclean *et al.* 2006, 2007, 2012, Pérez Lapeña *et al.* 2010). There has also been much further consideration given to survey design, with the development of distance sampling software (Thomas *et al.* 2010) and, more recently in conjunction with this, density surface modelling approaches that allow consideration of environmental covariates (Rexstad 2011). Such approaches very much improve the power to detect change (Maclean *et al.* 2006, 2007, 2012) and have been used to investigate displacement at wind farms in Denmark (Petersen *et al.* 2011) and also re-evaluate data for Kentish Flats (Rexstad & Buckland 2012). Lastly, it should be noted that displacement rates are likely to be context specific, and so dependent on a number of factors including the size, configuration and location of the wind farm and the extent and proximity of alternate habitat for displaced birds.

A4.16 Although the findings presented above must thus be treated as tentative, the information provided by the studies reviewed does provide some guidance as to the displacement rates that might be used in this assessment.

A4.17 Despite the limitations noted, the evidence available suggests differences do exist in rates of displacement, or attraction, between different species. The relative apparent displacement / attraction rates suggested in these results are not inconsistent with the scores relating to sensitivity to disturbance presented by Furness & Wade (2012).

A4.18 The recent NE/JNCC (2012) advice note on assessing displacement quotes the scores of Furness & Wade (2012), though notes that their assessment of the sensitivity of northern gannet differs from Furness & Wade (2012) as, while the species might not be highly sensitive to disturbance in general (e.g. ship and helicopter traffic), there are indications of a strong macro-avoidance of offshore wind farms (Krijgsveld et al. 2010, 2011). The guidance also notes that these sensitivity scores give an initial indication of potential displacement levels that may be exhibited by each species and where in the full range of displacement each species might lie.

A4.19 Given the variability in apparent displacement / attraction rates noted by the review provided in Appendix 4, we thus draw from these sensitivity scores in deriving rates of displacement to take forward in this assessment. The displacement rates for different species taken forward are derived by applying the scores for sensitivity to disturbance (as given by Furness & Wade 2012) across a range of potential displacement rates from 0 to 100% – see Table 4.8 in the EIA methodology.

**Part 2: Mortality rates of birds displaced from offshore wind farms, and population-level consequences**

A4.20 There is little empirical evidence that allows the quantification of mortality rates or population-level consequences as a result of the displacement of birds from areas where offshore wind farms are built. Based on ecological principals, and evidence from other types of development that result in birds changing their distribution (e.g. Burton *et al.* 2006), we might expect that when birds are displaced from an area this would increase competition in the areas that they are displaced to. The effect of this will depend on the current population level in relation to the carrying capacity of the environment. Carrying capacity is the maximum number of individuals that an area can support, given the resources available. If birds avoid the area where a wind farm is built (i.e. they are displaced) this would be expected to reduce the carrying capacity of the overall environment that they inhabit as these birds effectively can no longer access any resources, such as food, that are within that area. This is likely to result in fitness consequences either directly to the individual birds that are displaced, or to the population as a whole in areas that they are displaced to. This could include reduced survival rates or lower productivity. The potential impacts of displacement and the barrier effects posed by wind farms on such demographic rates are the subject of current research being undertaken by the Centre for Ecology and Hydrology (McDonald *et al.* 2012).

A4.21 The mechanisms for these potential effects are summarised in the recent NE/JNCC advice note on assessing displacement from offshore wind farm developments (NE & JNCC 2012). This advice note refers to the review conducted on the vulnerability of seabirds to offshore wind turbines (Furness & Wade 2012) and suggests that their scores of species-specific habitat use flexibility may give an indication of the likelihood that mortality will arise from displacement of each species, and possibly its magnitude. This is because species that have more flexibility in their habitat use may be more able to cope with displacement to an alternative habitat, while those that are less flexible may not.

A4.22 Further research, for example developing individual behaviour-based models (Goss-Custard *et al.* 2000, Kaiser *et al.* 2006, Stillman 2003, 2008, Stillman & Goss-Custard in press, Stillman *et al.* 2007), would allow a more accurate estimation of the likely mortality consequences of displacement for bird species. However, such models are data-hungry, requiring information on a large number of parameters including the energetic requirements of each species, an understanding of their foraging ecology, and an understanding of how these change when birds are displaced. Future work

to produce such models could improve our understanding of the mortality consequences of displacement but will not be possible until we have a better understanding of the parameters on which such models are based. Therefore we cannot expect to have the understanding these models would provide in time for this application and must instead make the best use of evidence already available.

A4.23 In the absence of any empirical evidence regarding the mortality consequences as a result of displacement from offshore wind farms, it would seem that the present, most pragmatic course of action would be to draw from assessments of species sensitivities to habitat loss. In essence, these scores reflect the ability of a species to cope with habitat loss following displacement, and thus may be viewed as a proxy for the proportion of the species' population that might be expected to die following displacement. We thus draw from these sensitivity scores in deriving rates of mortality for displaced marine birds to take forward in the assessment in this technical report. Mortality rates for different species taken forward are derived by applying the scores for sensitivity to habitat loss (as given by Furness & Wade 2012) across a range of potential mortality rates from 0 to 50%. The derivation of these rates also follows stakeholder discussion.

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## APPENDIX 5 Review of the proportion of time spent underwater by marine birds while at sea

### Introduction

A5.1 Surveys for the Dogger Bank Zone have recorded several key species of diving marine birds including four diving auk species (common guillemot, razorbill, little auk, and Atlantic puffin), white-billed diver and northern gannet.

A5.2 These species spend a proportion of the time at sea submerged beneath the water. Consequently, a proportion of these birds may be missed by visual and high definition imagery methods and therefore population estimates for project areas may represent an underestimate of the total numbers that were present. Northern fulmar is also known to make shallow dives but to a much lesser extent than the other species listed and so is not considered further here.

A5.3 To address this concern, we conducted a literature review to suggest applicable correction factors that may be used to estimate the proportion of birds potentially missed from at-sea surveys. Within the EIA, quantitative assessment has been carried out on collision, disturbance and displacement, using population estimates produced from habitat association modelling. The effect of collision risk deals with birds in the air rather than on the sea and hence is unaffected by birds potentially missed from surveys due to diving underwater. Therefore, disturbance and displacement are effects for which such a correction factor needs considering.

### Methods

#### Literature review

A5.4 A review of peer- and non-peer reviewed studies was conducted, investigating the diving and foraging behaviour for key diving species in the impact assessment: white-billed diver, northern gannet, common guillemot, razorbill, little auk, and Atlantic puffin.

A5.5 At-sea surveys, that were used to produce population estimates of these species, only encounter birds when at sea. Therefore, in order to derive adequate correction factors, the time spent that birds spend underwater needs to be assessed in relation to when the adult bird is away from the colony, i.e. on foraging trips – when collecting food for chicks or themselves. This also requires knowledge of start and end of the foraging trip as well as detailed understanding of behaviour within it.

A5.6 Some detailed studies have been conducted during the breeding season, whereby tags have been attached to breeding adult birds to learn more about their foraging behaviour. A wide range of tagging studies are continuously emerging for these species, however, specific information is required to estimate the time spent underwater. For instance, studies investigating foraging areas used at sea using GPS or geo-location studies (Wanless *et al.* 1990; Hamer *et al.* 2009; Harris *et al.* 2012),

often cannot typically be used to give more fine-scaled behaviour required in this instance (although note that more sophisticated geo-location devices can now record diving behaviour).

A5.7 The time spent underwater by birds of these species outside the breeding season is largely unknown. However, time activity budgets during feeding trips of birds in the breeding season have been studied using activity loggers (e.g. Cairns *et al.* 1987, 1990, Benvenuiti *et al.* 2001; Dall'Antonia *et al.* 2001; Thaxter *et al.* 2009, 2010), whereby a sensor indicates differing behaviour such as flight, sea surface resting, and diving. Such studies become much more powerful when combined with information on diving behaviour underwater obtained from time-depth-recorders (TDRs) such as dive depth and duration (Wanless *et al.* 1988, Thaxter *et al.* 2010). Therefore, for some studies, information on trip duration, diving behaviour and time allocation including time underwater was extracted from these studies to present or estimate (if values were not given directly – see equations below) the proportion of time birds were submerged beneath the water.

A5.8 For some studies, however, the specific information desired could not be extracted from these more detailed studies. For instance, some studies investigated specific research questions, including those relating to trip duration only (e.g. Steen *et al.* 2007, Hamer *et al.* 2000). Early tagging studies using depth gauges just presented information on dive depths (e.g. Piatt & Nettleship 1985; Burger & Simpson 1987; Harris *et al.* 1990, Barrett & Furness 1990) or used time depth recorders (TDRs) but could not be used further (e.g. Wanless *et al.* 1988).

A5.9 Some diving studies (e.g. Watanuki *et al.* 2006, Jakubas *et al.* 2012) could not always give specific information on time spent underwater due the specific nature of their research question. Some studies only presented information for time per day (Spencer 2012) - while time per day is useful, it still includes a proportion of time at the colony that would be incorrect to include within a correction factor. Other studies did not split behaviour down to the detail required, for instance for little auks stating "time on the water" (Welker *et al.* 2009), which can include time on the sea surface, and time spent in "diving activity" (Karnovsky *et al.* 2011). Diving birds forage in cluster "bouts" of dives whereby alternating patterns of underwater and sea surface recovery or preparation time occurs between successive dives (Elliott *et al.* 2008a, b). Sea-surface pauses between dives are a related function of diving activity, but nonetheless should not strictly be included when correcting for birds missed from surveys at sea.

A5.10 A lack of information is available on diving behaviour of Atlantic puffins, and one detailed study, Spencer (2012), recorded all necessary information except the number of feeds per day. Therefore, a mean value was suggested across other colony-based studies (6.7 feeds per day, Hudson, 1979, Harris, 1984, Creelman & Storey 1991, Wickett, 1999[1], Baillie & Jones, 2004), however for reasons stated

[1] http://www.maine.gov/ifw/wildlife/species/plans/birds/atlanticpuffinrazorbill/puffinrazorbillassesment.pdf

below, this study was not recommended to be used as a final correction value for Atlantic puffin.

**Estimation of underwater correction factors**

A5.11 Foraging trips by breeding seabirds can range considerably in duration, and behaviour such as time spent diving within them can also change across the duration of the trip (Lewis *et al.* 2004). A suitable measure for correction is time spent underwater per time spent at sea per 24 hours. However, we investigated this currency for all studies which gave equivalent values as the time underwater per average individual foraging trip. Hence, we present time underwater per foraging trip as a final correction factor.

A5.12 Where possible, additional parameters were used to estimate the time spent underwater per trip using a combination of mean dive duration, trip duration, and number of dives per trip – in the latter parameter, if not given directly had to be calculated from the number of dives per 24 hours, and number of feeding trips made per day. Hence if time spent underwater per trip was not given, we used the following equations to derive this parameter:

Number of dives per trip = number of dives per day / number of trips per day [1]

Time underwater per trip = dive duration x number of dives per trip [2]

Time underwater per trip = Time underwater per day / number of trips per day [3]

The final "corrected" abundance estimates were thus calculated as:

Total abundance estimate + (Total abundance estimate * proportion underwater per feeding trip) [4]

A5.13 For studies where more than one location was included, we averaged information for specific studies before including those values in the overall mean.

A5.14 PROVISOS – the at-sea population estimates used in the assessment are modelled monthly estimates, but were produced from models predicting on a centre-point day of a month. At-sea data were also collected during daylight hours at specific periods of the day. Hence, excessive concern with underwater correction factors not spanning total 24 hour periods of "at-sea" bird activity or monthly periods may be considered a moot point. However, caution is still required since studies reviewed here were nearly always for the chick-rearing period of the breeding season only, and the behaviour of birds may vary outside of breeding.

**Results and Discussion**

A5.15 For Northern gannets, a total of six studies provided information (Lewis *et al.* 2002, 2004; Garthe *et al.* 1999, 2003, 2007, 2011). Northern gannets make much shorter dives (e.g. on average under 15 s) than auks (averaging more than 40 s), and

generally fewer dives per trip. Combined with much longer trip durations for gannets (average over 13 h), provided values of less than 1% time spent underwater per foraging trip and hence are of negligible likelihood in affecting overall population estimates.

A5.16 A total of five studies provided information for common guillemot, four for razorbill, and only one for Atlantic puffin, and four for little auk. All studies were during the chick-rearing period. Studies often presented more than one value, for instance if more than one colony or year was studied, indicated in Table A5.1.

A5.17 The single value for Atlantic puffin is based on only one study where extensive calculations and assumptions (see methods) had to be made to obtain the desired time spent underwater per trip. This value is considered extreme for the auk species reviewed here. Instead, we suggest taking a more realistic value across the other three species that have more certainty. However, for Atlantic puffin we assign a value of low confidence in this data. For all other species, including northern gannet, an adequate number of studies were available and we therefore assign high confidence in the data.

A5.18 Great northern divers are the best studied of all diver species. Some studies have focused on different aspects of great northern diver time-activity budgets (e.g. Rummel & Goetzinger 1975, McIntyre 1978, McIntyre & Barr 1983, Barr 1996, Gostomski & Evers 1998, Nocera & Taylor 2000, Nocera & Burgess 2002). Much less is known about red-throated, black-throated divers (Polak & Ciach 2007) and white-billed divers, especially during migration and winter periods, and barely nothing is known about offshore diving behaviour. For great northern divers, dive durations are on average 42.7±2.5 s across studies presenting this information (McIntyre 1978; Alvo and Berrill 1992; Nocera & Burgess 2002; Gingras & Paszkowski 2006; Thompson & Price 2006) but information on numbers of dives and trip durations during breeding are not readily reported, hence less is known about total time budgets. For great northern divers a value of >50% time spent "foraging" including surface pauses was presented by Gingras & Paszkowski (2006). For red-throated and black-throated divers studied during autumn stop-overs at inland lakes in Poland, 63.2% and 71.3% time spent underwater were reported for immature and adult birds averaged. Therefore we suggest taking a conservative value of 71.3% as realistic precautionary for white-billed diver. However, given the transfer of this value from other species, the lack of overall studies, lack of correct study location and time period, we assign very low confidence on this figure.

A5.19 Final values of percentage of time spent underwater per trip, are given as:

- Northern gannet: <1 %, High confidence;
- Common guillemot: 18.0 %, High confidence;
- Razorbill: 16.4 %, High confidence;
- Little auk: 26.1 %, High confidence;

- Atlantic puffin (51.8 %) but value suggested = mean across other auks: 20.2 %, Low confidence;
- White-billed diver: 71.3 %, Very low confidence.

A5.20 We make the assumption that time spent underwater equates to the proportion of birds that may be missed from at-sea surveys.

**Table A5.1** Review of studies where time spent underwater per trip was either given directly, or could be calculated from other parameters presented by authors; * estimated from calculation, ** extracted from graph, *** mean value from other studies with caution, "-" no value available or value not necessary for calculation.

| Species | Reference | Trip duration (hrs) | Time underwater per trip (hrs) | Mean dive duration (s) | Trips / day / bird | Dives / 24 hrs | No. dives / trip | % underwater / 24 hrs | % underwater / feeding trip # | Colony |
|---|---|---|---|---|---|---|---|---|---|---|
| Common guillemot | Thaxter *et al.* 2010 | 8.3±6.6 | 1.9±1.3 | 46.4±27.4; 118.4±17.2 | 2.4±0.9 | 167±76 | 94±83 | 14.5±5.3 | *22.9 | Isle of May, Scotland |
| | Tremblay *et al.* 2003 | 3.2±2.8 | *0.4 | 38.7±21.3 | 3.2±1.4 | - | 37±48 | 3.9 | *12.5 | Norway |
| | Cairns *et al.* 1987 | - | - | - | - | - | - | 6.6 | 16.8 | Newfoundland |
| | Cairns *et al.* 1990 | - | - | - | - | - | - | 8.1 | 12.5–13.4 | Newfoundland |
| | Monaghan *et al.* 1994 | - | - | - | - | - | - | 4.6-16.7 | 15.4–34.2 | Shetland, Scotland |
| Razorbill | Thaxter *et al.* 2010 | 5.1±5.6 | 0.8±0.7 | 23.1±14.9 | 2.4±1.2 | 376±189 | 142±169 | 8.0±5.4 | *15.7 | Isle of May, Scotland |
| | Dall'Antonia *et al.* 2001. | 17.1±7.4; 13.1±6.3 | 4.7±2.5; 2.3±1.7 | - | *0.77-1.02 | - | 515±219; 339±260 | *8.34-13.12 | 20-32 | Iceland, 1997 & 1998 |
| | Benvenuti *et al.* 2001 | D 1.96±1.42; N 9.17±1.12 | D 0.27±0.28; N 1.15±0.43 | *46.7±13.5 | *2.9 (2.0-2.5) | - | D 19±13; N 85±29 | - | D 13.8; N 12.5 | Graesholmen, day (D), night (N) |
| | Paredes *et al.* 2006, 2008 | M 2.03±0.15; F 1.93±0.2 | *0.21 | M 48.3±14.7; F 52.1±11.7 | M 3.32±0.10; F 3.09±0.10 | M 43.0±34.7; F 54.1±26.4 | *15.2 | *2.8 | *10.7 | Gannet Islands, Canada, 2000-2003; male (M), female (F) |
| Little Auk | Karnovsky *et al.* 2011 | **G, 1-4; H, 0-4; K, 1-4 | *G 0.60; H 1.19; K 0.95 | 37.0±15.5 | G 4.9; H 4.1; K 3.7 | G 285±29; H 473±49; K, 340±25 | *G 58.2; H 115.4; K 91.9 | *G 42; H 50; K 35 (+ post-dive) | *G 23.9; H 59.3; K 37.8 | Greenland (G), Hornsund (H), Kongsfjord (K) |
| | Gremillet *et al.* 2012 | - | - | - | - | - | - | - | **KH 11.6; H 21.5; K 16.9 | Kap H (KH), Hornsund (H), Kongfjord (K) |
| | Harding *et al.* 2009 | 3.15±0.55 | - | 52.1±0.4 | - | - | 58.9 | - | 12 | Greenland |
| | Brown *et al.* 2012 | ST 1.9±0.5, LT: 9.8±0.7 | *ST 0.7; LT 3.3 | **ST 45; LT 55 | - | - | ST 58±19; LT 218±30 | - | *ST, 36.8; LT 33.7 | Greenland, short trip (ST), long trip (LT) |
| Puffin | Spencer 2012 | 1.00±0.64 | *0.52 | 48.7±3.5 | ***6.7 | 256.9±99.6 | *38.3 | 14.2±5.5 | *51.8 | Maine |
| Gannet | Garthe *et al.* 2011 | 2003 14.9±5.0; 2005 17.3±9.6 | *2003 0.05; 2005 0.03 | 2003 10.1±1.0; 2005 5.0±0.2 | - | - | 2003 18±11; 2005 20±17 | - | *2003 0.34; 2005 0.16 | Funk Island, Canada |
| | Garthe *et al.* 2003 | 13.5 | - | - | - | - | - | - | *< 1 % | Funk Island, Canada |

| Species | Reference | Trip duration (hrs) | Time underwater per trip (hrs) | Mean dive duration (s) | Trips / day / bird | Dives / 24 hrs | No. dives / trip | % underwater / 24 hrs | % underwater / feeding trip # | Colony |
|---|---|---|---|---|---|---|---|---|---|---|
| | Lewis *et al.* 2002 | M 20.88±1.20; F 22.34±1.10 | *M 0.05; F 0.13 | M 7.36±0.28; F 10.01±0.35 | - | - | M 25.92±6.06; F 47.75±13.45 | - | *M 0.24; F 0.58 | Bass Rock |
| | Lewis *et al.* 2004 | 25.72±10.58 | 0.08±0.08 | - | - | - | 34±29 | - | *0.31 | Bass Rock |
| | Garthe *et al.* 1999 | 13 | - | 4.4 | - | - | - | - | *< 1 % | Hermaness, Shetland |
| | Garthe *et al.* 2007 | 14.9-28.0 | - | max up to 39 s | - | - | - | - | *< 1 % | Bonaventure Island, Funk Island, Canada |

# used in final calculation for correction of population estimates

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## APPENDIX 6 Species-specific collision risk assessment summaries for Dogger Bank Teesside A and Dogger Bank Teesside B

A6.1 This appendix contains complete collision risk analyses for all turbine options (1-6) and flight height model options (1-3) for the Dogger Bank Teesside A and Dogger Bank Teesside B projects; details are contained within the legends of all graphs.

A6.2 In keeping with the structure of the impact assessment, results here are ordered by project and then by species – links below can be followed for ease of navigation.

**Dogger Bank Teesside A**
**Dogger Bank Teesside B**

**Dogger Bank Teesside A** [top]

**Northern fulmar**

A6.3 The annual pattern of the predicted number of collision differed between years. Based on population estimates from 2010 (Figure A6.1) and from July 2011 to June 2012 (Figure A6.3), the number of collisions was predicted to peak during the spring and early summer, whilst using population estimates from July 2010 to June 2011, the number of collisions was predicted to peak during July (Figure A6.2). These differences reflect differences in the abundance of birds between each year. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.1)

**Table A6.1** Annual collision rates for Dogger Bank Teesside A for northern fulmar using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 12 (11-16) | 2 (2-2) | 1 (1-1) | 9 (7-11) | 1 (1-2) | 0 (0-1) | 14 (12-18) | 2 (2-3) | 1 (1-1) |
| 6MW, 113.5m | 12 (11-16) | 2 (1-2) | 1 (0-1) | 9 (7-11) | 1 (1-1) | 0 (0-0) | 14 (12-18) | 2 (2-2) | 1 (1-1) |
| 6MW, 133.5m | 12 (11-16) | 1 (0-1) | 0 (0-0) | 9 (7-11) | 0 (0-0) | 0 (0-0) | 14 (12-18) | 1 (1-1) | 0 (0-0) |
| 6MW, 183.5m | 12 (11-16) | 0 (0-0) | 0 (0-0) | 9 (7-11) | 0 (0-0) | 0 (0-0) | 14 (12-18) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 9 (7-11) | 1 (1-2) | 0 (0-0) | 6 (5-8) | 1 (1-1) | 0 (0-0) | 10 (8-13) | 2 (1-2) | 0 (0-1) |
| 10MW, 142.5m | 9 (7-11) | 1 (1-1) | 0 (0-0) | 6 (5-8) | 1 (1-1) | 0 (0-0) | 10 (8-13) | 1 (1-2) | 0 (0-0) |
| 10MW, 162.5m | 9 (7-11) | 0 (0-0) | 0 (0-0) | 6 (5-8) | 0 (0-0) | 0 (0-0) | 10 (8-13) | 0 (0-1) | 0 (0-0) |
| 10MW, 182.5m | 9 (7-11) | 0 (0-0) | 0 (0-0) | 6 (5-8) | 0 (0-0) | 0 (0-0) | 10 (8-13) | 0 (0-0) | 0 (0-0) |

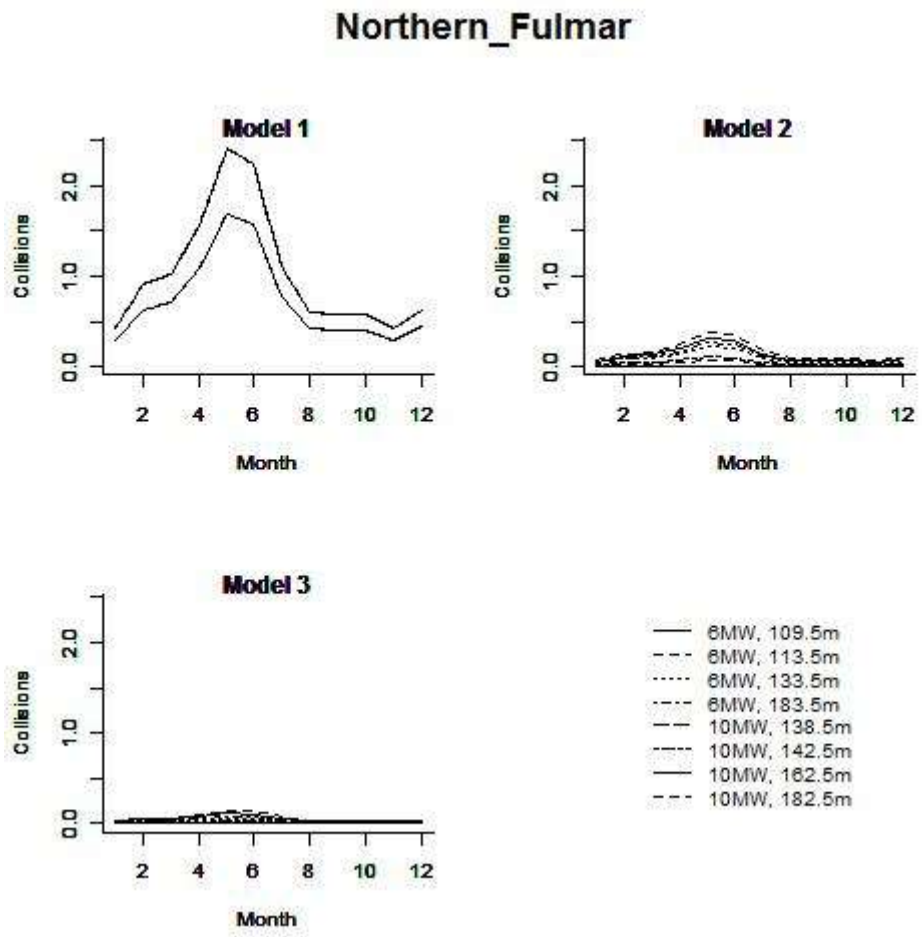



**Figure A6.1** Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

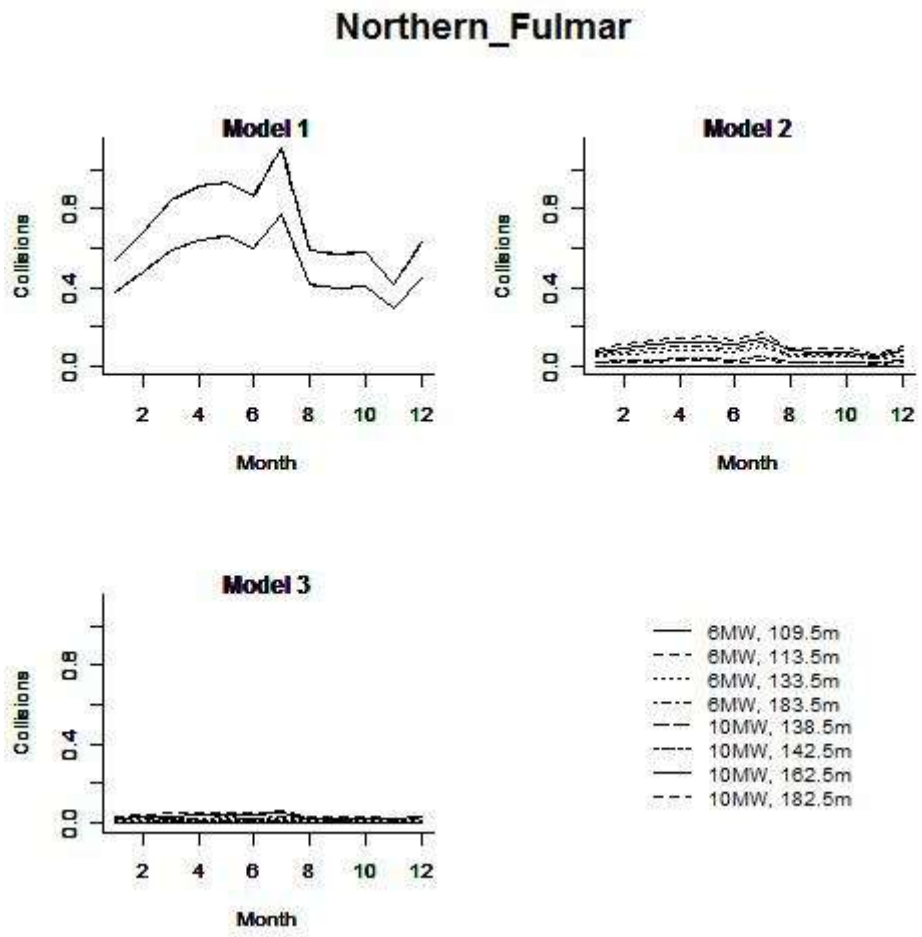



**Figure A6.2** Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

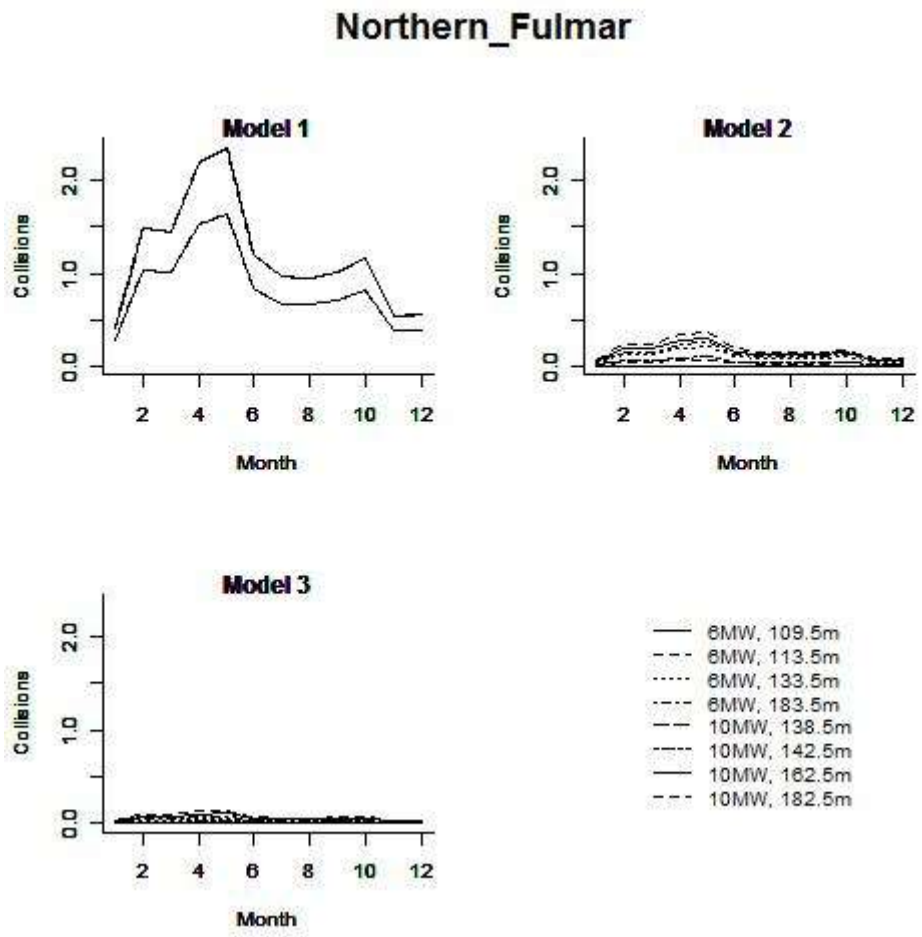



**Figure A6.3** Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Northern gannet**

A6.4 The annual pattern of the predicted number of collisions for northern gannet varied between years (Figures A6.4, A6.5 and A6.6). Using data from July 2010 to June 2011 and July 2011 to June 2012 the number of collision peaked during the spring. During 2010 the predicted number of collisions peaked during the late summer and autumn. These patterns reflect the annual breeding and migratory patterns of this species within the North Sea. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.2)

**Table A6.2** Annual collision rates for Dogger Bank Teesside A for northern gannet using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 99% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 38 (31-45) | 6 (4-7) | 11 (9-14) | 65 (53-78) | 10 (8-11) | 20 (16-24) | 178 (145-213) | 26 (21-31) | 54 (44-65) |
| 6MW, 113.5m | 38 (31-45) | 5 (4-6) | 10 (8-12) | 65 (53-78) | 8 (7-10) | 18 (14-21) | 178 (145-213) | 22 (18-26) | 48 (39-58) |
| 6MW, 133.5m | 38 (31-45) | 5 (4-6) | 6 (5-7) | 65 (53-78) | 8 (7-10) | 10 (8-12) | 178 (145-213) | 22 (18-26) | 27 (22-32) |
| 6MW, 183.5m | 38 (31-45) | 5 (4-5) | 1 (1-1) | 65 (53-78) | 8 (6-9) | 2 (2-2) | 178 (145-213) | 21 (17-26) | 6 (5-7) |
| 10MW, 138.5m | 26 (21-31) | 4 (3-5) | 4 (4-5) | 45 (36-53) | 7 (6-8) | 8 (6-9) | 122 (99-146) | 19 (15-22) | 21 (17-25) |
| 10MW, 142.5m | 26 (21-31) | 3 (3-4) | 4 (3-5) | 45 (36-53) | 6 (5-7) | 7 (6-8) | 122 (99-146) | 15 (12-18) | 18 (15-22) |
| 10MW, 162.5m | 26 (21-31) | 3 (3-4) | 3 (2-3) | 45 (36-53) | 5 (4-7) | 5 (4-6) | 122 (99-146) | 15 (12-18) | 13 (11-16) |
| 10MW, 182.5m | 26 (21-31) | 3 (3-4) | 2 (2-2) | 45 (36-53) | 6 (5-7) | 3 (3-4) | 122 (99-146) | 15 (12-18) | 9 (7-11) |

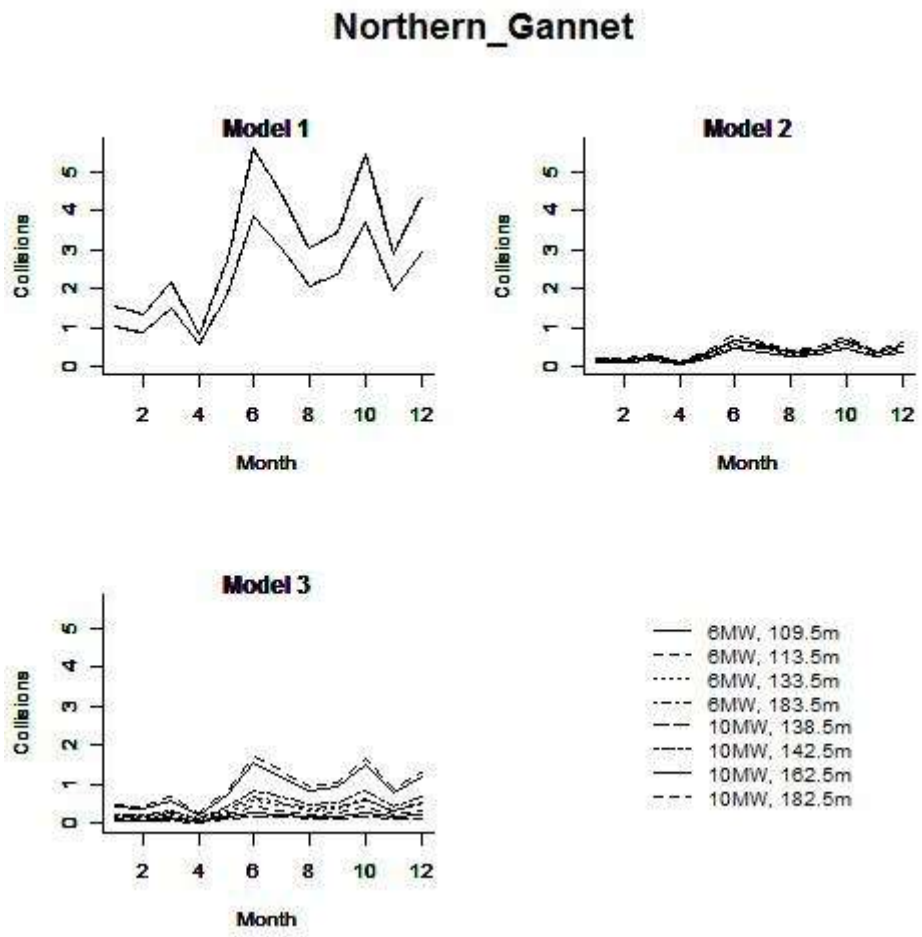



**Figure A6.4** Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

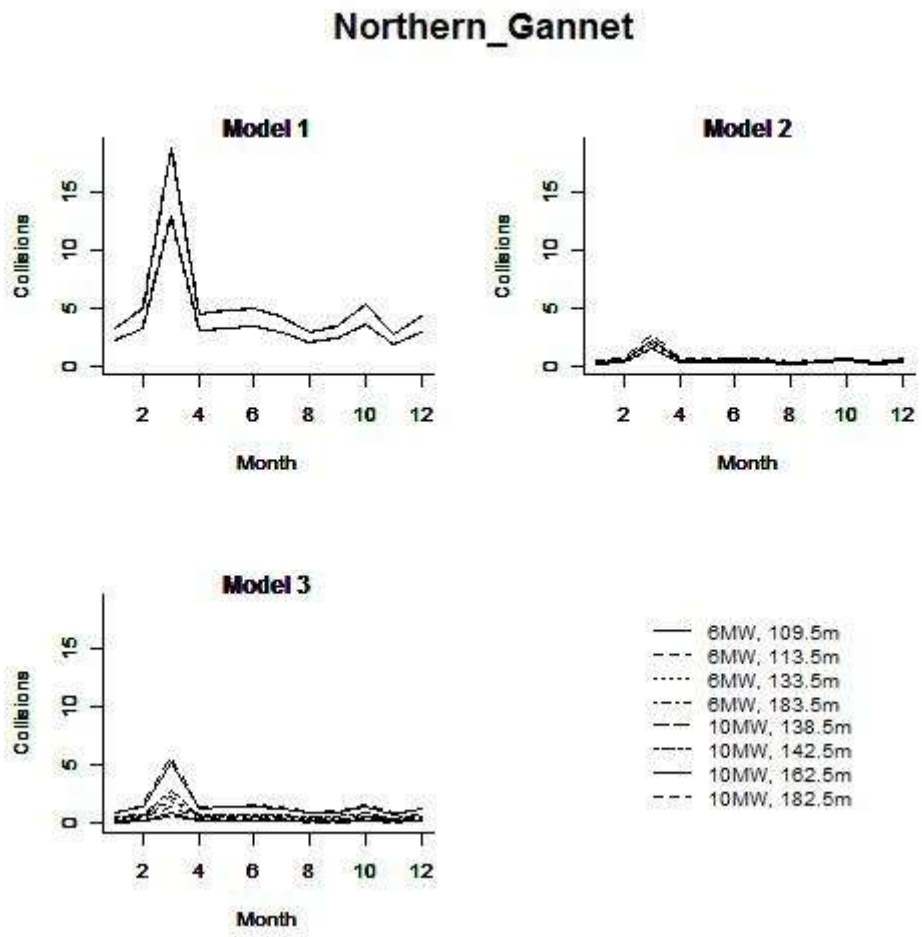



**Figure A6.5** Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

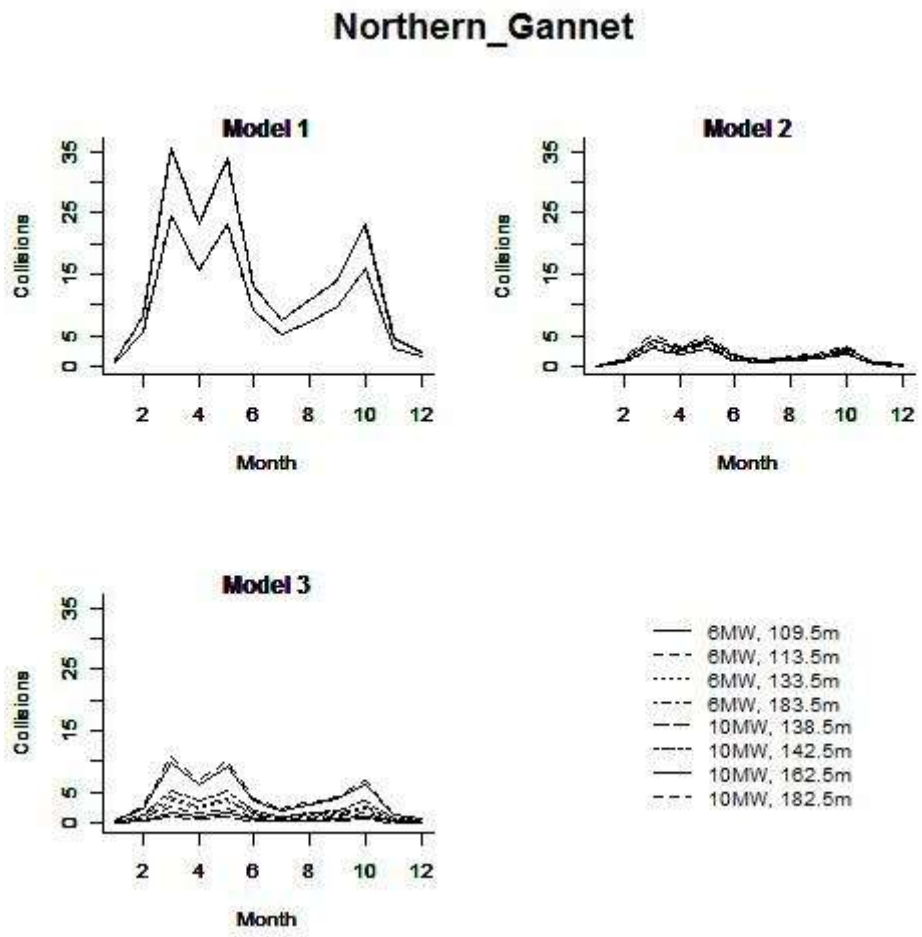



**Figure A6.6** Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Arctic skua**

A6.5 The annual patterns of the predicted number of collisions were relatively consistent between years. In all years the predicted number of collisions peaked during September (Figures A6.7, A6.8 and A6.9), but based on data from July 2010 to June 2011, there was a secondary peak in the predicted number of collisions in June (Figure A6.8). These patterns reflect seasonal abundance of Arctic skua within the wind farm area. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.3)

**Table A6.3** Annual collision rates for Dogger Bank Teesside A for Arctic skua using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 0 (0-990) | 0 (0-1230) | 0 (0-269) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-114) | 0 (0-141) | 0 (0-31) |
| 6MW, 113.5m | 0 (0-990) | 0 (0-635) | 0 (0-171) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-114) | 0 (0-73) | 0 (0-20) |
| 6MW, 133.5m | 0 (0-990) | 0 (0-64) | 0 (0-61) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-114) | 0 (0-7) | 0 (0-7) |
| 6MW, 183.5m | 0 (0-990) | 0 (0-32) | 0 (0-6) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-114) | 0 (0-4) | 0 (0-1) |
| 10MW, 138.5m | 0 (0-690) | 0 (0-861) | 0 (0-122) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-79) | 0 (0-99) | 0 (0-14) |
| 10MW, 142.5m | 0 (0-690) | 0 (0-460) | 0 (0-74) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-79) | 0 (0-53) | 0 (0-8) |
| 10MW, 162.5m | 0 (0-690) | 0 (0-44) | 0 (0-28) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-79) | 0 (0-5) | 0 (0-3) |
| 10MW, 182.5m | 0 (0-690) | 0 (0-38) | 0 (0-17) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-79) | 0 (0-4) | 0 (0-2) |

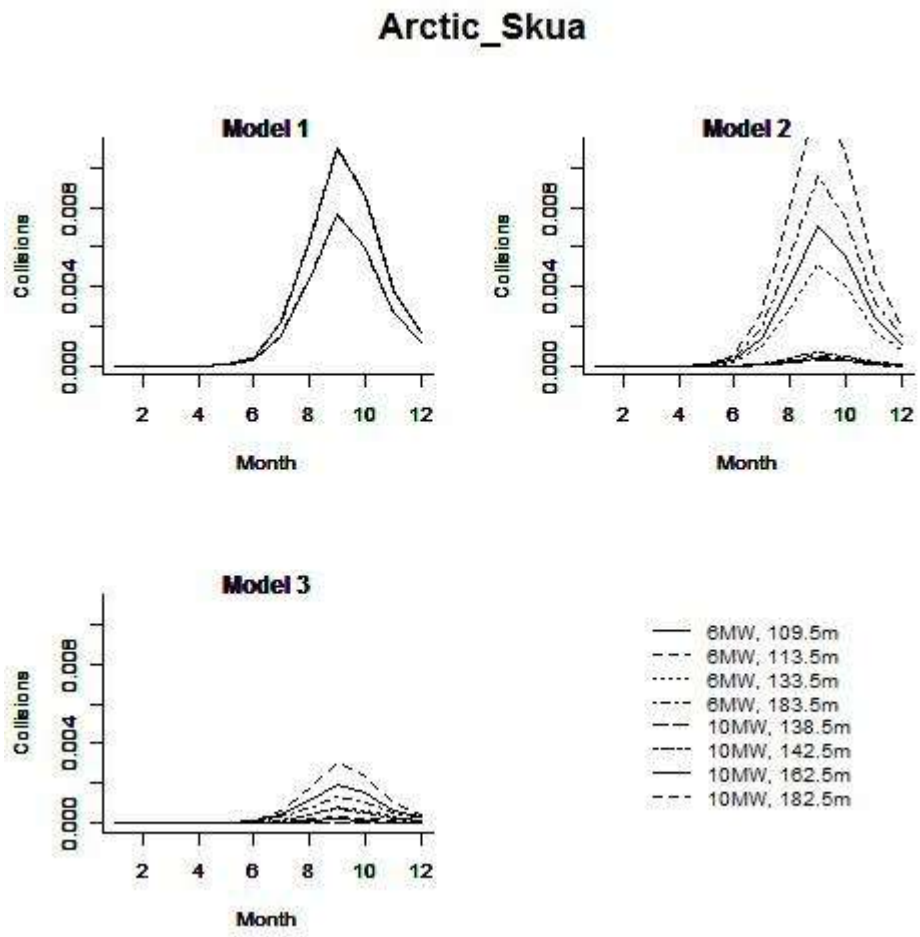



**Figure A6.7** Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

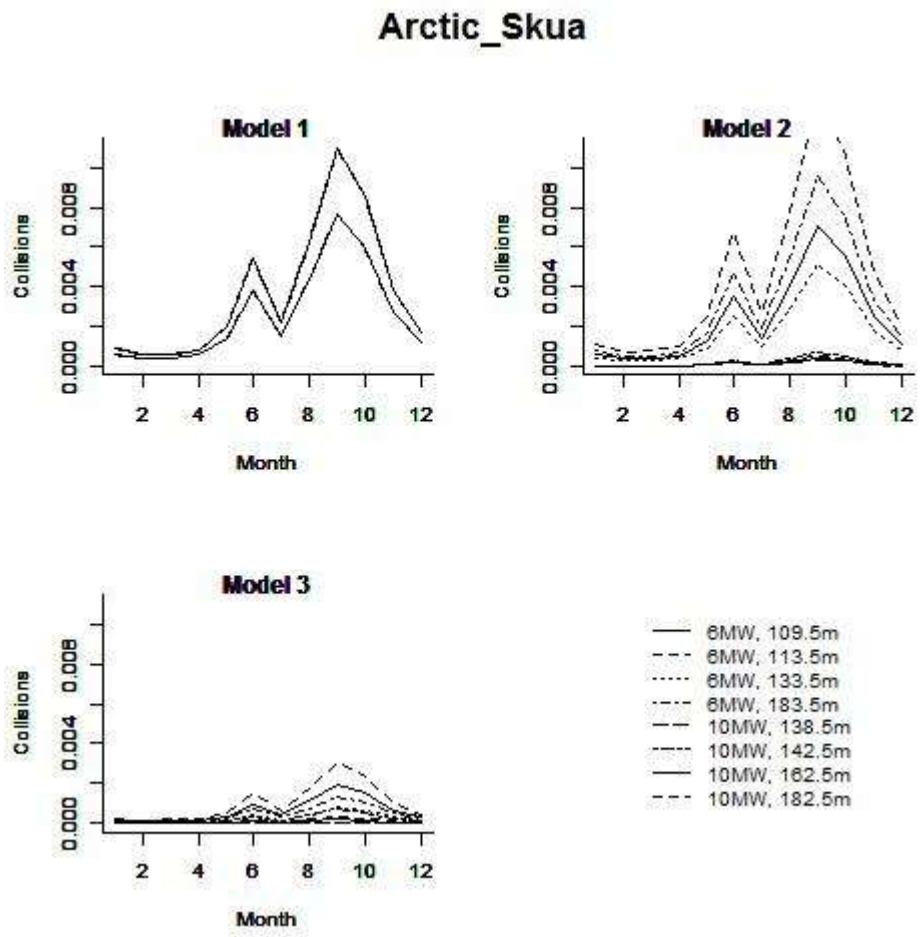



**Figure A6.8** Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

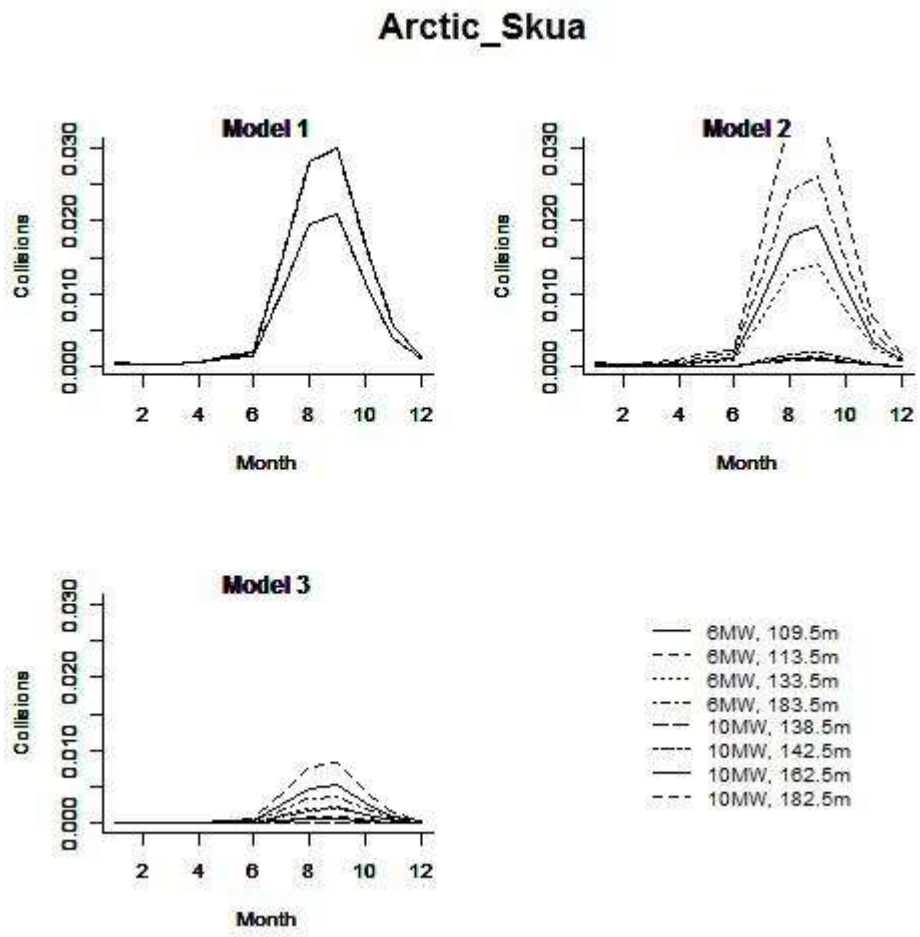



**Figure A6.9** Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Great skua**

A6.6 The annual patterns of the predicted number of collisions were relatively consistent between years. In all years the predicted number of collisions peaked during September (Figures A6.10, A6.11 and A6.12), but based on data from July 2010 to June 2011, there was a secondary peak in the predicted number of collisions in June (Figure A6.11). These patterns reflect seasonal abundance of great skua within the wind farm area. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.4)

**Table A6.4** Annual collision rates for Dogger Bank Teesside A for great skua using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 1 (0-2) | 0 (0-1) | 0 (0-0) | 1 (1-2) | 0 (0-1) | 0 (0-0) | 2 (1-4) | 1 (0-1) | 0 (0-1) |
| 6MW, 113.5m | 1 (0-2) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-1) | 0 (0-0) | 2 (1-4) | 1 (0-1) | 0 (0-1) |
| 6MW, 133.5m | 1 (0-2) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-4) | 0 (0-0) | 0 (0-0) |
| 6MW, 183.5m | 1 (0-2) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-4) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (0-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-1) | 0 (0-0) |
| 10MW, 142.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (0-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-1) | 0 (0-0) |
| 10MW, 162.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (0-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) |
| 10MW, 182.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (0-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) |

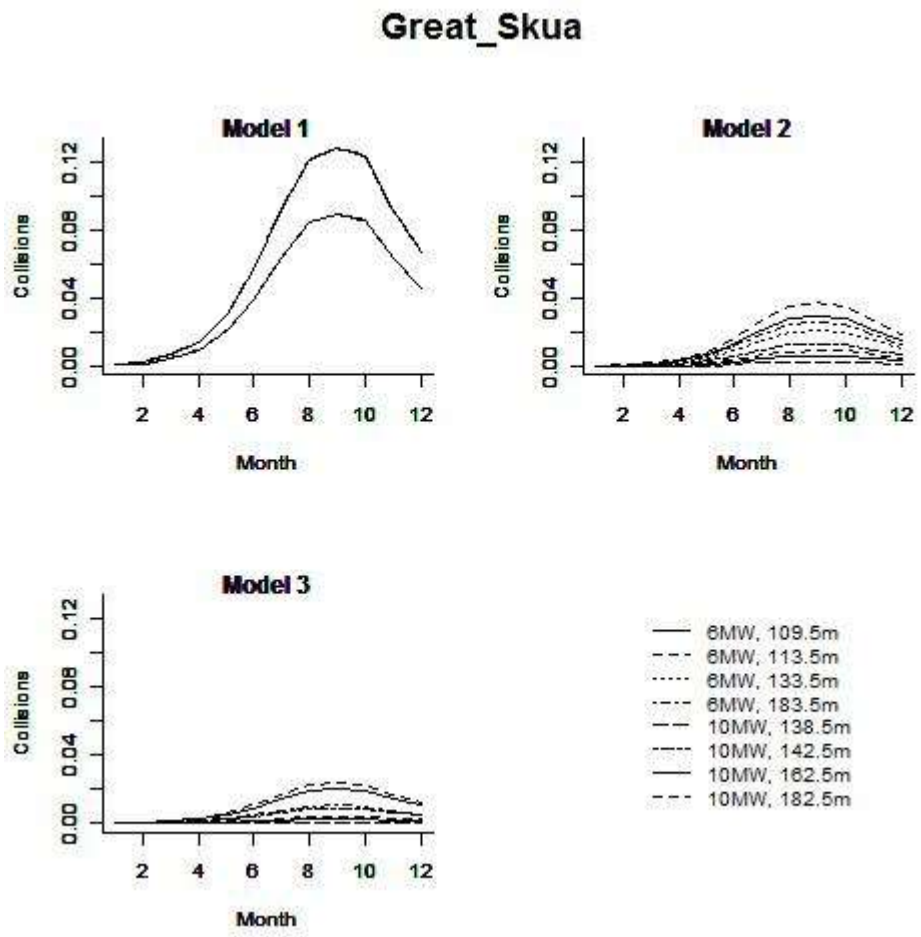



**Figure A6.10** Estimated monthly collision rates for great skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

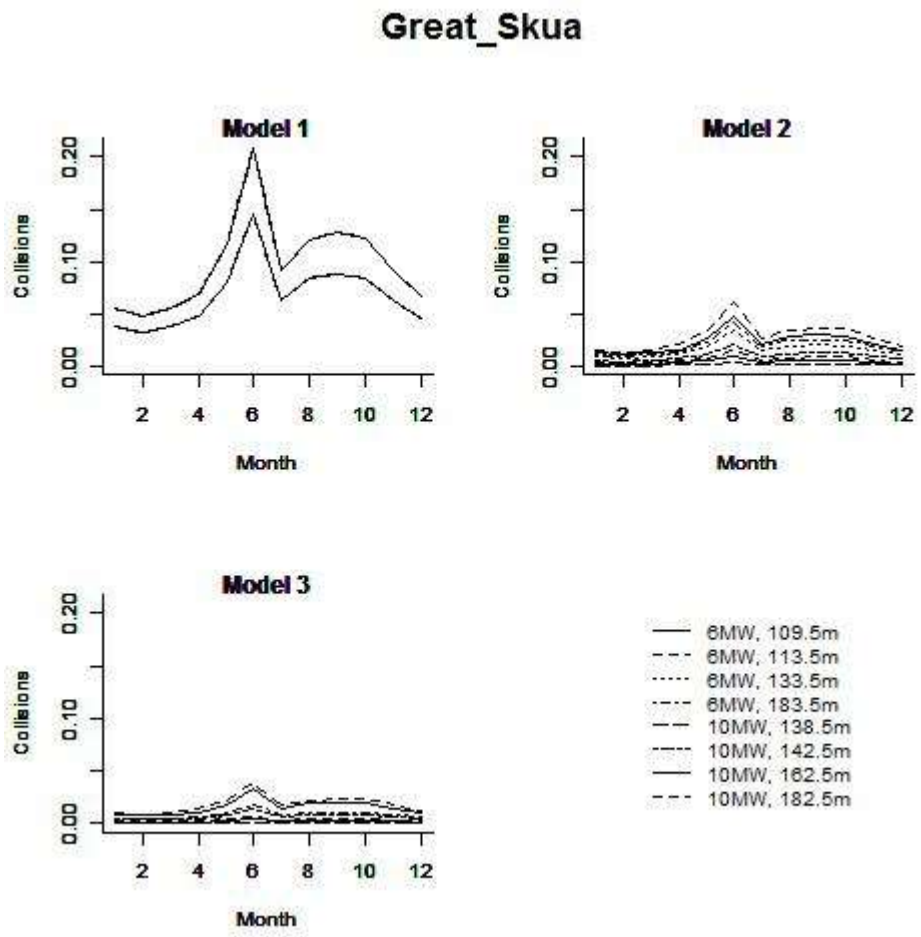



**Figure A6.11** Estimated monthly collision rates for great skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

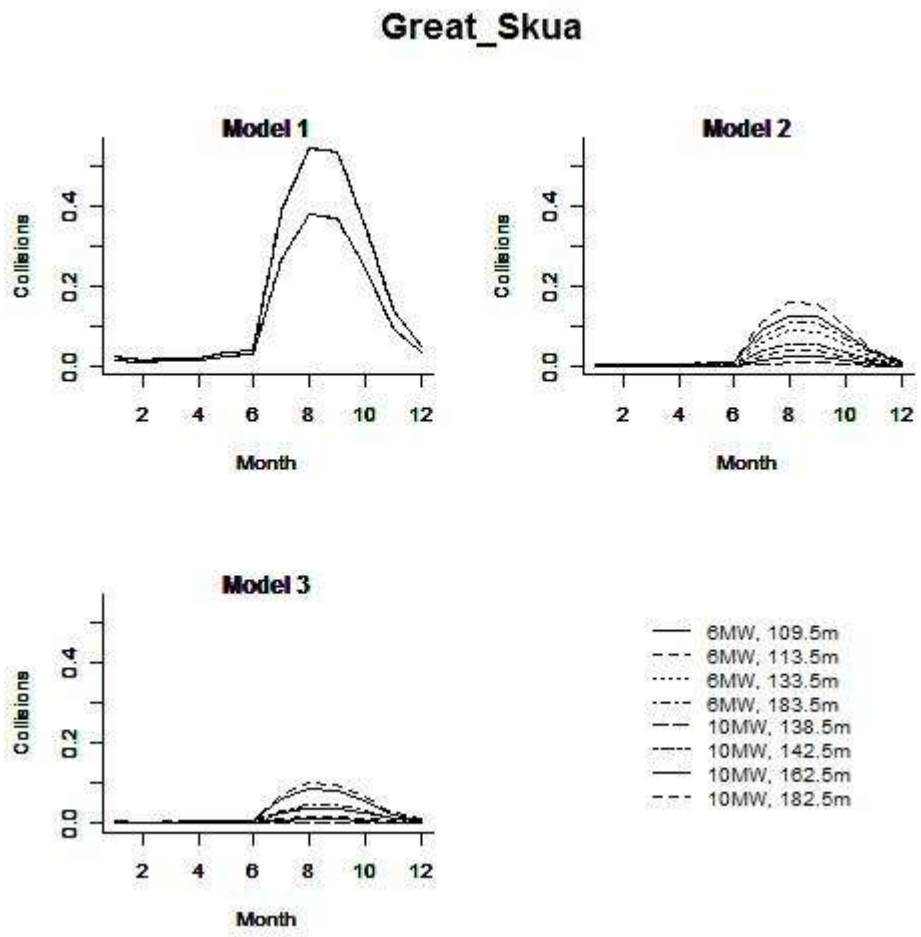



**Figure A6.12** Estimated monthly collision rates for great skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Black-legged kittiwake**

A6.7 The annual patterns of the predicted number of collisions were relatively consistent between years. In all years the predicted number of collisions peaked during the start of the year (Figures A6.13, A6.14 and A6.15), but in 2010, there was a secondary peak in the predicted number of collisions towards the end of the year (Figure A6.13). These patterns reflect seasonal abundance of black-legged kittiwake within the wind farm area. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.5)

**Table A6.5** Annual collision rates for Dogger Bank Teesside A for black-legged kittiwake using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 750 (672-848) | 210 (188-237) | 35 (31-39) | 1,364 (1,209-1,545) | 381 (338-432) | 63 (56-72) | 1,368 (1,198-1,571) | 382 (335-439) | 63 (56-73) |
| 6MW, 113.5m | 750 (672-848) | 122 (109-138) | 20 (18-23) | 1,364 (1,209-1,545) | 222 (197-251) | 36 (32-41) | 1,368 (1,198-1,571) | 222 (195-256) | 36 (32-42) |
| 6MW, 133.5m | 750 (672-848) | 9 (8-10) | 3 (2-3) | 1,364 (1,209-1,545) | 16 (15-19) | 5 (4-6) | 1,368 (1,198-1,571) | 16 (14-19) | 5 (4-6) |
| 6MW, 183.5m | 750 (672-848) | 1 (1-1) | 1 (1-1) | 1,364 (1,209-1,545) | 2 (2-2) | 2 (2-3) | 1,368 (1,198-1,571) | 2 (2-2) | 2 (2-3) |
| 10MW, 138.5m | 525 (470-593) | 148 (133-168) | 18 (17-21) | 954 (845-1,080) | 270 (239-305) | 34 (30-38) | 956 (838-1,099) | 270 (237-311) | 34 (29-39) |
| 10MW, 142.5m | 525 (470-593) | 86 (77-97) | 11 (10-12) | 954 (845-1,080) | 156 (139-177) | 19 (17-22) | 956 (838-1,099) | 157 (137-180) | 19 (17-22) |
| 10MW, 162.5m | 525 (470-593) | 6 (6-7) | 2 (2-2) | 954 (845-1,080) | 12 (10-13) | 4 (3-4) | 956 (838-1,099) | 12 (10-14) | 4 (3-4) |
| 10MW, 182.5m | 525 (470-593) | 1 (1-2) | 1 (1-1) | 954 (845-1,080) | 3 (2-3) | 2 (2-2) | 956 (838-1,099) | 3 (2-3) | 2 (2-2) |

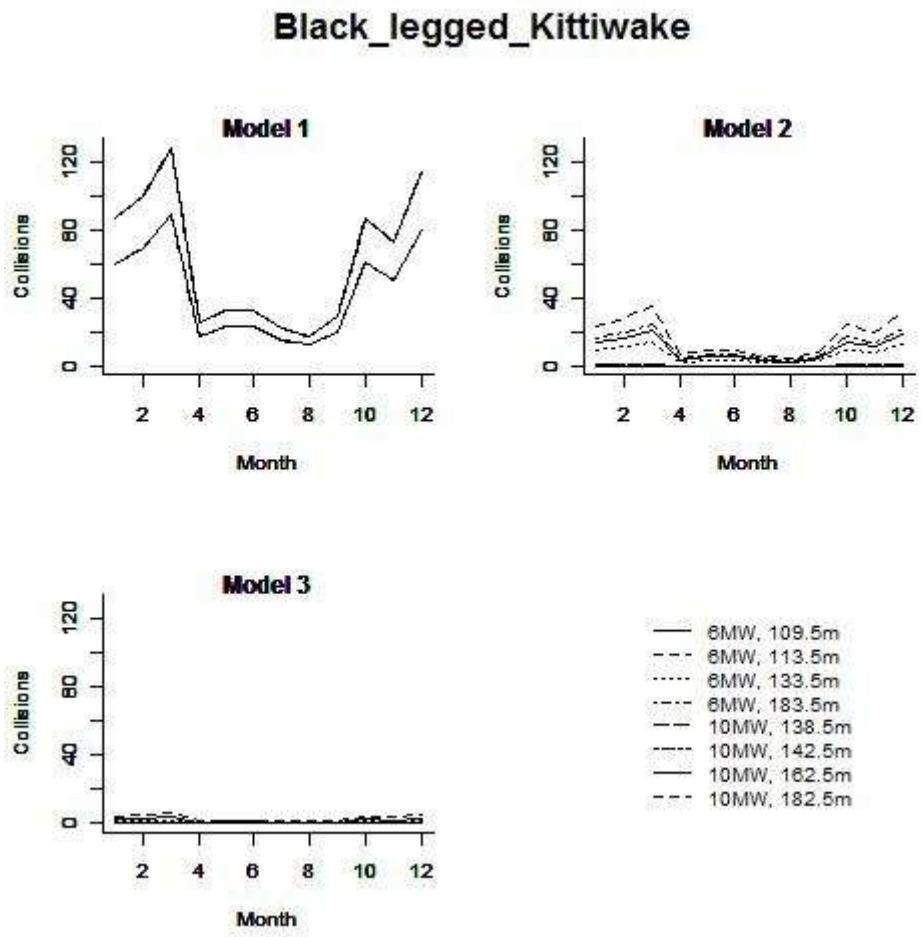



**Figure A6.13** Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

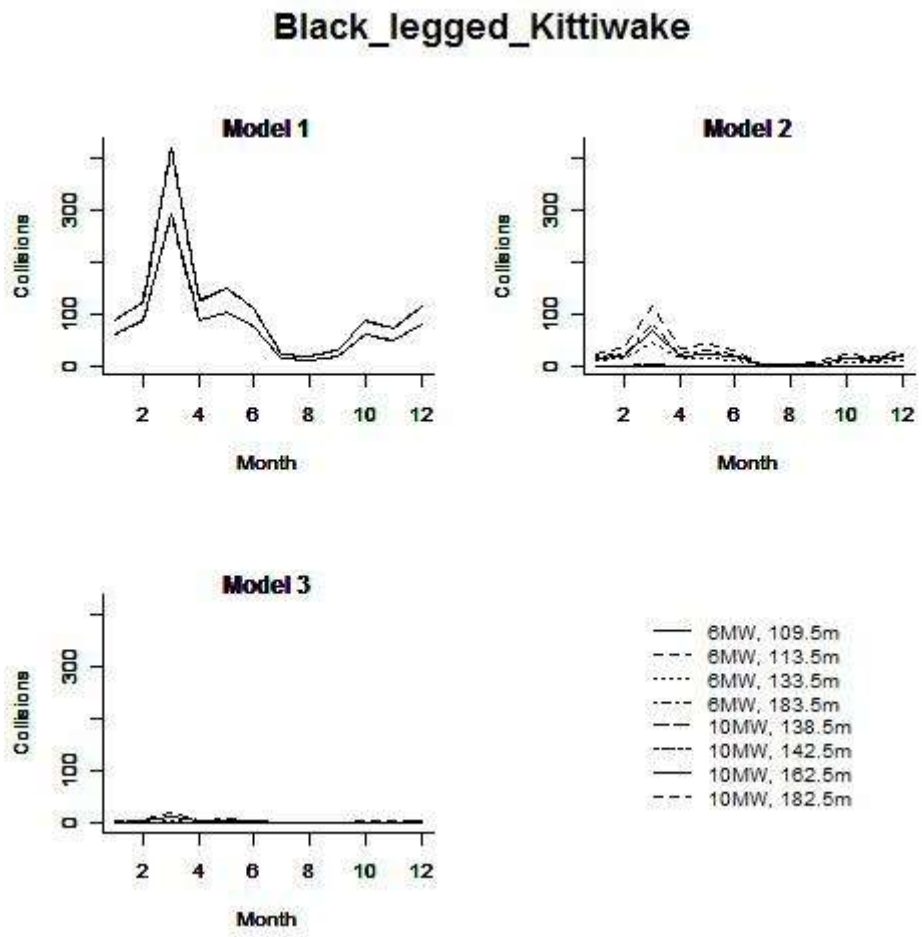



**Figure A6.14** Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

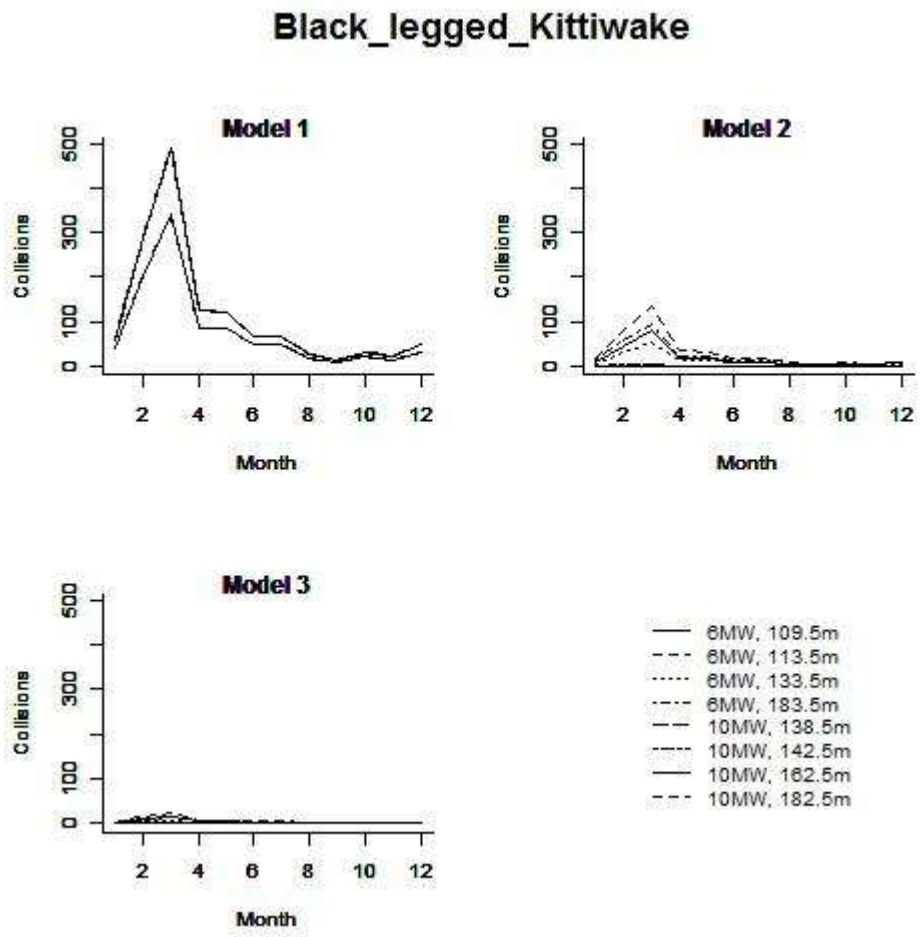



**Figure A6.15** Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Lesser black-backed gull**

A6.8 The annual pattern for the predicted number of collisions involving lesser black-backed gull in Dogger Bank Teesside A was consistent between years (Figures A6.16, A6.17 and A6.18). In each year, the number of predicted collisions peaked during the spring and early summer. These patterns reflect the annual migratory patterns of this species within the North Sea. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.6)

**Table A6.6** Annual collision rates for Dogger Bank Teesside A for lesser black-backed gull using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 92 (59-143) | 36 (23-57) | 24 (16-38) | 56 (35-94) | 22 (14-37) | 15 (9-25) | 39 (21-70) | 15 (8-28) | 10 (6-19) |
| 6MW, 113.5m | 92 (59-143) | 28 (18-44) | 22 (14-35) | 56 (35-94) | 17 (11-29) | 14 (8-23) | 39 (21-70) | 12 (6-22) | 9 (5-17) |
| 6MW, 133.5m | 92 (59-143) | 13 (8-20) | 15 (10-23) | 56 (35-94) | 8 (5-13) | 9 (6-15) | 39 (21-70) | 5 (3-10) | 6 (3-11) |
| 6MW, 183.5m | 92 (59-143) | 7 (4-11) | 3 (2-5) | 56 (35-94) | 4 (3-7) | 2 (1-3) | 39 (21-70) | 3 (2-5) | 1 (1-3) |
| 10MW, 138.5m | 63 (41-99) | 25 (16-39) | 14 (9-23) | 39 (24-65) | 15 (9-26) | 9 (5-15) | 27 (14-48) | 11 (6-19) | 6 (3-11) |
| 10MW, 142.5m | 63 (41-99) | 20 (13-31) | 12 (8-19) | 39 (24-65) | 12 (7-20) | 8 (5-13) | 27 (14-48) | 8 (4-15) | 5 (3-10) |
| 10MW, 162.5m | 63 (41-99) | 9 (6-14) | 7 (4-11) | 39 (24-65) | 5 (3-9) | 4 (3-7) | 27 (14-48) | 4 (2-7) | 3 (2-5) |
| 10MW, 182.5m | 63 (41-99) | 7 (4-10) | 4 (3-7) | 39 (24-65) | 4 (2-7) | 3 (2-4) | 27 (14-48) | 3 (2-5) | 2 (1-3) |

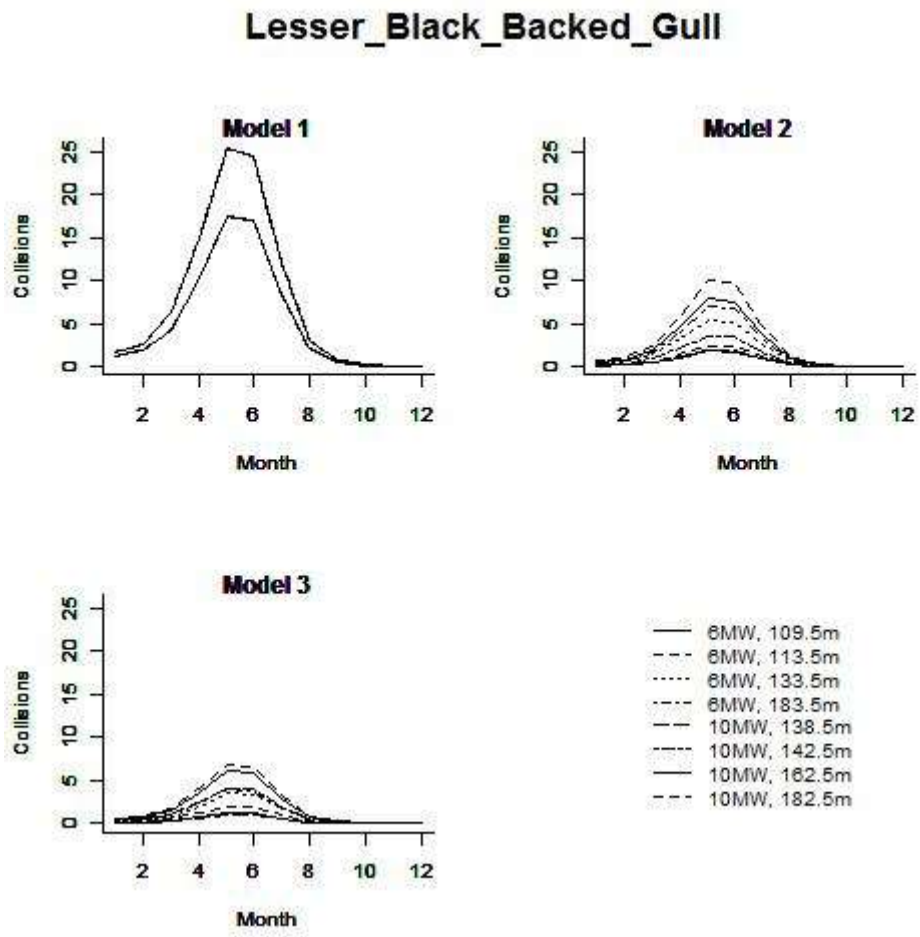



**Figure A6.16** Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

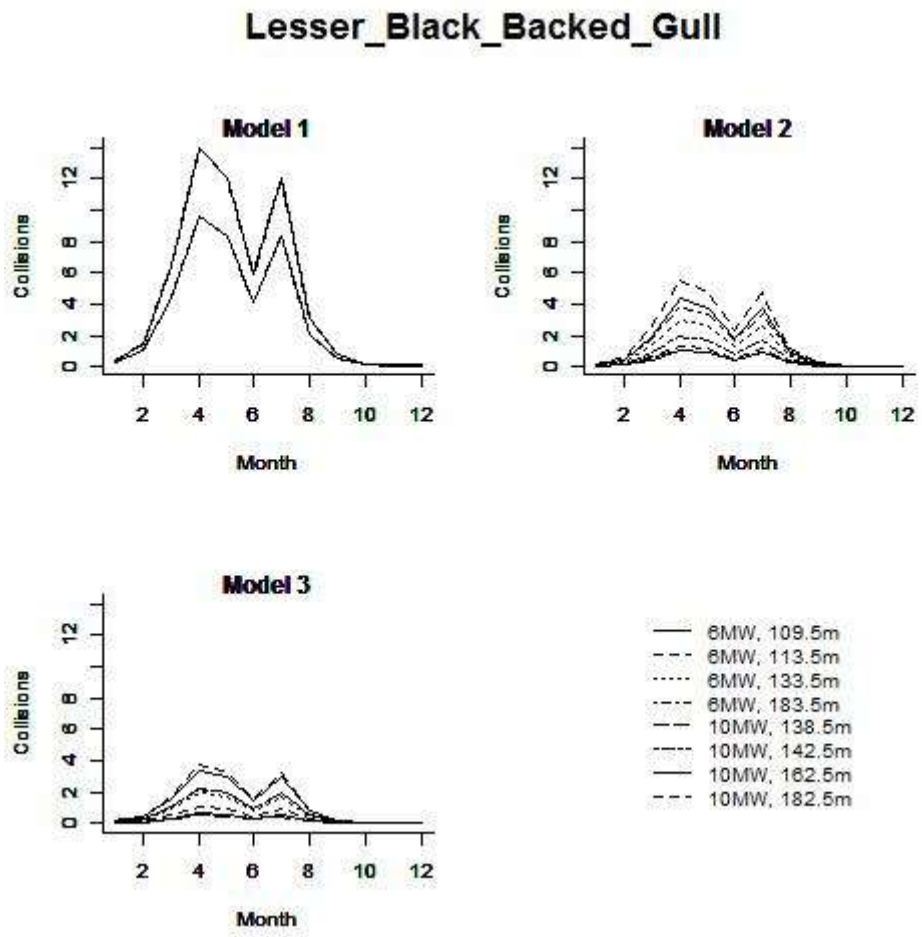



**Figure A6.17** Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

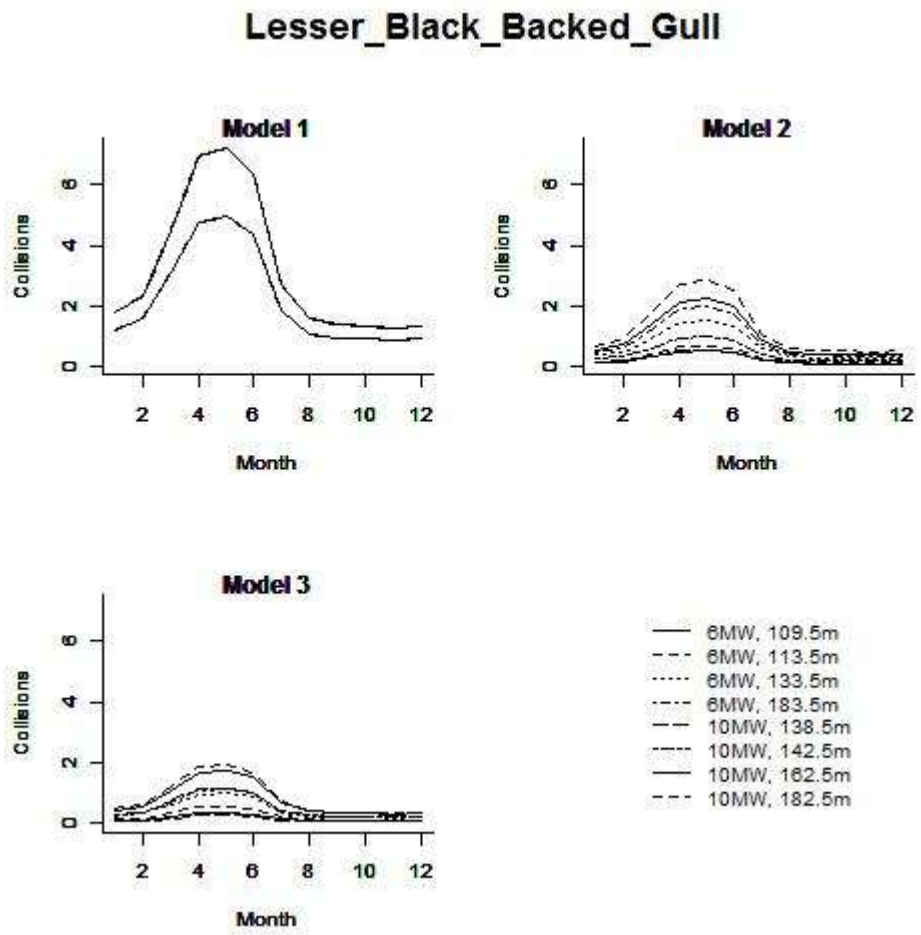



**Figure A6.18** Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Great black-backed gull**

A6.9 The annual pattern for the predicted number of collisions involving great black-backed gull in Dogger Bank Teesside A was consistent between years (Figures A6.19, A6.20 and A6.21). In each year, the number of predicted collisions peaked during the beginning and end of the year, with few collisions predicted over summer months. These patterns reflect the annual breeding and migratory patterns of this species within the North Sea. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.7)

**Table A6.7** Annual collision rates for Dogger Bank Teesside A for great black-backed gull using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 114 (81-167) | 70 (50-103) | 28 (20-41) | 133 (95-195) | 82 (59-120) | 33 (23-48) | 111 (70-175) | 68 (43-108) | 27 (17-43) |
| 6MW, 113.5m | 114 (81-167) | 55 (39-81) | 22 (16-33) | 133 (95-195) | 64 (46-94) | 26 (19-38) | 111 (70-175) | 54 (34-85) | 22 (14-34) |
| 6MW, 133.5m | 114 (81-167) | 17 (12-25) | 8 (6-12) | 133 (95-195) | 20 (14-29) | 9 (7-14) | 111 (70-175) | 16 (10-26) | 8 (5-12) |
| 6MW, 183.5m | 114 (81-167) | 2 (2-3) | 2 (2-3) | 133 (95-195) | 3 (2-4) | 3 (2-4) | 111 (70-175) | 2 (1-4) | 2 (1-3) |
| 10MW, 138.5m | 78 (56-115) | 48 (34-71) | 16 (11-23) | 91 (65-134) | 56 (40-83) | 18 (13-27) | 76 (48-120) | 47 (30-74) | 15 (10-24) |
| 10MW, 142.5m | 78 (56-115) | 38 (27-56) | 13 (9-19) | 91 (65-134) | 44 (32-65) | 15 (11-22) | 76 (48-120) | 37 (23-59) | 12 (8-19) |
| 10MW, 162.5m | 78 (56-115) | 12 (8-17) | 5 (3-7) | 91 (65-134) | 14 (10-20) | 6 (4-8) | 76 (48-120) | 11 (7-18) | 5 (3-7) |
| 10MW, 182.5m | 78 (56-115) | 4 (3-6) | 2 (2-4) | 91 (65-134) | 5 (3-7) | 3 (2-4) | 76 (48-120) | 4 (2-6) | 2 (2-4) |

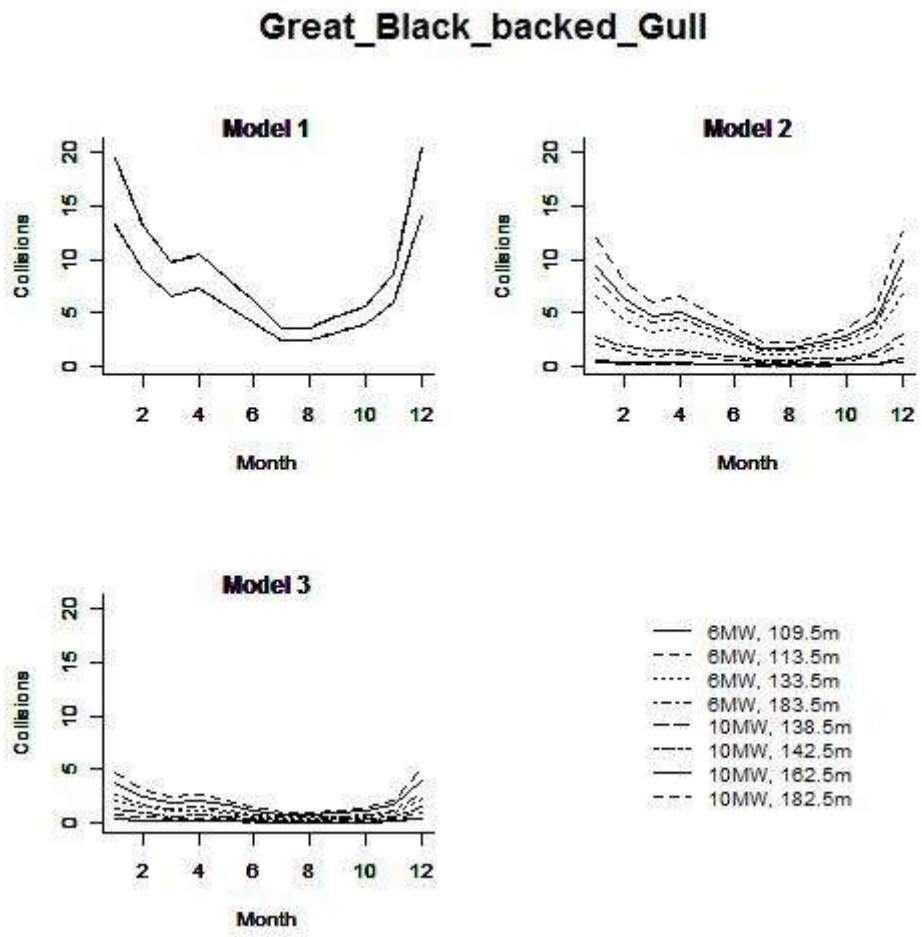



**Figure A6.19** Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

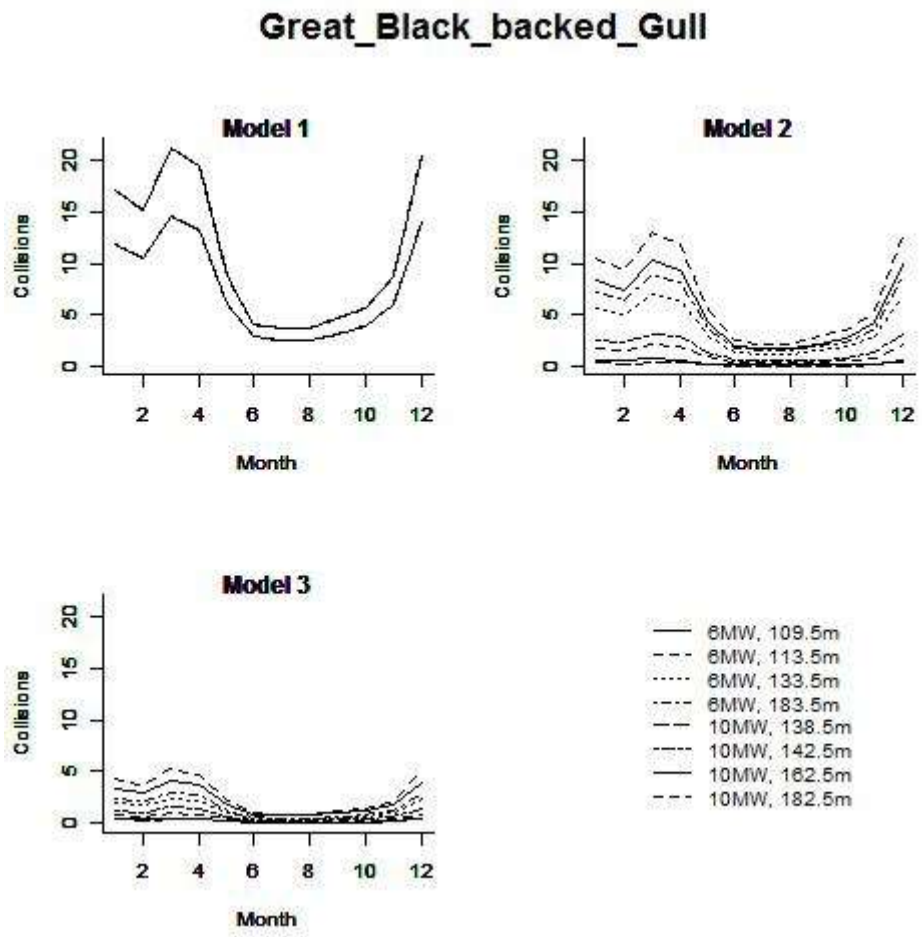



**Figure A6.20** Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

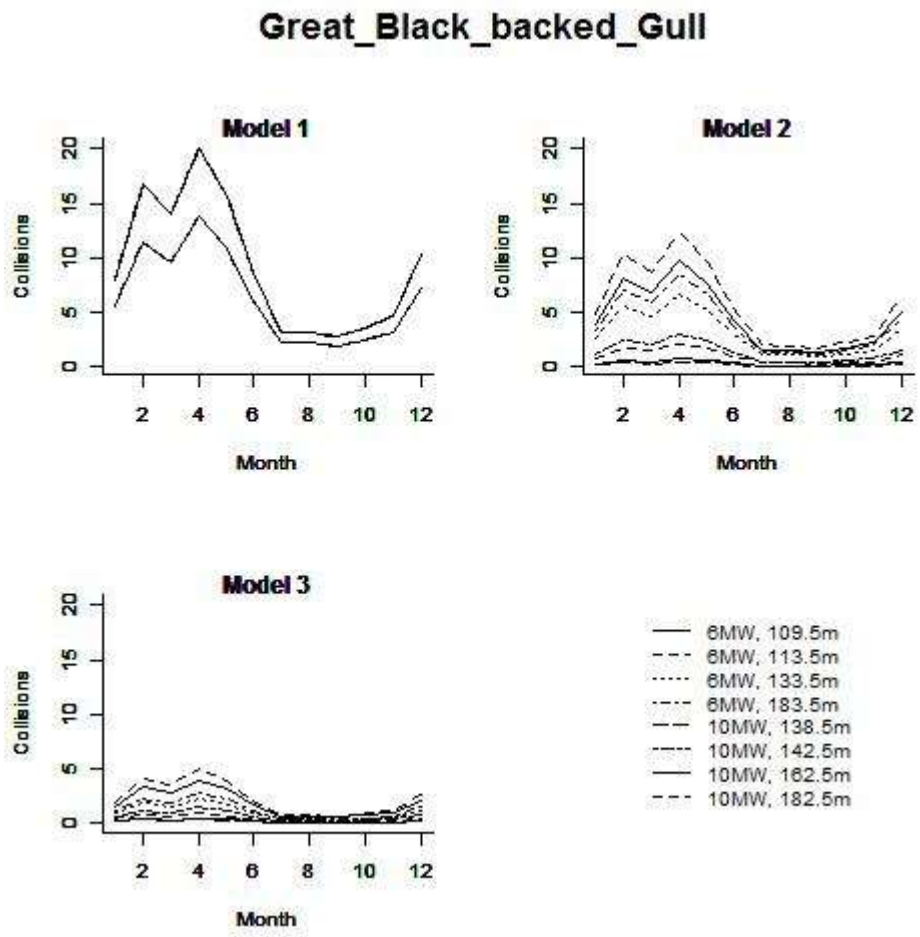



**Figure A6.21** Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Common guillemot**

A6.10 The annual pattern of the predicted number of collision was relatively consistent between years. The predicted number of collisions peaked during the spring and again towards the end of the year (Figure A6.22, A6.23 and A6.24). However, during 2010, the spring peak was less pronounced than in subsequent years. These patterns reflect the seasonal abundance of common guillemot within the wind farm area. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.8)

**Table A6.8** Annual collision rates for Dogger Bank Teesside A for common guillemot using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 11 (8-14) | 0 (0-0) | 0 (0-0) | 25 (19-33) | 0 (0-0) | 0 (0-0) | 19 (14-26) | 0 (0-0) | 0 (0-0) |
| 6MW, 113.5m | 11 (8-14) | 0 (0-0) | 0 (0-0) | 25 (19-33) | 0 (0-0) | 0 (0-0) | 19 (14-26) | 0 (0-0) | 0 (0-0) |
| 6MW, 133.5m | 11 (8-14) | 0 (0-0) | 0 (0-0) | 25 (19-33) | 0 (0-0) | 0 (0-0) | 19 (14-26) | 0 (0-0) | 0 (0-0) |
| 6MW, 183.5m | 11 (8-14) | 0 (0-0) | 0 (0-0) | 25 (19-33) | 0 (0-0) | 0 (0-0) | 19 (14-26) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 7 (5-10) | 0 (0-0) | 0 (0-0) | 18 (13-23) | 0 (0-0) | 0 (0-0) | 13 (10-18) | 0 (0-0) | 0 (0-0) |
| 10MW, 142.5m | 7 (5-10) | 0 (0-0) | 0 (0-0) | 18 (13-23) | 0 (0-0) | 0 (0-0) | 13 (10-18) | 0 (0-0) | 0 (0-0) |
| 10MW, 162.5m | 7 (5-10) | 0 (0-0) | 0 (0-0) | 18 (13-23) | 0 (0-0) | 0 (0-0) | 13 (10-18) | 0 (0-0) | 0 (0-0) |
| 10MW, 182.5m | 7 (5-10) | 0 (0-0) | 0 (0-0) | 18 (13-23) | 0 (0-0) | 0 (0-0) | 13 (10-18) | 0 (0-0) | 0 (0-0) |

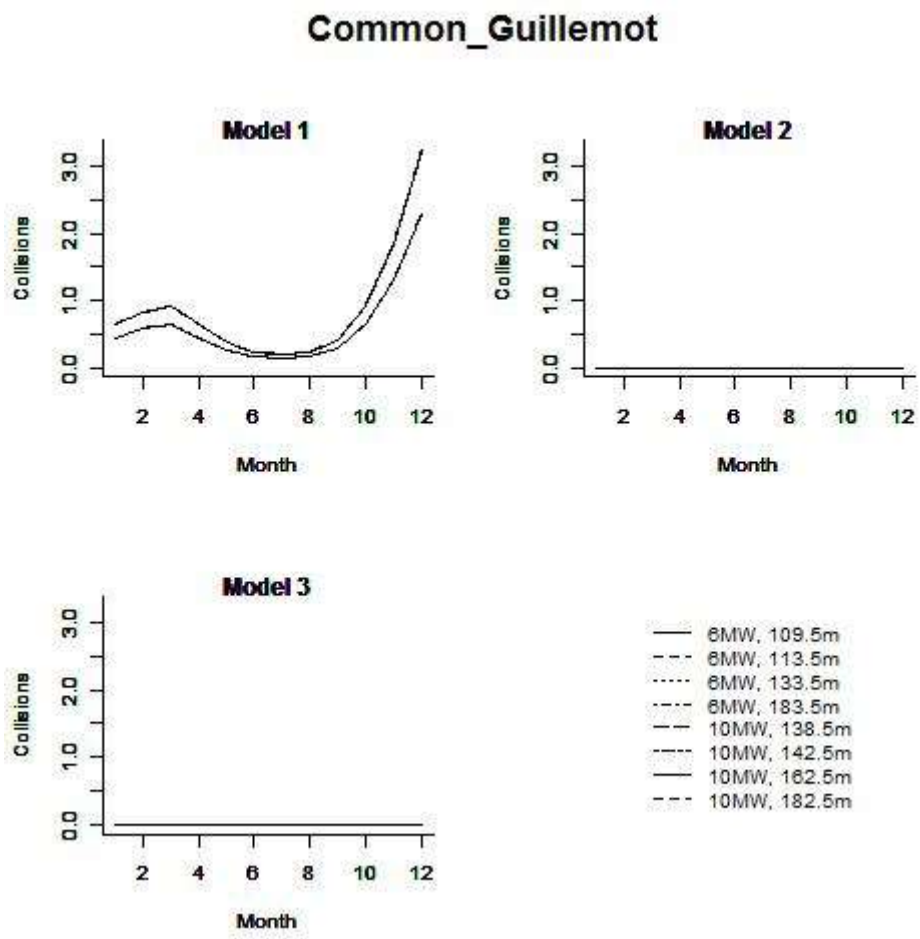



**Figure A6.22** Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

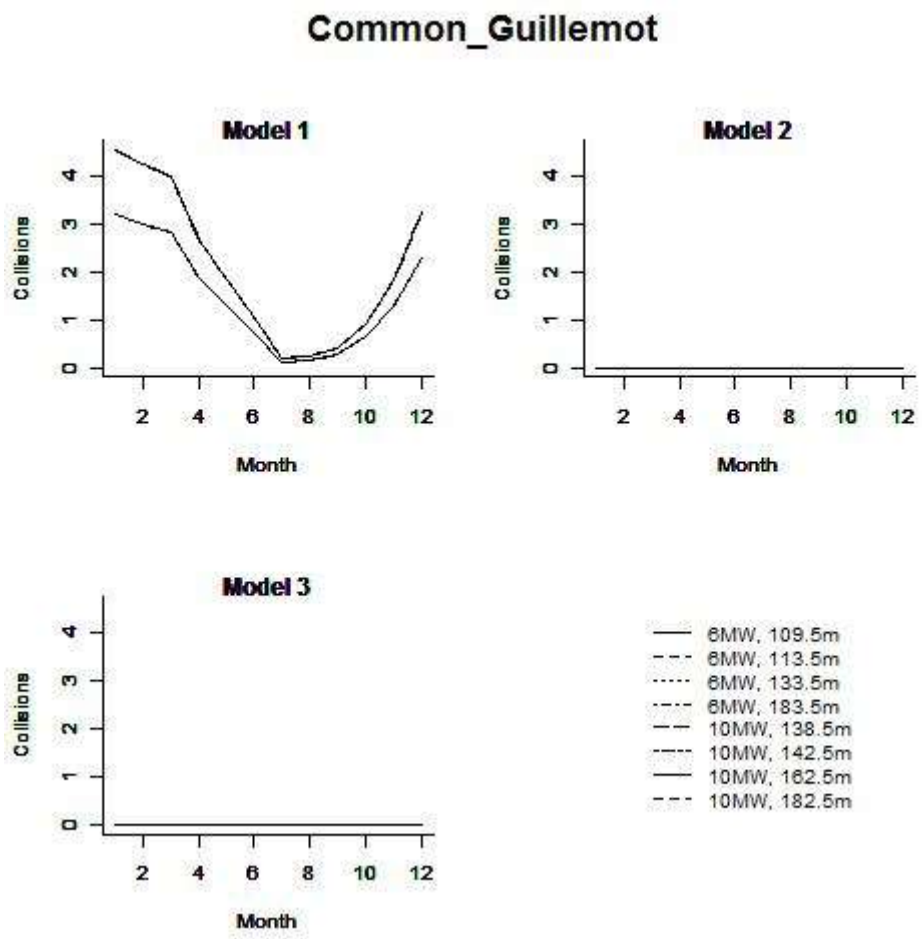



**Figure A6.23** Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

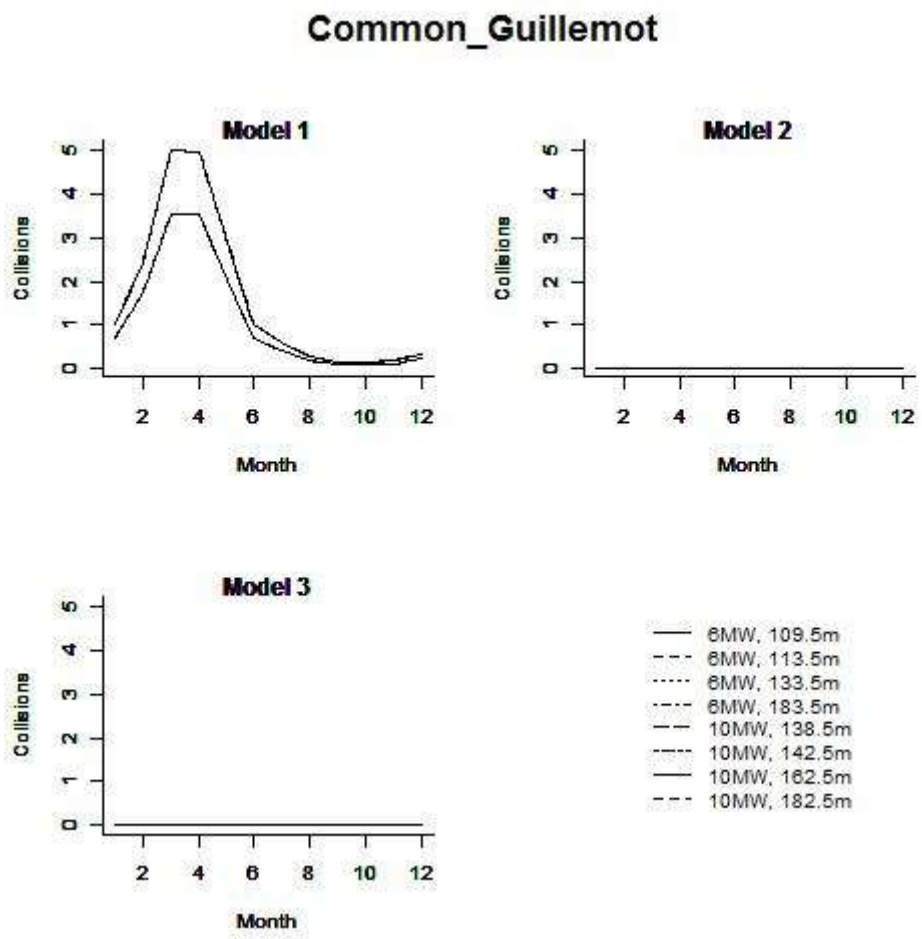



**Figure A6.24** Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Razorbill**

A6.11 The annual pattern of the predicted number of collision differed between years. Based on population estimates from 2010 (Figure A6.25), the number of collisions was predicted to peak during the start and end of the year, whilst using population estimates from July 2010 to June 2011 and July 2011 to June 2012, the number of collisions was predicted to peak during the spring (Figures A6.26 and A6.27). These differences reflect differences in the abundance of birds between 2010 and 2012. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.9)

**Table A6.9** Annual collision rates for Dogger Bank Teesside A for razorbill using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 8 (4-13) | 0 (0-1) | 1 (0-1) | 19 (11-32) | 1 (1-2) | 1 (1-2) | 16 (10-26) | 1 (1-1) | 1 (1-2) |
| 6MW, 113.5m | 8 (4-13) | 0 (0-1) | 1 (0-1) | 19 (11-32) | 1 (1-2) | 1 (1-2) | 16 (10-26) | 1 (1-1) | 1 (1-2) |
| 6MW, 133.5m | 8 (4-13) | 0 (0-1) | 0 (0-0) | 19 (11-32) | 1 (1-2) | 1 (0-1) | 16 (10-26) | 1 (0-1) | 1 (0-1) |
| 6MW, 183.5m | 8 (4-13) | 0 (0-0) | 0 (0-0) | 19 (11-32) | 0 (0-0) | 0 (0-0) | 16 (10-26) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 6 (3-9) | 0 (0-0) | 0 (0-0) | 13 (8-23) | 1 (0-1) | 1 (0-1) | 11 (7-19) | 1 (0-1) | 0 (0-1) |
| 10MW, 142.5m | 6 (3-9) | 0 (0-0) | 0 (0-0) | 13 (8-23) | 1 (0-1) | 1 (0-1) | 11 (7-19) | 1 (0-1) | 0 (0-1) |
| 10MW, 162.5m | 6 (3-9) | 0 (0-0) | 0 (0-0) | 13 (8-23) | 1 (0-1) | 0 (0-1) | 11 (7-19) | 1 (0-1) | 0 (0-0) |
| 10MW, 182.5m | 6 (3-9) | 0 (0-0) | 0 (0-0) | 13 (8-23) | 1 (0-1) | 0 (0-0) | 11 (7-19) | 0 (0-1) | 0 (0-0) |

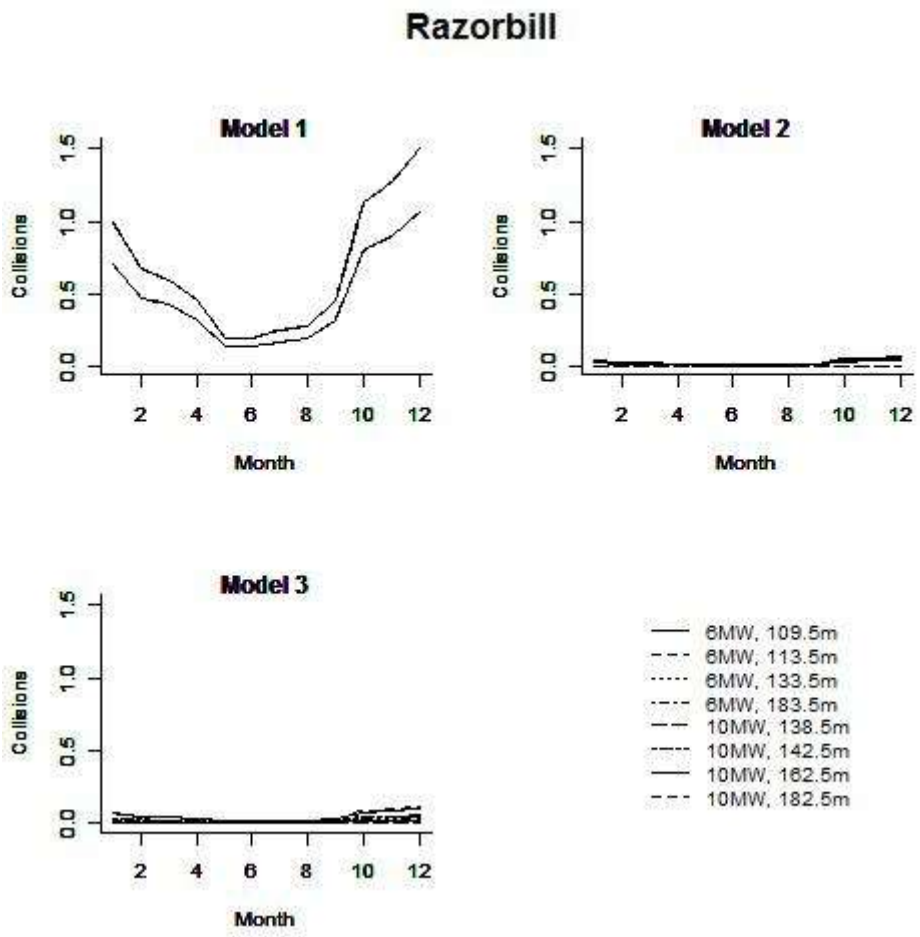



**Figure A6.25** Estimated monthly collision rates for razorbill in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

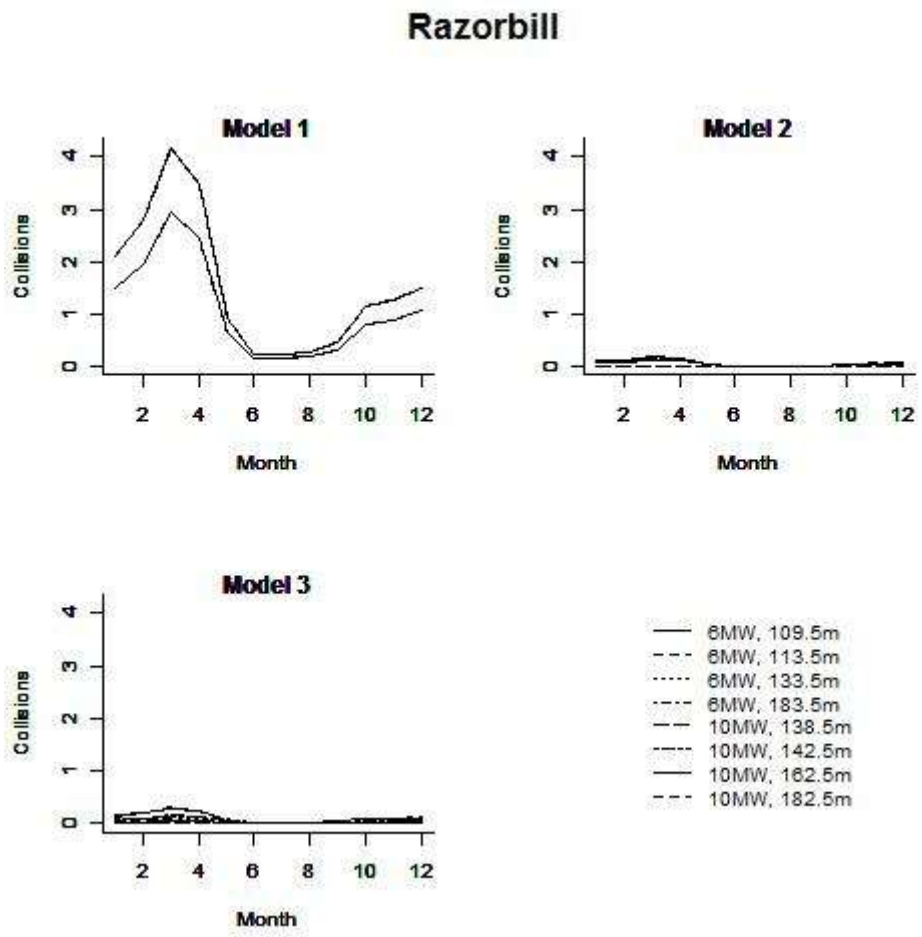



**Figure A6.26** Estimated monthly collision rates for razorbill in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

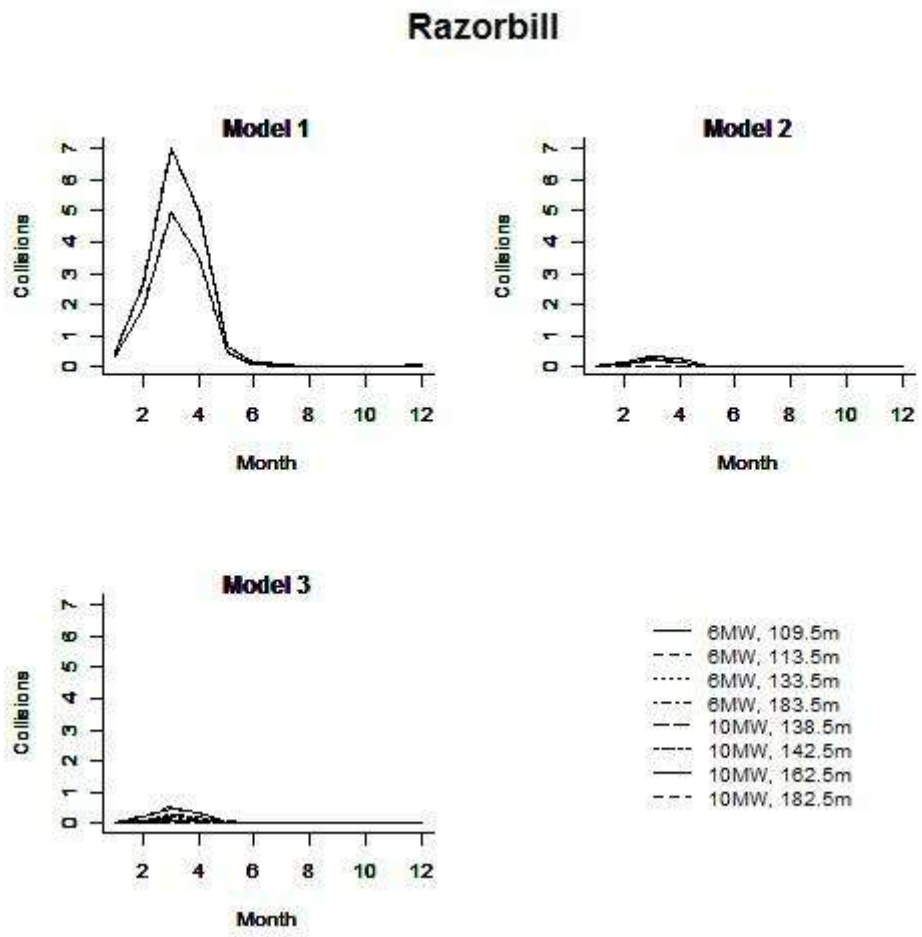



**Figure A6.27** Estimated monthly collision rates for razorbill in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Little auk**

A6.12 The annual pattern for the predicted number of collisions involving little auks in Dogger Bank Teesside A was consistent between years (Figures A6.28, A6.29 and A6.30). In each year, the number of predicted collisions peaked during the beginning and end of the year, with few collisions predicted over summer months. These patterns reflect the annual breeding and migratory patterns of this species within the North Sea. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.10)

**Table A6.10** Annual collision rates for Dogger Bank Teesside A for little auk using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) | 1 (0-1) | 0 (0-0) | 0 (0-0) |
| 6MW, 113.5m | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) | 1 (0-1) | 0 (0-0) | 0 (0-0) |
| 6MW, 133.5m | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) | 1 (0-1) | 0 (0-0) | 0 (0-0) |
| 6MW, 183.5m | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) | 1 (0-1) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-0) | 0 (0-0) |
| 10MW, 142.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-0) | 0 (0-0) |
| 10MW, 162.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-0) | 0 (0-0) |
| 10MW, 182.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-0) | 0 (0-0) |

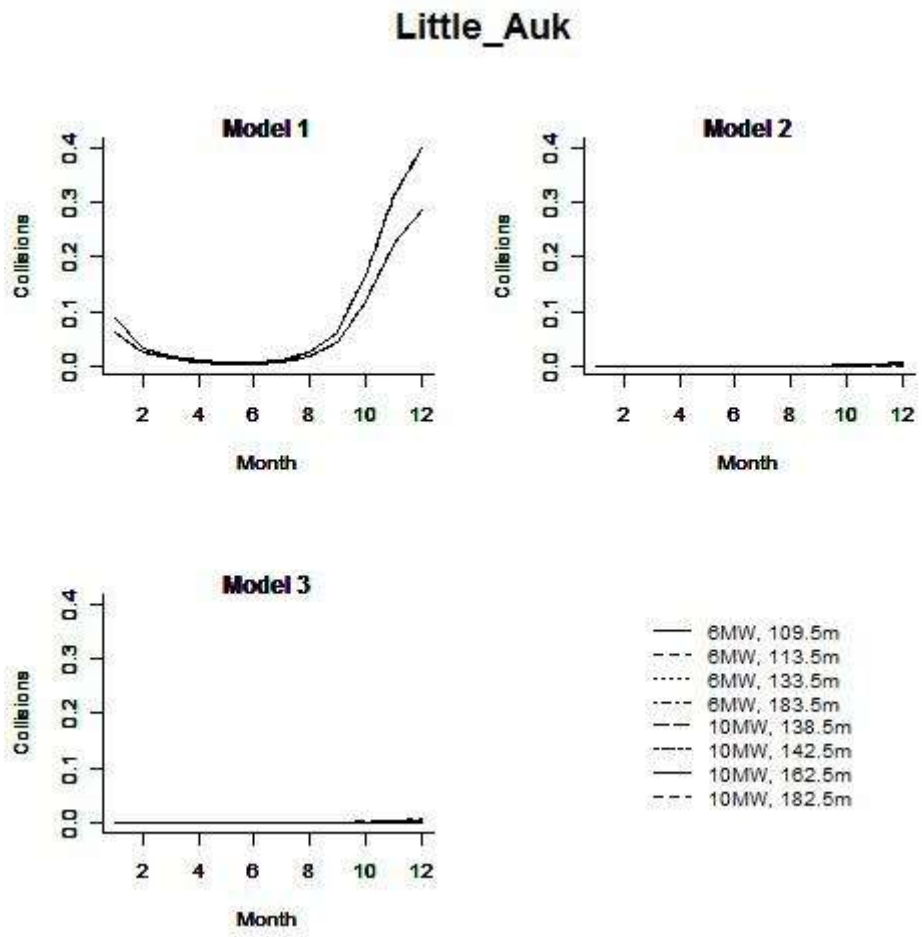



**Figure A6.28** Estimated monthly collision rates for little auk in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

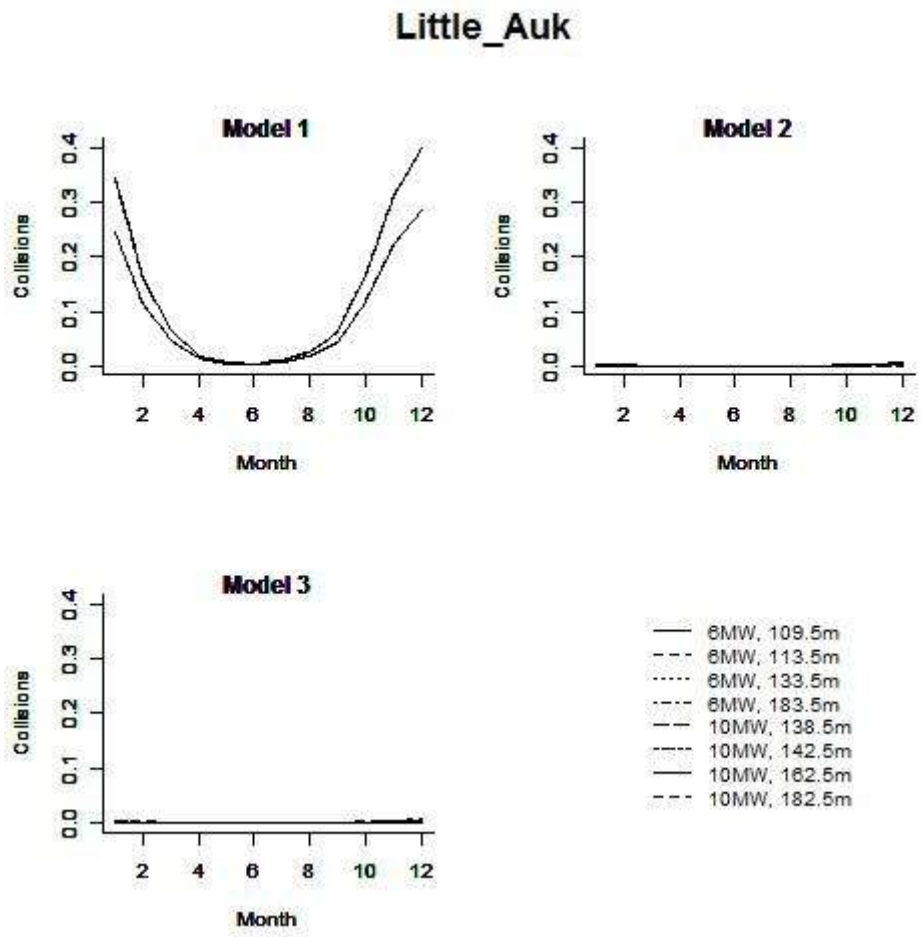



**Figure A6.29** Estimated monthly collision rates for little auk in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

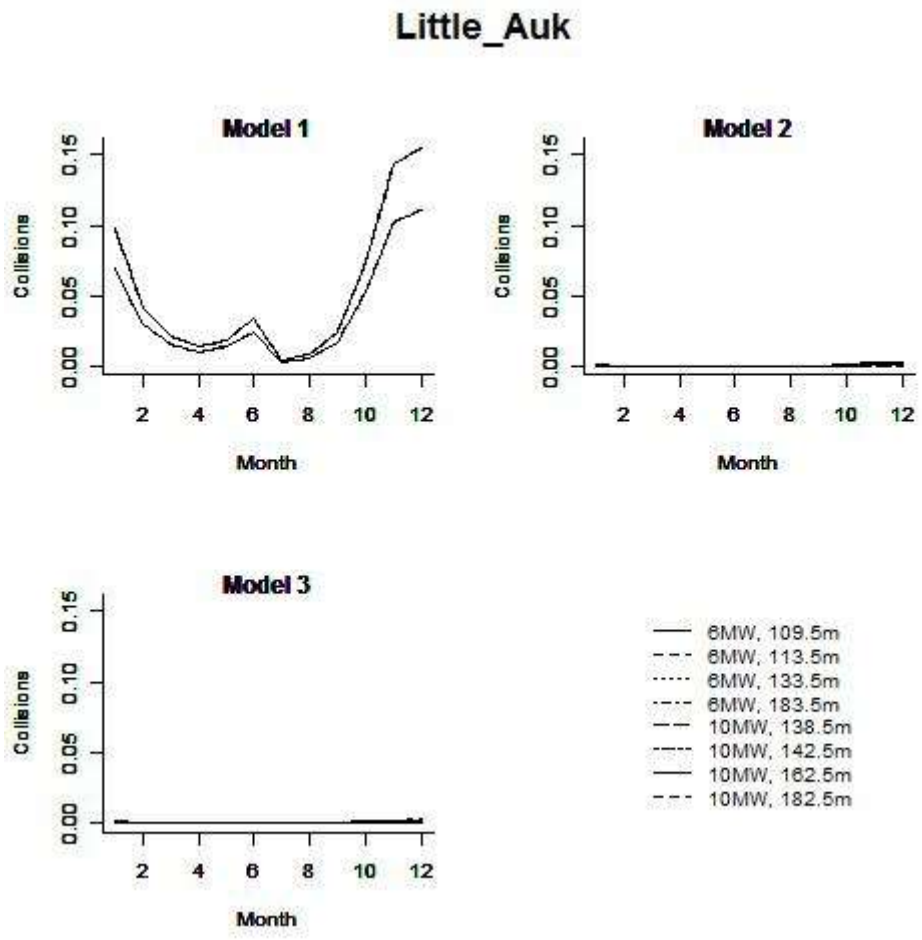



**Figure A6.30** Estimated monthly collision rates for little auk in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Atlantic puffin**

A6.13 The annual pattern of the predicted number of collision was relatively consistent between years. The predicted number of collisions peaked during the spring and declined throughout the rest of the year (A6.31, A6.32 and A6.33). These patterns reflect the seasonal abundance of Atlantic puffins within the wind farm area. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.11)

**Table A6.11** Annual collision rates for Dogger Bank Teesside A for Atlantic puffin using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 6MW, 113.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 6MW, 133.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 6MW, 183.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 10MW, 142.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 10MW, 162.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 10MW, 182.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

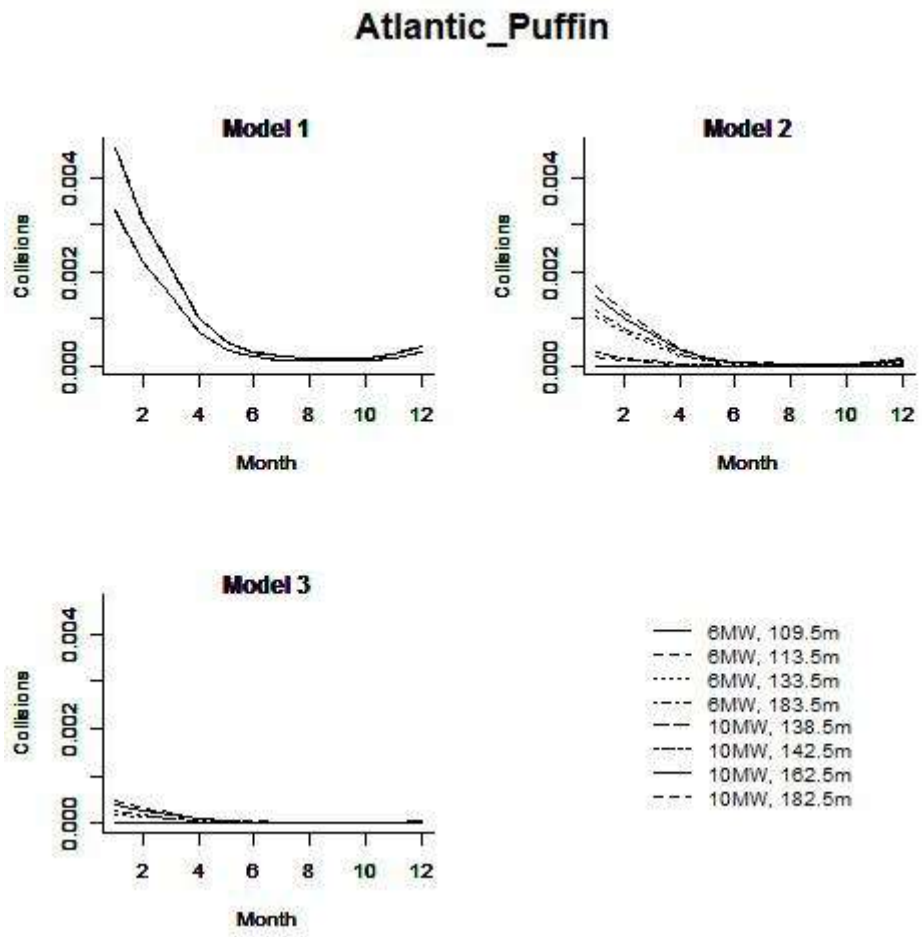



**Figure A6.31** Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

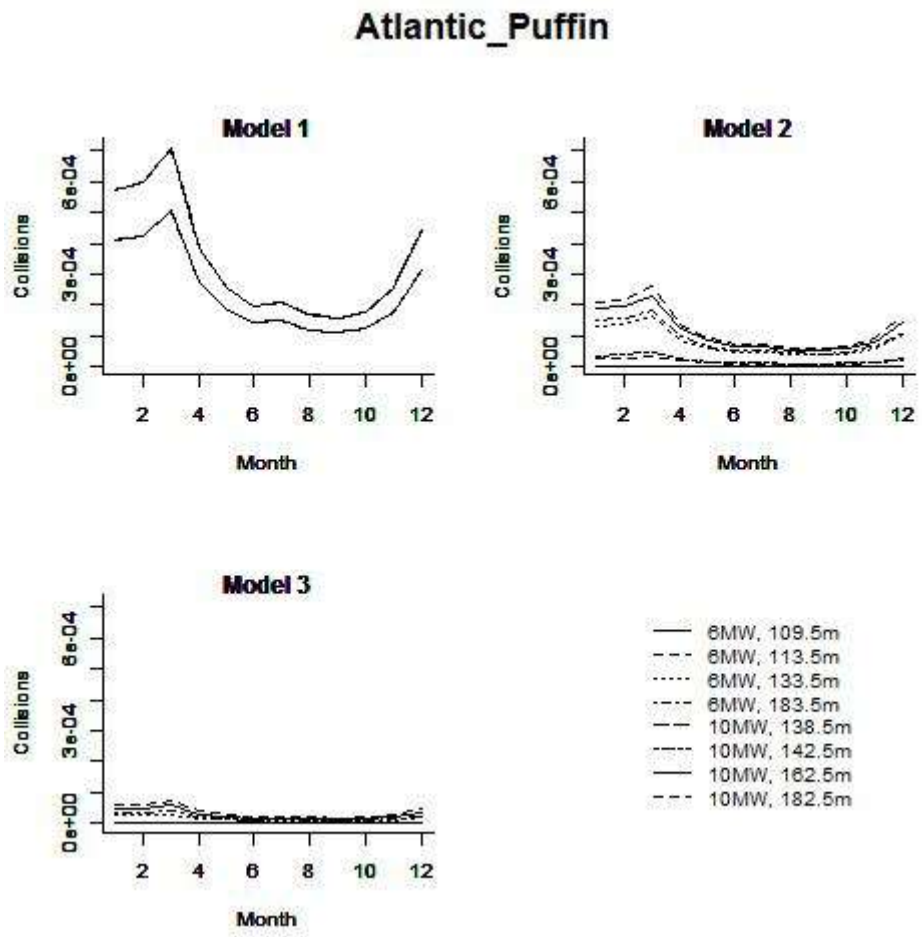



**Figure A6.32** Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

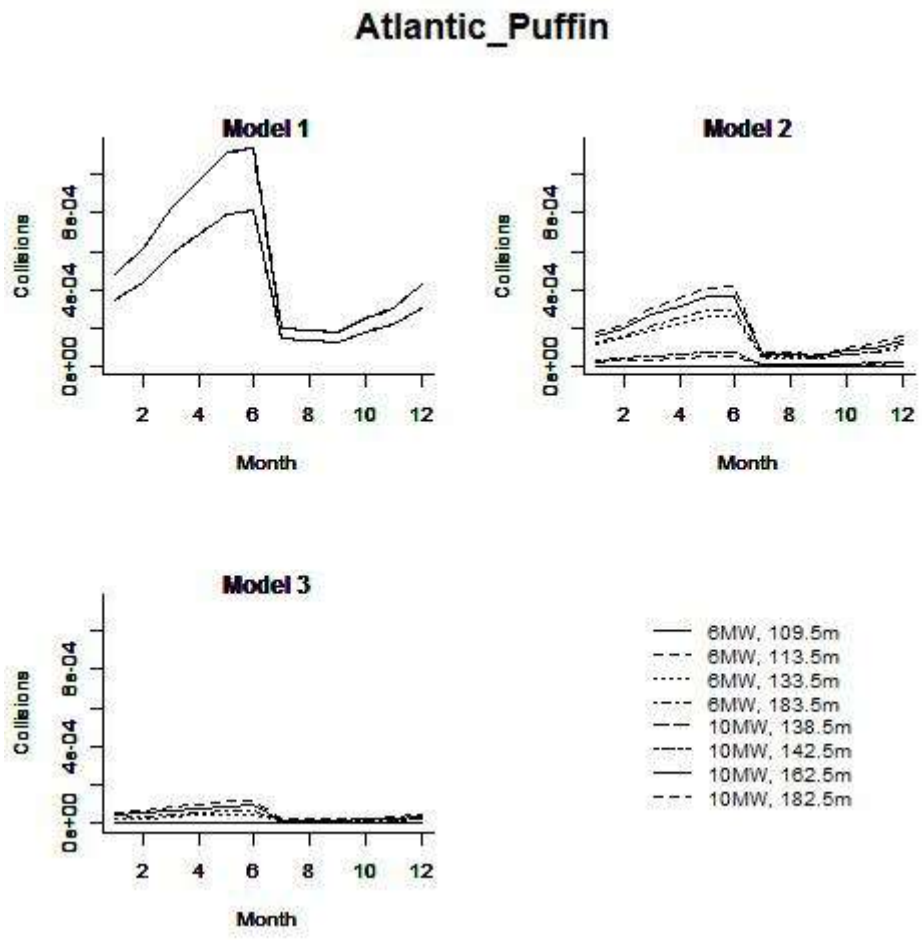



**Figure A6.33** Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Dogger Bank Teesside B [top]**

**Northern fulmar**

A6.14 The annual pattern of the predicted number of collision differed between years. Based on population estimates from 2010 (Figure A6.34) and from July 2011 to June 2012 (Figure A6.35), the number of collisions was predicted to peak during the spring and early summer, whilst using population estimates from July 2010 to June 2011, the number of collisions was predicted to peak during July (Figure A6.36). These differences reflect differences in the abundance of birds between 2010 and 2012. However, absolute numbers of collisions predicted were very low. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.12)

**Table A6.12** Annual collision rates for Dogger Bank Teesside B for northern fulmar using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 13 (11-17) | 2 (2-3) | 1 (1-1) | 9 (7-11) | 1 (1-2) | 1 (0-1) | 14 (12-18) | 2 (2-3) | 1 (1-1) |
| 6MW, 113.5m | 13 (11-17) | 2 (1-2) | 1 (0-1) | 9 (7-11) | 1 (1-1) | 0 (0-0) | 14 (12-18) | 2 (2-2) | 1 (1-1) |
| 6MW, 133.5m | 13 (11-17) | 1 (0-1) | 0 (0-0) | 9 (7-11) | 0 (0-0) | 0 (0-0) | 14 (12-18) | 1 (0-1) | 0 (0-0) |
| 6MW, 183.5m | 13 (11-17) | 0 (0-0) | 0 (0-0) | 9 (7-11) | 0 (0-0) | 0 (0-0) | 14 (12-18) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 9 (8-12) | 1 (1-2) | 0 (0-0) | 6 (5-8) | 1 (1-1) | 0 (0-0) | 10 (8-12) | 2 (1-2) | 0 (0-1) |
| 10MW, 142.5m | 9 (8-12) | 1 (1-1) | 0 (0-0) | 6 (5-8) | 1 (1-1) | 0 (0-0) | 10 (8-12) | 1 (1-2) | 0 (0-0) |
| 10MW, 162.5m | 9 (8-12) | 0 (0-1) | 0 (0-0) | 6 (5-8) | 0 (0-0) | 0 (0-0) | 10 (8-12) | 0 (0-1) | 0 (0-0) |
| 10MW, 182.5m | 9 (8-12) | 0 (0-0) | 0 (0-0) | 6 (5-8) | 0 (0-0) | 0 (0-0) | 10 (8-12) | 0 (0-0) | 0 (0-0) |

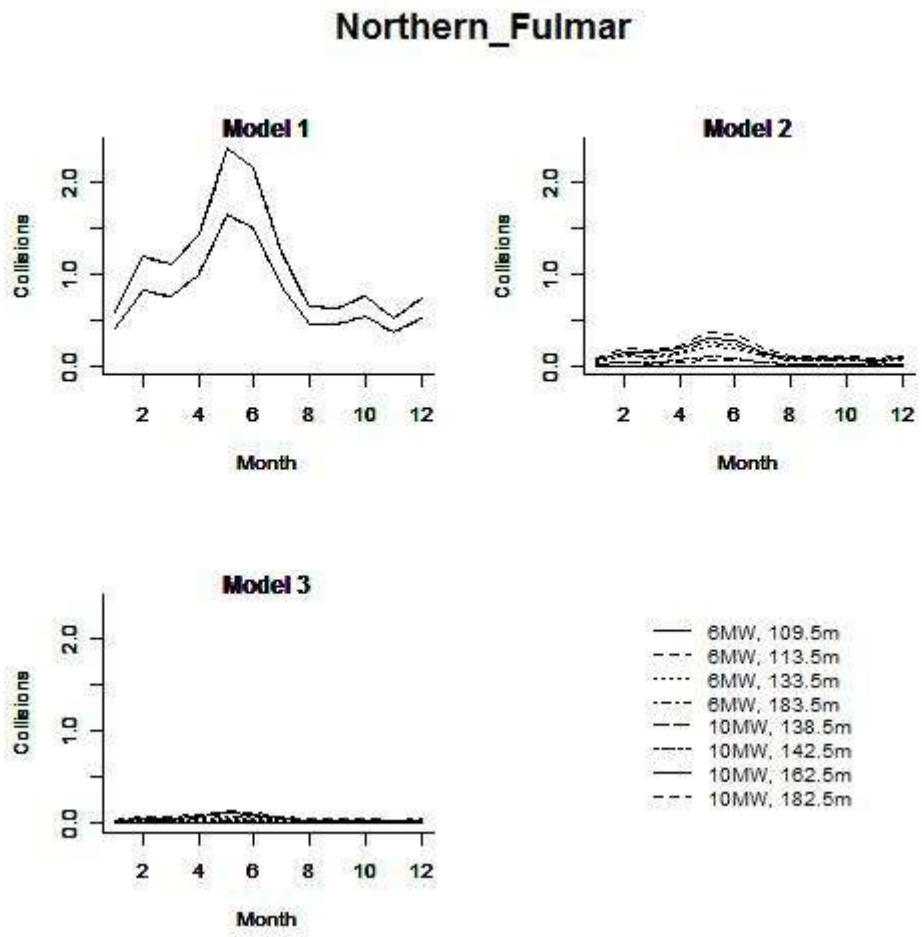



**Figure A6.34** Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

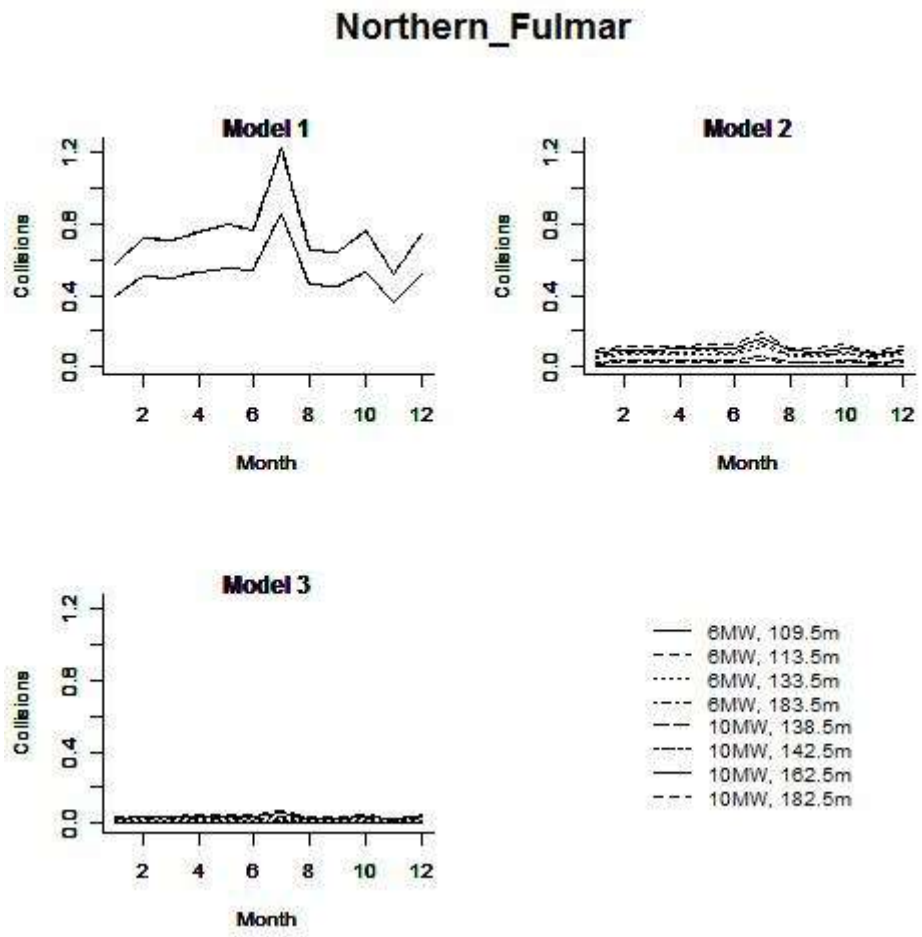



**Figure A6.35** Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

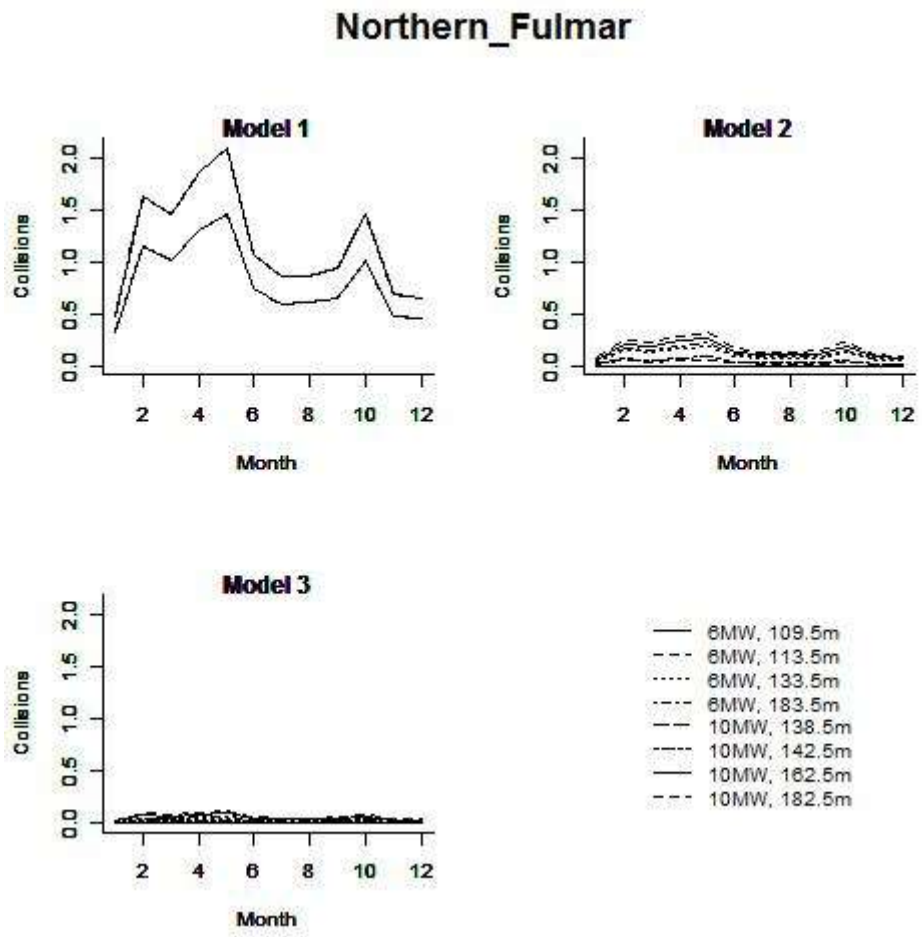



**Figure A6.36** Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Northern gannet**

A6.15 The annual pattern of the predicted number of collisions for northern gannet varied between years (Figures A6.37, A6.38 and A6.39). Using data from July 2010 to June 2011 and July 2011 to June 2012 the number of collision peaked during the spring. During 2010 the predicted number of collisions peaked during the late summer and autumn. These patterns reflect the annual breeding and migratory patterns of this species within the North Sea. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.13)

**Table A6.13** Annual collision rates for Dogger Bank Teesside B for northern gannet using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 13 (11-17) | 2 (2-3) | 1 (1-1) | 9 (7-11) | 1 (1-2) | 1 (0-1) | 14 (12-18) | 2 (2-3) | 1 (1-1) |
| 6MW, 113.5m | 13 (11-17) | 2 (1-2) | 1 (0-1) | 9 (7-11) | 1 (1-1) | 0 (0-0) | 14 (12-18) | 2 (2-2) | 1 (1-1) |
| 6MW, 133.5m | 13 (11-17) | 1 (0-1) | 0 (0-0) | 9 (7-11) | 0 (0-0) | 0 (0-0) | 14 (12-18) | 1 (0-1) | 0 (0-0) |
| 6MW, 183.5m | 13 (11-17) | 0 (0-0) | 0 (0-0) | 9 (7-11) | 0 (0-0) | 0 (0-0) | 14 (12-18) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 9 (8-12) | 1 (1-2) | 0 (0-0) | 6 (5-8) | 1 (1-1) | 0 (0-0) | 10 (8-12) | 2 (1-2) | 0 (0-1) |
| 10MW, 142.5m | 9 (8-12) | 1 (1-1) | 0 (0-0) | 6 (5-8) | 1 (1-1) | 0 (0-0) | 10 (8-12) | 1 (1-2) | 0 (0-0) |
| 10MW, 162.5m | 9 (8-12) | 0 (0-1) | 0 (0-0) | 6 (5-8) | 0 (0-0) | 0 (0-0) | 10 (8-12) | 0 (0-1) | 0 (0-0) |
| 10MW, 182.5m | 9 (8-12) | 0 (0-0) | 0 (0-0) | 6 (5-8) | 0 (0-0) | 0 (0-0) | 10 (8-12) | 0 (0-0) | 0 (0-0) |

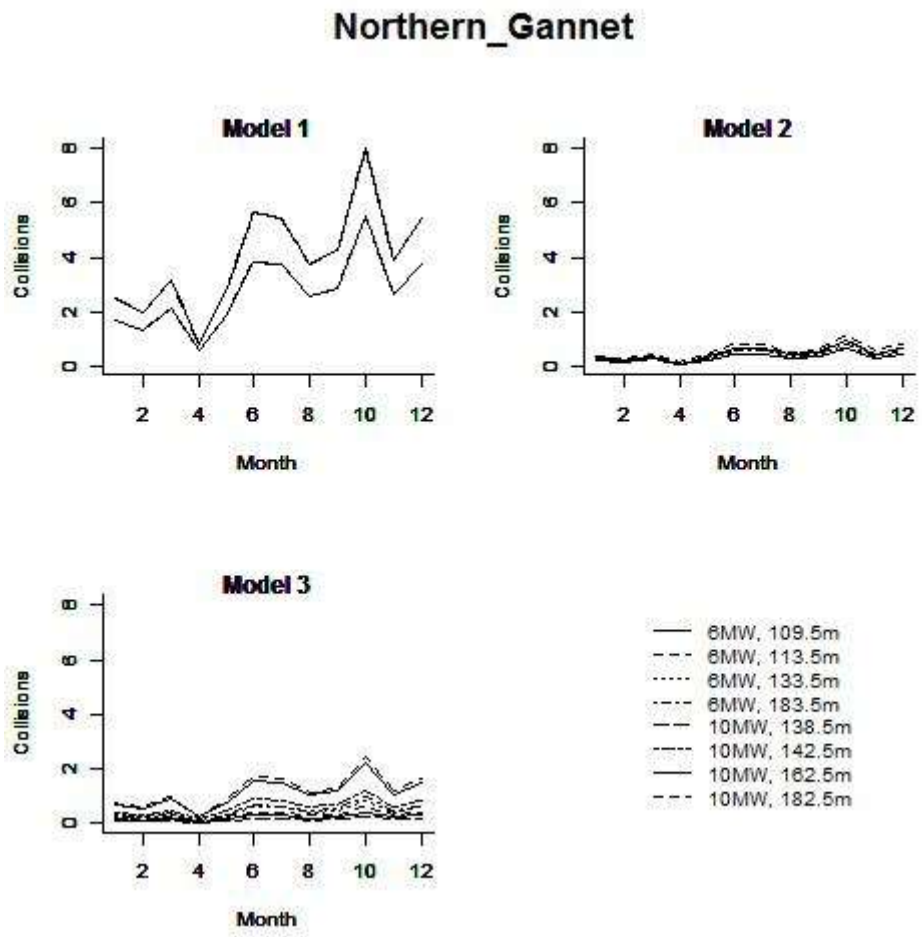



**Figure A6.37** Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

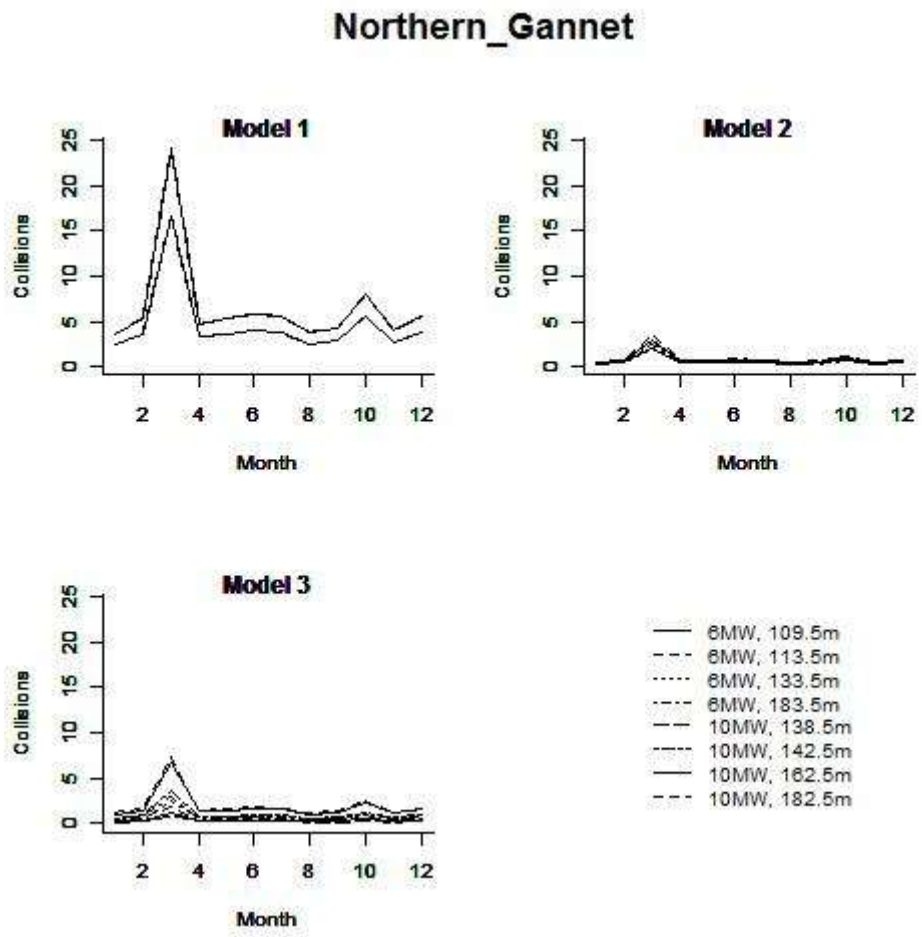



**Figure A6.38** Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

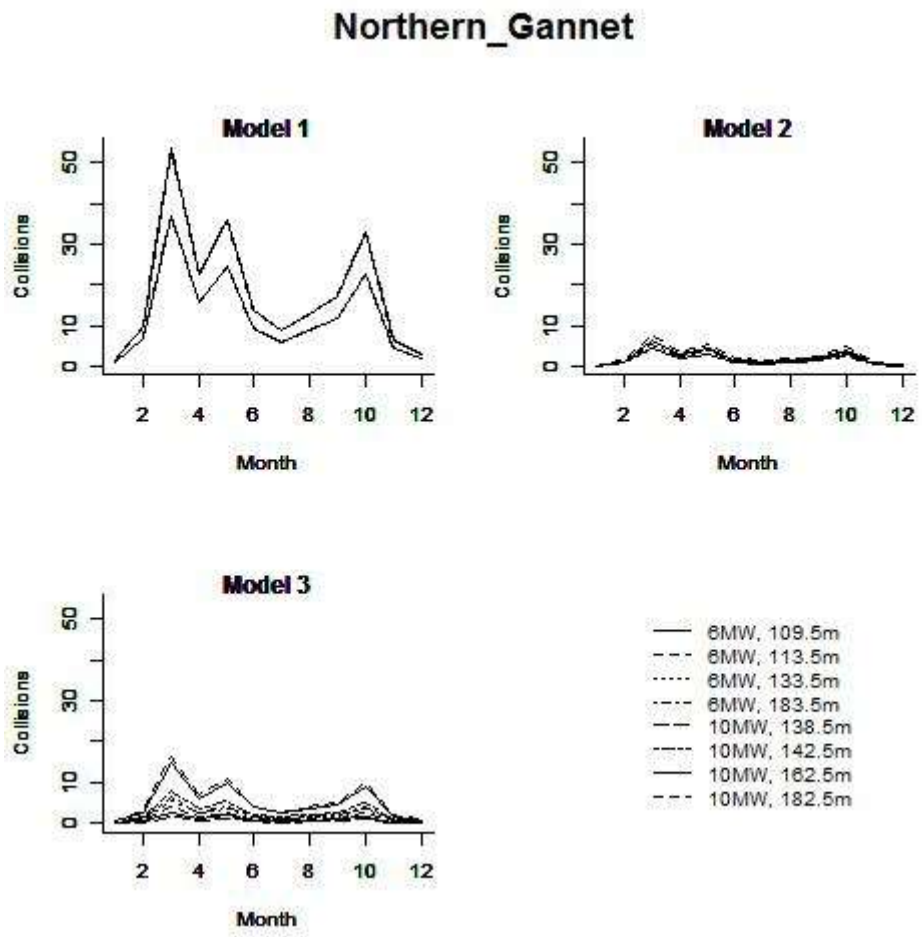



**Figure A6.39** Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Arctic skua**

A6.16 The annual patterns of the predicted number of collisions were relatively consistent between years. In all years the predicted number of collisions peaked during September (Figures A6.40, A6.41 and A6.42), but based on data from July 2010 to June 2011, there was a secondary peak in the predicted number of collisions in June (Figure A6.41). These patterns reflect seasonal abundance of Arctic skua within the wind farm area. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.14)

**Table A6.14** Annual collision rates for Dogger Bank Teesside B for Arctic skua using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 0 (0-858) | 0 (0-1,065) | 0 (0-233) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-101) | 0 (0-125) | 0 (0-27) |
| 6MW, 113.5m | 0 (0-858) | 0 (0-550) | 0 (0-148) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-101) | 0 (0-65) | 0 (0-17) |
| 6MW, 133.5m | 0 (0-858) | 0 (0-55) | 0 (0-53) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-101) | 0 (0-6) | 0 (0-6) |
| 6MW, 183.5m | 0 (0-858) | 0 (0-27) | 0 (0-5) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-101) | 0 (0-3) | 0 (0-1) |
| 10MW, 138.5m | 0 (0-598) | 0 (0-746) | 0 (0-106) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-70) | 0 (0-88) | 0 (0-12) |
| 10MW, 142.5m | 0 (0-598) | 0 (0-398) | 0 (0-64) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-70) | 0 (0-47) | 0 (0-8) |
| 10MW, 162.5m | 0 (0-598) | 0 (0-38) | 0 (0-24) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-70) | 0 (0-4) | 0 (0-3) |
| 10MW, 182.5m | 0 (0-598) | 0 (0-33) | 0 (0-15) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-70) | 0 (0-4) | 0 (0-2) |

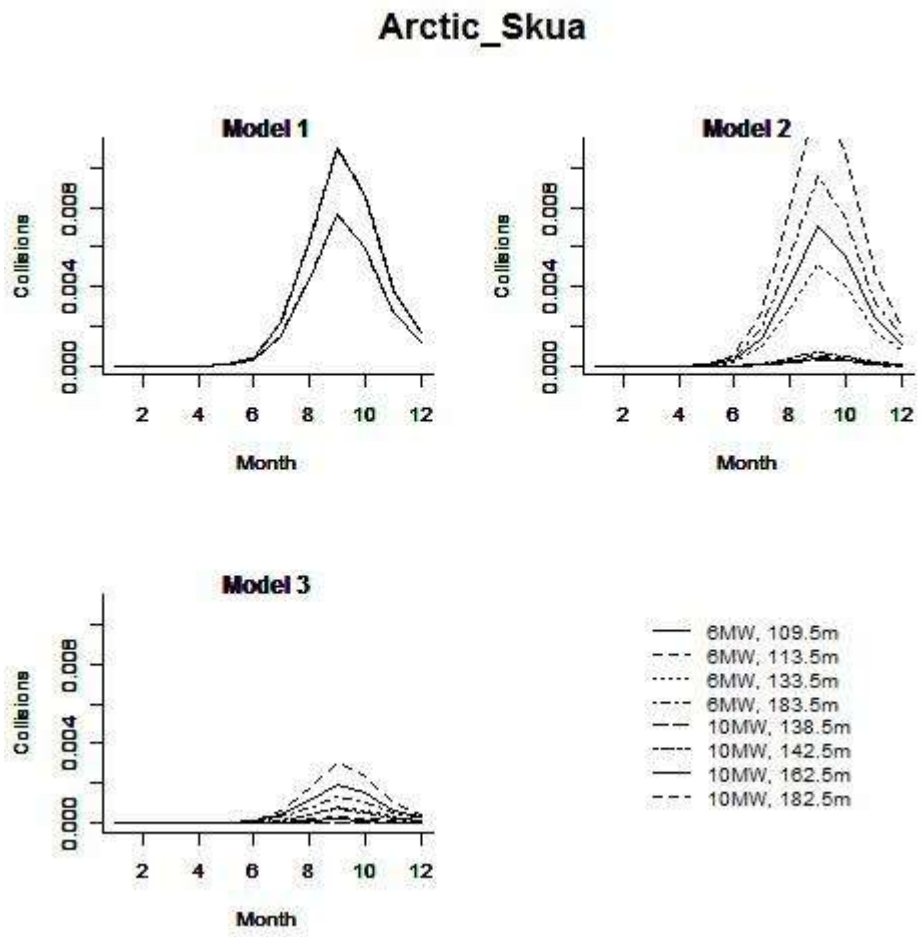



**Figure A6.40** Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

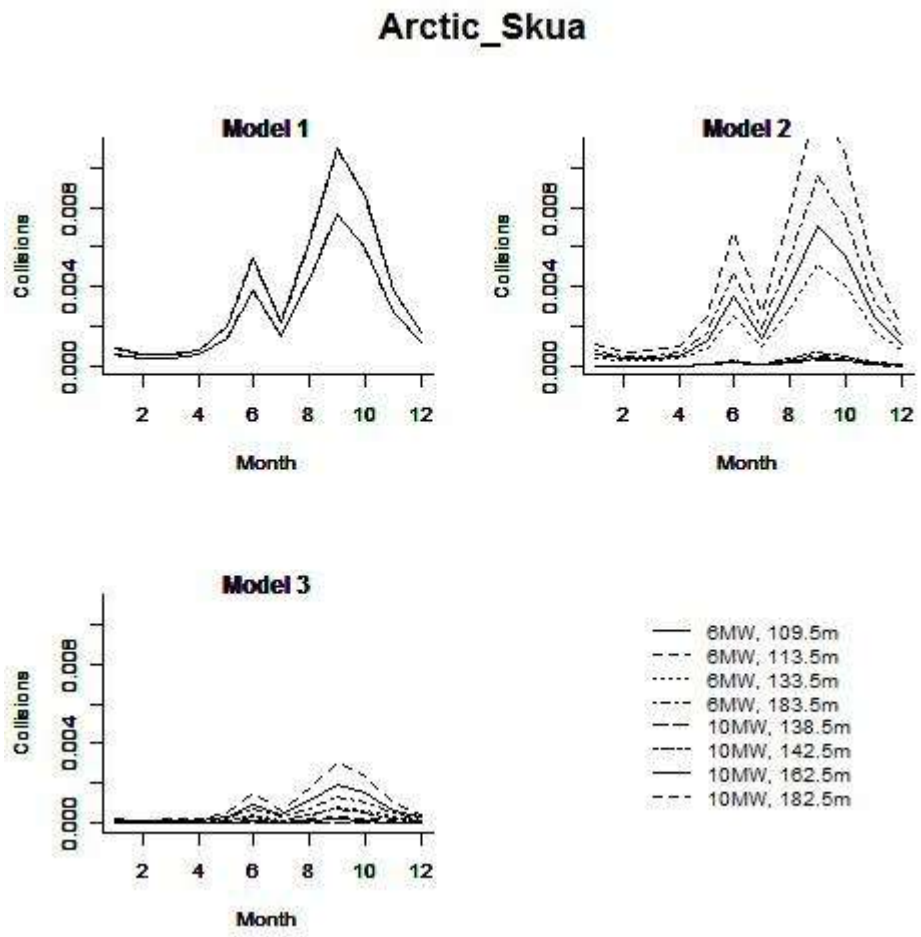



**Figure A6.41** Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

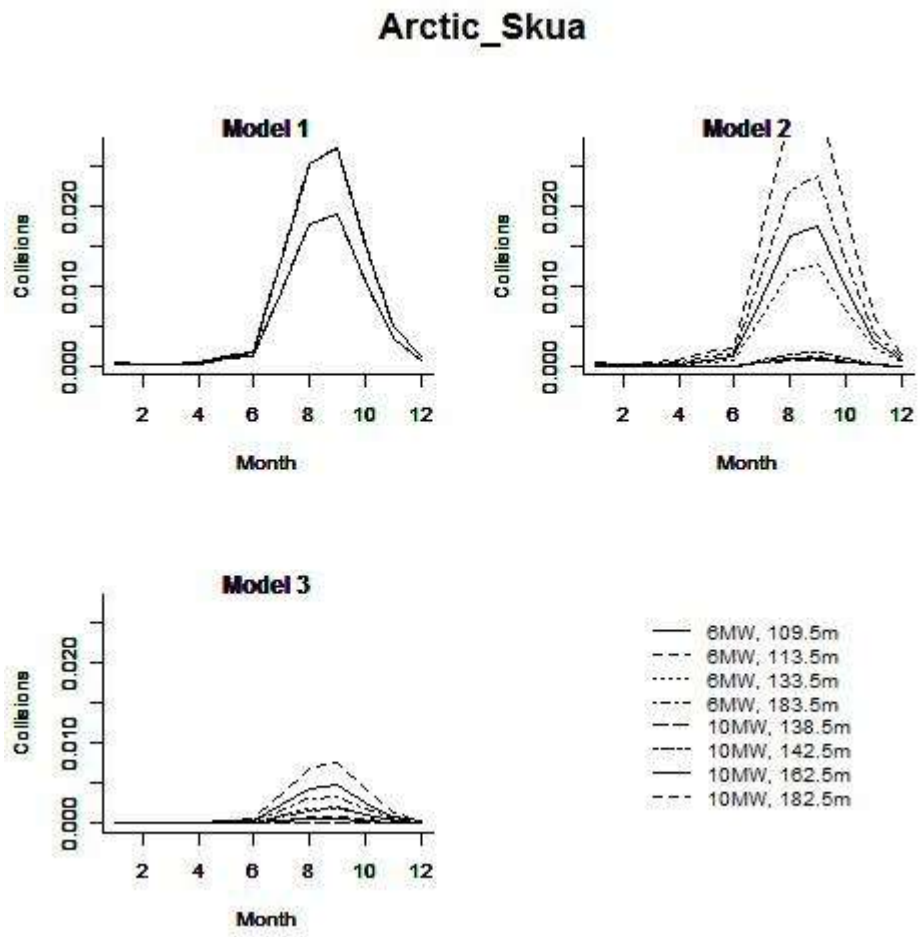



**Figure A6.42** Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Great skua**

A6.17 The annual patterns of the predicted number of collisions were relatively consistent between years. In all years the predicted number of collisions peaked during September (Figures A6.43, A6.44 and A6.45), but based on data from July 2010 to June 2011, there was a secondary peak in the predicted number of collisions in June (Figure A6.44). These patterns reflect seasonal abundance of great skua within the wind farm area. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.15)

**Table A6.15** Annual collision rates for Dogger Bank Teesside B for great skua using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 1 (0-2) | 0 (0-1) | 0 (0-0) | 1 (1-2) | 0 (0-1) | 0 (0-0) | 2 (1-4) | 1 (0-1) | 0 (0-1) |
| 6MW, 113.5m | 1 (0-2) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-1) | 0 (0-0) | 2 (1-4) | 1 (0-1) | 0 (0-1) |
| 6MW, 133.5m | 1 (0-2) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-4) | 0 (0-0) | 0 (0-0) |
| 6MW, 183.5m | 1 (0-2) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-4) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (0-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-1) | 0 (0-0) |
| 10MW, 142.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (0-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-1) | 0 (0-0) |
| 10MW, 162.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (0-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) |
| 10MW, 182.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (0-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) |

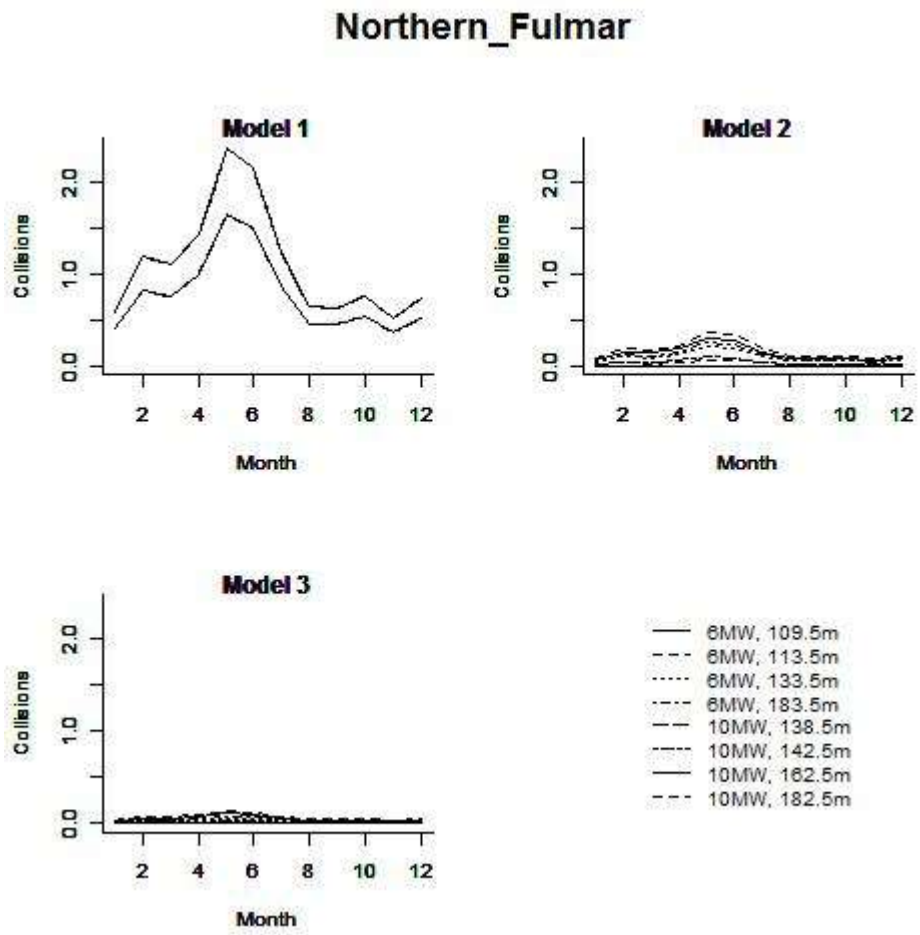



**Figure A6.43** Estimated monthly collision rates for great skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

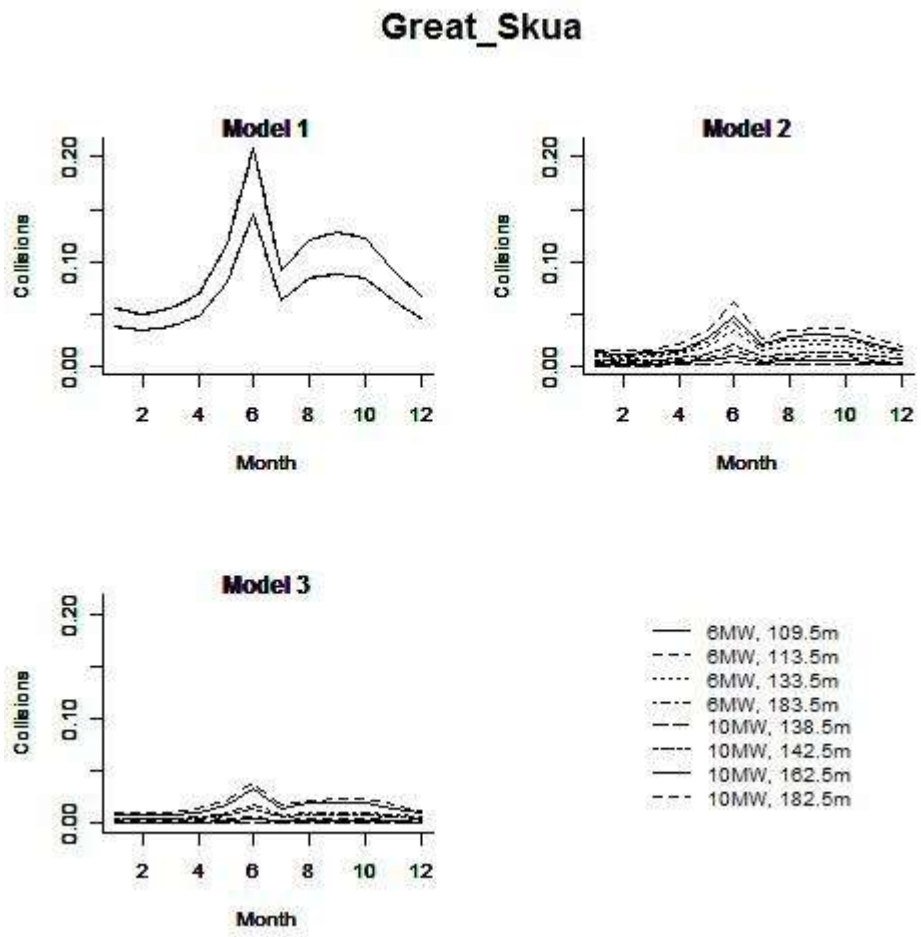



**Figure A6.44** Estimated monthly collision rates for great skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

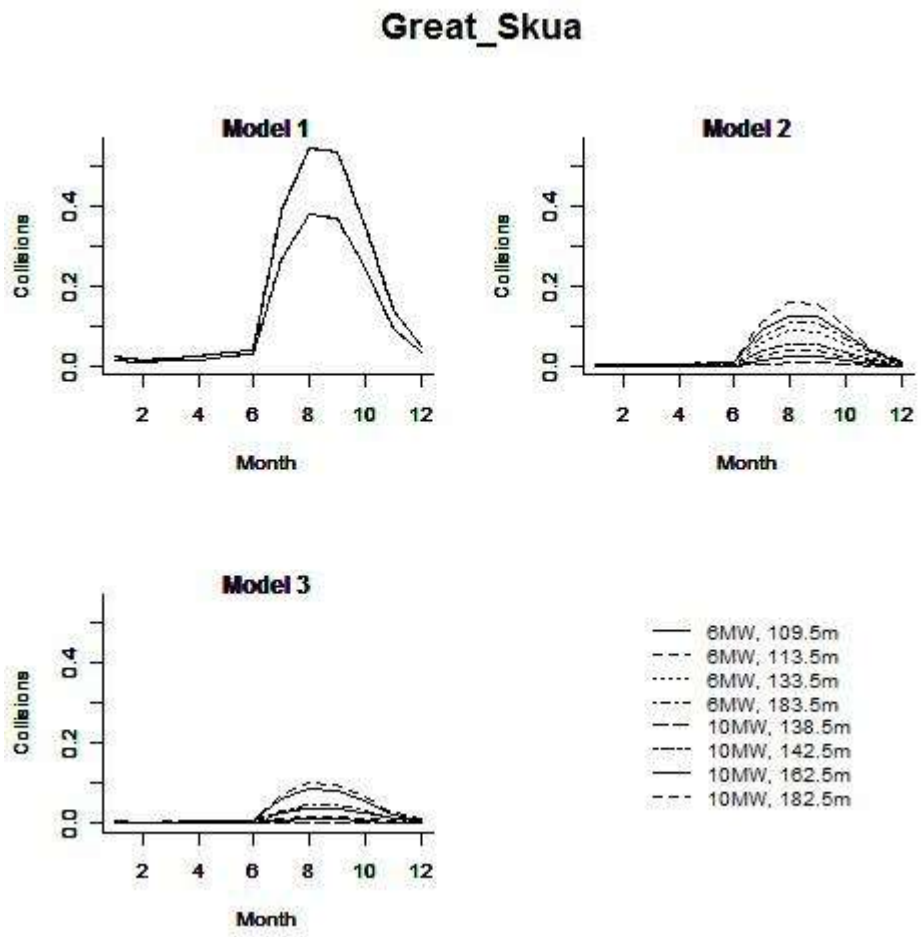



**Figure A6.45** Estimated monthly collision rates for great skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Black-legged kittiwake**

A6.18 The annual patterns of the predicted number of collisions were relatively consistent between years. In all years the predicted number of collisions peaked during the start of the year (Figures A6.46, A6.47 and A6.48), but in 2010, there was a secondary peak in the predicted number of collisions towards the end of the year (Figure A6.46). These patterns reflect seasonal abundance of black-legged kittiwake within the wind farm area. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.16)

**Table A6.16** Annual collision rates for Dogger Bank Teesside B for black-legged kittiwake using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 1,199 (1,079-1,346) | 335 (302-376) | 56 (50-62) | 2,043 (1,835-2,283) | 571 (513-638) | 95 (85-106) | 2,106 (1,874-2,392) | 588 (524-669) | 98 (87-111) |
| 6MW, 113.5m | 1,199 (1,079-1,346) | 195 (176-219) | 32 (29-36) | 2,043 (1,835-2,283) | 332 (298-371) | 54 (49-61) | 2,106 (1,874-2,392) | 343 (305-389) | 56 (50-64) |
| 6MW, 133.5m | 1,199 (1,079-1,346) | 14 (13-16) | 4 (4-5) | 2,043 (1,835-2,283) | 25 (22-27) | 7 (7-8) | 2,106 (1,874-2,392) | 25 (23-29) | 7 (7-9) |
| 6MW, 183.5m | 1,199 (1,079-1,346) | 2 (2-2) | 2 (2-2) | 2,043 (1,835-2,283) | 3 (3-3) | 4 (3-4) | 2,106 (1,874-2,392) | 3 (3-4) | 4 (3-4) |
| 10MW, 138.5m | 838 (755-941) | 237 (213-266) | 29 (27-33) | 1,428 (1,283-1,596) | 404 (363-452) | 50 (45-56) | 1,472 (1,310-1,672) | 416 (371-473) | 52 (46-59) |
| 10MW, 142.5m | 838 (755-941) | 137 (124-154) | 17 (15-19) | 1,428 (1,283-1,596) | 234 (210-262) | 29 (26-32) | 1,472 (1,310-1,672) | 241 (215-274) | 30 (27-34) |
| 10MW, 162.5m | 838 (755-941) | 10 (9-12) | 3 (3-4) | 1,428 (1,283-1,596) | 18 (16-20) | 5 (5-6) | 1,472 (1,310-1,672) | 18 (16-21) | 6 (5-6) |
| 10MW, 182.5m | 838 (755-941) | 2 (2-3) | 2 (2-2) | 1,428 (1,283-1,596) | 4 (3-4) | 3 (3-4) | 1,472 (1,310-1,672) | 4 (3-4) | 3 (3-4) |

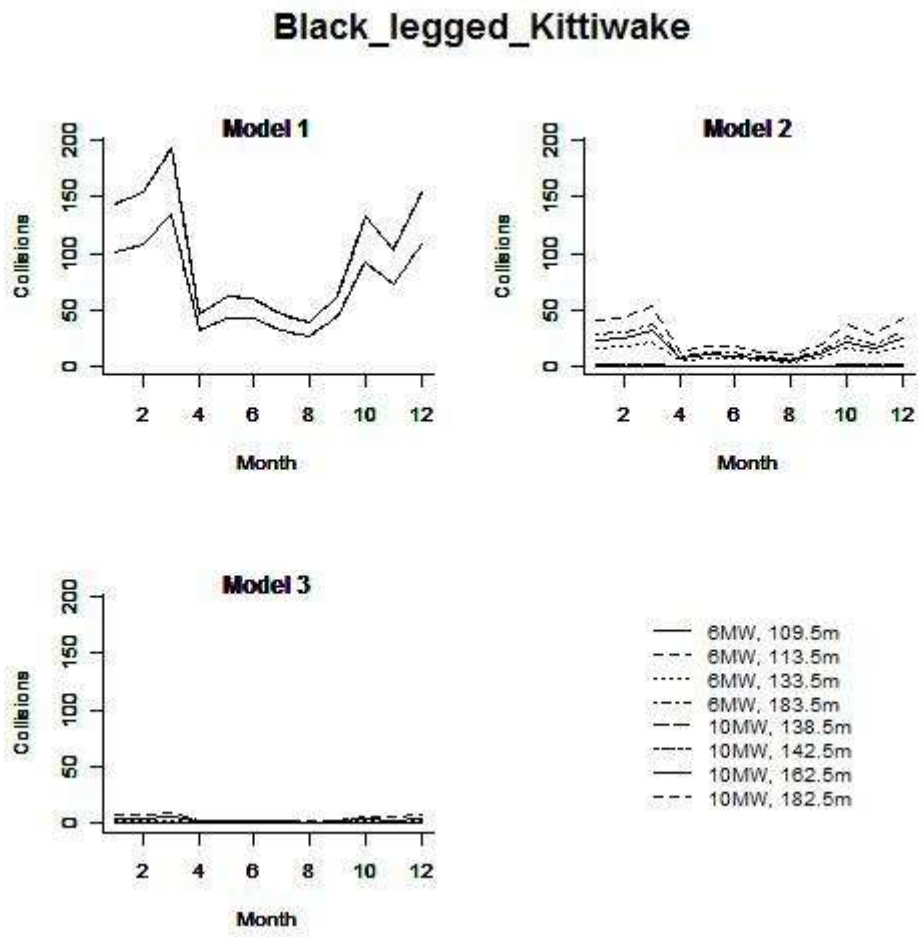



**Figure A6.46** Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

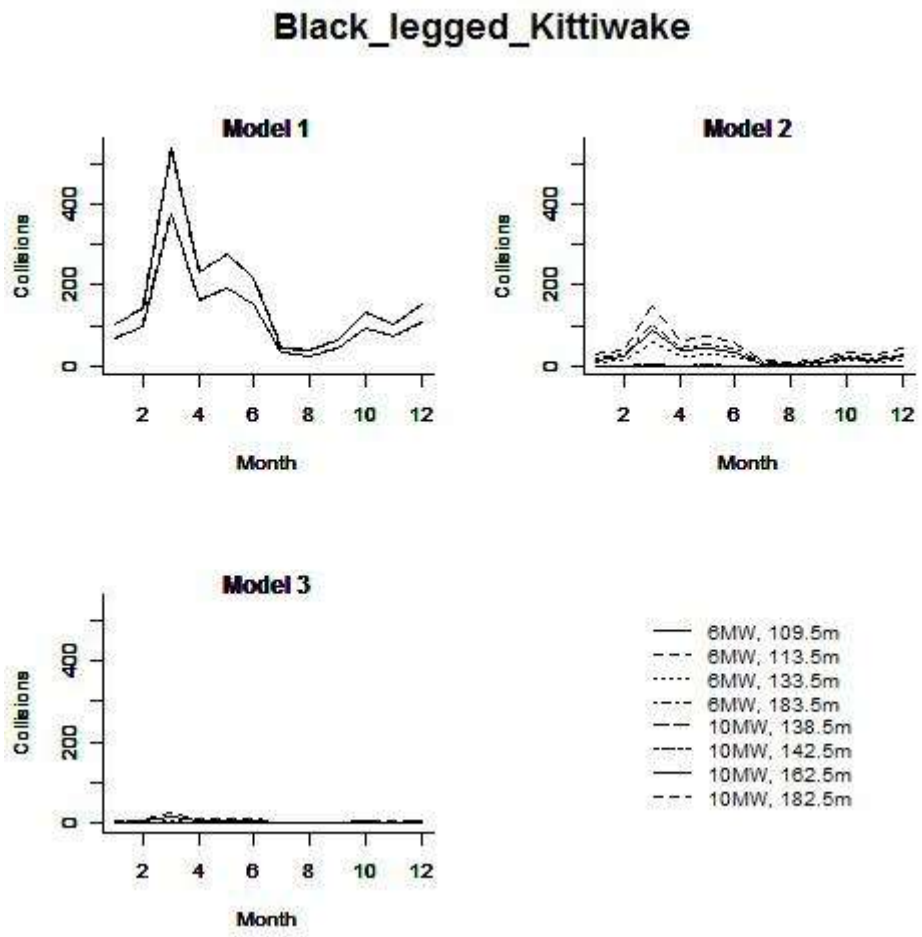



**Figure A6.47** Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

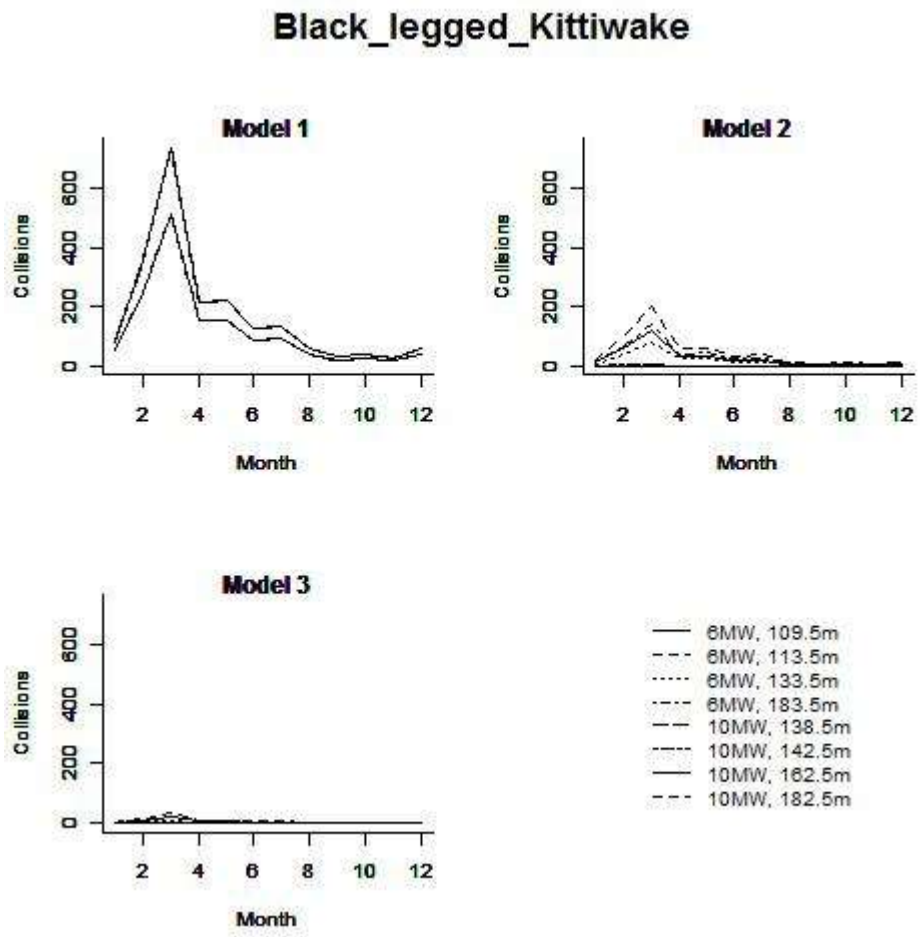



**Figure A6.48** Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Lesser black-backed gull**

A6.19 The annual pattern for the predicted number of collisions involving lesser black-backed gull in Dogger Bank Teesside B was consistent between years (Figures A6.49, A6.50 and A6.51). In each year, the number of predicted collisions peaked during the spring and early summer. These patterns reflect the annual migratory patterns of this species within the North Sea. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.17)

**Table A6.17** Annual collision rates for Dogger Bank Teesside B for lesser black-backed gull using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 94 (66-141) | 37 (26-56) | 25 (18-38) | 56 (37-89) | 22 (14-35) | 15 (10-24) | 38 (21-67) | 15 (8-26) | 10 (5-18) |
| 6MW, 113.5m | 94 (66-141) | 29 (20-43) | 23 (16-34) | 56 (37-89) | 17 (11-27) | 14 (9-22) | 38 (21-67) | 12 (6-21) | 9 (5-16) |
| 6MW, 133.5m | 94 (66-141) | 13 (9-20) | 15 (11-23) | 56 (37-89) | 8 (5-12) | 9 (6-14) | 38 (21-67) | 5 (3-9) | 6 (3-11) |
| 6MW, 183.5m | 94 (66-141) | 7 (5-11) | 3 (2-5) | 56 (37-89) | 4 (3-7) | 2 (1-3) | 38 (21-67) | 3 (2-5) | 1 (1-2) |
| 10MW, 138.5m | 65 (46-97) | 26 (18-39) | 15 (10-22) | 39 (25-62) | 15 (10-24) | 9 (6-14) | 26 (14-46) | 10 (6-18) | 6 (3-10) |
| 10MW, 142.5m | 65 (46-97) | 20 (14-30) | 13 (9-19) | 39 (25-62) | 12 (8-19) | 8 (5-12) | 26 (14-46) | 8 (4-14) | 5 (3-9) |
| 10MW, 162.5m | 65 (46-97) | 9 (6-14) | 7 (5-11) | 39 (25-62) | 5 (4-9) | 4 (3-7) | 26 (14-46) | 4 (2-6) | 3 (2-5) |
| 10MW, 182.5m | 65 (46-97) | 7 (5-10) | 4 (3-7) | 39 (25-62) | 4 (3-6) | 3 (2-4) | 26 (14-46) | 3 (1-5) | 2 (1-3) |

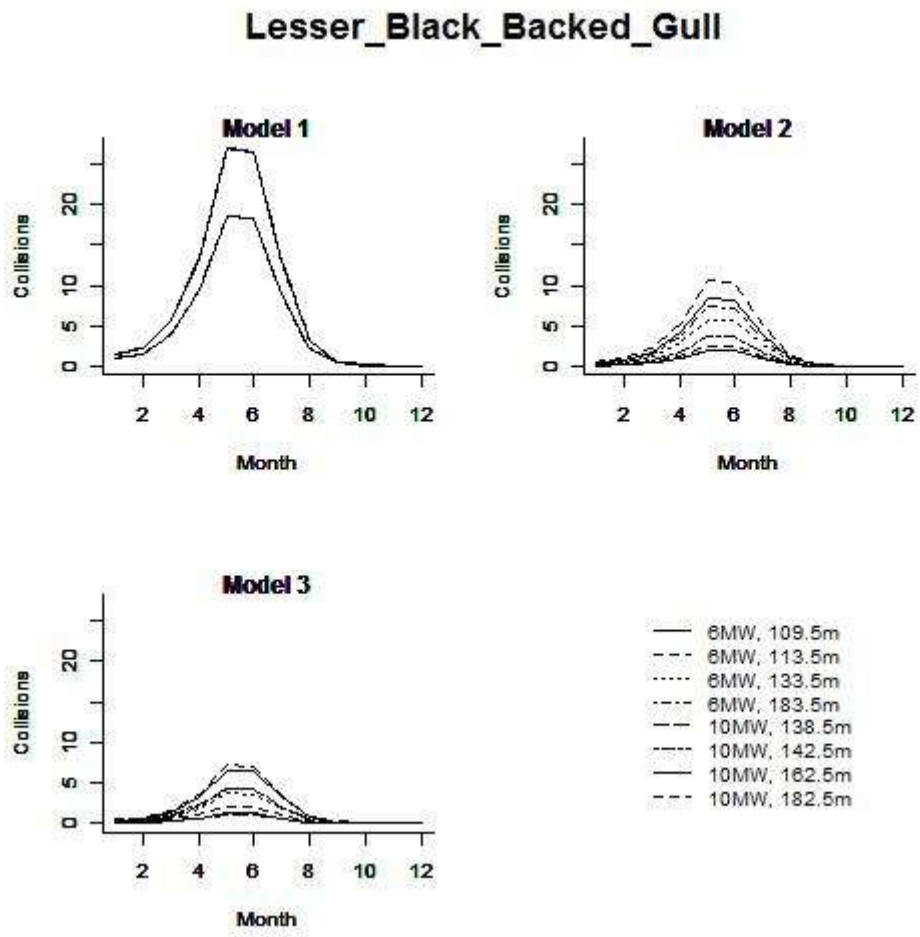



**Figure A6.49** Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

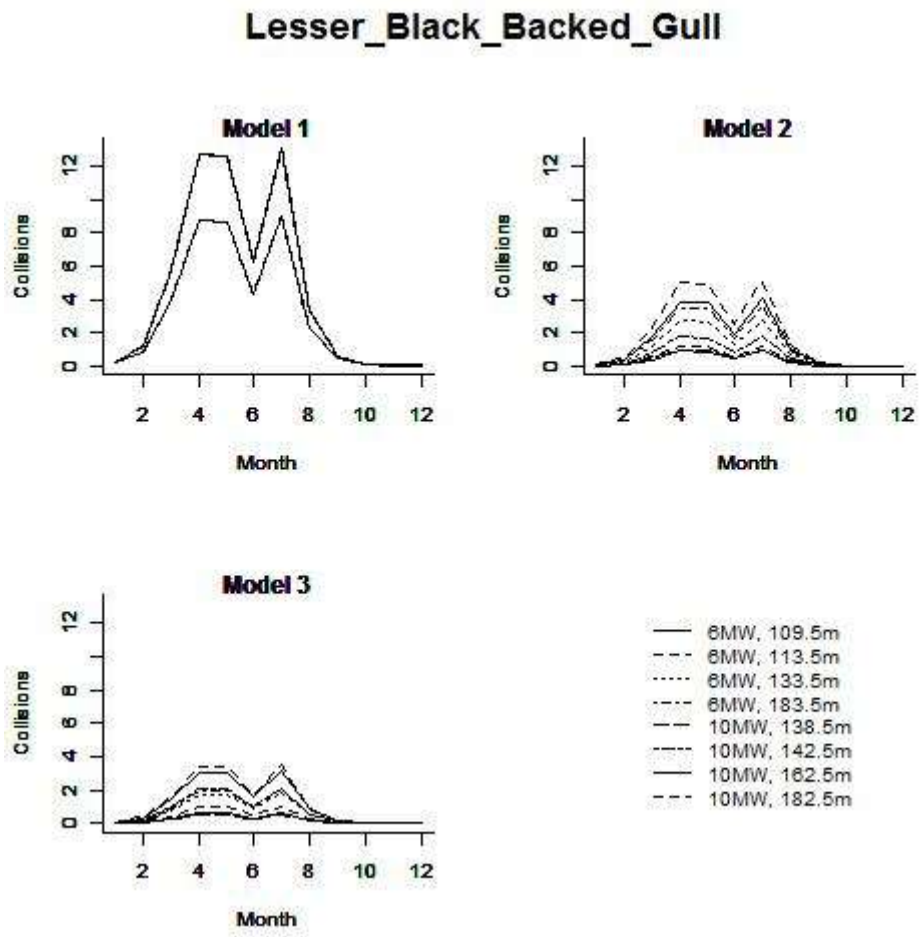



**Figure A6.50** Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

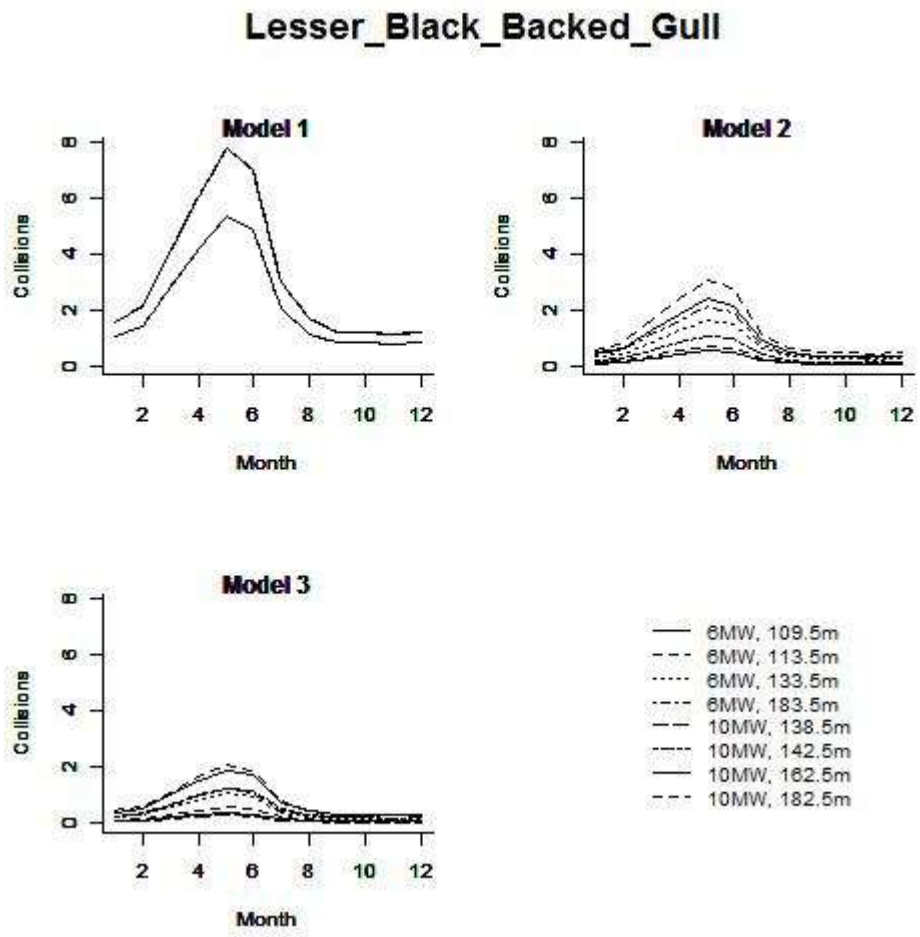



**Figure A6.51** Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Great black-backed gull**

A6.20 The annual pattern for the predicted number of collisions involving great black-backed gull in Dogger Bank Teesside B was consistent between years (Figures A6.52, A6.53 and A6.54). In each year, the number of predicted collisions peaked during the beginning and end of the year, with few collisions predicted over summer months. These patterns reflect the annual breeding and migratory patterns of this species within the North Sea. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.18)

**Table A6.18** Annual collision rates for Dogger Bank Teesside B for great black-backed gull using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 132 (95-185) | 81 (58-114) | 32 (23-45) | 138 (100-194) | 85 (61-119) | 34 (25-47) | 109 (70-164) | 67 (43-101) | 27 (17-40) |
| 6MW, 113.5m | 132 (95-185) | 64 (46-90) | 26 (19-36) | 138 (100-194) | 67 (49-94) | 27 (20-38) | 109 (70-164) | 53 (34-80) | 21 (14-32) |
| 6MW, 133.5m | 132 (95-185) | 20 (14-28) | 9 (7-13) | 138 (100-194) | 20 (15-29) | 10 (7-14) | 109 (70-164) | 16 (10-24) | 8 (5-12) |
| 6MW, 183.5m | 132 (95-185) | 3 (2-4) | 3 (2-4) | 138 (100-194) | 3 (2-4) | 3 (2-4) | 109 (70-164) | 2 (1-3) | 2 (1-3) |
| 10MW, 138.5m | 91 (65-127) | 56 (40-79) | 18 (13-25) | 95 (69-133) | 58 (42-82) | 19 (14-27) | 75 (48-113) | 46 (30-70) | 15 (10-23) |
| 10MW, 142.5m | 91 (65-127) | 44 (32-62) | 15 (11-21) | 95 (69-133) | 46 (33-65) | 15 (11-22) | 75 (48-113) | 37 (23-55) | 12 (8-18) |
| 10MW, 162.5m | 91 (65-127) | 14 (10-19) | 6 (4-8) | 95 (69-133) | 14 (10-20) | 6 (4-8) | 75 (48-113) | 11 (7-17) | 5 (3-7) |
| 10MW, 182.5m | 91 (65-127) | 5 (3-6) | 3 (2-4) | 95 (69-133) | 5 (3-7) | 3 (2-4) | 75 (48-113) | 4 (2-6) | 2 (2-4) |

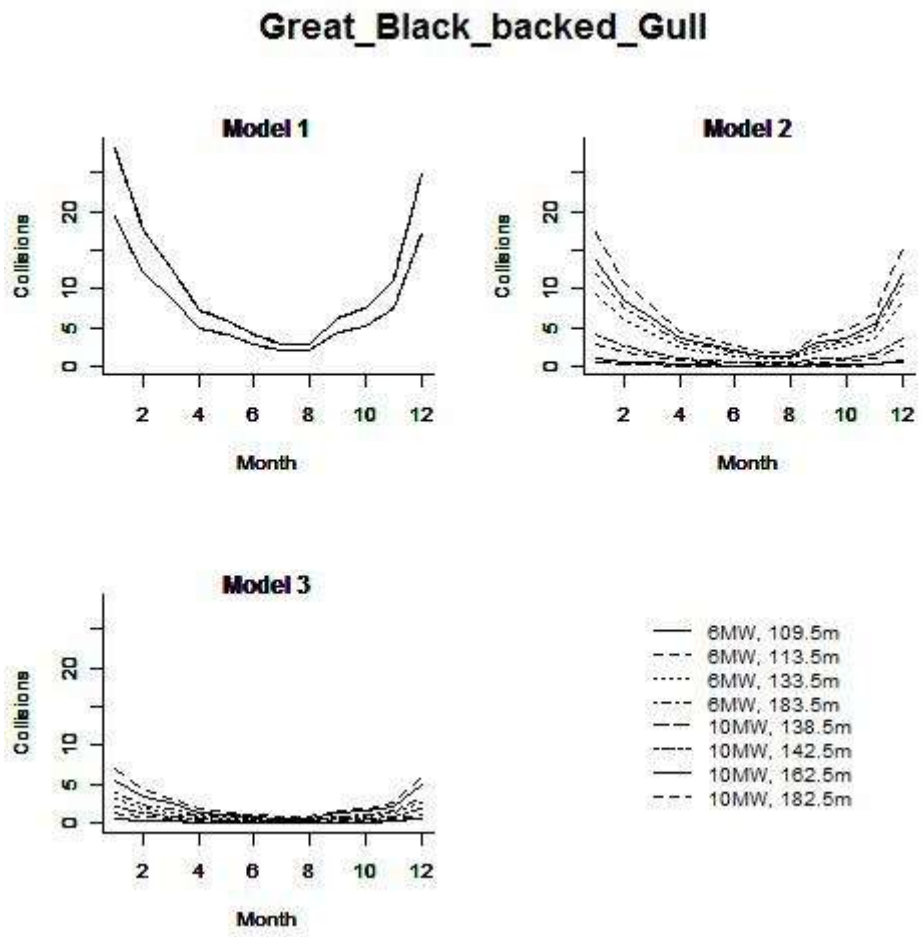



**Figure A6.52** Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

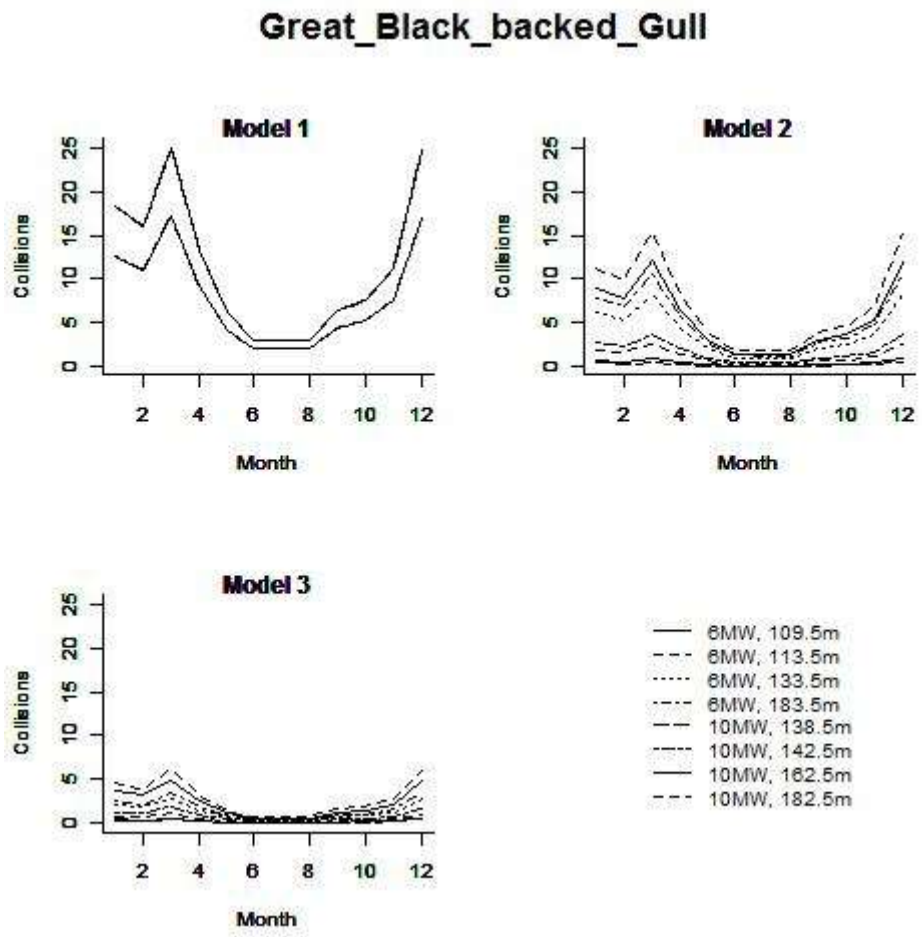



**Figure A6.53** Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

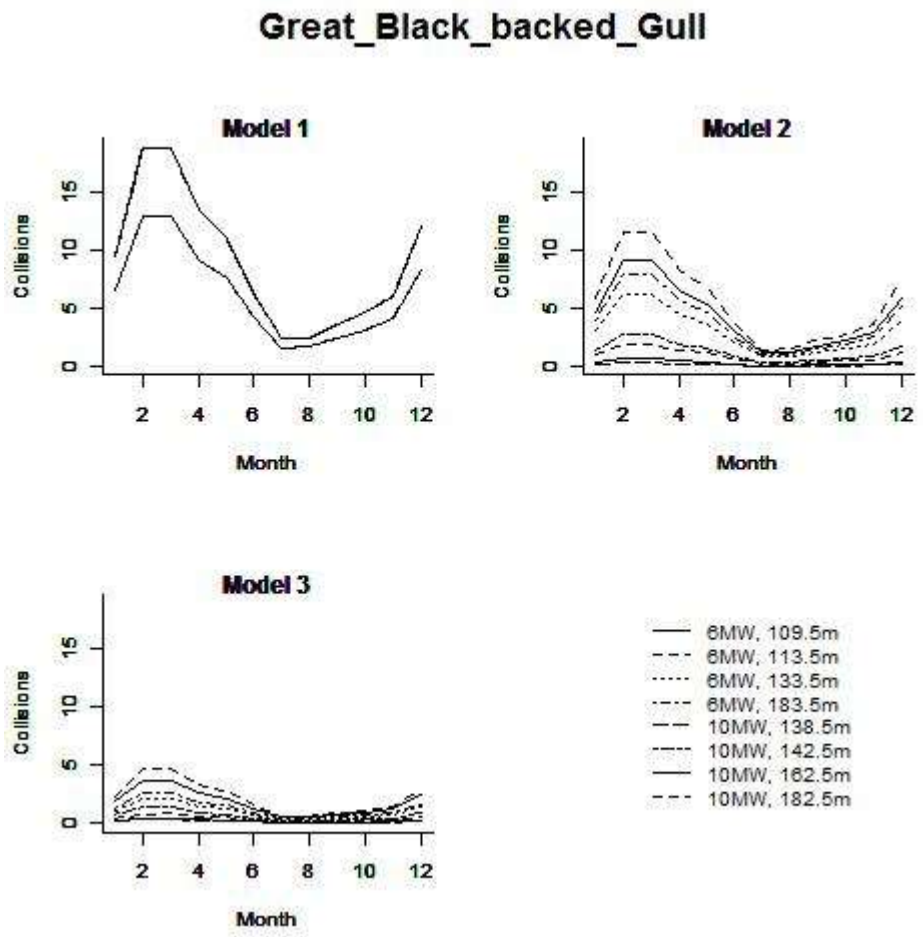



**Figure A6.54** Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Common guillemot**

A6.21 The annual pattern of the predicted number of collision was relatively consistent between years. The predicted number of collisions peaked during the spring and again towards the end of the year (Figure A6.55, A6.56 and A6.57). However, during 2010, the spring peak was less pronounced than in subsequent years. These patterns reflect the seasonal abundance of common guillemot within the wind farm area. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.19)

**Table A6.19** Annual collision rates for Dogger Bank Teesside B for common guillemot using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 15 (11-19) | 0 (0-0) | 0 (0-0) | 35 (27-45) | 0 (0-0) | 0 (0-0) | 27 (20-35) | 0 (0-0) | 0 (0-0) |
| 6MW, 113.5m | 15 (11-19) | 0 (0-0) | 0 (0-0) | 35 (27-45) | 0 (0-0) | 0 (0-0) | 27 (20-35) | 0 (0-0) | 0 (0-0) |
| 6MW, 133.5m | 15 (11-19) | 0 (0-0) | 0 (0-0) | 35 (27-45) | 0 (0-0) | 0 (0-0) | 27 (20-35) | 0 (0-0) | 0 (0-0) |
| 6MW, 183.5m | 15 (11-19) | 0 (0-0) | 0 (0-0) | 35 (27-45) | 0 (0-0) | 0 (0-0) | 27 (20-35) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 10 (8-14) | 0 (0-0) | 0 (0-0) | 25 (19-32) | 0 (0-0) | 0 (0-0) | 19 (14-25) | 0 (0-0) | 0 (0-0) |
| 10MW, 142.5m | 10 (8-14) | 0 (0-0) | 0 (0-0) | 25 (19-32) | 0 (0-0) | 0 (0-0) | 19 (14-25) | 0 (0-0) | 0 (0-0) |
| 10MW, 162.5m | 10 (8-14) | 0 (0-0) | 0 (0-0) | 25 (19-32) | 0 (0-0) | 0 (0-0) | 19 (14-25) | 0 (0-0) | 0 (0-0) |
| 10MW, 182.5m | 10 (8-14) | 0 (0-0) | 0 (0-0) | 25 (19-32) | 0 (0-0) | 0 (0-0) | 19 (14-25) | 0 (0-0) | 0 (0-0) |

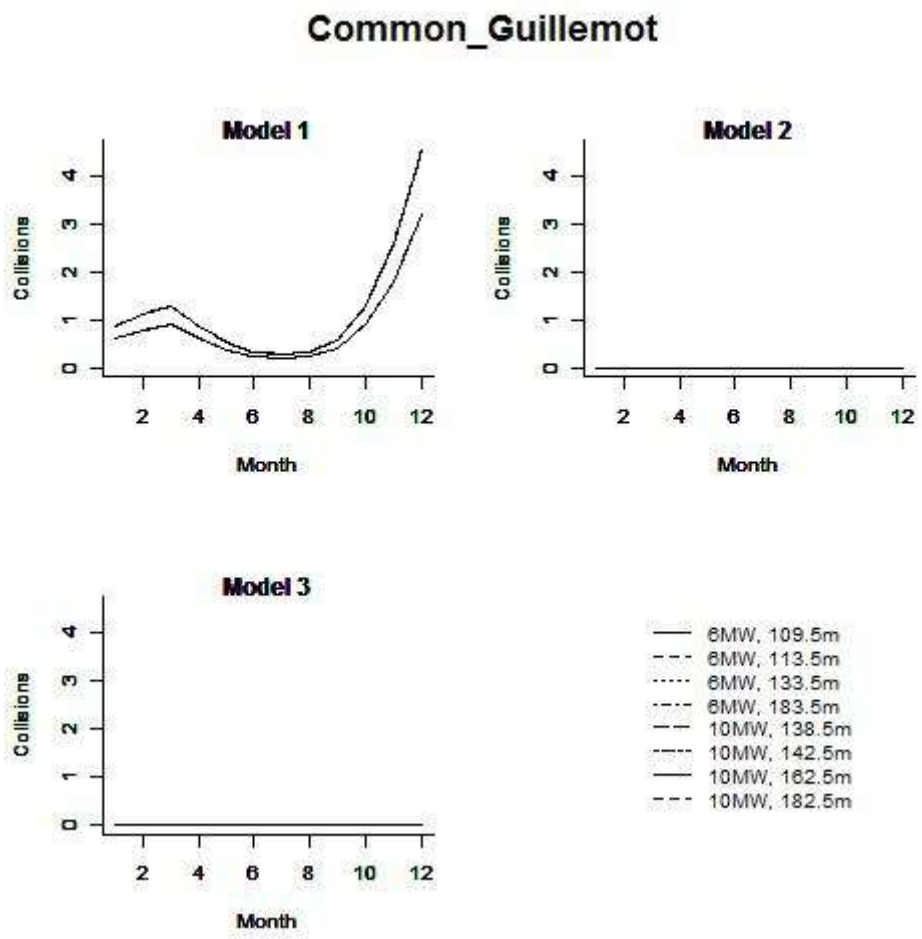



**Figure A6.55** Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

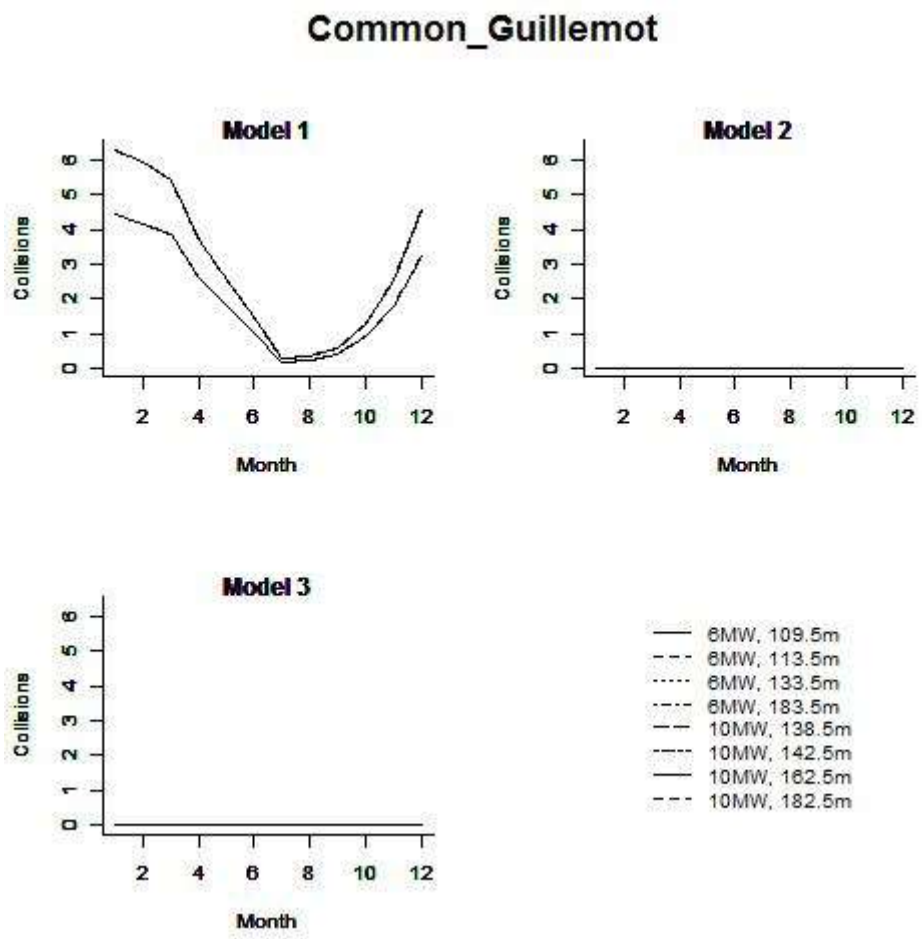



**Figure A6.56** Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

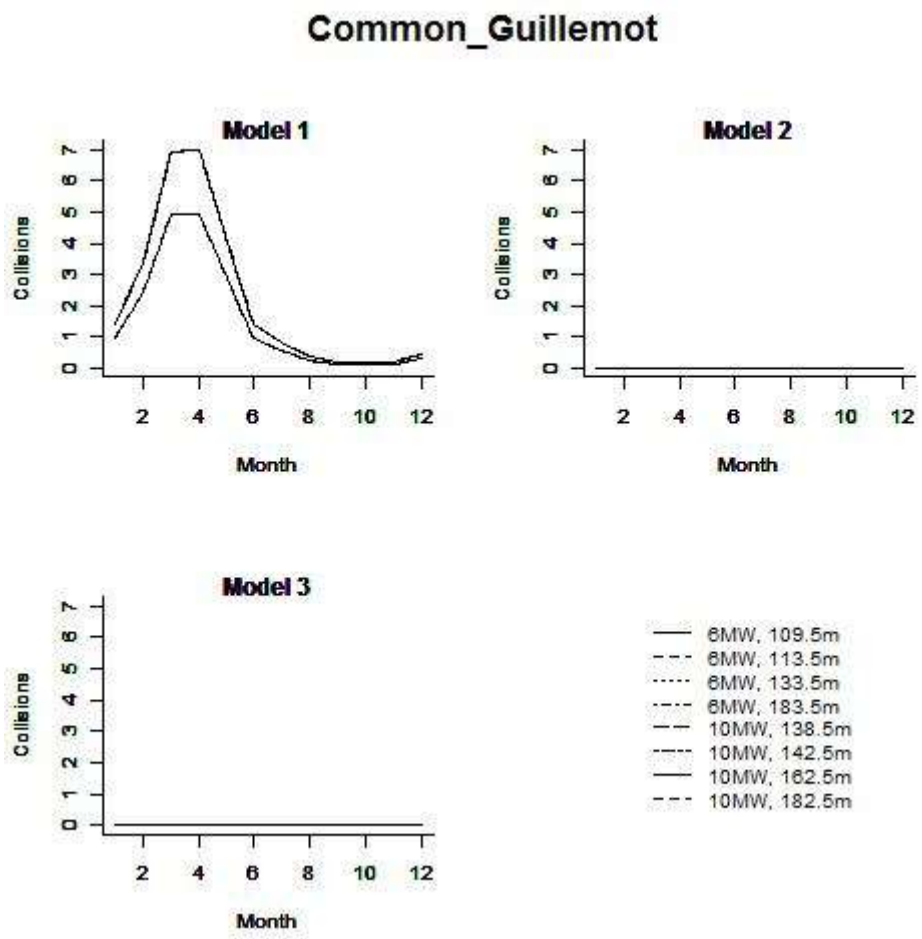



**Figure A6.57** Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Razorbill**

A6.22 The annual pattern of the predicted number of collision differed between years. Based on population estimates from 2010 (Figure A6.58), the number of collisions was predicted to peak during the start and end of the year, whilst using population estimates from July 2010 to June 2011 and July 2011 to June 2012, the number of collisions was predicted to peak during the spring (Figures A6.59 and A6.60). These differences reflect differences in the abundance of birds between 2010 and 2012. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.20)

**Table A6.20** Annual collision rates for Dogger Bank Teesside B for razorbill using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 11 (6-17) | 1 (0-1) | 1 (0-1) | 25 (15-42) | 1 (1-2) | 2 (1-3) | 21 (14-34) | 1 (1-2) | 2 (1-3) |
| 6MW, 113.5m | 11 (6-17) | 1 (0-1) | 1 (0-1) | 25 (15-42) | 1 (1-2) | 2 (1-3) | 21 (14-34) | 1 (1-2) | 1 (1-2) |
| 6MW, 133.5m | 11 (6-17) | 1 (0-1) | 0 (0-1) | 25 (15-42) | 1 (1-2) | 1 (1-2) | 21 (14-34) | 1 (1-2) | 1 (1-1) |
| 6MW, 183.5m | 11 (6-17) | 0 (0-0) | 0 (0-0) | 25 (15-42) | 0 (0-0) | 0 (0-0) | 21 (14-34) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 8 (4-12) | 0 (0-1) | 0 (0-1) | 17 (10-30) | 1 (1-1) | 1 (0-1) | 15 (10-24) | 1 (0-1) | 1 (0-1) |
| 10MW, 142.5m | 8 (4-12) | 0 (0-1) | 0 (0-0) | 17 (10-30) | 1 (1-1) | 1 (0-1) | 15 (10-24) | 1 (0-1) | 1 (0-1) |
| 10MW, 162.5m | 8 (4-12) | 0 (0-1) | 0 (0-0) | 17 (10-30) | 1 (1-1) | 0 (0-1) | 15 (10-24) | 1 (0-1) | 0 (0-1) |
| 10MW, 182.5m | 8 (4-12) | 0 (0-1) | 0 (0-0) | 17 (10-30) | 1 (0-1) | 0 (0-0) | 15 (10-24) | 1 (0-1) | 0 (0-0) |

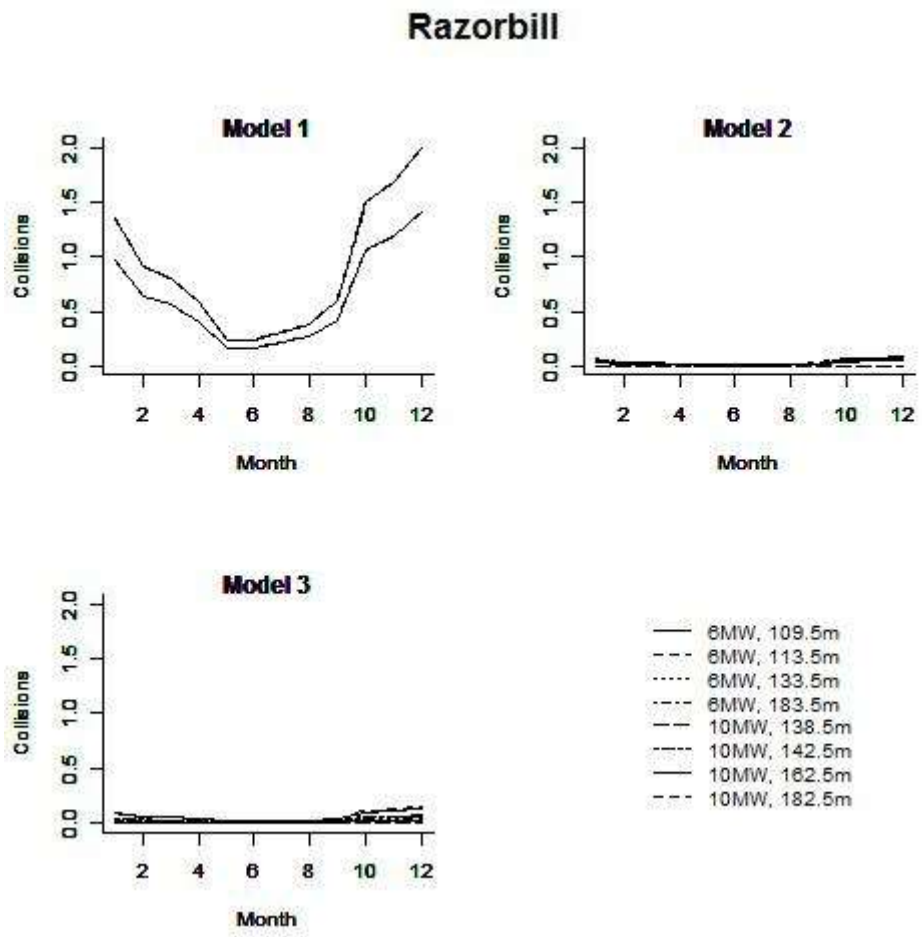



**Figure A6.58** Estimated monthly collision rates for razorbill in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

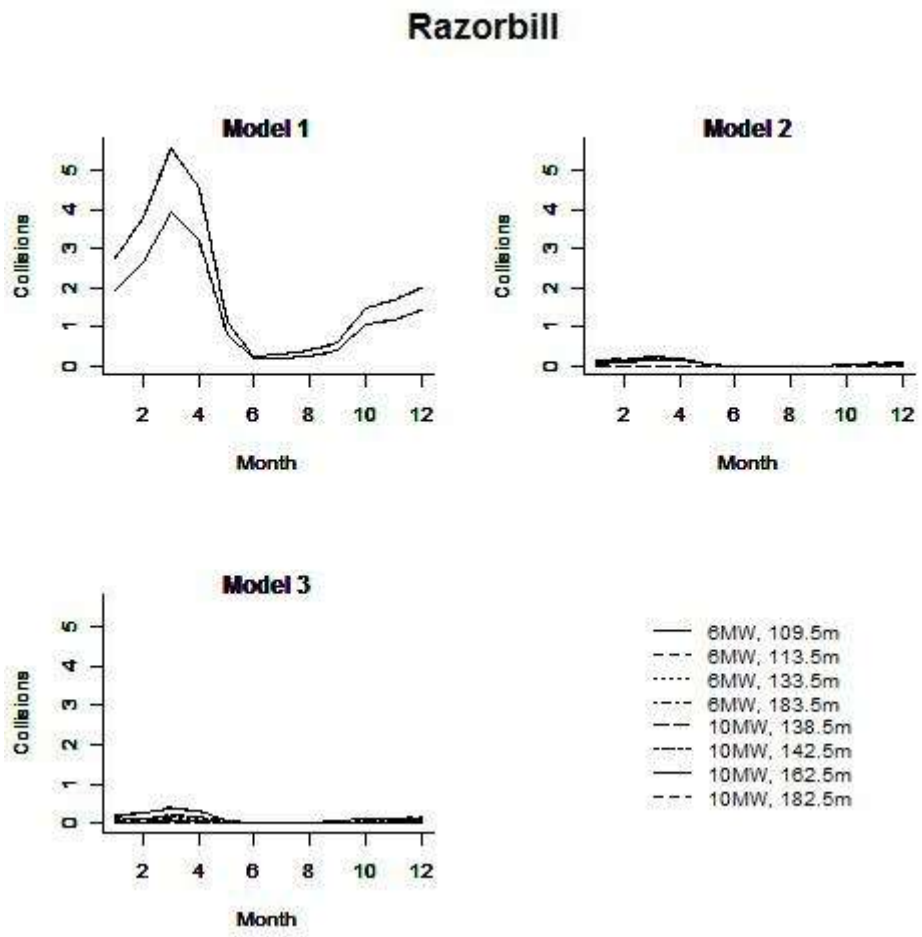



**Figure A6.59** Estimated monthly collision rates for razorbill in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

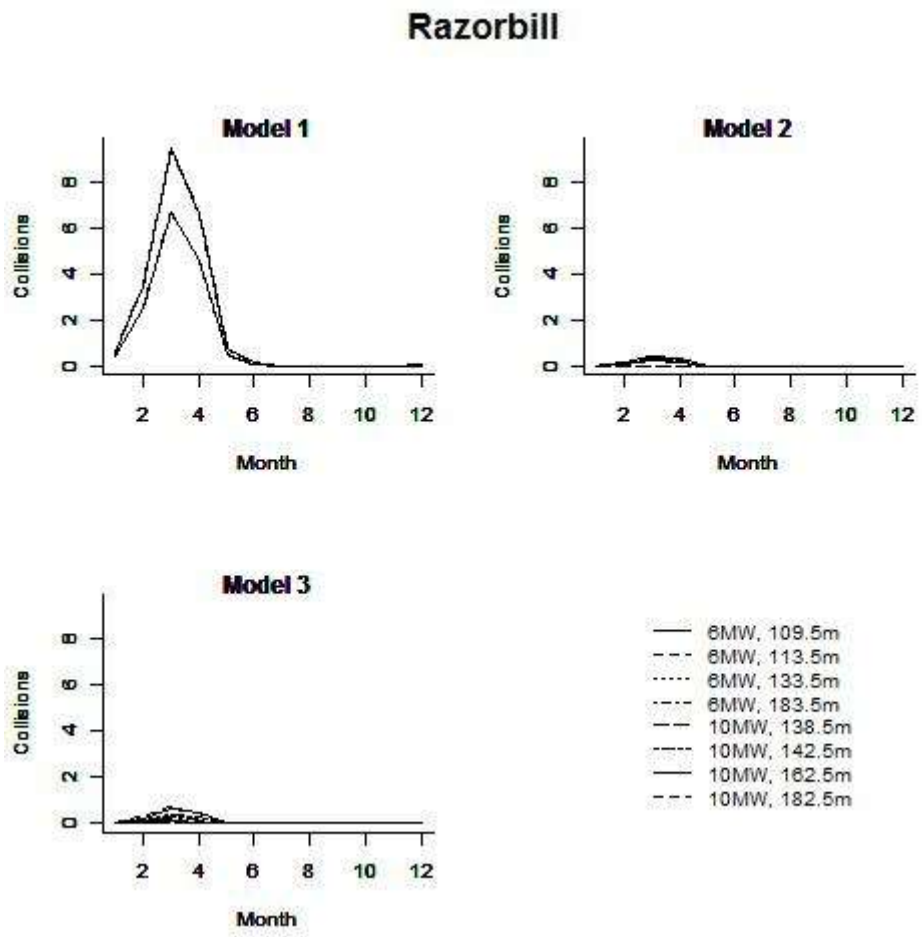



**Figure A6.60** Estimated monthly collision rates for razorbill in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Little auk**

A6.23 The annual pattern for the predicted number of collisions involving little auks in Dogger Bank Teesside B was consistent between years (Figures A6.61, A6.62 and A6.63). In each year, the number of predicted collisions peaked during the beginning and end of the year, with few collisions predicted over summer months. These patterns reflect the annual breeding and migratory patterns of this species within the North Sea. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.21)

**Table A6.21** Annual collision rates for Dogger Bank Teesside B for little auk using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) | 1 (0-1) | 0 (0-0) | 0 (0-0) |
| 6MW, 113.5m | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) | 1 (0-1) | 0 (0-0) | 0 (0-0) |
| 6MW, 133.5m | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) | 1 (0-1) | 0 (0-0) | 0 (0-0) |
| 6MW, 183.5m | 1 (1-2) | 0 (0-0) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 0 (0-0) | 1 (0-1) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-0) | 0 (0-0) |
| 10MW, 142.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-0) | 0 (0-0) |
| 10MW, 162.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-0) | 0 (0-0) |
| 10MW, 182.5m | 1 (0-1) | 0 (0-0) | 0 (0-0) | 1 (1-2) | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-0) | 0 (0-0) |

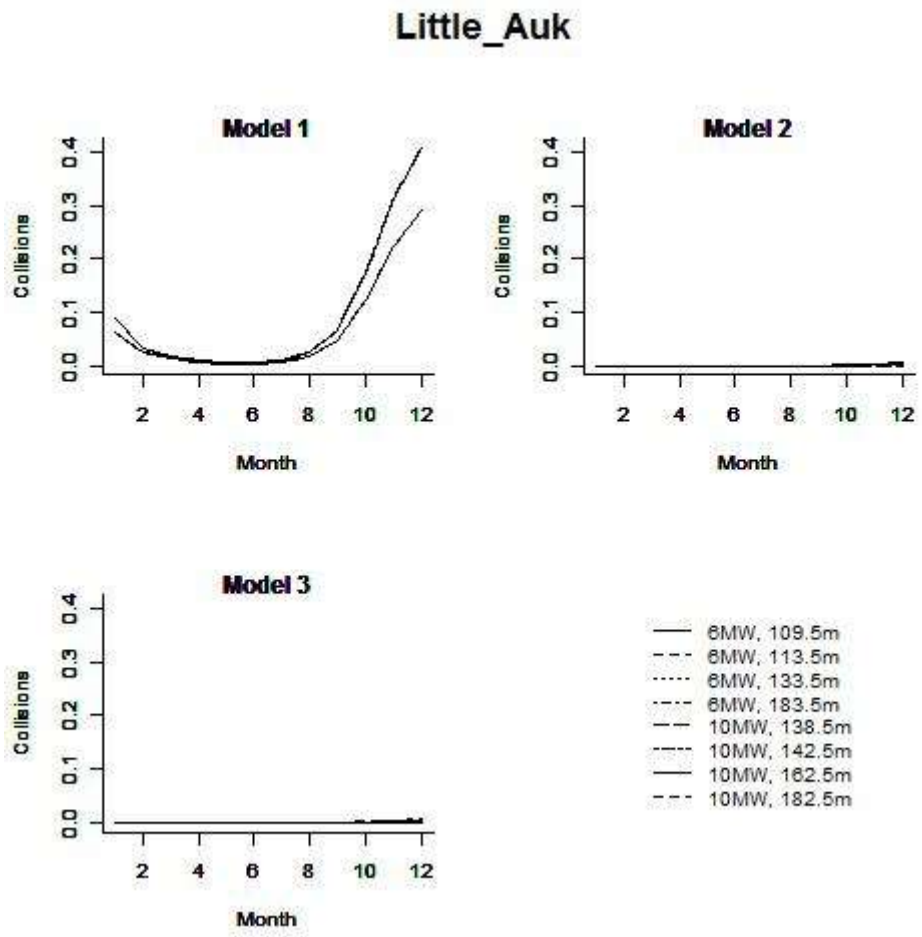



**Figure A6.61** Estimated monthly collision rates for little auk in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

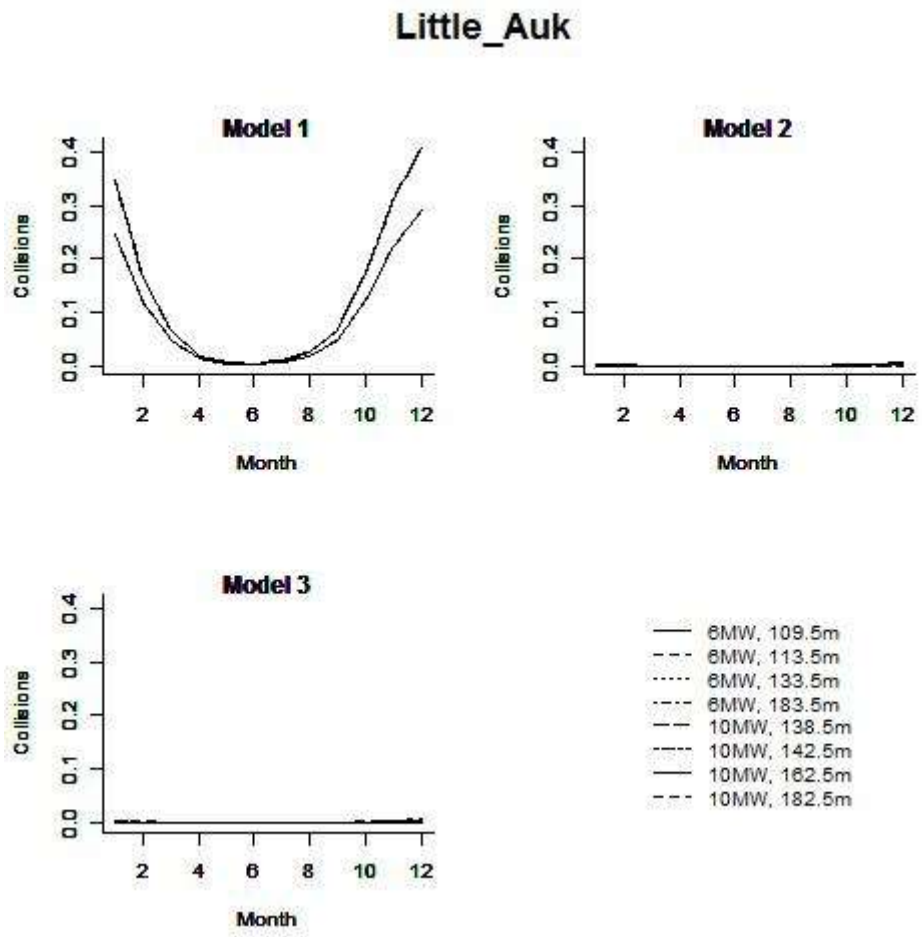



**Figure A6.62** Estimated monthly collision rates for little auk in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

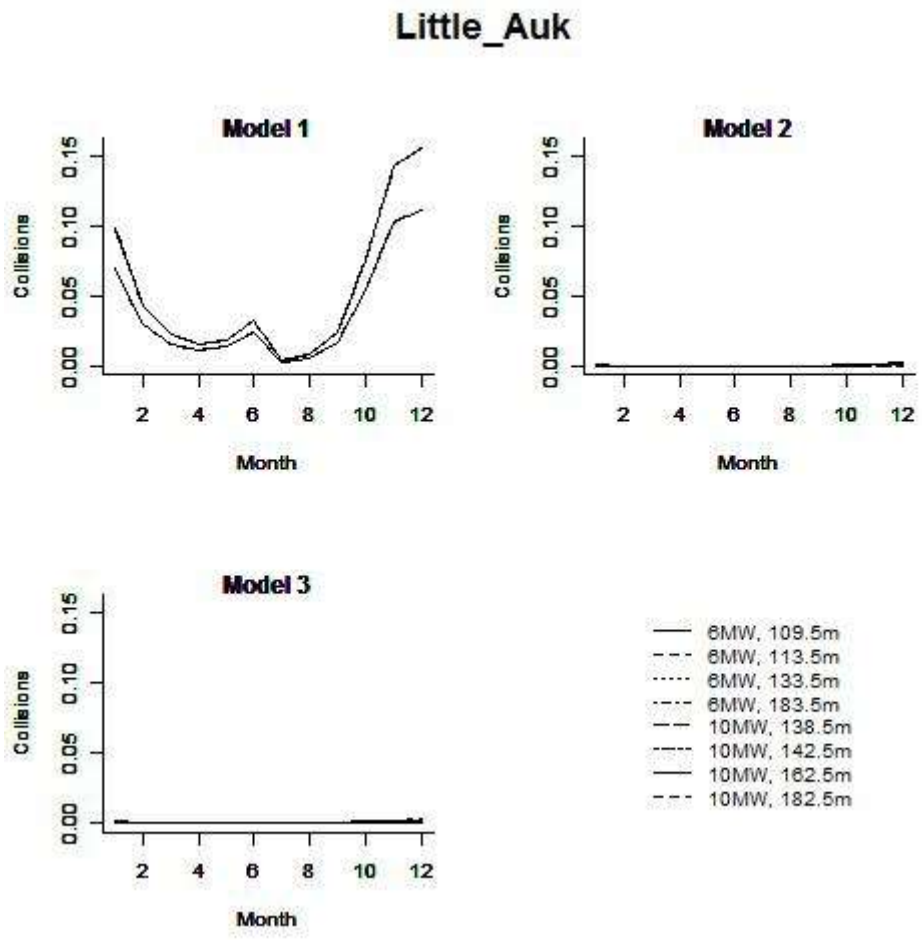



**Figure A6.63** Estimated monthly collision rates for little auk in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

**Atlantic puffin**

A6.24 The annual pattern of the predicted number of collision was relatively consistent between years. The predicted number of collisions peaked during the spring and declined throughout the rest of the year (A6.64, A6.65 and A6.66). These patterns reflect the seasonal abundance of Atlantic puffins within the wind farm area. Absolute numbers of collisions predicted were very low, however. In relation to annual collision rates, the worst case scenario was found to be the use of 6MW turbines with a minimum height of 26m above highest astronomic tide (Table A6.22)

**Table A6.22** Annual collision rates for Dogger Bank Teesside B for Atlantic puffin using each turbine design option and Band model options 1, 2, and 3. Band model option 1 uses site specific flight height data, Band model option 2 uses a fitted flight height distribution from Cook *et al.* (2012) and Band model option 3 uses the fitted flight height distribution from Cook *et al.* 2012 and corrects for variable collision risk within the rotor swept area. All models assume a 98% avoidance rate.

| Turbine Design | 2010 | | | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 | Option 1 | Option 2 | Option 3 |
| 6MW, 109.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 6MW, 113.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 6MW, 133.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 6MW, 183.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 10MW, 138.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 10MW, 142.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 10MW, 162.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| 10MW, 182.5m | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

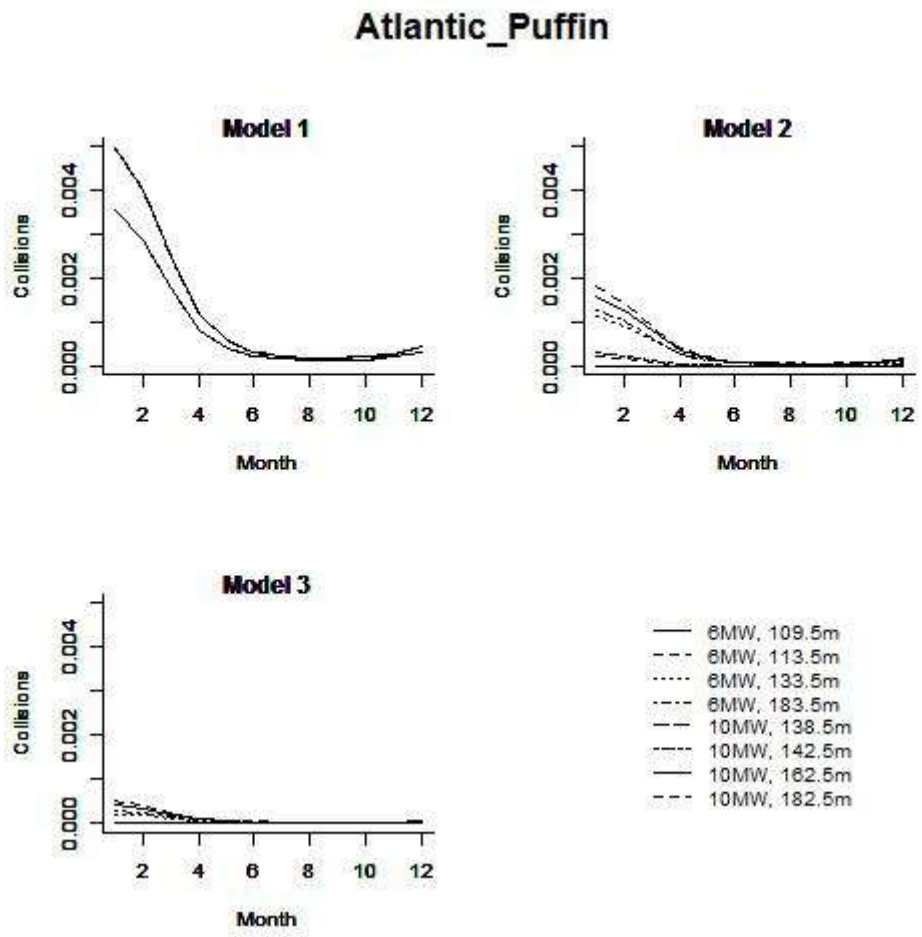



**Figure A6.64** Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

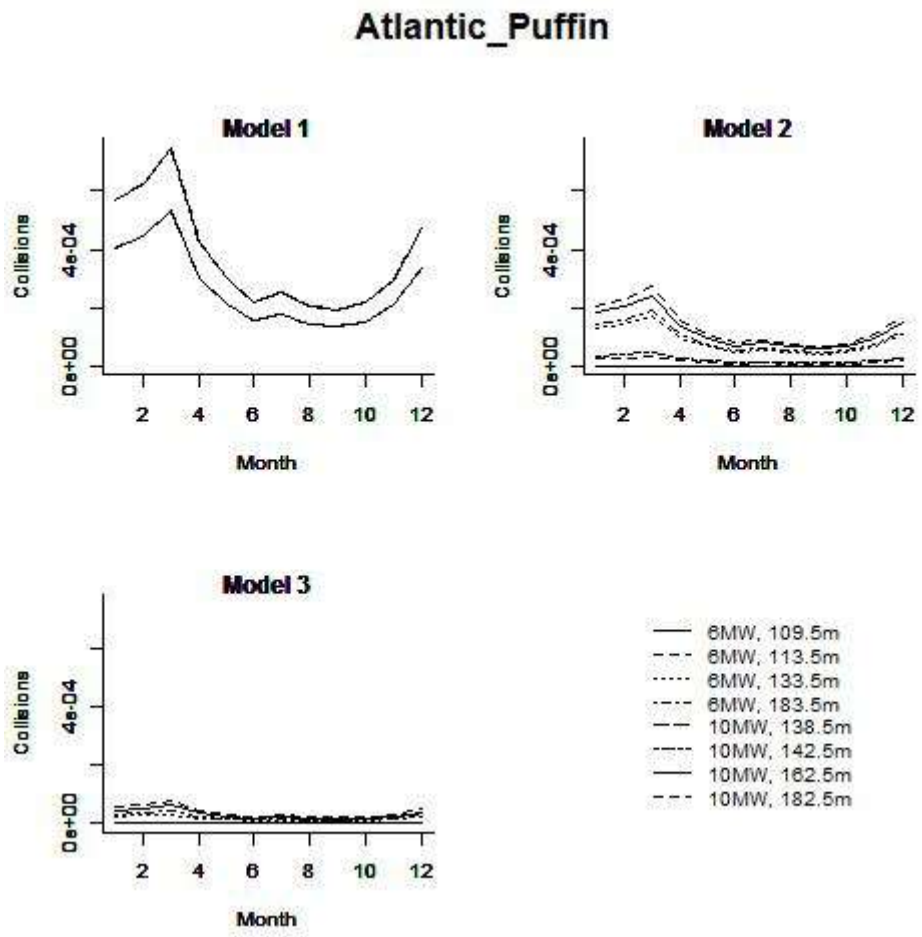



**Figure A6.65** Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

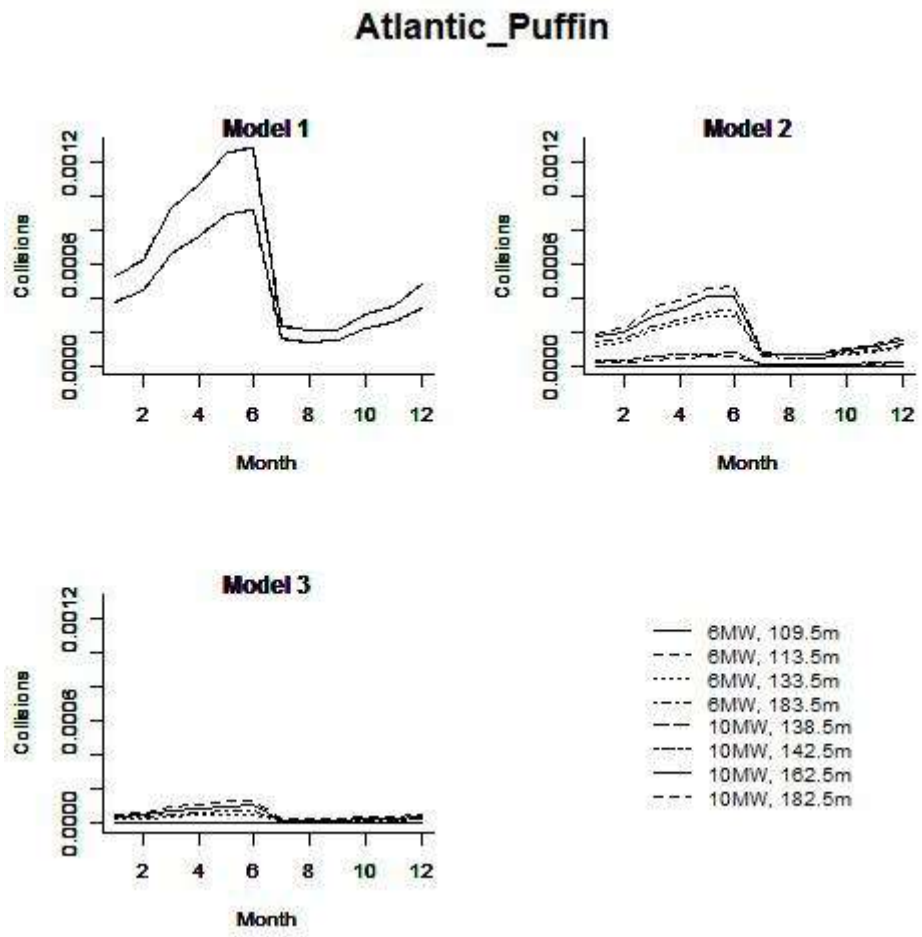



**Figure A6.66** Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating modelled flight height information to allow a variable collision risk within the rotor-swept area. Six different wind turbine capacity and height scenarios were considered.

## APPENDIX 7 Summary of the significance of impacts associated with collision risk using Option 1 of the Band collision risk model (Band *et al.* 2012)

A7.1. The updated Band model is capable of incorporating three options for considering flight heights:

- Option 1 – using the basic model, i.e. assuming that a uniform distribution of flight heights between lowest and highest levels of the rotors; and using the proportion of birds at risk height as derived from site survey;
- Option 2 – again using the basic model, but using the proportion of birds at risk height as derived from the generic flight height information;
- Option 3 – using the extended model, using the generic flight height information.

A7.2. Option 3, which uses modelled flight height distributions for each of the study species, allows comparison of the impact of varying the height of wind turbines, and to account for the fact that collision risk is not distributed evenly within the rotor swept area. This option was followed in the assessment (see section 4), though information provided below provides an overview of the significance of impacts associated with collision risk using the alternate Option 1 of the Band collision risk model (Band *et al.* 2012). (Note, no collision estimates were generated for white-billed diver.)

A7.3. However, it should be noted that results are not strictly comparable, as Option 1 exaggerates the extent of the rotor swept area (all heights > 20 m). This and, critically, the assumption of an even distribution of birds across this flight height range means that Option 1 will over-estimate the numbers of birds at risk.

**Dogger Bank Teesside A**

A7.4. There were strong between year differences in both the total numbers of birds present within Dogger Bank Teesside A, and annual patterns in their abundance (Tables A7.1 and A7.2).

A7.5. Using a realistic, precautionary avoidance rate of 98% (SNH 2010, Cook *et al.* 2012), the number of Arctic skua, great skua, little auk and Atlantic puffin colliding with wind turbines, was predicted to be less than two birds per year. Northern fulmar, common guillemot and razorbill were more prone to collisions, with predictions of 12, 17 and 13 per year respectively (Table A7.1).

A7.6. The numbers of northern gannet, lesser black-backed gull, great black-backed gull and black-legged kittiwake predicted to collide with wind turbines were greater. Assuming a 98% avoidance rate, the mean number of lesser black-backed gulls predicted to collide with wind turbines was 61 and for great black-backed gulls, 116 birds were predicted to collide each year (Table A7.1).

A7.7. The species that would be most impacted under option 1 were northern gannet and black-legged kittiwake, with mean predictions of 100 and 1,139 per year respectively, assuming a 99% avoidance rate for northern gannet and 98% avoidance rate for black-legged kittiwake.

A7.8. Investigations were also made into changes to the lower rotor tip height and the resultant impact on collision rates – these are presented for a range of values between 26m and 100m for all species for Dogger Bank Creyke Beck A and B as an example (Appendix 12).

A7.9. Collision rates were higher during the breeding season than the non-breeding season for northern gannet, black-legged kittiwake and lesser black-backed gull. For great black-backed gull, the reverse was true. For all other species, the predicted number of collisions was negligible in both seasons (Table A7.2).

**Table A7.1** Annual collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A project of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m in response to different avoidance rates. Estimates generated using option 1 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | | | July 2010 – June 2011 | | | | July 2011 – June 2012 | | | | Mean | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 95% | 98% | 99% | 99.50% | 95% | 98% | 99% | 99.50% | 95% | 98% | 99% | 99.50% | 95% | 98% | 99% | 99.5% |
| Northern fulmar | 31 (26-39) | 12 (11-16) | 6 (5-8) | 3 (3-4) | 22 (18-27) | 9 (7-11) | 4 (4-5) | 2 (2-3) | 36 (29-45) | 14 (12-18) | 7 (6-9) | 4 (3-5) | 30 (25-38) | 12 (10-15) | 6 (5-8) | 3 (3-4) |
| Northern gannet | 189 (152-226) | 76 (61-91) | 38 (31-45) | 19 (15-23) | 326 (266-389) | 131 (107-156) | 65 (53-78) | 33 (27-39) | 889 (723-1065) | 356 (289-426) | 178 (145-213) | 89 (72-107) | 501 (407-598) | 200 (163-240) | 100 (82-120) | 50 (41-60) |
| Arctic Skua | 0 (0-2475) | 0 (0-990) | 0 (0-495) | 0 (0-248) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-284) | 0 (0-114) | 0 (0-57) | 0 (0-28) | 0 (0-920) | 0 (0-368) | 0 (0-184) | 0 (0-92) |
| Great Skua | 2 (1-4) | 1 (0-2) | 0 (0-1) | 0 (0-0) | 3 (1-6) | 1 (1-2) | 1 (0-1) | 0 (0-1) | 5 (3-10) | 2 (1-4) | 1 (1-2) | 1 (0-1) | 4 (2-8) | 2 (1-3) | 1 (0-2) | 0 (0-1) |
| Black-legged kittiwake | 1,875 (1,678-2,118) | 750 (672-848) | 375 (336-424) | 188 (168-212) | 3,408 (3,020-3,859) | 1,364 (1,209-1,545) | 682 (604-773) | 341 (302-386) | 3,417 (2,994-3,926) | 1,368 (1,198-1,571) | 684 (599-786) | 342 (300-393) | 2846 (2514-3241) | 1139 (1006-1297) | 570 (503-649) | 285 (252-324) |
| Lesser black-backed gull | 229 (148-358) | 92 (59-143) | 46 (30-72) | 23 (15-36) | 141 (86-236) | 56 (35-94) | 28 (17-47) | 14 (9-24) | 97 (52-175) | 39 (21-70) | 19 (10-35) | 10 (5-18) | 153 (94-252) | 61 (38-101) | 31 (19-51) | 15 (9-25) |
| Great black-backed gull | 285 (203-417) | 114 (81-167) | 57 (41-84) | 29 (20-42) | 332 (238-486) | 133 (95-195) | 66 (48-97) | 33 (24-49) | 277 (175-438) | 111 (70-175) | 55 (35-88) | 28 (18-44) | 290 (199-435) | 116 (80-174) | 58 (40-87) | 29 (20-44) |
| Common guillemot | 26 (19-35) | 11 (8-14) | 5 (4-7) | 3 (2-4) | 63 (48-82) | 25 (19-33) | 13 (10-16) | 6 (5-8) | 48 (36-64) | 19 (14-26) | 10 (7-13) | 5 (4-6) | 44 (33-58) | 17 (13-23) | 9 (7-12) | 4 (3-6) |
| Razorbill | 20 (11-33) | 8 (4-13) | 4 (2-7) | 2 (1-3) | 46 (27-80) | 19 (11-32) | 9 (5-16) | 5 (3-8) | 40 (26-66) | 16 (10-26) | 8 (5-13) | 4 (3-7) | 33 (20-57) | 13 (8-23) | 7 (4-11) | 3 (2-6) |
| Little auk | 3 (2-5) | 1 (1-2) | 1 (0-1) | 0 (0-0) | 4 (2-6) | 2 (1-3) | 1 (0-1) | 0 (0-1) | 2 (1-3) | 1 (0-1) | 0 (0-1) | 0 (0-0) | 3 (1-4) | 1 (1-2) | 1 (0-1) | 0 (0-0) |
| Atlantic puffin | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Table A7.2** Seasonal collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A project of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m and an avoidance rate of 98 % (99% for northern gannet). Estimates generated using option 1 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | July 2010 – June 2011 | | July 2011 – June 2012 | | Mean | |
|---|---|---|---|---|---|---|---|---|
| | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding |
| Northern fulmar | 10 (8-12) | 3 (2-4) | 6 (5-7) | 3 (2-4) | 10 (8-13) | 4 (3-5) | 9 (7-11) | 3 (3-4) |
| Northern gannet | 20 (16-24) | 18 (14-21) | 26 (21-31) | 40 (33-47) | 103 (83-123) | 75 (62-91) | 53 (43-63) | 47 (39-57) |
| Arctic Skua | 0 (0-0) | 0 (0-990) | 0 (0-0) | 0 (0-0) | 0 (0-113) | 0 (0-1) | 0 (0-38) | 0 (0-330) |
| Great Skua | 0 (0-1) | 0 (0-1) | 1 (0-1) | 1 (0-1) | 1 (1-2) | 1 (1-2) | 1 (0-1) | 1 (1-2) |
| Black-legged kittiwake | 291 (260-332) | 460 (412-516) | 876 (775-994) | 488 (434-551) | 919 (805-1,052) | 449 (393-520) | 702 (620-801) | 437 (387-496) |
| Lesser black-backed gull | 65 (43-96) | 27 (16-48) | 33 (20-51) | 23 (14-43) | 18 (9-31) | 21 (12-39) | 37 (23-57) | 24 (15-45) |
| Great black-backed gull | 32 (22-51) | 82 (59-116) | 40 (28-60) | 93 (68-134) | 51 (30-86) | 60 (40-89) | 41 (26-65) | 75 (53-109) |
| Common guillemot | 1 (1-1) | 10 (7-13) | 3 (2-4) | 22 (17-29) | 5 (3-6) | 15 (11-20) | 3 (2-4) | 15 (11-19) |
| Razorbill | 1 (0-1) | 7 (4-12) | 1 (0-3) | 17 (11-29) | 1 (0-3) | 15 (10-23) | 1 (0-2) | 12 (8-20) |
| Little auk | 0 (0-0) | 1 (1-2) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 1 (0-1) | 0 (0-0) | 1 (1-2) |
| Atlantic puffin | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Northern fulmar**

A7.10. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 12 (90% CIs 10-15) northern fulmar collisions per year, of which nine would occur during the breeding season and three during the non-breeding season.

A7.11. Using Option 1, mean annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

A7.12. Mean annual collision estimates, using Option 1, represent less than 0.1% of the species' British breeding population and of the species' biogeographic population.

A7.13. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Northern gannet**

A7.14. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 100 (90% CIs 82-120) northern gannet collisions per year, of which 53 would occur during the breeding season and 47 during the non-breeding season.

A7.15. Using Option 1, mean annual estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature. The largest relative impact was predicted for the Flamborough Head and Bempton Cliffs SPA although less than 1% of the population at this site would be impacted even if Option 1 of the Band collision risk model were followed.

A7.16. Mean annual collision estimates, using Option 1, represent less than 0.1% of the species' British breeding population and of the species' biogeographic population.

A7.17. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Arctic skua**

A7.18. Analysis indicated a negligible difference in the number of Arctic skua collisions predicted if Option 1 of the Band collision risk model (Band *et al.* 2012), using site-specific flight height data, was followed rather than Option 3.

A7.19. Mean annual collision estimates, using 2010, 2010/11 and 2011/12 data and Option 1, represent less than 0.1% of the total population of the overall suite of protected

sites around the North Sea at which the species is a feature and less than 0.1% of the species' biogeographic population.

A7.20. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Great skua**

A7.21. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of two great skua collisions per year.

A7.22. Mean annual collision estimates, using Option 1, represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature and less than 0.1% of the species' biogeographic population.

A7.23. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Black-legged kittiwake**

A7.24. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 1,139 (90% CIs 1,006-1,297) black-legged kittiwake collisions per year. Of these, a mean of 702 would occur during the breeding season and 437 during the non-breeding season.

A7.25. Using Option 1, mean annual estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature. The largest relative impact was predicted for the Flamborough Head and Bempton Cliffs SPA although less than 1% of the population at this site would be impacted even if Option 1 of the Band collision risk model were followed.

A7.26. Using Option 1, mean annual estimates represent less than 1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and less than 0.1% of the species' British breeding population and of the species' biogeographic population.

A7.27. Using Option 1, mean annual collision estimates represent an increase in background mortality of 11.3% at the Flamborough Head and Bempton Cliffs SPA. At a national level, mean annual collision estimates reflect a 1.4% increase in background mortality and at a biogeographic level, they reflect an increase of 0.2% in background mortality.

A7.28. Thus using Option 1 of the Band collision risk model, collision risk would be considered of **low magnitude** at the protected site scale and of **moderate significance**.

**Lesser black-backed gull**

A7.29. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 61 (90% CIs 38-108) lesser black-backed gull collisions per year. Of these, 37 would be expected to occur in the breeding season and 24 in the non-breeding season.

A7.30. Using Option 1, mean annual estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and also less than 0.1% of the winter population estimate for the species in Great Britain and of the species' biogeographic population.

A7.31. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Great black-backed gull**

A7.32. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest 116 (90% CIs 80-174) great black-backed gull collisions per year. Of these, 41 would be expected to occur during the breeding season and 75 during the non-breeding season.

A7.33. Using Option 1, mean annual estimates represent up to 0.2% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and also less than 1% of the winter population estimate for the species in Great Britain and less than 0.1% of the species' biogeographic population.

A7.34. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Common guillemot**

A7.35. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 17 (90% CIs 13-23) common guillemot collisions per year. Of these, three would be expected to occur during the breeding season and 15 during the non-breeding season.

A7.36. Using Option 1, mean annual estimates of the number of collisions represent less than 0.1% of the populations of each of the five protected breeding sites for the species that the proposed project is within foraging range of mean annual estimates

also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.37. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Razorbill**

A7.38. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 13 (90% CIs 8-23) razorbill collisions per year. Of these, 12 would occur during the non-breeding season and just one during the breeding season.

A7.39. Using Option 1, mean annual estimates of the number of collisions using 2010, 2010/11 and 2011/12 data represent less than 0.1% of the population at the protected breeding sites for the species that the proposed project is within foraging range of mean annual estimates using 2010, 2010/11 and 2011/12 data also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.40. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Little auk**

A7.41. If Option 1 of the Band collision risk model (Band *et al.* 2012), using site-specific flight height data, was followed rather than Option 3, analysis provided mean estimates of just two little auk collisions per year.

A7.42. Using Option 1, mean annual collision estimates represent less than 0.1% of the species' biogeographic population.

A7.43. The predicted number of collisions represents an increase in background mortality of less than 1% at the national and biogeographic population levels.

**Atlantic puffin**

A7.44. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest mean estimates of less than one Atlantic puffin collision per year.

A7.45. Using Option 1, mean annual estimates of the number of collisions represent less than 0.1% of the population of the one protected breeding site for the species that the proposed project is within foraging range of mean annual estimates using also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.46. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Dogger Bank Teesside B**

A7.47. There were strong between year differences in both the total numbers of birds present within Dogger Bank Teesside B, and annual patterns in their abundance (Tables A7.3 and A7.4).

A7.48. Using a realistic, precautionary avoidance rate of 98% (SNH 2010, Cook *et al.* 2012), the number of Arctic skua, great skua, little auk and Atlantic puffin colliding with wind turbines, was predicted to be less than two birds per year. Northern fulmar, common guillemot and razorbill were more prone to collisions, with predictions of 12, 24 and 18 per year respectively.

A7.49. The numbers of northern gannet, lesser black-backed gull, great black-backed gull and black-legged kittiwake predicted to collide with wind turbines were greater. Assuming a 98% avoidance rate, the mean number of lesser black-backed gulls predicted to collide with wind turbines was 62 and for great black-backed gulls, 122 birds were predicted to collide each year.

A7.50. The species that would be most impacted under option 1 were northern gannet and black-legged kittiwake, with mean predictions of 124 and 1,752 per year respectively, assuming a 99% avoidance rate for northern gannet and 98% avoidance rate for black-legged kittiwake.

A7.51. Investigations were also made into changes to the lower rotor tip height and the resultant impact on collision rates – these are presented for a range of values between 26m and 100m for all species for Dogger Bank Creyke Beck A and B as an example (Appendix 12).

A7.52. Collision rates were higher during the breeding season than the non-breeding season for black-legged kittiwake and lesser black-backed gull. For northern gannet, great black-backed gull, the reverse was true. For all other species, the predicted number of collisions was negligible in both seasons (Table A7.4).

**Table A7.3** Annual collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside B project of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m in response to different avoidance rates. Estimates generated using option 1 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | | | July 2010 – June 2011 | | | | July 2011 – June 2012 | | | | Mean | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 95% | 98% | 99% | 99.50% | 95% | 98% | 99% | 99.50% | 95% | 98% | 99% | 99.50% | 95% | 98% | 99% | 99.5% |
| Northern fulmar | 33 (28-42) | 13 (11-17) | 7 (6-8) | 3 (3-4) | 22 (19-28) | 9 (7-11) | 4 (4-6) | 2 (2-3) | 35 (29-44) | 14 (12-18) | 7 (6-9) | 4 (3-4) | 31 (26-38) | 12 (10-15) | 6 (5-8) | 3 (3-4) |
| Northern gannet | 239 (197-281) | 96 (79-113) | 48 (40-56) | 24 (20-28) | 399 (331-468) | 160 (133-187) | 80 (66-94) | 40 (33-47) | 1,094 (901-1,282) | 438 (361-513) | 219 (180-257) | 109 (90-128) | 619 (512-725) | 248 (205-290) | 124 (102-145) | 62 (51-73) |
| Arctic Skua | 0 (0-2143) | 0 (0-858) | 0 (0-429) | 0 (0-215) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-252) | 0 (0-101) | 0 (0-50) | 0 (0-25) | 0 (0-799) | 0 (0-320) | 0 (0-160) | 0 (0-80) |
| Great Skua | 2 (1-4) | 1 (0-2) | 0 (0-1) | 0 (0-0) | 3 (1-6) | 1 (1-2) | 1 (0-1) | 0 (0-1) | 5 (3-10) | 2 (1-4) | 1 (1-2) | 1 (0-1) | 4 (2-8) | 2 (1-3) | 1 (0-2) | 0 (0-1) |
| Black-legged kittiwake | 2,996 (2,697-3,363) | 1,199 (1,079-1,346) | 600 (540-673) | 300 (270-337) | 5,104 (4,584-5,705) | 2,043 (1,835-2,283) | 1,022 (918-1,142) | 511 (459-571) | 5,261 (4,683-5,977) | 2,106 (1,874-2,392) | 1,053 (937-1,196) | 527 (469-598) | 4378 (3919-4929) | 1752 (1569-1973) | 876 (785-987) | 438 (392-493) |
| Lesser black-backed gull | 236 (166-352) | 94 (66-141) | 47 (33-71) | 24 (17-35) | 141 (92-223) | 56 (37-89) | 28 (18-45) | 14 (9-22) | 95 (51-166) | 38 (21-67) | 19 (10-33) | 10 (5-17) | 154 (101-242) | 62 (40-97) | 31 (20-48) | 15 (10-24) |
| Great black-backed gull | 329 (237-462) | 132 (95-185) | 66 (47-93) | 33 (24-46) | 344 (250-484) | 138 (100-194) | 69 (50-97) | 34 (25-48) | 273 (175-410) | 109 (70-164) | 55 (35-82) | 27 (18-41) | 305 (213-437) | 122 (85-175) | 61 (43-87) | 31 (21-44) |
| Common guillemot | 37 (27-48) | 15 (11-19) | 7 (5-10) | 4 (3-5) | 87 (66-112) | 35 (27-45) | 17 (13-22) | 9 (7-11) | 66 (51-87) | 27 (20-35) | 13 (10-17) | 7 (5-9) | 60 (46-79) | 24 (18-32) | 12 (9-16) | 6 (5-8) |
| Razorbill | 27 (15-43) | 11 (6-17) | 5 (3-9) | 3 (2-4) | 61 (37-105) | 25 (15-42) | 12 (7-21) | 6 (4-11) | 53 (35-86) | 21 (14-34) | 11 (7-17) | 5 (4-9) | 44 (28-74) | 18 (11-30) | 9 (6-15) | 4 (3-7) |
| Little auk | 3 (2-5) | 1 (1-2) | 1 (0-1) | 0 (0-0) | 4 (2-7) | 2 (1-3) | 1 (0-1) | 0 (0-1) | 2 (1-3) | 1 (0-1) | 0 (0-1) | 0 (0-0) | 3 (1-4) | 1 (1-2) | 1 (0-1) | 0 (0-0) |
| Atlantic puffin | 0 (0-1) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Table A7.4** Seasonal collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside B project of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m and an avoidance rate of 98 % (99% for northern gannet). Estimates generated using option 1 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | July 2010 – June 2011 | | July 2011 – June 2012 | | Mean | |
|---|---|---|---|---|---|---|---|---|
| | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding |
| Northern fulmar | 10 (8-12) | 4 (3-5) | 6 (5-7) | 3 (3-4) | 9 (8-11) | 5 (4-6) | 8 (7-10) | 4 (3-5) |
| Northern gannet | 23 (19-27) | 25 (21-30) | 29 (24-34) | 51 (42-59) | 112 (93-130) | 107 (88-127) | 59 (49-68) | 65 (54-77) |
| Arctic Skua | 0 (0-0) | 0 (0-858) | 0 (0-0) | 0 (0-0) | 0 (0-100) | 0 (0-1) | 0 (0-33) | 0 (0-286) |
| Great Skua | 0 (0-1) | 0 (0-1) | 1 (0-1) | 1 (0-1) | 1 (1-2) | 1 (1-2) | 1 (0-1) | 1 (1-2) |
| Black-legged kittiwake | 511 (460-579) | 688 (619-767) | 1,409 (1,268-1,571) | 634 (566-713) | 1,535 (1,366-1,740) | 570 (508-652) | 1165 (1043-1311) | 588 (526-662) |
| Lesser black-backed gull | 70 (51-100) | 24 (15-41) | 35 (24-53) | 21 (13-36) | 19 (10-32) | 19 (11-34) | 40 (27-59) | 22 (13-38) |
| Great black-backed gull | 23 (16-35) | 109 (79-150) | 28 (21-41) | 109 (79-152) | 36 (21-59) | 74 (49-105) | 29 (19-45) | 93 (66-130) |
| Common guillemot | 1 (1-2) | 13 (10-18) | 4 (3-6) | 31 (23-39) | 6 (5-8) | 20 (16-27) | 4 (3-5) | 20 (15-26) |
| Razorbill | 1 (0-1) | 10 (6-16) | 2 (0-4) | 23 (14-39) | 1 (0-4) | 20 (14-30) | 1 (0-3) | 17 (11-27) |
| Little auk | 0 (0-0) | 1 (1-2) | 0 (0-0) | 2 (1-3) | 0 (0-0) | 1 (0-1) | 0 (0-0) | 1 (1-2) |
| Atlantic puffin | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Northern fulmar**

A7.53. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 12 (90% CIs 10-15) northern fulmar collisions per year. Of these, eight would occur during the breeding season and four during the non-breeding season.

A7.54. Using Option 1, mean annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

A7.55. Mean annual collision estimates, using Option 1, represent less than 0.1% of the species' British breeding population and of the species' biogeographic population.

A7.56. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Northern gannet**

A7.57. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 124 (90% CIs 102-145) northern gannet collisions per year. Of these, 59 would be expected to occur during the breeding season and 65 during the non-breeding season.

A7.58. Using Option 1, mean annual estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature. The largest relative impact was predicted for the Flamborough Head and Bempton Cliffs SPA although less than 1% of the population at this site would be impacted even if Option 1 of the Band collision risk model were followed.

A7.59. Using Option 1, the predicted number of collisions reflects an increase in background mortality of 1.4% at Flamborough Head and Bempton Cliffs SPA and less than 1% at the remaining sites at which northern gannet is a designated feature.

A7.60. Mean annual collision estimates represent less than 0.1% of the species' British breeding population and of the species' biogeographic population. The predicted number of collisions reflects an increase of less than 1% in background mortality at the national and biogeographic population levels.

**Arctic skua**

A7.61. Analysis indicated a negligible difference in the number of Arctic skua collisions predicted if Option 1 of the Band collision risk model (Band *et al.* 2012), using site-specific flight height data, was followed rather than Option 3.

A7.62. Mean annual collision estimates, using Option 1, represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature and less than 0.1% of the species' biogeographic population.

A7.63. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Great skua**

A7.64. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of two great skua collisions per year.

A7.65. Mean annual collision estimates, using Option 1, represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature and less than 0.1% of the species' biogeographic population.

A7.66. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Black-legged kittiwake**

A7.67. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 1,752 (90% CIs 1,569-1,973) black-legged kittiwake collisions per year. Of these, 1,165 would occur during the breeding season and 588 during the non-breeding season.

A7.68. The proposed project is within foraging range of two protected breeding sites around the North Sea at which the species is a feature – the Durham Coast SSSI and the Flamborough Head and Bempton Cliffs SPA. Using site-specific flight height data in Option 1 of the Band collision risk model, mean annual estimates of the number of collisions represent approximately 0.6% and 1.1% of the population of the sites' populations respectively. The predicted collision rates also reflect an increase above background mortality at each site of 11.8% and 17.5% respectively.

A7.69. Using Option 1, mean annual estimates using both 2010 and 2011 data represent just over 1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, but less than 0.1% of the species' British breeding population and of the species' biogeographic population. At a national level, the predicted annual collision rate would represent an increase of 2.1% of background mortality and less than 1% (0.4%) of background mortality at an international level.

A7.70. Thus using Option 1 of the Band collision risk model, collision risk would be considered of **low magnitude** at the protected site level and of **moderate significance**.

**Lesser black-backed gull**

A7.71. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 62 (90% CIs 40-97) lesser black-backed gull collisions per year. Of these, 40 would be predicted to occur during the breeding season and 22 during the non-breeding season.

A7.72. Using Option 1, mean annual estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and also less than 0.1% of the winter population estimate for the species in Great Britain and of the species' biogeographic population.

A7.73. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Great black-backed gull**

A7.74. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 122 (90% CIs 85-175) great black-backed gull collisions per year. Of these, 29 would be expected to occur during the breeding season and 93 during the non-breeding season.

A7.75. Using Option 1, mean annual estimates represent up to 0.2% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and also less than 1% of the winter population estimate for the species in Great Britain and less than 0.1% of the species' biogeographic population.

A7.76. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Common guillemot**

A7.77. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 24 (90% CIs 18-32) common guillemot collisions per year. Of these, four would be expected to occur during the breeding season and 20 during the non-breeding season.

A7.78. Using Option 1, mean annual estimates of the number of collisions represent less than 0.1% of the populations of each of the five protected breeding sites for the species that the proposed project is within foraging range of mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected

sites around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.79. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Razorbill**

A7.80. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 18 (90% CIs 11-30) razorbill collisions per year. Of these, 17 would occur during the non-breeding season and one during the breeding season.

A7.81. Using Option 1, mean annual estimates of the number of collisions represent less than 0.1% of the population at the protected breeding sites for the species that the proposed project is within foraging range of mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.82. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Little auk**

A7.83. If Option 1 of the Band collision risk model (Band *et al.* 2012), using site-specific flight height data, was followed rather than Option 3, analysis provided mean estimates of just one little auk collision per year.

A7.84. Using Option 1, mean annual collisions represent less than 0.1% of the species' biogeographic population

A7.85. The predicted number of collisions represents an increase in background mortality of less than 1% at the national and biogeographic population levels.

**Atlantic puffin**

A7.86. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest mean estimates of less than one Atlantic puffin collision per year.

A7.87. Using Option 1, mean annual estimates of the number of collisions data represent less than 0.1% of the population of the one protected breeding site for the species that the proposed project is within foraging range of mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites

around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.88. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Dogger Bank Teesside A and B**

A7.89. There were strong between year differences in both the total numbers of birds present within Dogger Bank Teesside A and B, and annual patterns in their abundance (Tables 7.5 and A7.6).

A7.90. Using a realistic, precautionary avoidance rate of 98% (SNH 2010, Cook *et al.* 2012), the number of Arctic skua, great skua, little auk and Atlantic puffin colliding with wind turbines, was predicted to be less than three birds per year. Northern fulmar, common guillemot and razorbill were more prone to collisions, with predictions of 24, 42 and 31 per year respectively.

A7.91. The numbers of northern gannet, lesser black-backed gull, great black-backed gull and black-legged kittiwake predicted to collide with wind turbines were greater. Assuming a 98% avoidance rate, the mean number of lesser black-backed gulls predicted to collide with wind turbines was 123 and for great black-backed gulls, 238 birds were predicted to collide each year.

A7.92. The species that would be most impacted under option 1 were northern gannet and black-legged kittiwake, with mean predictions of 224 and 2,892 per year respectively, assuming a 99% avoidance rate for northern gannet and 98% avoidance rate for black-legged kittiwake.

A7.93. Investigations were also made into changes to the lower rotor tip height and the resultant impact on collision rates – these are presented for a range of values between 26m and 100m for all species for Dogger Bank Creyke Beck A and B as an example (Appendix 12).

A7.94. Collision rates were higher during the breeding season than the non-breeding season for black-legged kittiwake and lesser black-backed gull. For northern gannet, great black-backed gull, the reverse was true. For all other species, the predicted number of collisions was negligible in both seasons (Table A7.6).

**Table A7.5** Annual collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A and B projects of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m in response to different avoidance rates. Estimates generated using option 1 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | | | July 2010 – June 2011 | | | | July 2011 – June 2012 | | | | Mean | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 95% | 98% | 99% | 99.50% | 95% | 98% | 99% | 99.50% | 95% | 98% | 99% | 99.50% | 0.95 | 0.98 | 0.99 | 0.995 |
| Northern fulmar | 65 (55-80) | 26 (22-32) | 13 (11-16) | 6 (5-8) | 44 (37-55) | 18 (15-22) | 9 (7-11) | 4 (4-6) | 71 (59-89) | 28 (24-36) | 14 (12-18) | 7 (6-9) | 61 (51-76) | 24 (20-30) | 12 (10-15) | 6 (5-8) |
| Northern gannet | 428 (350-508) | 171 (140-203) | 86 (70-102) | 43 (35-51) | 799 (598-856) | 320 (239-343) | 160 (120-171) | 80 (60-86) | 1,982 (1,624-2,347) | 794 (650-940) | 397 (325-470) | 198 (163-235) | 1120 (919-1324) | 448 (368-530) | 224 (184-265) | 112 (92-133) |
| Arctic Skua | 0 (0-4618) | 0 (0-1848) | 0 (0-924) | 0 (0-462) | 0 (0-1) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-536) | 0 (0-214) | 0 (0-107) | 0 (0-54) | 0 (0-1718) | 0 (0-688) | 0 (0-344) | 0 (0-172) |
| Great Skua | 4 (2-9) | 1 (1-3) | 1 (0-2) | 0 (0-1) | 6 (3-12) | 2 (1-5) | 1 (1-2) | 1 (0-1) | 11 (7-21) | 4 (3-8) | 2 (1-4) | 1 (1-2) | 8 (5-15) | 3 (2-6) | 2 (1-3) | 1 (0-2) |
| Black-legged kittiwake | 4,871 (4,375-5,480) | 1,950 (1,751-2,194) | 975 (876-1,097) | 488 (438-549) | 9,564 (7,604-10,209) | 3,828 (3,044-4,086) | 1,914 (1,522-2,043) | 957 (761-1,022) | 8,678 (7,677-9,903) | 3,473 (3,073-3,964) | 1,737 (1,537-1,982) | 869 (768-991) | 7224 (6433-8171) | 2892 (2575-3270) | 1446 (1288-1636) | 723 (644-818) |
| Lesser black-backed gull | 465 (314-711) | 186 (126-285) | 93 (63-142) | 47 (31-71) | 282 (178-458) | 113 (71-184) | 56 (36-92) | 28 (18-46) | 192 (104-342) | 77 (42-137) | 38 (21-68) | 19 (10-34) | 307 (195-495) | 123 (78-198) | 61 (39-99) | 31 (20-50) |
| Great black-backed gull | 614 (440-880) | 246 (176-352) | 123 (88-176) | 61 (44-88) | 688 (488-970) | 275 (195-388) | 138 (98-194) | 69 (49-97) | 550 (350-848) | 220 (140-340) | 110 (70-170) | 55 (35-85) | 595 (413-872) | 238 (165-349) | 119 (83-175) | 60 (41-87) |
| Common guillemot | 63 (46-84) | 25 (18-33) | 13 (9-17) | 6 (5-8) | 175 (114-194) | 70 (46-78) | 35 (23-39) | 17 (11-19) | 114 (87-151) | 46 (35-61) | 23 (17-30) | 11 (9-15) | 104 (78-137) | 42 (31-55) | 21 (16-27) | 10 (8-14) |
| Razorbill | 47 (26-76) | 19 (10-31) | 9 (5-15) | 5 (3-8) | 122 (64-185) | 49 (26-74) | 25 (13-37) | 12 (6-19) | 93 (61-151) | 37 (24-61) | 19 (12-30) | 9 (6-15) | 78 (48-131) | 31 (19-52) | 16 (10-26) | 8 (5-13) |
| Little auk | 6 (3-10) | 2 (1-4) | 1 (1-2) | 1 (0-1) | 8 (5-13) | 3 (2-5) | 2 (1-3) | 1 (0-1) | 3 (2-6) | 1 (1-2) | 1 (0-1) | 0 (0-1) | 5 (3-9) | 2 (1-4) | 1 (1-2) | 1 (0-1) |
| Atlantic puffin | 0 (0-1) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-1) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Table A7.6** Seasonal collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A and B projects of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m and an avoidance rate of 98 % (99% for northern gannet). Estimates generated using option 1 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | July 2010 – June 2011 | | July 2011 – June 2012 | | Mean | |
|---|---|---|---|---|---|---|---|---|
| | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding |
| Northern fulmar | 20 (16-24) | 7 (5-9) | 12 (10-14) | 6 (5-8) | 19 (16-24) | 9 (7-11) | 17 (14-21) | 8 (6-10) |
| Northern gannet | 43 (35-51) | 43 (35-51) | 55 (45-65) | 91 (75-106) | 215 (176-253) | 182 (150-218) | 112 (92-132) | 112 (92-133) |
| Arctic Skua | 0 (0-0) | 0 (0-1848) | 0 (0-0) | 0 (0-0) | 0 (0-213) | 0 (0-2) | 0 (0-71) | 0 (0-617) |
| Great Skua | 0 (0-2) | 0 (0-2) | 2 (0-2) | 2 (0-2) | 2 (2-4) | 2 (2-4) | 1 (1-3) | 2 (1-3) |
| Black-legged kittiwake | 802 (720-911) | 1,148 (1,031-1,283) | 2,285 (2,043-2,565) | 1,122 (1,000-1,264) | 2,454 (2,171-2,792) | 1,019 (901-1,172) | 1867 (1663-2111) | 1024 (912-1159) |
| Lesser black-backed gull | 135 (94-196) | 51 (31-89) | 68 (44-104) | 44 (27-79) | 37 (19-63) | 40 (23-73) | 77 (50-115) | 46 (28-83) |
| Great black-backed gull | 55 (38-86) | 191 (138-266) | 68 (49-101) | 202 (147-286) | 87 (51-145) | 134 (89-194) | 70 (45-110) | 168 (120-239) |
| Common guillemot | 2 (2-3) | 23 (17-31) | 7 (5-10) | 53 (40-68) | 11 (8-14) | 35 (27-47) | 7 (5-9) | 35 (26-46) |
| Razorbill | 2 (0-2) | 17 (10-28) | 3 (0-7) | 40 (25-68) | 2 (0-7) | 35 (24-53) | 2 (0-5) | 29 (19-47) |
| Little auk | 0 (0-0) | 2 (2-4) | 0 (0-0) | 4 (2-6) | 0 (0-0) | 2 (0-2) | 0 (0-0) | 2 (1-4) |
| Atlantic puffin | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |

**Northern fulmar**

A7.95. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 24 (90% CIs 20-30) northern fulmar collisions per year. Of these, 17 would occur during the breeding season and eight during the non-breeding season.

A7.96. Using Option 1, mean annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

A7.97. Mean annual collision estimates, using Option 1, represent less than 0.1% of the species' British breeding population and of the species' biogeographic population.

A7.98. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Northern gannet**

A7.99. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 224 (90% CIs 184-265) northern gannet collisions per year. Of these, 112 would be expected to occur during the breeding season and 112 during the non-breeding season.

A7.100. Using Option 1, mean annual estimates using represent less than 1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature. The largest relative impact was predicted for the Flamborough Head and Bempton Cliffs SPA although less than 1% (up to 0.2%) of the population at this site would be impacted even if Option 1 of the Band collision risk model were followed.

A7.101. Using Option 1, the predicted number of collisions reflects an increase in background mortality of approximately 2.6% at Flamborough Head and Bempton Cliffs SPA and 1.2% each at the Forth Islands SPA and the 'Seevogelschutzgebiet Helgoland SPA at which northern gannet is a designated feature.

A7.102. Mean annual collision estimates represent less than 0.1% of the species' British breeding population and of the species' biogeographic population. The predicted number of collisions reflects an increase of less than 1% in background mortality at the national and biogeographic population levels.

**Arctic skua**

A7.103. Analysis indicated a negligible difference in the number of Arctic skua collisions predicted if Option 1 of the Band collision risk model (Band *et al.* 2012), using site-specific flight height data, was followed rather than Option 3.

A7.104. Mean annual collision estimates, using Option 1, represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature and less than 0.1% of the species' biogeographic population.

A7.105. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Great skua**

A7.106. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of three great skua collisions per year.

A7.107. Mean annual collision estimates, using Option 1, represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature and less than 0.1% of the species' biogeographic population.

A7.108. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Black-legged kittiwake**

A7.109. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 2,892 (90% CIs 2,575-3,270) black-legged kittiwake collisions per year. Of these, 1,867 would occur during the breeding season and 1,024 during the non-breeding season.

A7.110. The proposed projects are within foraging range of two protected breeding sites around the North Sea at which the species is a feature – the Durham Coast SSSI and the Flamborough Head and Bempton Cliffs SPA. Using site-specific flight height data in Option 1 of the Band collision risk model, mean annual estimates of the number of collisions represent approximately 0.9% and 1.7% of the population of the sites' populations respectively. The predicted collision rates also reflect an increase above background mortality at each site of 13.3% and 28.9% respectively.

A7.111. Using Option 1, mean annual estimates represent just over 1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, but less than 0.1% of the species' British breeding population and of the species' biogeographic population. At a national level, the predicted annual collision rate would represent an increase of 3.5% of background mortality and less than 1% ()up to 0.6%) of background mortality at an international level.

A7.112. Thus using Option 1 of the Band collision risk model, collision risk would be considered of **medium magnitude** at the protected site level and of **major significance**.

**Lesser black-backed gull**

A7.113. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 123 (90% CIs 78-198) lesser black-backed gull collisions per year. Of these, 77 would be predicted to occur during the breeding season and 46 during the non-breeding season.

A7.114. Using Option 1, mean annual estimates represent 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and also less than 0.1% of the winter population estimate for the species in Great Britain and of the species' biogeographic population.

A7.115. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Great black-backed gull**

A7.116. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 238 (90% CIs 165-349) great black-backed gull collisions per year. Of these, 70 would be expected to occur during the breeding season and 168 during the non-breeding season.

A7.117. Using Option 1, mean annual estimates represent less than 1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature and of the winter population estimate for the species in Great Britain, and less than 0.1% of the species' biogeographic population.

A7.118. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Common guillemot**

A7.119. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a maximum of 542 (90% CIs 31-55) common guillemot collisions per year. Of these, seven would be expected to occur during the breeding season and 35 during the non-breeding season.

A7.120. Using Option 1, mean annual estimates of the number of collisions represent less than 0.1% of the populations of each of the six protected breeding sites for the species that the proposed projects are within foraging range of mean annual estimates also represent less than 0.1% of the total population of the overall suite of

protected sites around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.121. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Razorbill**

A7.122. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 31 (90% CIs 19-52) razorbill collisions per year. Of these, 29 would occur during the non-breeding season and two during the breeding season.

A7.123. Using Option 1, mean annual estimates of the number of collisions represent less than 0.1% of the population at the protected breeding sites for the species that the proposed projects are within foraging range of mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.124. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Little auk**

A7.125. If Option 1 of the Band collision risk model (Band *et al.* 2012), using site-specific flight height data, was followed rather than Option 3, analysis provided estimates of just two little auk collisions per year.

A7.126. Using Option 1, mean annual collision estimates using 2010, 2010/11 and 2011/12 data represent less than 0.1% of the species' biogeographic population

A7.127. The predicted number of collisions represents an increase in background mortality of less than 1% at the national and biogeographic population levels.

**Atlantic puffin**

A7.128. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of less than one Atlantic puffin collision per year.

A7.129. Using Option 1, mean annual estimates of the number of collisions represent less than 0.1% of the population of the one protected breeding site for the species that the proposed projects are within foraging range of mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites

around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.130. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Dogger Bank Teesside A and B, Dogger Bank Teesside C and D and Dogger Bank Creyke Beck A and B**

A7.131. There were strong between year differences in both the total numbers of birds present within Dogger Bank Teesside A and B, Dogger Bank Teesside C and D and Dogger Bank Creyke Beck A and B, and annual patterns in their abundance (Tables A7.7 and A7.8).

A7.132. Using a realistic, precautionary avoidance rate of 98% (SNH 2010, Cook *et al.* 2012), the number of Arctic skua, great skua, little auk and Atlantic puffin colliding with wind turbines, was predicted to be less than nine birds per year. Northern fulmar, common guillemot and razorbill were more prone to collisions, with predictions of 67, 147 and 107 per year respectively.

A7.133. The numbers of northern gannet, lesser black-backed gull, great black-backed gull and black-legged kittiwake predicted to collide with wind turbines were greater. Assuming a 98% avoidance rate, the mean number of lesser black-backed gulls predicted to collide with wind turbines was 330 and for great black-backed gulls, 664 birds were predicted to collide each year.

A7.134. The species that would be most impacted under option 1 were northern gannet and black-legged kittiwake, with mean predictions of 718 and 11,922 per year respectively, assuming a 99% avoidance rate for northern gannet and 98% avoidance rate for black-legged kittiwake.

A7.135. Investigations were also made into changes to the lower rotor tip height and the resultant impact on collision rates – these are presented for a range of values between 26m and 100m for all species for Dogger Bank Creyke Beck A and B as an example (Appendix 12).

A7.136. Collision rates were higher during the breeding season than the non-breeding season for northern fulmar, black-legged kittiwake and lesser black-backed gull. For northern gannet, great black-backed gull, common guillemot and razorbill, the reverse was true. For other species, the number of collisions in either season was negligible (Table A7.8).

**Table A7.7** Annual collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A and B, Dogger Bank Teesside C and D and Dogger Bank Creyke Beck A and B projects of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m in response to different avoidance rates. Estimates generated using option 1 of Band model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | | | July 2010 – June 2011 | | | | July 2011 – June 2012 | | | | Mean | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 95% | 98% | 99% | 99.50% | 95% | 98% | 99% | 99.50% | 95% | 98% | 99% | 99.50% | 0.95 | 0.98 | 0.99 | 0.995 |
| Northern fulmar | 178 (148-224) | 71 (59-90) | 36 (30-45) | 18 (15-22) | 123 (101-155) | 49 (40-62) | 25 (20-31) | 12 (10-16) | 196 (161-248) | 78 (65-99) | 39 (32-50) | 20 (16-25) | 168 (139-212) | 67 (56-85) | 34 (28-42) | 17 (14-21) |
| Northern gannet | 1,435 (1,170-1,711) | 574 (468-685) | 287 (234-343) | 144 (117-171) | 2,332 (1,855-2,677) | 933 (743-1,072) | 467 (371-536) | 233 (186-268) | 6,312 (5,154-7,487) | 2,527 (2,063-2,997) | 1,264 (1,032-1,499) | 632 (516-750) | 3586 (2935-4252) | 1435 (1175-1702) | 718 (588-851) | 359 (294-426) |
| Arctic Skua | 0 (0-11,485) | 0 (0-4,597) | 0 (0-2,299) | 0 (0-1,150) | 1 (0-2) | 0 (0-1) | 0 (0-0) | 0 (0-0) | 1 (0-1,336) | 0 (0-535) | 0 (0-268) | 0 (0-134) | 1 (0-4275) | 0 (0-1711) | 0 (0-856) | 0 (0-428) |
| Great Skua | 10 (4-23) | 4 (2-9) | 2 (1-5) | 1 (0-2) | 16 (8-31) | 6 (3-12) | 3 (2-6) | 2 (1-3) | 29 (18-54) | 11 (7-22) | 6 (4-11) | 3 (2-5) | 21 (12-41) | 8 (5-16) | 4 (2-8) | 2 (1-4) |
| Black-legged kittiwake | 19,927 (17,762-22,604) | 7,976 (7,109-9,047) | 3,989 (3,555-4,525) | 1,995 (1,778-2,263) | 36,804 (31,206-39,687) | 14,731 (12,490-15,885) | 7,367 (6,247-7,944) | 3,684 (3,124-3,973) | 35,581 (31,409-40,707) | 14,242 (12,571-16,293) | 7,122 (6,287-8,148) | 3,562 (3,144-4,075) | 29786 (26410-33855) | 11922 (10571-13551) | 5962 (5286-6777) | 2981 (2644-3389) |
| Lesser black-backed gull | 1,264 (851-1,940) | 506 (341-776) | 253 (170-388) | 127 (85-194) | 758 (470-1220) | 304 (188-489) | 152 (94-244) | 76 (47-122) | 506 (261-901) | 203 (104-360) | 101 (52-180) | 51 (26-90) | 824 (516-1325) | 330 (206-531) | 165 (103-265) | 83 (52-133) |
| Great black-backed gull | 1,830 (1,275-2,620) | 732 (510-1,049) | 366 (255-525) | 183 (128-262) | 1,858 (1,291-2,639) | 744 (517-1,056) | 372 (258-528) | 186 (129-264) | 1,474 (935-2,249) | 590 (374-900) | 295 (187-450) | 148 (94-225) | 1660 (1129-2416) | 664 (452-967) | 332 (226-484) | 166 (113-242) |
| Common guillemot | 222 (160-292) | 89 (64-117) | 44 (32-59) | 22 (16-29) | 556 (396-681) | 222 (159-273) | 111 (79-136) | 56 (40-68) | 404 (303-531) | 162 (121-212) | 81 (61-106) | 40 (30-53) | 368 (273-479) | 147 (109-192) | 74 (55-96) | 37 (27-48) |
| Razorbill | 161 (91-265) | 65 (36-106) | 32 (18-53) | 16 (9-26) | 387 (221-641) | 155 (88-257) | 77 (44-128) | 39 (22-64) | 320 (209-522) | 128 (84-209) | 64 (42-105) | 32 (21-52) | 268 (165-451) | 107 (66-181) | 54 (33-90) | 27 (17-45) |
| Little auk | 15 (9-26) | 6 (3-10) | 3 (2-5) | 2 (1-3) | 21 (12-35) | 9 (5-14) | 4 (2-7) | 2 (1-3) | 9 (5-16) | 3 (2-6) | 2 (1-3) | 1 (0-2) | 14 (8-24) | 6 (3-10) | 3 (2-5) | 1 (1-2) |
| Atlantic puffin | 0 (0-6) | 0 (0-2) | 0 (0-1) | 0 (0-1) | 0 (0-6) | 0 (0-2) | 0 (0-1) | 0 (0-1) | 0 (0-1) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-3) | 0 (0-1) | 0 (0-1) | 0 (0-0) |

**Table A7.8** Seasonal collision risk estimates (with 90% confidence limits) for study species within the Dogger Bank Teesside A and B, Dogger Bank Teesside C and D and Dogger Bank Creyke Beck A and B projects of the Dogger Bank Zone, assuming a worst case scenario of 200 6MW wind turbines with a lower rotor tip height of 26m above highest astronomical tide and a rotor diameter of 167m and an avoidance rate of 98 % (99% for northern gannet). Estimates generated using option 1 of Band collision risk model, which corrects for variable collision risk within the rotor-swept area.

| Species | 2010 | | July 2010 – June 2011 | | July 2011 – June 2012 | | Mean | |
|---|---|---|---|---|---|---|---|---|
| | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding | Breeding | Non-breeding |
| Northern fulmar | 50 (8-61) | 17 (3-29) | 31 (26-37) | 19 (15-24) | 50 (41-63) | 28 (22-35) | 43 (36-54) | 24 (19-31) |
| Northern gannet | 138 (16-164) | 122 (18-178) | 173 (141-205) | 281 (229-332) | 645 (528-762) | 620 (505-738) | 342 (280-404) | 376 (307-447) |
| Arctic Skua | 0 (0-0) | 0 (0-4597) | 0 (0-0) | 0 (0-0) | 0 (0-531) | 0 (0-4) | 0 (0-177) | 0 (0-1534) |
| Great Skua | 0 (0-5) | 0 (0-5) | 5 (0-5) | 5 (0-5) | 5 (5-11) | 5 (5-11) | 4 (2-7) | 5 (3-9) |
| Black-legged kittiwake | 3,725 (260-4,252) | 3795 (460-4,796) | 10,273 (9,144-11,581) | 3,779 (3,345-4,305) | 10,831 (9,549-12,367) | 3,411 (3,022-3,927) | 8367 (7415-9500) | 3555 (3155-4051) |
| Lesser black-backed gull | 381 (43-563) | 72 (27-215) | 195 (126-296) | 107 (64-193) | 106 (52-183) | 96 (53-177) | 217 (142-331) | 113 (65-200) |
| Great black-backed gull | 116 (22-184) | 432 (82-864) | 147 (101-221) | 593 (416-834) | 180 (103-311) | 411 (272-590) | 146 (92-237) | 518 (359-730) |
| Common guillemot | 7 (1-9) | 59 (10-108) | 25 (18-33) | 188 (140-239) | 38 (27-49) | 124 (94-164) | 24 (17-31) | 123 (92-160) |
| Razorbill | 5 (0-8) | 35 (7-98) | 9 (2-22) | 139 (87-234) | 5 (0-23) | 122 (83-185) | 7 (1-18) | 101 (65-163) |
| Little auk | 0 (0-0) | 5 (1-11) | 0 (0-0) | 10 (5-16) | 0 (0-0) | 5 (0-5) | 0 (0-0) | 6 (3-10) |
| Atlantic puffin | 0 (0-0) | 0 (0-2) | 0 (0-0) | 0 (0-2) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-1) |

**Northern fulmar**

A7.137. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 67 (90% CIs 56-85) northern fulmar collisions per year. Of these, 43 would occur during the breeding season and 24 during the non-breeding season.

A7.138. Using Option 1, mean annual collision estimates represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature.

A7.139. Mean annual collision estimates, using Option 1, represent less than 0.1% of the species' British breeding population and of the species' biogeographic population.

A7.140. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Northern gannet**

A7.141. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 718 (90% CIs 588-851) northern gannet collisions per year. Of these, 342 would be expected to occur during the breeding season and 376 during the non-breeding season.

A7.142. Using Option 1, mean annual estimates using represent less than 1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature. The largest relative impact was predicted for the Flamborough Head and Bempton Cliffs SPA although less than 1% of the population at this site would also be impacted even if Option 1 of the Band collision risk model were followed.

A7.143. Using Option 1, the predicted number of collisions reflects an increase in background mortality of approximately 8.9% at Flamborough Head and Bempton Cliffs SPA and 3.7% and 3.4% at the Forth Islands SPA and the 'Seevogelschutzgebiet Helgoland SPA respectively.

A7.144. Mean annual collision estimates represent less than 0.1% of the species' British breeding population and of the species' biogeographic population. The predicted number of collisions reflects an increase of less than 1% in background mortality at the national and biogeographic population levels.

A7.145. Thus using Option 1 of the Band collision risk model, collision risk would be considered of **low magnitude** at the protected site scale and thus of **moderate significance**.

**Arctic skua**

A7.146. Analysis indicated a negligible difference in the number of Arctic skua collisions predicted if Option 1 of the Band collision risk model (Band *et al.* 2012), using site-specific flight height data, was followed rather than Option 3.

A7.147. Mean annual collision estimates, using Option 1, represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature and less than 0.1% of the species' biogeographic population.

A7.148. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Great skua**

A7.149. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of eight (90% CIs 5-16) great skua collisions per year.

A7.150. Mean annual collision estimates, using Option 1, represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature and less than 0.1% of the species' biogeographic population.

A7.151. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Black-legged kittiwake**

A7.152. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 11,922 (90% CIs 10,571-13,551) black-legged kittiwake collisions per year. Of these, 8,367 would occur during the breeding season and 3,555 during the non-breeding season.

A7.153. The proposed projects are within foraging range of three protected breeding sites around the North Sea at which the species is a feature – the Durham Coast SSSI, Farne Islands SPA and the Flamborough Head and Bempton Cliffs SPA. Using site-specific flight height data in Option 1 of the Band collision risk model, mean annual estimates of the number of collisions represent approximately 3.2%, 1.7% and 5.7% of the population of the sites' populations respectively. The predicted collision rates also reflect an increase above background mortality at each site of 69.2%, 37.0 and 123.4% respectively.

A7.154. Using Option 1, mean annual estimates using both 2010 and 2011 data represent just over 1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, but less than 0.1% of the species' British breeding population and of the species' biogeographic population. At a national level, the predicted annual collision rate would represent an increase of 14.5% of background mortality and less than 5% (up to 2.4%) of background mortality at an international level.

A7.155. Thus using Option 1 of the Band collision risk model, collision risk would be considered of **very high magnitude** at the protected site level and of **major significance**. Furthermore, using Option 1, collision risk would be considered of **low magnitude** at the national level and of **moderate significance**.

**Lesser black-backed gull**

A7.156. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 330 (90% CIs 206-531) lesser black-backed gull collisions per year. Of these, 217 would be predicted to occur during the breeding season and 113 during the non-breeding season.

A7.157. Using Option 1, mean annual estimates represent less than 0.2% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and also less than 0.1% of the winter population estimate for the species in Great Britain and of the species' biogeographic population.

A7.158. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Great black-backed gull**

A7.159. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 664 (90% CIs 452-967) great black-backed gull collisions per year. Of these, 146 would be expected to occur during the breeding season and 518 during the non-breeding season.

A7.160. Using Option 1, mean annual estimates represent less than 1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature and of the winter population estimate for the species in Great Britain, and less than 0.1% of the species' biogeographic population.

A7.161. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Common guillemot**

A7.162. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a maximum of 147 (90% CIs 109-192) common guillemot collisions per year. Of these, 24 would be expected to occur during the breeding season and 123 during the non-breeding season.

A7.163. Using Option 1, mean annual estimates of the number of collisions represent less than 0.1% of the populations of each of the six protected breeding sites for the species that the proposed projects are within foraging range of mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.164. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Razorbill**

A7.165. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of 107 (90% CIs 66-181) razorbill collisions per year. Of these, 101 would occur during the non-breeding season and seven during the breeding season.

A7.166. Using Option 1, mean annual estimates of the number of collisions represent less than 0.1% of the population at the protected breeding sites for the species that the proposed projects are within foraging range of mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.167. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

**Little auk**

A7.168. If Option 1 of the Band collision risk model (Band *et al.* 2012), using site-specific flight height data, was followed rather than Option 3, analysis provided estimates of just six (90% CIs 3-10) little auk collisions per year.

A7.169. Using Option 1, mean annual collision estimates using 2010, 2010/11 and 2011/12 data represent less than 0.1% of the species' biogeographic population

A7.170. The predicted number of collisions represents an increase in background mortality of less than 1% at the national and biogeographic population levels.

**Atlantic puffin**

A7.171. Using site-specific flight height data in Option 1 of the Band collision risk model (Band *et al.* 2012), analysis would suggest a mean of less than one Atlantic puffin collision per year.

A7.172. Using Option 1, mean annual estimates of the number of collisions represent less than 0.1% of the population of the one protected breeding site for the species that the proposed projects are within foraging range of mean annual estimates also represent less than 0.1% of the total population of the overall suite of protected sites around the North Sea at which the species is a feature, and of the species' British breeding population and of the species' biogeographic population.

A7.173. The predicted number of collisions represents an increase in background mortality of less than 1% at the protected site, protected site suite, national and biogeographic population levels.

## APPENDIX 8 Other projects considered for cumulative impact assessment

A8.1 This appendix details the other projects considered for cumulative impact assessment. An initial long-list list of sites considered for cumulative impact included oil and gas, cables and pipelines, archaeology, shipping and navigation, military, and nature conservation.

A8.2 We here consider other offshore wind farms and marine aggregates to have the most similar effects to those presented by the Dogger Bank Teesside A and B offshore wind farm projects and hence we have screened out other types of activities prior to the cumulative assessment being carried out. A full list of offshore wind farms and marine aggregates considered in the Greater North Sea OSPAR region is detailed in Table A8.1.

A8.3 Appendix 1 assessed whether during the breeding season, species identified as features of breeding colonies should be screened in or out of the EIA process, by considering whether the potential foraging ranges of the species concerned overlapped with the Dogger Bank Teesside A and B projects. Tables A8.2 to A8.7 detail which further offshore wind farm and marine aggregate projects are also in the potential foraging range of these species during the breeding season from the sites identified as relevant to the Dogger Bank Teesside A and B projects.

**Table A8.1** Total list of sites considered for the assessment.

| Type of activity | Country | Name of project |
|---|---|---|
| Wind farm | UK | Beatrice |
| | | Blyth Demonstration Site |
| | | Docking Shoal |
| | | Dogger Bank Zone |
| | | Dudgeon |
| | | E1: STW Medium Term Options |
| | | East Anglia One (East Anglia) |
| | | European Offshore Wind Deployment Centre |
| | | Firth of Forth |
| | | Galloper |
| | | Greater Gabbard |
| | | H2-20 |
| | | Hornsea Subzone One (Hornsea) |
| | | Hornsea Zone |
| | | Humber Gateway |
| | | Inch Cape |
| | | Lincs |
| | | Methil |
| | | Moray Firth |
| | | N2-3: STW Medium Term Options |
| | | N4-6: STW Medium Term Options |
| | | N5: STW Medium Term Options |
| | | N6: STW Medium Term Options |
| | | N7: STW Medium Term Options |
| | | N8: STW Medium Term Options |
| | | NE1: STW Medium Term Options |
| | | NE2: STW Medium Term Options |
| | | NE3: STW Medium Term Options |
| | | Neart na Gaoithe |
| | | Norfolk Bank (East anglia) |
| | | Race Bank |
| | | Sheringham Shoal |
| | | Dogger Bank Teesside |
| | | Thanet, R2, construction |
| | | Triton Knoll |
| | | Westermost Rough |
| | Belgium | Belwind Phase 2 |
| | | Norther |
| | | Northwind |
| | | RENTEL |
| | | Seastar |

| Type of activity | Country | Name of project |
|---|---|---|
| | | Thornton Bank phase II |
| | | Thornton Bank phase III |
| | | THV Mermaid |
| | Denmark | DanTysk DK |
| | | Horns Rev 3 |
| | | Horns Rev A HR5 |
| | | Horns Rev B HR6 |
| | | Horns Rev B HR7 |
| | | Horns Rev reserved area |
| | | Jammerbugt A J3 |
| | | Jammerbugt A J4 |
| | | Jammerbugt B J1 |
| | | Jammerbugt B J2 |
| | | Jammerbugt Nord |
| | | Jammerbugt Reserved Area |
| | | Jammerbugt Syd |
| | | Ringkøbing Fjord A RK1 |
| | | Ringkøbing Fjord A RK2 |
| | | Ringkøbing Fjord B RK3 |
| | | Ringkøbing Fjord B RK4 |
| | | Ringkøbing Fjord B RK5 |
| | | Ringkøbing Reserved Area |
| | | Rønland II |
| | | Rønland III |
| | | Vesterhavet Nord |
| | | Vesterhavet Syd |
| | Germany | Aiolos |
| | | Albabtros |
| | | Amrumbank West |
| | | Aquamarin |
| | | Area C I |
| | | Area C II |
| | | Area C III |
| | | Austerngrund |
| | | BARD Offshore 1 |
| | | Bernstein |
| | | Bight Power I |
| | | Bight Power II |
| | | Borkum Riffgat |
| | | Borkum Riffgrund |
| | | Borkum Riffgrund II |
| | | Borkum Riffgrund West |
| | | Borkum Riffgrund West II |

| Type of activity | Country | Name of project |
|---|---|---|
| | | Borkum West II |
| | | Citrin |
| | | Dan Tysk |
| | | Diamant |
| | | EnBW He Dreiht |
| | | EnBW Hohe See |
| | | ENOVA Offshore NSWP |
| | | ENOVA Offshore NSWP |
| | | ENOVA Offshore NSWP |
| | | ENOVA Offshore NSWP |
| | | ENOVA Offshore NSWP |
| | | ENOVA Offshore NSWP |
| | | ENOVA Offshore NSWP |
| | | ENOVA Offshore NSWP |
| | | ENOVA Offshore NSWP |
| | | Enova offshore NSWP4 |
| | | Enova offshore NSWP5 |
| | | Enova offshore NSWP6 |
| | | Enova offshore NSWP7 |
| | | Euklas |
| | | Gaia I |
| | | Gaia II |
| | | Gaia III |
| | | Gaia IV |
| | | Gaia V |
| | | Gannet |
| | | Globe Tech I |
| | | Globe Tech II |
| | | Globe Tech III |
| | | Gode Wind |
| | | Gode Wind II |
| | | Gode Wind III |
| | | He Dreiht II |
| | | Heron |
| | | Horizant I |
| | | Horizant II |
| | | Horizant III |
| | | Innogy Norsee 2 |
| | | Innogy Norsee 3 |
| | | Innogy Norsee I |
| | | Jules Verne |
| | | Kaikas |
| | | Kaskasi |

| Type of activity | Country | Name of project |
|---|---|---|
| | | Mainstream |
| | | Meerwind |
| | | Meerwind West |
| | | MEG offshore 1 |
| | | Nautilus |
| | | Nautilus II |
| | | Nemo |
| | | Neptun |
| | | Neptun |
| | | Neptun |
| | | Neptun |
| | | Neptun |
| | | Norderland |
| | | Norderland |
| | | Nordlicher Grund |
| | | NORD-OST PASSAT I |
| | | NORD-OST PASSAT II |
| | | NORD-OST PASSAT III |
| | | Nordpassage |
| | | Nordsee Ost |
| | | Notos |
| | | Offshore- Bürger- windpark Butendiek |
| | | Offshore Wind Park (Deutsche Burcht) |
| | | Offshore Wind Park Nordergrunde |
| | | OWP Delta Nordsee I |
| | | OWP Delta Nordsee II |
| | | OWP west |
| | | Petrel |
| | | PROWIND 1 |
| | | PROWIND 2 |
| | | PROWIND 3 |
| | | Sandbank 24 |
| | | Sandbank 24 extension |
| | | Sea Storm |
| | | Sea Storm II |
| | | Sea Wind (Storm) IV |
| | | Sea Wind III |
| | | Seagull |
| | | SeaWind I |
| | | SeaWind II |
| | | Skua |
| | | Testfield Helagoland |
| | | Veja Mate |

| Type of activity | Country | Name of project |
|---|---|---|
| | | Vento Tec Nord I |
| | | Vento Tec Nord II |
| | | Witte Bank |
| | Holland | Beaufort (formally Katwijk) |
| | | Borssele – Development Zone |
| | | Breeveertien |
| | | Breeveertien II |
| | | Brown Ridge Oost |
| | | Bruine Bank |
| | | Callantsoog Oost |
| | | Callantsoog West |
| | | Callantsoog Zuid |
| | | Clearcamp |
| | | Cornelia |
| | | Den Haag I |
| | | Den Haag II |
| | | Den Haag III |
| | | Den Haag Noord |
| | | Den Helder 1 |
| | | Den Helder 2 |
| | | Den Helder 3 |
| | | Den Helder I |
| | | Den Helder I |
| | | Den Helder II |
| | | Den Helder III |
| | | Den Helder IV |
| | | Den Helder Noord |
| | | Den Helder Zuid |
| | | Eneco Lunchterduinen |
| | | Eurogeul Noord |
| | | Favorius |
| | | FLOW - Far Offshore Demonstration Park |
| | | FLOW – Turbine Development Facility |
| | | Gemini |
| | | Helder |
| | | Hoek van Holland 1 |
| | | Hoek van Holland 2 |
| | | Hoek van Holland 3 |
| | | Hoek van Holland 4 |
| | | Hollandse kust-Development Zone |
| | | Hopper |
| | | HoriWind |
| | | Horizon |

| Type of activity | Country | Name of project |
|---|---|---|
| | | IJmuiden |
| | | Ijmuiden – Development Zone |
| | | Ijmuiden 1 |
| | | Ijmuiden 2 |
| | | Katwijk Buiten |
| | | Maas West Buiten |
| | | Noord Hinder |
| | | Noord Hinder 1 |
| | | Noord Hinder 2 |
| | | Norodermeerdijks – windpark Noordoostpolder |
| | | Okeanos |
| | | Oost Friesland |
| | | Osters Bank 1 |
| | | Osters Bank 2 |
| | | Osters Bank 3 |
| | | Osters Bank 4 |
| | | P12 |
| | | P15-WP |
| | | Q4 |
| | | Q7-West |
| | | Riffgrond |
| | | Rijnveld Zuid |
| | | Rotterdam Noord – West |
| | | Ruyter Oost |
| | | Ruyter West |
| | | Schaar |
| | | Scheveningen 1 |
| | | Scheveningen 2 |
| | | Scheveningen 3 |
| | | Scheveningen 4 |
| | | Scheveningen 5 |
| | | Scheveningen Buiten |
| | | Ten noorden van de Waddeneilanden – Development Zone |
| | | Thetys |
| | | Tromp Binnen |
| | | Tromp Oost |
| | | Tromp West |
| | | West - Rijn |
| | | Westermeerdijk buitendijks – Windpark Noordoostpolder |
| | | Wieringermeerdijk |
| | | Wijk aan Zee |
| | | WindNed Noord |
| | | WindNed Zuid |

| Type of activity | Country | Name of project |
|---|---|---|
| | Norway | Aegir-havvindpark |
| | | Idunn Energipark |
| | | Karmoy Wind Demonstration area |
| | | Kvitsoy Wind Demonstration area |
| | | Rennesoy Wind Demonstration area |
| | | Siragrunnen |
| | | Sorlige Nordsjo I |
| | | Sorlige Nordsjo II |
| | | Sorlig-nordsjoen |
| | | Sway-10mw-test-turbine |
| | | Sway-1-6-prototype |
| | | Sway-2.6mw-test |
| | | Utsira-nord |
| | | Utsira-phase-I |
| | | Utsira-phase-II |
| | | Windsea-as-prototype |
| Aggregates | UK | Area 448 |
| | | Area 449 |
| | | Area 466/1 |
| | | Area 485/1 |
| | | Area 485/2 |
| | | Area 483 |
| | | Area 484 |
| | | Area 490 |
| | | Area 491 |
| | | Area 506 |
| | | Area 400 |
| | | Area 439 |
| | | Area 492 |
| | | Area 493 |
| | | Area 441/3 |
| | | Area 454/512 |
| | | Area 495/1 |
| | | Area 495/2 |
| | | Area 496 |
| | | Area 494 |
| | Holland | Marine aggregates |

**Table A8.2**. Protected sites identified as relevant to the Dogger Bank Teesside A and B projects for northern fulmar, and other offshore wind farm and marine aggregates projects within the species' potential foraging range from these sites during the breeding season, denoted by a "1" if within foraging range. (Note, this table is based on use of a maximum foraging range of 580km.)

| Type | Country | Project name | BUCHAN NESS TO COLLIESTON COAST | CALF OF EDAY | CAPE WRATH | COPINSAY | EAST CAITHNESS CLIFFS | FAIR ISLE | FLAMBOROUGH HEAD & BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | HOY | NORTH CAITHNESS CLIFFS | ROUSAY | SUMBURGH HEAD | TROUP, PENNAN AND LION`S HEADS | WEST WESTRAY | LITTORAL SEINO-MARIN | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind farms | UK | Beatrice | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Blyth Demonstration Site | | | | | | | 1 | | | | | | | | | | |
| | | Docking Shoal | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Dudgeon | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | E1: STW Medium Term Options | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | East Anglia One (East Anglia) | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | European Offshore Wind | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Firth of Forth | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Galloper | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Greater Gabbard | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | H2-20 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 |
| | | Hornsea Subzone One (Hornsea) | 1 | | | | 1 | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Hornsea Zone | | | | | | | 1 | | | | | | | | | | |
| | | Humber Gateway | 1 | | | | 1 | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Inch Cape | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Inch Cape, STW site | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Lincs | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Methil | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Moray Firth | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | N2-3: STW Medium Term | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | N4-6: STW Medium Term | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | N7: STW Medium Term Options | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |

| Type | Country | Project name | BUCHAN NESS TO COLLIESTON COAST | CALF OF EDAY | CAPE WRATH | COPINSAY | EAST CAITHNESS CLIFFS | FAIR ISLE | FLAMBOROUGH HEAD & BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | HOY | NORTH CAITHNESS CLIFFS | ROUSAY | SUMBURGH HEAD | TROUP, PENNAN AND LION`S HEADS | WEST WESTRAY | LITTORAL SEINO-MARIN | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N8: STW Medium Term Options | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | NE1: STW Medium Term Options | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | NE2: STW Medium Term Options | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | NE3: STW Medium Term Options | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Neart na Gaoithe | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Norfolk Bank (East Anglia) | | | | | | | 1 | | | | | | | | | | |
| | | Race Bank | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Sheringham Shoal | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Teesside | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Triton Knoll | 1 | | | | 1 | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Westermost Rough | 1 | | | | 1 | | 1 | 1 | 1 | | 1 | | | 1 | | 1 | 1 |
| | Belgium | Belwind Phase 2 | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Norther | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Northwind | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | RENTEL | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Seastar | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Thornton Bank phase II | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Thornton Bank phase III | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | THV Mermaid | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | Denmark | DanTysk DK | | | | | | | 1 | | | | | | | | | | 1 |
| | | Horns Rev 3 | | | | | | | 1 | | | | | | | | | | 1 |
| | | Horns Rev A HR5 | | | | | | | 1 | | | | | | | | | | 1 |
| | | Horns Rev B HR6 | | | | | | | 1 | | | | | | | | | | 1 |
| | | Horns Rev B HR7 | | | | | | | 1 | | | | | | | | | | 1 |
| | | Horns Rev reserved area | 1 | | | | | | 1 | | 1 | | | | | | | | 1 |
| | | Jammerbugt A J3 | | | | | | | | | | | | | | | | | 1 |
| | | Jammerbugt A J4 | | | | | | | | | | | | | | | | | 1 |

| Type | Country | Project name | BUCHAN NESS TO COLLIESTON COAST | CALF OF EDAY | CAPE WRATH | COPINSAY | EAST CAITHNESS CLIFFS | FAIR ISLE | FLAMBOROUGH HEAD & BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | HOY | NORTH CAITHNESS CLIFFS | ROUSAY | SUMBURGH HEAD | TROUP, PENNAN AND LION`S HEADS | WEST WESTRAY | LITTORAL SEINO-MARIN | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jammerbugt B J1 | | | | | | | | | | | | | | | | | 1 |
| | | Jammerbugt B J2 | | | | | | | | | | | | | | | | | 1 |
| | | Jammerbugt Nord | | | | | | | | | | | | | | | | | 1 |
| | | Jammerbugt Reserved Area | | | | | | | | | | | | | | | | | 1 |
| | | Jammerbugt Syd | | | | | | | | | | | | | | | | | 1 |
| | | Ringkøbing Fjord A RK1 | | | | | | | 1 | | | | | | | | | | 1 |
| | | Ringkøbing Fjord A RK2 | | | | | | | 1 | | | | | | | | | | 1 |
| | | Ringkøbing Fjord B RK3 | | | | | | | 1 | | | | | | | | | | 1 |
| | | Ringkøbing Fjord B RK4 | | | | | | | 1 | | | | | | | | | | 1 |
| | | Ringkøbing Fjord B RK5 | | | | | | | 1 | | | | | | | | | | 1 |
| | | Ringkøbing Reserved Area | 1 | | | | | | 1 | | 1 | | | | | | | | 1 |
| | | Rønland II | | | | | | | | | | | | | | | | | 1 |
| | | Rønland III | | | | | | | | | | | | | | | | | 1 |
| | | Vesterhavet Nord | | | | | | | | | | | | | | | | | 1 |
| | | Vesterhavet Syd | | | | | | | 1 | | | | | | | | | | 1 |
| | Germany | Aiolos | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Albabtros | | | | | | | 1 | | | | | | | | | | 1 |
| | | Amrumbank West | | | | | | | 1 | | | | | | | | | | 1 |
| | | Aquamarin | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Area C I | | | | | | | 1 | | | | | | | | | | 1 |
| | | Area C II | | | | | | | 1 | | | | | | | | | | 1 |
| | | Area C III | | | | | | | 1 | | | | | | | | | | 1 |
| | | Austerngrund | 1 | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | BARD Offshore 1 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Bernstein | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Bight Power I | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Bight Power II | | | | | | | 1 | | | | | | | | | | 1 |

| Type | Country | Project name | BUCHAN NESS TO COLLIESTON COAST | CALF OF EDAY | CAPE WRATH | COPINSAY | EAST CAITHNESS CLIFFS | FAIR ISLE | FLAMBOROUGH HEAD & BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | HOY | NORTH CAITHNESS CLIFFS | ROUSAY | SUMBURGH HEAD | TROUP, PENNAN AND LION`S HEADS | WEST WESTRAY | LITTORAL SEINO-MARIN | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Borkum Riffgat | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Borkum Riffgrund | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Borkum Riffgrund II | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Borkum Riffgrund West | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Borkum Riffgrund West II | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Borkum West II | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Citrin | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Dan Tysk | | | | | | | 1 | | | | | | | | | | 1 |
| | | Diamant | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | EnBW He Dreiht | | | | | | | 1 | | | | | | | | | | 1 |
| | | EnBW Hohe See | | | | | | | 1 | | | | | | | | | | 1 |
| | | ENOVA Offshore NSWP | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | Enova offshore NSWP4 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | Enova offshore NSWP5 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | Enova offshore NSWP6 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | Enova offshore NSWP7 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | Euklas | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Gaia I | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Gaia II | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Gaia III | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Gaia IV | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Gaia V | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Gannet | | | | | | | 1 | | | | | | | | | | 1 |
| | | Globe Tech I | | | | | | | 1 | | | | | | | | | | 1 |
| | | Globe Tech II | | | | | | | 1 | | | | | | | | | | 1 |
| | | Globe Tech III | | | | | | | 1 | | | | | | | | | | 1 |
| | | Gode Wind | | | | | | | 1 | | | | | | | | | | 1 |

| Type | Country | Project name | BUCHAN NESS TO COLLIESTON COAST | CALF OF EDAY | CAPE WRATH | COPINSAY | EAST CAITHNESS CLIFFS | FAIR ISLE | FLAMBOROUGH HEAD & BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | HOY | NORTH CAITHNESS CLIFFS | ROUSAY | SUMBURGH HEAD | TROUP, PENNAN AND LION`S HEADS | WEST WESTRAY | LITTORAL SEINO-MARIN | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Gode Wind II | | | | | | | 1 | | | | | | | | | | 1 |
| | | Gode Wind III | | | | | | | 1 | | | | | | | | | | 1 |
| | | He Dreiht II | | | | | | | 1 | | | | | | | | | | 1 |
| | | Heron | | | | | | | 1 | | | | | | | | | | 1 |
| | | Horizant I | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Horizant II | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Horizant III | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Innogy Norsee 2 | | | | | | | 1 | | | | | | | | | | 1 |
| | | Innogy Norsee 3 | | | | | | | 1 | | | | | | | | | | 1 |
| | | Innogy Norsee I | | | | | | | 1 | | | | | | | | | | 1 |
| | | Jules Verne | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | Kaikas | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Kaskasi | | | | | | | 1 | | | | | | | | | | 1 |
| | | Mainstream | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Meerwind | | | | | | | 1 | | | | | | | | | | 1 |
| | | Meerwind West | | | | | | | 1 | | | | | | | | | | 1 |
| | | MEG offshore 1 | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Nautilus | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | Nautilus II | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | Nemo | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | Neptun | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | Norderland | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Nordlicher Grund | | | | | | | 1 | | | | | | | | | | 1 |
| | | NORD-OST PASSAT I | 1 | | | | 1 | | 1 | 1 | 1 | | 1 | | | 1 | | | 1 |
| | | NORD-OST PASSAT II | 1 | | | | 1 | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | NORD-OST PASSAT III | 1 | | | | 1 | | 1 | 1 | 1 | | 1 | | | 1 | | | 1 |
| | | Nordpassage | | | | | | | 1 | | | | | | | | | | 1 |

| Type | Country | Project name | BUCHAN NESS TO COLLIESTON COAST | CALF OF EDAY | CAPE WRATH | COPINSAY | EAST CAITHNESS CLIFFS | FAIR ISLE | FLAMBOROUGH HEAD & BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | HOY | NORTH CAITHNESS CLIFFS | ROUSAY | SUMBURGH HEAD | TROUP, PENNAN AND LION`S HEADS | WEST WESTRAY | LITTORAL SEINO-MARIN | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nordsee Ost | | | | | | | 1 | | | | | | | | | | 1 |
| | | Notos | | | | | | | 1 | | | | | | | | | | 1 |
| | | Offshore- Bürger- windpark | | | | | | | 1 | | | | | | | | | | 1 |
| | | Offshore Wind Park (Deutsche | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Offshore Wind Park | | | | | | | 1 | | | | | | | | | | 1 |
| | | OWP Delta Nordsee I | | | | | | | 1 | | | | | | | | | | 1 |
| | | OWP Delta Nordsee II | | | | | | | 1 | | | | | | | | | | 1 |
| | | OWP west | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Petrel | | | | | | | 1 | | | | | | | | | | 1 |
| | | PROWIND 1 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | PROWIND 2 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | PROWIND 3 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | | 1 |
| | | Sandbank 24 | 1 | | | | | | 1 | | | | | | | | | | 1 |
| | | Sandbank 24 extension | 1 | | | | | | 1 | | | | | | | | | | 1 |
| | | Sea Storm | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Sea Storm II | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Sea Wind (Storm) IV | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Sea Wind III | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Seagull | | | | | | | 1 | | | | | | | | | | 1 |
| | | SeaWind I | | | | | | | 1 | | | | | | | | | | 1 |
| | | SeaWind II | | | | | | | 1 | | | | | | | | | | 1 |
| | | Skua | | | | | | | 1 | | | | | | | | | | 1 |
| | | Testfield Helagoland | | | | | | | 1 | | | | | | | | | | 1 |
| | | Veja Mate | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Vento Tec Nord I | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Vento Tec Nord II | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |
| | | Witte Bank | 1 | | | | | | 1 | 1 | 1 | | | | | | | | 1 |

| Type | Country | Project name | BUCHAN NESS TO COLLIESTON COAST | CALF OF EDAY | CAPE WRATH | COPINSAY | EAST CAITHNESS CLIFFS | FAIR ISLE | FLAMBOROUGH HEAD & BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | HOY | NORTH CAITHNESS CLIFFS | ROUSAY | SUMBURGH HEAD | TROUP, PENNAN AND LION`S HEADS | WEST WESTRAY | LITTORAL SEINO-MARIN | SEEVOGELSCHUTZGEBIE T HELGOLAND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Holland | Beaufort (formally Katwijk) | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Borssele – Development Zone | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Breeveertien | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Breeveertien II | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Brown Ridge Oost | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Bruine Bank | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Callantsoog Oost | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Callantsoog West | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Callantsoog Zuid | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Clearcamp | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Cornelia | 1 | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Den Haag I | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Den Haag II | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Den Haag III | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Den Haag Noord | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Den Helder 1 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Den Helder 2 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Den Helder 3 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Den Helder I | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Den Helder II | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Den Helder III | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Den Helder IV | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Den Helder Noord | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Den Helder Zuid | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Eneco Lunchterduinen | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Eurogeul Noord | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Favorius | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |

| Type | Country | Project name | BUCHAN NESS TO COLLIESTON COAST | CALF OF EDAY | CAPE WRATH | COPINSAY | EAST CAITHNESS CLIFFS | FAIR ISLE | FLAMBOROUGH HEAD & BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | HOY | NORTH CAITHNESS CLIFFS | ROUSAY | SUMBURGH HEAD | TROUP, PENNAN AND LION`S HEADS | WEST WESTRAY | LITTORAL SEINO-MARIN | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FLOW - Far Offshore | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | FLOW – Turbine Development | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Gemini | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Helder | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Hoek van Holland 1 | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Hoek van Holland 2 | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Hoek van Holland 3 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Hoek van Holland 4 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Hollandse kust-Development | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Hopper | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | HoriWind | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Horizon | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | IJmuiden | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Ijmuiden – Development Zone | 1 | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Ijmuiden 1 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Ijmuiden 2 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Katwijk Buiten | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Maas West Buiten | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Noord Hinder | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Noord Hinder 1 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Noord Hinder 2 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Norodermeerdijks – windpark | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Okeanos | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Oost Friesland | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Osters Bank 1 | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Osters Bank 2 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Osters Bank 3 | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |

| Type | Country | Project name | BUCHAN NESS TO COLLIESTON COAST | CALF OF EDAY | CAPE WRATH | COPINSAY | EAST CAITHNESS CLIFFS | FAIR ISLE | FLAMBOROUGH HEAD & BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | HOY | NORTH CAITHNESS CLIFFS | ROUSAY | SUMBURGH HEAD | TROUP, PENNAN AND LION`S HEADS | WEST WESTRAY | LITTORAL SEINO-MARIN | SEEVOGELSCHUTZGEBIE T HELGOLAND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Osters Bank 4 | 1 | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | P12 | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | P15-WP | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Q4 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Q7-West | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Riffgrond | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Rijnveld Zuid | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Rotterdam Noord – West | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Ruyter Oost | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Ruyter West | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Schaar | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Scheveningen 1 | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Scheveningen 2 | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Scheveningen 3 | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Scheveningen 4 | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Scheveningen 5 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Scheveningen Buiten | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Ten noorden van de | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Thetys | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Tromp Binnen | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Tromp Oost | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Tromp West | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | West - Rijn | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Westermeerdijk buitendijks – | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Wieringermeerdijk | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | Wijk aan Zee | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | | WindNed Noord | | | | | | | 1 | | | | | | | | | 1 | 1 |

| Type | Country | Project name | BUCHAN NESS TO COLLIESTON COAST | CALF OF EDAY | CAPE WRATH | COPINSAY | EAST CAITHNESS CLIFFS | FAIR ISLE | FLAMBOROUGH HEAD & BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | HOY | NORTH CAITHNESS CLIFFS | ROUSAY | SUMBURGH HEAD | TROUP, PENNAN AND LION`S HEADS | WEST WESTRAY | LITTORAL SEINO-MARIN | SEEVOGELSCHUTZGEBIE T HELGOLAND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | WindNed Zuid | | | | | | | 1 | | | | | | | | | 1 | 1 |
| | Grand | | 74 | 18 | 17 | 18 | 25 | 18 | 220 | 121 | 83 | 18 | 21 | 18 | 18 | 45 | 18 | 121 | 220 |
| Aggregates | UK | Area 400 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Area 439 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Area 441/3 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Area 448 | 1 | | | | 1 | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Area 449 | 1 | | | | 1 | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Area 454/512 | | | | | | | | 1 | 1 | | | | | | | 1 | 1 |
| | | Area 466/1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Area 483 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Area 484 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Area 485/1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | 1 |
| | | Area 485/2 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | 1 |
| | | Area 490 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Area 491 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Area 492 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Area 493 | 1 | | | | 1 | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | | Area 494 | 1 | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Area 495/1 | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Area 495/2 | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 |
| | | Area 496 | | | | | | | 1 | 1 | | | | | | | | 1 | 1 |
| | | Area 506 | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | Holland | Marine aggregates | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 1 |
| | Grand | | 17 | 3 | 1 | 3 | 6 | 3 | 20 | 21 | 20 | 3 | 3 | 3 | 1 | 16 | 1 | 21 | 21 |

**Table A8.3** Protected sites identified as relevant to the Dogger Bank Teesside A and B projects for northern gannet, and other offshore wind farm and marine aggregates projects within the species' potential foraging range from these sites during the breeding season. (Note, this table is based on use of a maximum foraging range of 580km.)

| Type | Country | Project Name | FAIR ISLE | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | NOSS | SULE SKERRY AND SULE STACK | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|
| Wind farms | UK | Beatrice | 1 | 1 | 1 | 1 | 1 | |
| | | Docking Shoal | | 1 | 1 | | | 1 |
| | | Dudgeon | | 1 | 1 | | | 1 |
| | | E1: STW Medium Term Options | 1 | 1 | 1 | 1 | 1 | |
| | | East Anglia One (East Anglia) | | 1 | 1 | | | 1 |
| | | European Offshore Wind Deployment Centre | 1 | 1 | 1 | 1 | 1 | |
| | | Firth of Forth | 1 | 1 | 1 | 1 | 1 | |
| | | Galloper | | 1 | 1 | | | 1 |
| | | Greater Gabbard | | 1 | 1 | | | 1 |
| | | H2-20 | 1 | 1 | 1 | 1 | | 1 |
| | | Hornsea Subzone One (Hornsea) | | 1 | 1 | | | 1 |
| | | Humber Gateway | | 1 | 1 | | | 1 |
| | | Inch Cape | 1 | 1 | 1 | 1 | 1 | |
| | | Inch Cape, STW site | 1 | 1 | 1 | 1 | 1 | |
| | | Lincs | | 1 | 1 | | | 1 |
| | | Methil | 1 | 1 | 1 | 1 | 1 | |
| | | Moray Firth | 1 | 1 | 1 | 1 | 1 | |
| | | N2-3: STW Medium Term Options | 1 | 1 | 1 | 1 | 1 | |
| | | N4-6: STW Medium Term Options | 1 | | 1 | 1 | 1 | |
| | | N7: STW Medium Term Options | 1 | | 1 | 1 | 1 | |
| | | N8: STW Medium Term Options | 1 | | 1 | 1 | 1 | |

| Type | Country | Project Name | FAIR ISLE | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | NOSS | SULE SKERRY AND SULE STACK | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|
| | | NE1: STW Medium Term Options | 1 | 1 | 1 | 1 | 1 | |
| | | NE2: STW Medium Term Options | 1 | 1 | 1 | 1 | 1 | |
| | | NE3: STW Medium Term Options | 1 | 1 | 1 | 1 | 1 | |
| | | Neart na Gaoithe | 1 | 1 | 1 | 1 | 1 | |
| | | Race Bank | | 1 | 1 | | | 1 |
| | | Sheringham Shoal | | 1 | 1 | | | 1 |
| | | Teesside | 1 | 1 | 1 | | 1 | 1 |
| | | Triton Knoll | | 1 | 1 | | | 1 |
| | | Westermost Rough | | 1 | 1 | | | 1 |
| | Belgium | Belwind Phase 2 | | 1 | | | | 1 |
| | | Norther | | 1 | | | | 1 |
| | | Northwind | | 1 | | | | 1 |
| | | RENTEL | | 1 | | | | 1 |
| | | Seastar | | 1 | | | | 1 |
| | | Thornton Bank phase II | | 1 | | | | 1 |
| | | Thornton Bank phase III | | 1 | | | | 1 |
| | | THV Mermaid | | 1 | | | | 1 |
| | Denmark | DanTysk DK | | 1 | | | | 1 |
| | | Horns Rev 3 | | 1 | | | | 1 |
| | | Horns Rev A HR5 | | 1 | | | | 1 |
| | | Horns Rev B HR6 | | 1 | | | | 1 |
| | | Horns Rev B HR7 | | 1 | | | | 1 |
| | | Horns Rev reserved area | | 1 | 1 | | | 1 |
| | | Jammerbugt A J3 | | | | | | 1 |
| | | Jammerbugt A J4 | | | | | | 1 |
| | | Jammerbugt B J1 | | | | | | 1 |

| Type | Country | Project Name | FAIR ISLE | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | NOSS | SULE SKERRY AND SULE STACK | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|
| | | Jammerbugt B J2 | | | | | | 1 |
| | | Jammerbugt Nord | | | | | | 1 |
| | | Jammerbugt Reserved Area | | | | | | 1 |
| | | Jammerbugt Syd | | | | | | 1 |
| | | Ringkøbing Fjord A RK1 | | 1 | | | | 1 |
| | | Ringkøbing Fjord A RK2 | | 1 | | | | 1 |
| | | Ringkøbing Fjord B RK3 | | 1 | | | | 1 |
| | | Ringkøbing Fjord B RK4 | | 1 | | | | 1 |
| | | Ringkøbing Fjord B RK5 | | 1 | | | | 1 |
| | | Ringkøbing Reserved Area | | 1 | | | | 1 |
| | | Rønland II | | | | | | 1 |
| | | Rønland III | | | | | | 1 |
| | | Vesterhavet Nord | | 1 | | | | 1 |
| | | Vesterhavet Syd | | 1 | | | | 1 |
| | Germany | Aiolos | | 1 | 1 | | | 1 |
| | | Albabtros | | 1 | 1 | | | 1 |
| | | Amrumbank West | | 1 | | | | 1 |
| | | Aquamarin | | 1 | 1 | | | 1 |
| | | Area C I | | 1 | | | | 1 |
| | | Area C II | | 1 | | | | 1 |
| | | Area C III | | 1 | | | | 1 |
| | | Austerngrund | | 1 | 1 | | | 1 |
| | | BARD Offshore 1 | | 1 | 1 | | | 1 |
| | | Bernstein | | 1 | 1 | | | 1 |
| | | Bight Power I | | 1 | 1 | | | 1 |
| | | Bight Power II | | 1 | | | | 1 |

| Type | Country | Project Name | FAIR ISLE | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | NOSS | SULE SKERRY AND SULE STACK | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|
| | | Borkum Riffgat | | 1 | | | | 1 |
| | | Borkum Riffgrund | | 1 | | | | 1 |
| | | Borkum Riffgrund II | | 1 | | | | 1 |
| | | Borkum Riffgrund West | | 1 | | | | 1 |
| | | Borkum Riffgrund West II | | 1 | | | | 1 |
| | | Borkum West II | | 1 | | | | 1 |
| | | Citrin | | 1 | 1 | | | 1 |
| | | Dan Tysk | | 1 | | | | 1 |
| | | Diamant | | 1 | 1 | | | 1 |
| | | EnBW He Dreiht | | 1 | 1 | | | 1 |
| | | EnBW Hohe See | | 1 | 1 | | | 1 |
| | | ENOVA Offshore NSWP | | 1 | 1 | | | 1 |
| | | Enova offshore NSWP4 | | 1 | 1 | | | 1 |
| | | Enova offshore NSWP5 | | 1 | 1 | | | 1 |
| | | Enova offshore NSWP6 | | 1 | 1 | | | 1 |
| | | Enova offshore NSWP7 | | 1 | 1 | | | 1 |
| | | Euklas | | 1 | 1 | | | 1 |
| | | Gaia I | | 1 | 1 | | | 1 |
| | | Gaia II | | 1 | 1 | | | 1 |
| | | Gaia III | | 1 | 1 | | | 1 |
| | | Gaia IV | | 1 | 1 | | | 1 |
| | | Gaia V | | 1 | 1 | | | 1 |
| | | Gannet | | 1 | | | | 1 |
| | | Globe Tech I | | 1 | 1 | | | 1 |
| | | Globe Tech II | | 1 | 1 | | | 1 |
| | | Globe Tech III | | 1 | | | | 1 |

| Type | Country | Project Name | FAIR ISLE | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | NOSS | SULE SKERRY AND SULE STACK | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|
| | | Gode Wind | | 1 | | | | 1 |
| | | Gode Wind II | | 1 | | | | 1 |
| | | Gode Wind III | | 1 | | | | 1 |
| | | He Dreiht II | | 1 | 1 | | | 1 |
| | | Heron | | 1 | | | | 1 |
| | | Horizant I | | 1 | 1 | | | 1 |
| | | Horizant II | | 1 | 1 | | | 1 |
| | | Horizant III | | 1 | 1 | | | 1 |
| | | Innogy Norsee 2 | | 1 | | | | 1 |
| | | Innogy Norsee 3 | | 1 | | | | 1 |
| | | Innogy Norsee I | | 1 | | | | 1 |
| | | Jules Verne | | 1 | 1 | | | 1 |
| | | Kaikas | | 1 | 1 | | | 1 |
| | | Kaskasi | | 1 | | | | 1 |
| | | Mainstream | | 1 | 1 | | | 1 |
| | | Meerwind | | 1 | | | | 1 |
| | | Meerwind West | | 1 | | | | 1 |
| | | MEG offshore 1 | | 1 | | | | 1 |
| | | Nautilus | | 1 | 1 | | | 1 |
| | | Nautilus II | | 1 | 1 | | | 1 |
| | | Nemo | | 1 | 1 | | | 1 |
| | | Neptun | | 1 | 1 | | | 1 |
| | | Norderland | | 1 | 1 | | | 1 |
| | | Nordlicher Grund | | 1 | | | | 1 |
| | | NORD-OST PASSAT I | 1 | 1 | 1 | | | 1 |
| | | NORD-OST PASSAT II | | 1 | 1 | | | 1 |

| Type | Country | Project Name | FAIR ISLE | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | NOSS | SULE SKERRY AND SULE STACK | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|
| | | NORD-OST PASSAT III | 1 | 1 | 1 | | | 1 |
| | | Nordpassage | | 1 | | | | 1 |
| | | Nordsee Ost | | 1 | | | | 1 |
| | | Notos | | 1 | 1 | | | 1 |
| | | Offshore- Bürger- windpark Butendiek | | 1 | | | | 1 |
| | | Offshore Wind Park (Deutsche Burcht) | | 1 | 1 | | | 1 |
| | | Offshore Wind Park Nordergrunde | | 1 | | | | 1 |
| | | OWP Delta Nordsee I | | 1 | | | | 1 |
| | | OWP Delta Nordsee II | | 1 | | | | 1 |
| | | OWP west | | 1 | | | | 1 |
| | | Petrel | | 1 | | | | 1 |
| | | PROWIND 1 | | 1 | 1 | | | 1 |
| | | PROWIND 2 | | 1 | 1 | | | 1 |
| | | PROWIND 3 | | 1 | 1 | | | 1 |
| | | Sandbank 24 | | 1 | | | | 1 |
| | | Sandbank 24 extension | | 1 | | | | 1 |
| | | Sea Storm | | 1 | 1 | | | 1 |
| | | Sea Storm II | | 1 | 1 | | | 1 |
| | | Sea Wind (Storm) IV | | 1 | 1 | | | 1 |
| | | Sea Wind III | | 1 | 1 | | | 1 |
| | | Seagull | | 1 | | | | 1 |
| | | SeaWind I | | 1 | 1 | | | 1 |
| | | SeaWind II | | 1 | 1 | | | 1 |
| | | Skua | | 1 | | | | 1 |
| | | Testfield Helagoland | | 1 | | | | 1 |
| | | Veja Mate | | 1 | 1 | | | 1 |

| Type | Country | Project Name | FAIR ISLE | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | NOSS | SULE SKERRY AND SULE STACK | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|
| | | Vento Tec Nord I | | 1 | 1 | | | 1 |
| | | Vento Tec Nord II | | 1 | 1 | | | 1 |
| | | Witte Bank | | 1 | 1 | | | 1 |
| | Holland | Beaufort (formally Katwijk) | | 1 | | | | 1 |
| | | Borssele – Development Zone | | 1 | | | | 1 |
| | | Breeveertien | | 1 | 1 | | | 1 |
| | | Breeveertien II | | 1 | 1 | | | 1 |
| | | Brown Ridge Oost | | 1 | 1 | | | 1 |
| | | Bruine Bank | | 1 | 1 | | | 1 |
| | | Callantsoog Oost | | 1 | 1 | | | 1 |
| | | Callantsoog West | | 1 | 1 | | | 1 |
| | | Callantsoog Zuid | | 1 | 1 | | | 1 |
| | | Clearcamp | | 1 | 1 | | | 1 |
| | | Cornelia | | 1 | 1 | | | 1 |
| | | Den Haag I | | 1 | | | | 1 |
| | | Den Haag II | | 1 | 1 | | | 1 |
| | | Den Haag III | | 1 | 1 | | | 1 |
| | | Den Haag Noord | | 1 | 1 | | | 1 |
| | | Den Helder 1 | | 1 | 1 | | | 1 |
| | | Den Helder 2 | | 1 | 1 | | | 1 |
| | | Den Helder 3 | | 1 | 1 | | | 1 |
| | | Den Helder I | | 1 | 1 | | | 1 |
| | | Den Helder II | | 1 | 1 | | | 1 |
| | | Den Helder III | | 1 | 1 | | | 1 |
| | | Den Helder IV | | 1 | 1 | | | 1 |
| | | Den Helder Noord | | 1 | 1 | | | 1 |

| Type | Country | Project Name | FAIR ISLE | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | NOSS | SULE SKERRY AND SULE STACK | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|
| | | Den Helder Zuid | | 1 | 1 | | | 1 |
| | | Eneco Lunchterduinen | | 1 | | | | 1 |
| | | Eurogeul Noord | | 1 | 1 | | | 1 |
| | | Favorius | | 1 | 1 | | | 1 |
| | | FLOW - Far Offshore Demonstration Park | | 1 | 1 | | | 1 |
| | | FLOW – Turbine Development Facility | | 1 | 1 | | | 1 |
| | | Gemini | | 1 | 1 | | | 1 |
| | | Helder | | 1 | 1 | | | 1 |
| | | Hoek van Holland 1 | | 1 | | | | 1 |
| | | Hoek van Holland 2 | | 1 | 1 | | | 1 |
| | | Hoek van Holland 3 | | 1 | 1 | | | 1 |
| | | Hoek van Holland 4 | | 1 | 1 | | | 1 |
| | | Hollandse kust-Development Zone | | 1 | 1 | | | 1 |
| | | Hopper | | 1 | 1 | | | 1 |
| | | HoriWind | | 1 | 1 | | | 1 |
| | | Horizon | | 1 | 1 | | | 1 |
| | | IJmuiden | | 1 | 1 | | | 1 |
| | | Ijmuiden – Development Zone | | 1 | 1 | | | 1 |
| | | Ijmuiden 1 | | 1 | 1 | | | 1 |
| | | Ijmuiden 2 | | 1 | 1 | | | 1 |
| | | Katwijk Buiten | | 1 | | | | 1 |
| | | Maas West Buiten | | 1 | 1 | | | 1 |
| | | Noord Hinder | | 1 | 1 | | | 1 |
| | | Noord Hinder 1 | | 1 | 1 | | | 1 |
| | | Noord Hinder 2 | | 1 | 1 | | | 1 |
| | | Norodermeerdijks – windpark Noordoostpolder | | 1 | | | | 1 |

| Type | Country | Project Name | FAIR ISLE | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | NOSS | SULE SKERRY AND SULE STACK | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|
| | | Okeanos | | 1 | 1 | | | 1 |
| | | Oost Friesland | | 1 | | | | 1 |
| | | Osters Bank 1 | | 1 | 1 | | | 1 |
| | | Osters Bank 2 | | 1 | 1 | | | 1 |
| | | Osters Bank 3 | | 1 | 1 | | | 1 |
| | | Osters Bank 4 | | 1 | 1 | | | 1 |
| | | P12 | | 1 | | | | 1 |
| | | P15-WP | | 1 | | | | 1 |
| | | Q4 | | 1 | 1 | | | 1 |
| | | Q7-West | | 1 | 1 | | | 1 |
| | | Riffgrond | | 1 | | | | 1 |
| | | Rijnveld Zuid | | 1 | | | | 1 |
| | | Rotterdam Noord – West | | 1 | | | | 1 |
| | | Ruyter Oost | | 1 | 1 | | | 1 |
| | | Ruyter West | | 1 | 1 | | | 1 |
| | | Schaar | | 1 | | | | 1 |
| | | Scheveningen 1 | | 1 | | | | 1 |
| | | Scheveningen 2 | | 1 | 1 | | | 1 |
| | | Scheveningen 3 | | 1 | | | | 1 |
| | | Scheveningen 4 | | 1 | 1 | | | 1 |
| | | Scheveningen 5 | | 1 | 1 | | | 1 |
| | | Scheveningen Buiten | | 1 | | | | 1 |
| | | Ten noorden van de Waddeneilanden – Development Zone | | 1 | 1 | | | 1 |
| | | Thetys | | 1 | 1 | | | 1 |
| | | Tromp Binnen | | 1 | 1 | | | 1 |
| | | Tromp Oost | | 1 | 1 | | | 1 |

| Type | Country | Project Name | FAIR ISLE | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | NOSS | SULE SKERRY AND SULE STACK | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|
| | | Tromp West | | 1 | 1 | | | 1 |
| | | West - Rijn | | 1 | 1 | | | 1 |
| | | Westermeerdijk buitendijks – Windpark Noordoostpolder | | 1 | | | | 1 |
| | | Wieringermeerdijk | | 1 | | | | 1 |
| | | Wijk aan Zee | | 1 | 1 | | | 1 |
| | | WindNed Noord | | 1 | 1 | | | 1 |
| | | WindNed Zuid | | 1 | 1 | | | 1 |
| | Grand Total | | 20 | 224 | 148 | 17 | 17 | 220 |
| Aggregates | UK | Area 400 | | 1 | 1 | | | 1 |
| | | Area 439 | | 1 | 1 | | | 1 |
| | | Area 441/3 | | 1 | 1 | | | 1 |
| | | Area 448 | | 1 | 1 | | | 1 |
| | | Area 449 | | 1 | 1 | | | 1 |
| | | Area 454/512 | | 1 | 1 | | | 1 |
| | | Area 466/1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Area 483 | | 1 | 1 | | | 1 |
| | | Area 484 | | 1 | 1 | | | 1 |
| | | Area 485/1 | 1 | 1 | 1 | | | 1 |
| | | Area 485/2 | 1 | 1 | 1 | | | 1 |
| | | Area 490 | | 1 | 1 | | | 1 |
| | | Area 491 | | 1 | 1 | | | 1 |
| | | Area 492 | | 1 | 1 | | | 1 |
| | | Area 493 | | 1 | 1 | | | 1 |
| | | Area 494 | | 1 | 1 | | | 1 |
| | | Area 495/1 | | 1 | 1 | | | 1 |

| Type | Country | Project Name | FAIR ISLE | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | NOSS | SULE SKERRY AND SULE STACK | SEEVOGELSCHUTZGEBIET HELGOLAND |
|---|---|---|---|---|---|---|---|---|
| | | Area 495/2 | | 1 | 1 | | | 1 |
| | | Area 496 | | 1 | 1 | | | 1 |
| | | Area 506 | | 1 | 1 | | | 1 |
| | Holland | Marine aggregates | | 1 | 1 | | | 1 |
| | Grand Total | | 3 | 21 | 21 | 1 | 1 | 21 |

**Table A8.4** Protected sites identified as relevant to the Dogger Bank Teesside A and B projects for black-legged kittiwake, and other offshore wind farm and marine aggregates projects within the species' potential foraging range from these sites during the breeding season.

| Type | Country | ProjectName | FLAMBOROUGH HEAD AND BEMPTON CLIFFS |
|---|---|---|---|
| Wind farms | UK | Docking Shoal | 1 |
| | | Dudgeon | 1 |
| | | E1: STW Medium Term Options | 1 |
| | | Firth of Forth | 1 |
| | | Hornsea Subzone One (Hornsea) | 1 |
| | | Humber Gateway | 1 |
| | | Lincs | 1 |
| | | Race Bank | 1 |
| | | Sheringham Shoal | 1 |
| | | Teesside | 1 |
| | | Triton Knoll | 1 |
| | | Westermost Rough | 1 |
| | Grand Total | | 12 |
| Aggregates | UK | Area 400 | 1 |
| | | Area 439 | 1 |
| | | Area 441/3 | 1 |
| | | Area 448 | 1 |
| | | Area 449 | 1 |
| | | Area 454/512 | 1 |
| | | Area 466/1 | 1 |
| | | Area 483 | 1 |
| | | Area 484 | 1 |
| | | Area 485/1 | 1 |
| | | Area 485/2 | 1 |
| | | Area 490 | 1 |
| | | Area 491 | 1 |

| Type | Country | ProjectName | FLAMBOROUGH HEAD AND BEMPTON CLIFFS |
|---|---|---|---|
| | | Area 492 | 1 |
| | | Area 493 | 1 |
| | | Area 494 | 1 |
| | | Area 495/1 | 1 |
| | | Area 495/2 | 1 |
| | | Area 506 | 1 |
| | Holland | Marine aggregates | 1 |
| | Grand Total | | 20 |

**Table A8.5** Protected sites identified as relevant to the Dogger Bank Teesside A and B projects for common guillemot, and other offshore wind farm and marine aggregates projects within the species' potential foraging range from these sites during the breeding season.

| Type | Country | Project Name | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | SEEVOGELSCHUTZGEBIET HELGOLAND | ST ABB'S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|---|
| Wind farms | UK | Beatrice | 1 | | 1 | 1 | 1 | 1 |
| | | Blyth Demonstration Site | | | | | 1 | |
| | | Docking Shoal | 1 | 1 | | | 1 | |
| | | Dudgeon | 1 | 1 | | | 1 | |
| | | E1: Scottish Territorial Waters Medium Term Options | 1 | 1 | 1 | 1 | | 1 |
| | | East Anglia One (East Anglia) | | 1 | | | 1 | |
| | | European Offshore Wind Deployment Centre | 1 | | 1 | 1 | 1 | 1 |
| | | Firth of Forth | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Galloper | | 1 | | | 1 | |
| | | Greater Gabbard | | 1 | | | 1 | |
| | | H2-20 | | 1 | | | 1 | |
| | | Hornsea Subzone One (Hornsea) | 1 | 1 | | | 1 | 1 |
| | | Hornsea Zone | | | | | 1 | |
| | | Humber Gateway | 1 | 1 | 1 | | 1 | 1 |
| | | Inch Cape | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Inch Cape, STW site | 1 | 1 | 1 | 1 | | 1 |
| | | Lincs | 1 | 1 | | | 1 | 1 |
| | | Methil | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Moray Firth | 1 | | 1 | 1 | 1 | 1 |
| | | N2-3: STW Medium Term Options | | | 1 | 1 | | 1 |
| | | N4-6: STW Medium Term Options | | | | 1 | | |
| | | N7: STW Medium Term Options | | | | 1 | | |

| Type | Country | Project Name | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | SEEVOGELSCHUTZGEBIET HELGOLAND | ST ABB`S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|---|
| | | NE1: STW Medium Term Options | 1 | | 1 | 1 | | 1 |
| | | NE2: STW Medium Term Options | 1 | | 1 | 1 | | 1 |
| | | NE3: STW Medium Term Options | 1 | 1 | 1 | 1 | | 1 |
| | | Neart na Gaoithe | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Norfolk Bank (East anglia) | | | | | 1 | |
| | | Race Bank | 1 | 1 | | | 1 | 1 |
| | | Sheringham Shoal | 1 | 1 | | | 1 | |
| | | Teesside | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Triton Knoll | 1 | 1 | | | 1 | 1 |
| | | Westermost Rough | 1 | 1 | 1 | | 1 | 1 |
| | Belgium | Belwind Phase 2 | | 1 | | | 1 | |
| | | Norther | | | | | 1 | |
| | | Northwind | | | | | 1 | |
| | | RENTEL | | | | | 1 | |
| | | Seastar | | 1 | | | 1 | |
| | | Thornton Bank phase II | | | | | 1 | |
| | | Thornton Bank phase III | | | | | 1 | |
| | | THV Mermaid | | 1 | | | 1 | |
| | Germany | DanTysk DK | | | | | 1 | |
| | | Horns Rev 3 | | | | | 1 | |
| | | Horns Rev A HR5 | | | | | 1 | |
| | | Horns Rev B HR6 | | | | | 1 | |
| | | Horns Rev B HR7 | | | | | 1 | |
| | | Horns Rev reserved area | | | | | 1 | |
| | | Jammerbugt Syd | | | | | 1 | |
| | | Ringkøbing Fjord A RK1 | | | | | 1 | |
| | | Ringkøbing Fjord A RK2 | | | | | 1 | |

| Type | Country | Project Name | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | SEEVOGELSCHUTZGEBIET HELGOLAND | ST ABB`S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|---|
| | | Ringkøbing Fjord B RK3 | | | | | 1 | |
| | | Ringkøbing Fjord B RK4 | | | | | 1 | |
| | | Ringkøbing Fjord B RK5 | | | | | 1 | |
| | | Ringkøbing Reserved Area | | | | | 1 | |
| | | Vesterhavet Syd | | | | | 1 | |
| | | Aiolos | | | | | 1 | |
| | | Albabtros | | | | | 1 | |
| | | Amrumbank West | | | | | 1 | |
| | | Aquamarin | | | | | 1 | |
| | | Area C I | | | | | 1 | |
| | | Area C II | | | | | 1 | |
| | | Area C III | | | | | 1 | |
| | | Austerngrund | | | | | 1 | |
| | | BARD Offshore 1 | | | | | 1 | |
| | | Bernstein | | | | | 1 | |
| | | Bight Power I | | | | | 1 | |
| | | Bight Power II | | | | | 1 | |
| | | Borkum Riffgat | | | | | 1 | |
| | | Borkum Riffgrund | | | | | 1 | |
| | | Borkum Riffgrund II | | | | | 1 | |
| | | Borkum Riffgrund West | | | | | 1 | |
| | | Borkum Riffgrund West II | | | | | 1 | |
| | | Borkum West II | | | | | 1 | |
| | | Citrin | | | | | 1 | |
| | | Dan Tysk | | | | | 1 | |
| | | Diamant | | | | | 1 | |
| | | EnBW He Dreiht | | | | | 1 | |

| Type | Country | Project Name | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | SEEVOGELSCHUTZGEBIET HELGOLAND | ST ABB`S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|---|
| | | EnBW Hohe See | | | | | 1 | |
| | | ENOVA Offshore NSWP | | | | | 1 | |
| | | ENOVA Offshore NSWP | | | | | 1 | |
| | | ENOVA Offshore NSWP | | | | | 1 | |
| | | ENOVA Offshore NSWP | | | | | 1 | |
| | | ENOVA Offshore NSWP | | | | | 1 | |
| | | ENOVA Offshore NSWP | | | | | 1 | |
| | | ENOVA Offshore NSWP | | | | | 1 | |
| | | ENOVA Offshore NSWP | | | | | 1 | |
| | | ENOVA Offshore NSWP | | | | | 1 | |
| | | Enova offshore NSWP4 | | | | | 1 | |
| | | Enova offshore NSWP5 | | | | | 1 | |
| | | Enova offshore NSWP6 | | | | | 1 | |
| | | Enova offshore NSWP7 | | | | | 1 | |
| | | Euklas | | 1 | | | 1 | |
| | | Gaia I | | | | | 1 | |
| | | Gaia II | | | | | 1 | |
| | | Gaia III | | | | | 1 | |
| | | Gaia IV | | | | | 1 | |
| | | Gaia V | | | | | 1 | |
| | | Gannet | | | | | 1 | |
| | | Globe Tech I | | | | | 1 | |
| | | Globe Tech II | | | | | 1 | |
| | | Globe Tech III | | | | | 1 | |
| | | Gode Wind | | | | | 1 | |
| | | Gode Wind II | | | | | 1 | |
| | | Gode Wind III | | | | | 1 | |

| Type | Country | Project Name | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | SEEVOGELSCHUTZGEBIET HELGOLAND | ST ABB`S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|---|
| | | He Dreiht II | | | | | 1 | |
| | | Heron | | | | | 1 | |
| | | Horizant I | | | | | 1 | |
| | | Horizant II | | | | | 1 | |
| | | Horizant III | | | | | 1 | |
| | | Innogy Norsee 2 | | | | | 1 | |
| | | Innogy Norsee 3 | | | | | 1 | |
| | | Innogy Norsee I | | | | | 1 | |
| | | Jules Verne | | | | | 1 | |
| | | Kaikas | | | | | 1 | |
| | | Kaskasi | | | | | 1 | |
| | | Mainstream | | | | | 1 | |
| | | Meerwind | | | | | 1 | |
| | | Meerwind West | | | | | 1 | |
| | | MEG offshore 1 | | | | | 1 | |
| | | Nautilus | | | | | 1 | |
| | | Nautilus II | | | | | 1 | |
| | | Nemo | | | | | 1 | |
| | | Neptun | | | | | 1 | |
| | | Neptun | | | | | 1 | |
| | | Neptun | | | | | 1 | |
| | | Neptun | | | | | 1 | |
| | | Neptun | | | | | 1 | |
| | | Norderland | | | | | 1 | |
| | | Norderland | | | | | 1 | |
| | | Nordlicher Grund | | | | | 1 | |
| | | NORD-OST PASSAT I | | 1 | | | 1 | |

| Type | Country | Project Name | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | SEEVOGELSCHUTZGEBIET HELGOLAND | ST ABB`S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|---|
| | | NORD-OST PASSAT II | | 1 | | | 1 | |
| | | NORD-OST PASSAT III | | 1 | | | 1 | |
| | | Nordpassage | | | | | 1 | |
| | | Nordsee Ost | | | | | 1 | |
| | | Notos | | | | | 1 | |
| | | Offshore- Bürger- windpark Butendiek | | | | | 1 | |
| | | Offshore Wind Park (Deutsche Burcht) | | | | | 1 | |
| | | Offshore Wind Park Nordergrunde | | | | | 1 | |
| | | OWP Delta Nordsee I | | | | | 1 | |
| | | OWP Delta Nordsee II | | | | | 1 | |
| | | OWP west | | | | | 1 | |
| | | Petrel | | | | | 1 | |
| | | PROWIND 1 | | 1 | | | 1 | |
| | | PROWIND 2 | | 1 | | | 1 | |
| | | PROWIND 3 | | 1 | | | 1 | |
| | | Sandbank 24 | | | | | 1 | |
| | | Sandbank 24 extension | | | | | 1 | |
| | | Sea Storm | | | | | 1 | |
| | | Sea Storm II | | | | | 1 | |
| | | Sea Wind (Storm) IV | | | | | 1 | |
| | | Sea Wind III | | | | | 1 | |
| | | Seagull | | | | | 1 | |
| | | SeaWind I | | | | | 1 | |
| | | SeaWind II | | | | | 1 | |
| | | Skua | | | | | 1 | |
| | | Testfield Helagoland | | | | | 1 | |
| | | Veja Mate | | | | | 1 | |

| Type | Country | Project Name | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | SEEVOGELSCHUTZGEBIET HELGOLAND | ST ABB`S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|---|
| | | Vento Tec Nord I | | | | | 1 | |
| | | Vento Tec Nord II | | | | | 1 | |
| | | Witte Bank | | | | | 1 | |
| | Holland | Beaufort (formally Katwijk) | | 1 | | | 1 | |
| | | Borssele – Development Zone | | 1 | | | 1 | |
| | | Breeveertien | | 1 | | | 1 | |
| | | Breeveertien II | | 1 | | | 1 | |
| | | Brown Ridge Oost | | 1 | | | 1 | |
| | | Bruine Bank | | 1 | | | 1 | |
| | | Callantsoog Oost | | 1 | | | 1 | |
| | | Callantsoog West | | 1 | | | 1 | |
| | | Callantsoog Zuid | | 1 | | | 1 | |
| | | Clearcamp | | | | | 1 | |
| | | Cornelia | | | | | 1 | |
| | | Den Haag I | | 1 | | | 1 | |
| | | Den Haag II | | 1 | | | 1 | |
| | | Den Haag III | | 1 | | | 1 | |
| | | Den Haag Noord | | 1 | | | 1 | |
| | | Den Helder 1 | | 1 | | | 1 | |
| | | Den Helder 2 | | 1 | | | 1 | |
| | | Den Helder 3 | | 1 | | | 1 | |
| | | Den Helder I | | 1 | | | 1 | |
| | | Den Helder II | | 1 | | | 1 | |
| | | Den Helder III | | 1 | | | 1 | |
| | | Den Helder IV | | 1 | | | 1 | |
| | | Den Helder Noord | | 1 | | | 1 | |
| | | Den Helder Zuid | | 1 | | | 1 | |

| Type | Country | Project Name | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | SEEVOGELSCHUTZGEBIET HELGOLAND | ST ABB`S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|---|
| | | Eneco Lunchterduinen | | 1 | | | 1 | |
| | | Eurogeul Noord | | 1 | | | 1 | |
| | | Favorius | | 1 | | | 1 | |
| | | FLOW - Far Offshore Demonstration Park | | 1 | | | 1 | |
| | | FLOW – Turbine Development Facility | | 1 | | | 1 | |
| | | Gemini | | | | | 1 | |
| | | Helder | | 1 | | | 1 | |
| | | Hoek van Holland 1 | | 1 | | | 1 | |
| | | Hoek van Holland 2 | | 1 | | | 1 | |
| | | Hoek van Holland 3 | | 1 | | | 1 | |
| | | Hoek van Holland 4 | | 1 | | | 1 | |
| | | Hollandse kust-Development Zone | | 1 | | | 1 | |
| | | Hopper | | 1 | | | 1 | |
| | | HoriWind | | 1 | | | 1 | |
| | | Horizon | | 1 | | | 1 | |
| | | IJmuiden | | 1 | | | 1 | |
| | | Ijmuiden – Development Zone | | 1 | | | 1 | |
| | | Ijmuiden 1 | | 1 | | | 1 | |
| | | Ijmuiden 2 | | 1 | | | 1 | |
| | | Katwijk Buiten | | 1 | | | 1 | |
| | | Maas West Buiten | | 1 | | | 1 | |
| | | Noord Hinder | | 1 | | | 1 | |
| | | Noord Hinder 1 | | 1 | | | 1 | |
| | | Noord Hinder 2 | | 1 | | | 1 | |
| | | Norodermeerdijks – windpark | | | | | 1 | |
| | | Okeanos | | 1 | | | 1 | |
| | | Oost Friesland | | | | | 1 | |

| Type | Country | Project Name | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | SEEVOGELSCHUTZGEBIET HELGOLAND | ST ABB`S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|---|
| | | Osters Bank 1 | | | | | 1 | |
| | | Osters Bank 2 | | | | | 1 | |
| | | Osters Bank 3 | | | | | 1 | |
| | | Osters Bank 4 | | 1 | | | 1 | |
| | | P12 | | 1 | | | 1 | |
| | | P15-WP | | 1 | | | 1 | |
| | | Q4 | | 1 | | | 1 | |
| | | Q7-West | | 1 | | | 1 | |
| | | Riffgrond | | | | | 1 | |
| | | Rijnveld Zuid | | 1 | | | 1 | |
| | | Rotterdam Noord – West | | 1 | | | 1 | |
| | | Ruyter Oost | | | | | 1 | |
| | | Ruyter West | | | | | 1 | |
| | | Schaar | | | | | 1 | |
| | | Scheveningen 1 | | 1 | | | 1 | |
| | | Scheveningen 2 | | 1 | | | 1 | |
| | | Scheveningen 3 | | 1 | | | 1 | |
| | | Scheveningen 4 | | 1 | | | 1 | |
| | | Scheveningen 5 | | 1 | | | 1 | |
| | | Scheveningen Buiten | | 1 | | | 1 | |
| | | Ten noorden van de Waddeneilanden – Development | | | | | 1 | |
| | | Thetys | | 1 | | | 1 | |
| | | Tromp Binnen | | 1 | | | 1 | |
| | | Tromp Oost | | 1 | | | 1 | |
| | | Tromp West | | 1 | | | 1 | |
| | | West - Rijn | | 1 | | | 1 | |
| | | Westermeerdijk buitendijks – Windpark | | | | | 1 | |

| Type | Country | Project Name | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FORTH ISLANDS | FOWLSHEUGH | SEEVOGELSCHUTZGEBIET HELGOLAND | ST ABB`S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|---|
| | | Wieringermeerdijk | | | | | 1 | |
| | | Wijk aan Zee | | 1 | | | 1 | |
| | | WindNed Noord | | 1 | | | 1 | |
| | | WindNed Zuid | | 1 | | | 1 | |
| | Grand | | 22 | 98 | 16 | 16 | 234 | 20 |
| Aggregates | UK | Area 400 | 1 | 1 | | | 1 | 1 |
| | | Area 439 | 1 | 1 | | | 1 | 1 |
| | | Area 441/3 | 1 | 1 | | | 1 | 1 |
| | | Area 448 | 1 | 1 | 1 | | 1 | 1 |
| | | Area 449 | 1 | 1 | 1 | | 1 | 1 |
| | | Area 454/512 | | 1 | | | | |
| | | Area 466/1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Area 483 | 1 | 1 | | | 1 | |
| | | Area 484 | 1 | 1 | | | 1 | |
| | | Area 485/1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Area 485/2 | 1 | 1 | 1 | | 1 | 1 |
| | | Area 490 | 1 | 1 | | | 1 | |
| | | Area 491 | 1 | 1 | | | 1 | |
| | | Area 492 | 1 | 1 | | | 1 | |
| | | Area 493 | 1 | 1 | | | 1 | 1 |
| | | Area 494 | | 1 | | | 1 | |
| | | Area 495/1 | | 1 | | | 1 | |
| | | Area 495/2 | | 1 | | | 1 | |
| | | Area 496 | | 1 | | | 1 | |
| | | Area 506 | 1 | 1 | | | 1 | |
| | Holland | Marine aggregates | 1 | 1 | | | 1 | |
| | Grand | | 16 | 21 | 5 | 2 | 20 | 9 |

**Table A8.6** Protected sites identified as relevant to the Dogger Bank Teesside A and B projects for razorbill, and other offshore wind farm and marine aggregates projects within the species' potential foraging range from these sites during the breeding season.

| Type | Country | ProjectName | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FIRTH OF FORTH ISLANDS | FOWLSHEUGH | ST ABB`S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|
| Wind farms | UK | Beatrice | 1 | | 1 | 1 | 1 |
| | | Blyth Demonstration Site | | | 1 | | |
| | | Docking Shoal | 1 | 1 | | | |
| | | Dudgeon | | 1 | | | |
| | | E1: Scottish Territorial Waters Medium Term Options | 1 | 1 | 1 | | 1 |
| | | E1: STW Medium Term Options | | | | 1 | |
| | | East Anglia One (East Anglia) | | 1 | 1 | | |
| | | European Offshore Wind Deployment Centre | 1 | | 1 | 1 | 1 |
| | | Firth of Forth | 1 | 1 | 1 | 1 | 1 |
| | | Galloper | | 1 | | | |
| | | Greater Gabbard | | 1 | | | |
| | | Hornsea Subzone One (Hornsea) | 1 | 1 | | | |
| | | Hornsea Zone | | | 1 | | |
| | | Humber Gateway | 1 | 1 | | | 1 |
| | | Inch Cape | 1 | 1 | 1 | 1 | 1 |
| | | Inch Cape, STW site | 1 | 1 | | 1 | 1 |
| | | Lincs | 1 | 1 | | | |
| | | Methil | 1 | 1 | 1 | 1 | 1 |
| | | Moray Firth | 1 | | 1 | 1 | 1 |
| | | N2-3: STW Medium Term Options | | | | 1 | |
| | | NE1: Scottish Territorial Waters Medium Term Options | 1 | | 1 | | 1 |
| | | NE1: STW Medium Term Options | | | | 1 | |

| Type | Country | ProjectName | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FIRTH OF FORTH ISLANDS | FOWLSHEUGH | ST ABB'S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|
| | | NE2: Scottish Territorial Waters Medium Term Options | 1 | | 1 | | 1 |
| | | NE2: STW Medium Term Options | | | | 1 | |
| | | NE3: Scottish Territorial Waters Medium Term Options | 1 | | 1 | | 1 |
| | | NE3: STW Medium Term Options | | | | 1 | |
| | | Neart na Gaoithe | 1 | 1 | 1 | 1 | 1 |
| | | Race Bank | 1 | 1 | | | |
| | | Sheringham Shoal | | 1 | | | |
| | | Teesside | 1 | 1 | 1 | 1 | 1 |
| | | Triton Knoll | 1 | 1 | | | |
| | | Westermost Rough | 1 | 1 | 1 | | 1 |
| | Holland | Breeveertien II | | 1 | | | |
| | | Brown Ridge Oost | | 1 | | | |
| | | Bruine Bank | | 1 | | | |
| | | Callantsoog Oost | | 1 | | | |
| | | Callantsoog West | | 1 | | | |
| | | Callantsoog Zuid | | 1 | | | |
| | | Den Haag III | | 1 | | | |
| | | Den Helder 1 | | 1 | | | |
| | | Den Helder 2 | | 1 | | | |
| | | Den Helder 3 | | 1 | | | |
| | | Den Helder I | | 1 | | | |
| | | Den Helder II | | 1 | | | |
| | | Den Helder III | | 1 | | | |
| | | Den Helder IV | | 1 | | | |
| | | Den Helder Noord | | 1 | | | |

| Type | Country | ProjectName | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FIRTH OF FORTH ISLANDS | FOWLSHEUGH | ST ABB'S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|
| | | Den Helder Zuid | | 1 | | | |
| | | FLOW - Far Offshore Demonstration Park | | 1 | | | |
| | | FLOW – Turbine Development Facility | | 1 | | | |
| | | Helder | | 1 | | | |
| | | Hoek van Holland 3 | | 1 | | | |
| | | Hoek van Holland 4 | | 1 | | | |
| | | Hollandse kust-Development Zone | | 1 | | | |
| | | Hopper | | 1 | | | |
| | | HoriWind | | 1 | | | |
| | | Horizon | | 1 | | | |
| | | Ijmuiden – Development Zone | | 1 | | | |
| | | Ijmuiden 1 | | 1 | | | |
| | | Ijmuiden 2 | | 1 | | | |
| | | Noord Hinder | | 1 | | | |
| | | Noord Hinder 1 | | 1 | | | |
| | | Noord Hinder 2 | | 1 | | | |
| | | Scheveningen 5 | | 1 | | | |
| | | Tromp Binnen | | 1 | | | |
| | | Tromp Oost | | 1 | | | |
| | | Tromp West | | 1 | | | |
| | Grand Total | | 20 | 54 | 16 | 14 | 15 |
| Aggregates | UK | Area 400 | 1 | 1 | | | |
| | | Area 439 | 1 | 1 | | | |
| | | Area 441/3 | 1 | 1 | | | |
| | | Area 448 | 1 | 1 | | | 1 |

| Type | Country | ProjectName | FARNE ISLANDS | FLAMBOROUGH HEAD AND BEMPTON CLIFFS | FIRTH OF FORTH ISLANDS | FOWLSHEUGH | ST ABB'S HEAD TO FAST CASTLE |
|---|---|---|---|---|---|---|---|
| | | Area 449 | 1 | 1 | | | 1 |
| | | Area 454/512 | | 1 | | | |
| | | Area 466/1 | 1 | 1 | 1 | 1 | 1 |
| | | Area 483 | | 1 | | | |
| | | Area 484 | | 1 | | | |
| | | Area 485/1 | 1 | 1 | 1 | | 1 |
| | | Area 485/2 | 1 | 1 | 1 | | 1 |
| | | Area 490 | 1 | 1 | | | |
| | | Area 491 | | 1 | | | |
| | | Area 492 | 1 | 1 | | | |
| | | Area 493 | 1 | 1 | | | |
| | | Area 494 | | 1 | | | |
| | | Area 495/1 | | 1 | | | |
| | | Area 495/2 | | 1 | | | |
| | | Area 496 | | 1 | | | |
| | | Area 506 | 1 | 1 | | | |
| | Holland | Marine aggregates | | 1 | | | |
| | Grand Total | | 12 | 21 | 3 | 1 | 5 |

**Table A8.7** Protected sites identified as relevant to the Dogger Bank Teesside A and B projects for Atlantic puffin, and other offshore wind farm and marine aggregates projects within the species' potential foraging range from these sites during the breeding season. (Note, this table is based on use of a maximum foraging range of 580km.)

| Type | Country | Project Name | FLAMBOROUGH HEAD AND BEMPTON CLIFFS |
|---|---|---|---|
| Wind farms | UK | Docking Shoal | 1 |
| | | Dudgeon | 1 |
| | | Hornsea Subzone One (Hornsea) | 1 |
| | | Humber Gateway | 1 |
| | | Race Bank | 1 |
| | | Sheringham Shoal | 1 |
| | | Teesside | 1 |
| | | Triton Knoll | 1 |
| | | Westermost Rough | 1 |
| | Grand Total | | 9 |
| Aggregates | UK | Area 400 | 1 |
| | | Area 439 | 1 |
| | | Area 441/3 | 1 |
| | | Area 448 | 1 |
| | | Area 449 | 1 |
| | | Area 466/1 | 1 |
| | | Area 483 | 1 |
| | | Area 484 | 1 |
| | | Area 485/1 | 1 |
| | | Area 485/2 | 1 |
| | | Area 490 | 1 |
| | | Area 491 | 1 |
| | | Area 492 | 1 |
| | | Area 493 | 1 |
| | | Area 506 | 1 |
| | Holland | Marine aggregates | 1 |
| | Grand Total | | 16 |

**APPENDIX 9 Tables summarising the apportioning to protected sites of the impacts associated with the effects of disturbance, displacement, barrier effects, and collision**


Teeside A
Teeside B
Dogger Bank Teesside A and B
Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D

**Dogger Bank Teesside A [top]**

**Table A9.1** Apportioning to protected sites of the maximum breeding season numbers of adult northern fulmars in flight in the proposed Dogger Bank Teesside A project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| **Sitename** | **Designation** | **Mean between years** | |
|---|---|---|---|
| | | **Number of adults** | **% of current population[1]** |
| Buchan Ness to Collieston Coast | SPA, SSSI | 12.95 (10.48-15.62) | 0.47 (0.38-0.56) |
| Forth Islands | SPA, SSSI | 6.28 (5.09-7.58) | 0.56 (0.45-0.67) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 48.55 (39.32-58.58) | 2.66 (2.15-3.2) |
| Fowlsheugh | SPA, SSSI | 1.21 (0.98-1.46) | 0.31 (0.25-0.38) |
| Hunstanton Cliffs | SSSI | 1.97 (1.59-2.37) | 1.08 (0.87-1.3) |
| North Berwick Coast (Firth of Forth SPA) | SSSI | 6 (4.86-7.24) | 0.55 (0.45-0.67) |
| Seevogelschutzgebiet Helgoland | SPA | 1.2 (0.97-1.45) | 0.65 (0.53-0.79) |
| Weybourne Cliffs | SSSI | 0.39 (0.31-0.47) | 1.08 (0.87-1.3) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.2** Apportioning to protected sites of the maximum breeding season numbers of adult northern gannets in flight in the proposed Dogger Bank Teesside A project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| **Sitename** | **Designation** | **Mean between years** | |
|---|---|---|---|
| | | **Number of adults** | **% of current population[1]** |
| Forth Islands | SPA, SSSI | 36.68 (30.86-43.67) | 0.03 (0.03-0.04) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 17.02 (14.32-20.26) | 0.11 (0.09-0.13) |
| Seevogelschutzgebiet Helgoland | SPA | 0.09 (0.07-0.11) | 0.04 (0.03-0.05) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.3a**. Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 1.18 | 1.18 | 0 (0-0) | 1.18 | 1.18 | 0 (0-0) | 0.03 |
| Seevogelschutzgebiet Helgoland | SPA | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0.01) | 0.07 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.22 | 0.07 | 0 (0-0) | 0.22 | 0.07 | 0 (0-0) | 0.03 |
| Forth Islands | SPA, SSSI | 2.61 | 1.02 | 0 (0-0) | 3.35 | 1.31 | 0 (0-0) | 5.96 | 3.92 | 0 (0-0.01) | 0.06 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.21 | 0.36 | 0.01 (0.01-0.01) | 0.51 | 0.15 | 0 (0-0) | 1.72 | 1.36 | 0.01 (0.01-0.01) | 0.13 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.47 | 0.99 | 0 (0-0) | 1.47 | 0.99 | 0 (0-0) | 0.03 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.59 | 0.41 | 0 (0-0) | 0.59 | 0.41 | 0 (0-0) | 0.03 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 0.28 | 0.36 | 0 (0-0) | 0.28 | 0.36 | 0 (0-0) | 0.03 |
| TOTAL | | 3.83 | - | 0 | 7.61 | - | 0 | 11.44 | - | 0 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.3b** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 2.31 | 2.31 | 0 (0-0) | 2.31 | 2.31 | 0 (0-0) | 0.06 |
| Seevogelschutzgebiet Helgoland | SPA | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.12 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.42 | 0.14 | 0 (0-0) | 0.42 | 0.14 | 0 (0-0) | 0.06 |
| Forth Islands | SPA, SSSI | 3.31 | 1.29 | 0 (0-0) | 6.57 | 2.56 | 0 (0-0) | 9.88 | 5.87 | 0.01 (0.01-0.01) | 0.11 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.54 | 0.45 | 0.01 (0.01-0.01) | 1 | 0.3 | 0 (0-0) | 2.54 | 1.83 | 0.01 (0.01-0.02) | 0.20 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 2.88 | 1.94 | 0 (0-0) | 2.88 | 1.94 | 0 (0-0) | 0.06 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 1.16 | 0.81 | 0 (0-0) | 1.16 | 0.81 | 0 (0-0) | 0.06 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 0.55 | 0.7 | 0 (0-0) | 0.55 | 0.7 | 0 (0-0) | 0.06 |
| TOTAL | | 4.86 | - | 0 | 14.91 | - | 0 | 19.76 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.3c** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 5.33 | 5.33 | 0.01 (0.01-0.01) | 5.33 | 5.33 | 0.01 (0.01-0.01) | 0.12 |
| Seevogelschutzgebiet Helgoland | SPA | 0.03 | 0.03 | 0.01 (0.01-0.02) | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.06 | 0.06 | 0.02 (0.02-0.03) | 0.33 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.98 | 0.32 | 0.01 (0.01-0.01) | 0.98 | 0.32 | 0.01 (0.01-0.01) | 0.12 |
| Forth Islands | SPA, SSSI | 13.3 | 5.18 | 0.01 (0.01-0.01) | 15.13 | 5.89 | 0.01 (0.01-0.01) | 28.44 | 19.2 | 0.02 (0.02-0.03) | 0.30 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 6.17 | 1.82 | 0.04 (0.03-0.04) | 2.31 | 0.68 | 0.01 (0.01-0.01) | 8.48 | 6.86 | 0.05 (0.04-0.05) | 0.66 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 6.64 | 4.47 | 0.01 (0.01-0.01) | 6.64 | 4.47 | 0.01 (0.01-0.01) | 0.12 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 2.66 | 1.87 | 0.01 (0.01-0.01) | 2.66 | 1.87 | 0.01 (0.01-0.01) | 0.12 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 1.28 | 1.61 | 0.01 (0.01-0.01) | 1.28 | 1.61 | 0.01 (0.01-0.01) | 0.12 |
| TOTAL | | 19.51 | - | 0.01 | 34.36 | - | 0.01 | 53.87 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.3d** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 3.14 | 3.14 | 0.01 (0-0.01) | 3.14 | 3.14 | 0.01 (0-0.01) | 0.08 |
| Seevogelschutzgebiet Helgoland | SPA | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.02 | 0.02 | 0.01 (0-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.02) | 0.18 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.58 | 0.19 | 0.01 (0-0.01) | 0.58 | 0.19 | 0.01 (0-0.01) | 0.08 |
| Forth Islands | SPA, SSSI | 6.88 | 2.68 | 0.01 (0-0.01) | 8.92 | 3.47 | 0.01 (0-0.01) | 15.8 | 10.35 | 0.01 (0.01-0.01) | 0.17 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.19 | 0.94 | 0.02 (0.02-0.02) | 1.36 | 0.4 | 0.01 (0-0.01) | 4.55 | 3.59 | 0.02 (0.02-0.03) | 0.35 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 3.92 | 2.64 | 0.01 (0-0.01) | 3.92 | 2.64 | 0.01 (0-0.01) | 0.08 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 1.57 | 1.1 | 0.01 (0-0.01) | 1.57 | 1.1 | 0.01 (0-0.01) | 0.08 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 0.75 | 0.95 | 0.01 (0-0.01) | 0.75 | 0.95 | 0.01 (0-0.01) | 0.08 |
| TOTAL | | 10.08 | - | 0 | 20.26 | - | 0.01 | 30.34 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.4** Apportioning to protected sites of the maximum breeding season numbers of adult black-legged kittiwakes in flight in the proposed Dogger Bank Teesside A project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 327.17 (288.22-366.58) | 0.43 (0.38-0.48) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.5a**. Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) | 0.09 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0 (0-0) | 0.02 | 0.02 | 0 (0-0) | 0.09 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.2 | 0.2 | 0 (0-0) | 0.2 | 0.2 | 0 (0-0) | 0.09 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0 (0-0) | 0.05 | 0.05 | 0 (0-0) | 0.09 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.11 | - | 0 (0-0) | 0.11 | - | 0 (0-0) | 0.09 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 1.58 | 3.83 | 0 (0-0) | 1.58 | 3.83 | 0 (0-0) | 0.09 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.22 | 0 (0-0) | 0.04 | 0.22 | 0 (0-0) | 0.09 |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.58 | 1.22 | 0 (0-0) | 0.58 | 1.22 | 0 (0-0) | 0.09 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.22 | 1.2 | 0 (0-0) | 0.22 | 1.2 | 0 (0-0) | 0.09 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.14 | - | 0 (0-0) | 0.14 | - | 0 (0-0) | 0.09 |
| Durham Coast and Marsden Bay | SSSI | 0 | - | 0 | 0.32 | - | 0 (0-0) | 0.32 | - | 0 (0-0) | 0.09 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.07 | - | 0 (0-0) | 0.07 | - | 0 (0-0) | 0.09 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 5.05 | 4.09 | 0 (0-0) | 5.05 | 4.09 | 0 (0-0) | 0.09 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.18 | 2.29 | 0 (0-0) | 0.18 | 2.29 | 0 (0-0) | 0.09 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 0.5 | 0.78 | 0 (0-0) | 0.5 | 0.78 | 0 (0-0) | 0.09 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.48 | 1.06 | 0 (0-0) | 0.48 | 1.06 | 0 (0-0) | 0.09 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 4.84 | 9.07 | 0.01 (0-0.01) | 5.6 | 10.49 | 0 (0-0) | 10.45 | 15.34 | 0.01 (0.01-0.01) | 0.20 |
| Foula | SPA | 0 | 0 | 0 | 0.06 | 0.48 | 0 (0-0) | 0.06 | 0.48 | 0 (0-0) | 0.09 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.18 | 4.61 | 0 (0-0) | 1.18 | 4.61 | 0 (0-0) | 0.09 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.12 | 0 (0-0) | 0.04 | 0.12 | 0 (0-0) | 0.09 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.05 | 0.38 | 0 (0-0) | 0.05 | 0.38 | 0 (0-0) | 0.09 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 0.34 | 0.97 | 0 (0-0) | 0.34 | 0.97 | 0 (0-0) | 0.09 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.28 | 1.65 | 0 (0-0) | 1.28 | 1.65 | 0 (0-0) | 0.09 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.06 | 0.88 | 0 (0-0) | 0.06 | 0.88 | 0 (0-0) | 0.09 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.17 | 0.62 | 0 (0-0) | 0.17 | 0.62 | 0 (0-0) | 0.09 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 2.04 | 2.66 | 0 (0-0) | 2.04 | 2.66 | 0 (0-0) | 0.09 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.17 | 0 (0-0) | 0.07 | 0.17 | 0 (0-0) | 0.09 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.87 | 3.98 | 0 (0-0) | 1.87 | 3.98 | 0 (0-0) | 0.09 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.69 | 3.01 | 0 (0-0) | 0.69 | 3.01 | 0 (0-0) | 0.09 |
| TOTAL | | 4.84 | - | 0 | 23.01 | - | 0 | 27.85 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.5b** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.15 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.15 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.32 | 0.32 | 0.01 (0.01-0.01) | 0.32 | 0.32 | 0.01 (0.01-0.01) | 0.15 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0.01 (0.01-0.01) | 0.08 | 0.08 | 0.01 (0.01-0.01) | 0.15 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.18 | - | 0.01 (0.01-0.01) | 0.18 | - | 0.01 (0.01-0.01) | 0.15 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 2.54 | 6.16 | 0.01 (0.01-0.01) | 2.54 | 6.16 | 0.01 (0.01-0.01) | 0.15 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.35 | 0.01 (0.01-0.01) | 0.07 | 0.35 | 0.01 (0.01-0.01) | 0.15 |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.93 | 1.96 | 0.01 (0.01-0.01) | 0.93 | 1.96 | 0.01 (0.01-0.01) | 0.15 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.36 | 1.93 | 0.01 (0.01-0.01) | 0.36 | 1.93 | 0.01 (0.01-0.01) | 0.15 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.22 | - | 0.01 (0.01-0.01) | 0.22 | - | 0.01 (0.01-0.01) | 0.15 |
| Durham Coast and Marsden Bay | SSSI | 0 | - | 0 | 0.51 | - | 0.01 (0.01-0.01) | 0.51 | - | 0.01 (0.01-0.01) | 0.15 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.11 | - | 0.01 (0.01-0.01) | 0.11 | - | 0.01 (0.01-0.01) | 0.15 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 8.12 | 6.58 | 0.01 (0.01-0.01) | 8.12 | 6.58 | 0.01 (0.01-0.01) | 0.15 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.29 | 3.67 | 0.01 (0.01-0.01) | 0.29 | 3.67 | 0.01 (0.01-0.01) | 0.15 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 0.8 | 1.26 | 0.01 (0.01-0.01) | 0.8 | 1.26 | 0.01 (0.01-0.01) | 0.15 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.76 | 1.7 | 0.01 (0.01-0.01) | 0.76 | 1.7 | 0.01 (0.01-0.01) | 0.15 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 13.64 | 25.55 | 0.02 (0.01-0.02) | 9.01 | 16.87 | 0.01 (0.01-0.01) | 22.65 | 30.51 | 0.02 (0.02-0.03) | 0.44 |
| Foula | SPA | 0 | 0 | 0 | 0.1 | 0.78 | 0.01 (0.01-0.01) | 0.1 | 0.78 | 0.01 (0.01-0.01) | 0.15 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.89 | 7.41 | 0.01 (0.01-0.01) | 1.89 | 7.41 | 0.01 (0.01-0.01) | 0.15 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.06 | 0.19 | 0.01 (0.01-0.01) | 0.06 | 0.19 | 0.01 (0.01-0.01) | 0.15 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.61 | 0.01 (0.01-0.01) | 0.08 | 0.61 | 0.01 (0.01-0.01) | 0.15 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 0.54 | 1.56 | 0.01 (0.01-0.01) | 0.54 | 1.56 | 0.01 (0.01-0.01) | 0.15 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 2.05 | 2.65 | 0.01 (0.01-0.01) | 2.05 | 2.65 | 0.01 (0.01-0.01) | 0.15 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.1 | 1.42 | 0.01 (0.01-0.01) | 0.1 | 1.42 | 0.01 (0.01-0.01) | 0.15 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.28 | 0.99 | 0.01 (0.01-0.01) | 0.28 | 0.99 | 0.01 (0.01-0.01) | 0.15 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 3.28 | 4.28 | 0.01 (0.01-0.01) | 3.28 | 4.28 | 0.01 (0.01-0.01) | 0.15 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.11 | 0.28 | 0.01 (0.01-0.01) | 0.11 | 0.28 | 0.01 (0.01-0.01) | 0.15 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 3.01 | 6.41 | 0.01 (0.01-0.01) | 3.01 | 6.41 | 0.01 (0.01-0.01) | 0.15 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.11 | 4.84 | 0.01 (0.01-0.01) | 1.11 | 4.84 | 0.01 (0.01-0.01) | 0.15 |
| TOTAL | | 13.64 | - | 0 | 36.98 | - | 0.01 | 50.62 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.5c** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.15 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.15 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.33 | 0.33 | 0.01 (0.01-0.01) | 0.33 | 0.33 | 0.01 (0.01-0.01) | 0.15 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.09 | 0.09 | 0.01 (0.01-0.01) | 0.09 | 0.09 | 0.01 (0.01-0.01) | 0.15 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.18 | - | 0.01 (0.01-0.01) | 0.18 | - | 0.01 (0.01-0.01) | 0.15 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 2.6 | 6.32 | 0.01 (0.01-0.01) | 2.6 | 6.32 | 0.01 (0.01-0.01) | 0.15 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.36 | 0.01 (0.01-0.01) | 0.07 | 0.36 | 0.01 (0.01-0.01) | 0.15 |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.96 | 2.01 | 0.01 (0.01-0.01) | 0.96 | 2.01 | 0.01 (0.01-0.01) | 0.15 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.37 | 1.98 | 0.01 (0.01-0.01) | 0.37 | 1.98 | 0.01 (0.01-0.01) | 0.15 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.23 | - | 0.01 (0.01-0.01) | 0.23 | - | 0.01 (0.01-0.01) | 0.15 |
| Durham Coast and Marsden Bay | SSSI | 0 | - | 0 | 0.53 | - | 0.01 (0.01-0.01) | 0.53 | - | 0.01 (0.01-0.01) | 0.15 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.11 | - | 0.01 (0.01-0.01) | 0.11 | - | 0.01 (0.01-0.01) | 0.15 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 8.34 | 6.75 | 0.01 (0.01-0.01) | 8.34 | 6.75 | 0.01 (0.01-0.01) | 0.15 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.3 | 3.77 | 0.01 (0.01-0.01) | 0.3 | 3.77 | 0.01 (0.01-0.01) | 0.15 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 0.83 | 1.3 | 0.01 (0.01-0.01) | 0.83 | 1.3 | 0.01 (0.01-0.01) | 0.15 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.78 | 1.74 | 0.01 (0.01-0.01) | 0.78 | 1.74 | 0.01 (0.01-0.01) | 0.15 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 12.79 | 23.96 | 0.01 (0.01-0.02) | 9.25 | 17.31 | 0.01 (0.01-0.01) | 22.04 | 30.11 | 0.02 (0.02-0.02) | 0.43 |
| Foula | SPA | 0 | 0 | 0 | 0.1 | 0.8 | 0.01 (0.01-0.01) | 0.1 | 0.8 | 0.01 (0.01-0.01) | 0.15 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.94 | 7.61 | 0.01 (0.01-0.01) | 1.94 | 7.61 | 0.01 (0.01-0.01) | 0.15 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.06 | 0.19 | 0.01 (0.01-0.01) | 0.06 | 0.19 | 0.01 (0.01-0.01) | 0.15 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.62 | 0.01 (0.01-0.01) | 0.08 | 0.62 | 0.01 (0.01-0.01) | 0.15 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 0.56 | 1.6 | 0.01 (0.01-0.01) | 0.56 | 1.6 | 0.01 (0.01-0.01) | 0.15 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 2.11 | 2.72 | 0.01 (0.01-0.01) | 2.11 | 2.72 | 0.01 (0.01-0.01) | 0.15 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.11 | 1.46 | 0.01 (0.01-0.01) | 0.11 | 1.46 | 0.01 (0.01-0.01) | 0.15 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.29 | 1.02 | 0.01 (0.01-0.01) | 0.29 | 1.02 | 0.01 (0.01-0.01) | 0.15 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 3.37 | 4.4 | 0.01 (0.01-0.01) | 3.37 | 4.4 | 0.01 (0.01-0.01) | 0.15 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.11 | 0.28 | 0.01 (0.01-0.01) | 0.11 | 0.28 | 0.01 (0.01-0.01) | 0.15 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 3.09 | 6.58 | 0.01 (0.01-0.01) | 3.09 | 6.58 | 0.01 (0.01-0.01) | 0.15 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.14 | 4.96 | 0.01 (0.01-0.01) | 1.14 | 4.96 | 0.01 (0.01-0.01) | 0.15 |
| TOTAL | | 12.79 | - | 0 | 37.96 | - | 0.01 | 50.76 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.5d** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) | 0.07 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0 (0-0) | 0.02 | 0.02 | 0 (0-0) | 0.07 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.19 | 0.19 | 0 (0-0) | 0.19 | 0.19 | 0 (0-0) | 0.07 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0 (0-0) | 0.05 | 0.05 | 0 (0-0) | 0.07 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.1 | - | 0 (0-0) | 0.1 | - | 0 (0-0) | 0.07 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 1.46 | 3.55 | 0 (0-0) | 1.46 | 3.55 | 0 (0-0) | 0.07 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.2 | 0 (0-0) | 0.04 | 0.2 | 0 (0-0) | 0.07 |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.54 | 1.13 | 0 (0-0) | 0.54 | 1.13 | 0 (0-0) | 0.07 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.21 | 1.11 | 0 (0-0) | 0.21 | 1.11 | 0 (0-0) | 0.07 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.13 | - | 0 (0-0) | 0.13 | - | 0 (0-0) | 0.07 |
| Durham Coast and Marsden Bay | SSSI | 0 | - | 0 | 0.3 | - | 0 (0-0) | 0.3 | - | 0 (0-0) | 0.07 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.06 | - | 0 (0-0) | 0.06 | - | 0 (0-0) | 0.07 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 4.68 | 3.79 | 0 (0-0) | 4.68 | 3.79 | 0 (0-0) | 0.07 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.17 | 2.12 | 0 (0-0) | 0.17 | 2.12 | 0 (0-0) | 0.07 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 0.46 | 0.73 | 0 (0-0) | 0.46 | 0.73 | 0 (0-0) | 0.07 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.44 | 0.98 | 0 (0-0) | 0.44 | 0.98 | 0 (0-0) | 0.07 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 20.96 | 39.25 | 0.02 (0.02-0.03) | 5.19 | 9.72 | 0 (0-0) | 26.15 | 30.68 | 0.03 (0.02-0.03) | 0.53 |
| Foula | SPA | 0 | 0 | 0 | 0.06 | 0.45 | 0 (0-0) | 0.06 | 0.45 | 0 (0-0) | 0.07 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.09 | 4.27 | 0 (0-0) | 1.09 | 4.27 | 0 (0-0) | 0.07 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.11 | 0 (0-0) | 0.03 | 0.11 | 0 (0-0) | 0.07 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.05 | 0.35 | 0 (0-0) | 0.05 | 0.35 | 0 (0-0) | 0.07 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 0.31 | 0.9 | 0 (0-0) | 0.31 | 0.9 | 0 (0-0) | 0.07 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.18 | 1.53 | 0 (0-0) | 1.18 | 1.53 | 0 (0-0) | 0.07 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.06 | 0.82 | 0 (0-0) | 0.06 | 0.82 | 0 (0-0) | 0.07 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.16 | 0.57 | 0 (0-0) | 0.16 | 0.57 | 0 (0-0) | 0.07 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 1.89 | 2.47 | 0 (0-0) | 1.89 | 2.47 | 0 (0-0) | 0.07 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.06 | 0.16 | 0 (0-0) | 0.06 | 0.16 | 0 (0-0) | 0.07 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.74 | 3.69 | 0 (0-0) | 1.74 | 3.69 | 0 (0-0) | 0.07 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.64 | 2.79 | 0 (0-0) | 0.64 | 2.79 | 0 (0-0) | 0.07 |
| TOTAL | | 20.96 | - | 0.01 | 21.32 | - | 0 | 42.27 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.6a**. Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.01 (0.01-0.02) | 0.05 | 0.05 | 0.01 (0.01-0.02) | 0.07 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.07 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0.01-0.02) | 0.03 | 0.03 | 0.01 (0.01-0.02) | 0.07 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.07 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.2 | 0.2 | 0.01 (0.01-0.02) | 0.2 | 0.2 | 0.01 (0.01-0.02) | 0.07 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.07 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0.01-0.02) | 0.02 | 0.02 | 0.01 (0.01-0.02) | 0.07 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.07 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.48 | 1.48 | 0.01 (0.01-0.02) | 1.48 | 1.48 | 0.01 (0.01-0.02) | 0.07 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 7.17 | 7.17 | 0.01 (0.01-0.02) | 7.17 | 7.17 | 0.01 (0.01-0.02) | 0.07 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 2.26 | 2.26 | 0.01 (0.01-0.02) | 2.26 | 2.26 | 0.01 (0.01-0.02) | 0.07 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.63 | 0.63 | 0.01 (0.01-0.02) | 0.63 | 0.63 | 0.01 (0.01-0.02) | 0.07 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 4.35 | 4.35 | 0.01 (0.01-0.02) | 4.35 | 4.35 | 0.01 (0.01-0.02) | 0.07 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 0.78 | 0.78 | 0.01 (0.01-0.02) | 0.78 | 0.78 | 0.01 (0.01-0.02) | 0.07 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 5.91 | 5.91 | 0.01 (0.01-0.02) | 5.91 | 5.91 | 0.01 (0.01-0.02) | 0.07 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0.01-0.02) | 0.03 | 0.03 | 0.01 (0.01-0.02) | 0.07 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.07 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 0.88 | 6.75 | 0.01 (0.01-0.02) | 0.88 | 6.75 | 0.01 (0.01-0.02) | 0.07 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.63 | 0.47 | 0.01 (0.01-0.02) | 0.63 | 0.47 | 0.01 (0.01-0.02) | 0.07 |
| TOTAL | | 0 | - | 0 | 24.44 | - | 0.01 | 24.44 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.6b** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0-0.01) | 0.03 | 0.03 | 0.01 (0-0.01) | 0.06 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0-0.01) | 0.02 | 0.02 | 0.01 (0-0.01) | 0.06 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.12 | 0.12 | 0.01 (0-0.01) | 0.12 | 0.12 | 0.01 (0-0.01) | 0.06 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0-0.01) | 0.01 | 0.01 | 0.01 (0-0.01) | 0.06 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0-0.01) | 0.01 | 0.01 | 0.01 (0-0.01) | 0.06 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.91 | 0.91 | 0.01 (0-0.01) | 0.91 | 0.91 | 0.01 (0-0.01) | 0.06 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 4.4 | 4.4 | 0.01 (0-0.01) | 4.4 | 4.4 | 0.01 (0-0.01) | 0.06 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 1.39 | 1.39 | 0.01 (0-0.01) | 1.39 | 1.39 | 0.01 (0-0.01) | 0.06 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.39 | 0.39 | 0.01 (0-0.01) | 0.39 | 0.39 | 0.01 (0-0.01) | 0.06 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 2.67 | 2.67 | 0.01 (0-0.01) | 2.67 | 2.67 | 0.01 (0-0.01) | 0.06 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 0.48 | 0.48 | 0.01 (0-0.01) | 0.48 | 0.48 | 0.01 (0-0.01) | 0.06 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 3.63 | 3.63 | 0.01 (0-0.01) | 3.63 | 3.63 | 0.01 (0-0.01) | 0.06 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0-0.01) | 0.02 | 0.02 | 0.01 (0-0.01) | 0.06 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 0.54 | 4.14 | 0.01 (0-0.01) | 0.54 | 4.14 | 0.01 (0-0.01) | 0.06 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.38 | 0.29 | 0.01 (0-0.01) | 0.38 | 0.29 | 0.01 (0-0.01) | 0.06 |
| TOTAL | | 0 | - | 0 | 15.01 | - | 0.01 | 15.01 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.6c** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0 (0-0.01) | 0.02 | 0.02 | 0 (0-0.01) | 0.06 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) | 0.06 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0.01) | 0.01 | 0.01 | 0 (0-0.01) | 0.06 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) | 0.06 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0 (0-0.01) | 0.08 | 0.08 | 0 (0-0.01) | 0.06 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) | 0.06 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0.01) | 0.01 | 0.01 | 0 (0-0.01) | 0.06 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) | 0.06 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.62 | 0.62 | 0 (0-0.01) | 0.62 | 0.62 | 0 (0-0.01) | 0.06 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 3.03 | 3.03 | 0 (0-0.01) | 3.03 | 3.03 | 0 (0-0.01) | 0.06 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.96 | 0.96 | 0 (0-0.01) | 0.96 | 0.96 | 0 (0-0.01) | 0.06 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.27 | 0.27 | 0 (0-0.01) | 0.27 | 0.27 | 0 (0-0.01) | 0.06 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 1.84 | 1.84 | 0 (0-0.01) | 1.84 | 1.84 | 0 (0-0.01) | 0.06 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 0.33 | 0.33 | 0 (0-0.01) | 0.33 | 0.33 | 0 (0-0.01) | 0.06 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 2.49 | 2.49 | 0 (0-0.01) | 2.49 | 2.49 | 0 (0-0.01) | 0.06 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0.01) | 0.01 | 0.01 | 0 (0-0.01) | 0.06 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) | 0.06 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 0.37 | 2.85 | 0 (0-0.01) | 0.37 | 2.85 | 0 (0-0.01) | 0.06 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.26 | 0.2 | 0 (0-0.01) | 0.26 | 0.2 | 0 (0-0.01) | 0.06 |
| TOTAL | | 0 | - | 0 | 10.31 | - | 0 | 10.31 | - | 0 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.6d** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0-0.01) | 0.03 | 0.03 | 0.01 (0-0.01) | 0.06 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0-0.01) | 0.02 | 0.02 | 0.01 (0-0.01) | 0.06 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.13 | 0.13 | 0.01 (0-0.01) | 0.13 | 0.13 | 0.01 (0-0.01) | 0.06 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0-0.01) | 0.01 | 0.01 | 0.01 (0-0.01) | 0.06 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0-0.01) | 0.01 | 0.01 | 0.01 (0-0.01) | 0.06 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.98 | 0.98 | 0.01 (0-0.01) | 0.98 | 0.98 | 0.01 (0-0.01) | 0.06 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 4.78 | 4.78 | 0.01 (0-0.01) | 4.78 | 4.78 | 0.01 (0-0.01) | 0.06 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 1.51 | 1.51 | 0.01 (0-0.01) | 1.51 | 1.51 | 0.01 (0-0.01) | 0.06 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.42 | 0.42 | 0.01 (0-0.01) | 0.42 | 0.42 | 0.01 (0-0.01) | 0.06 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 2.9 | 2.9 | 0.01 (0-0.01) | 2.9 | 2.9 | 0.01 (0-0.01) | 0.06 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 0.52 | 0.52 | 0.01 (0-0.01) | 0.52 | 0.52 | 0.01 (0-0.01) | 0.06 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 3.94 | 3.94 | 0.01 (0-0.01) | 3.94 | 3.94 | 0.01 (0-0.01) | 0.06 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0-0.01) | 0.02 | 0.02 | 0.01 (0-0.01) | 0.06 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 0.59 | 4.5 | 0.01 (0-0.01) | 0.59 | 4.5 | 0.01 (0-0.01) | 0.06 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.42 | 0.31 | 0.01 (0-0.01) | 0.42 | 0.31 | 0.01 (0-0.01) | 0.06 |
| TOTAL | | 0 | - | 0 | 16.29 | - | 0.01 | 16.29 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.7a**. Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.22 | 0.22 | 0.04 (0.03-0.07) | 0.22 | 0.22 | 0.04 (0.03-0.07) | 0.17 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.17 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.41 | 0.41 | 0.04 (0.03-0.07) | 0.41 | 0.41 | 0.04 (0.03-0.07) | 0.17 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.18 | 0.18 | 0.04 (0.03-0.07) | 0.18 | 0.18 | 0.04 (0.03-0.07) | 0.17 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.17 |
| Chausay | SPA | 0 | 0 | 0 | 0.7 | 0.7 | 0.04 (0.03-0.07) | 0.7 | 0.7 | 0.04 (0.03-0.07) | 0.17 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.09 | 0.09 | 0.04 (0.03-0.07) | 0.09 | 0.09 | 0.04 (0.03-0.07) | 0.17 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.17 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.04 (0.03-0.07) | 0.04 | 0.04 | 0.04 (0.03-0.07) | 0.17 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.35 | 1.35 | 0.04 (0.03-0.07) | 1.35 | 1.35 | 0.04 (0.03-0.07) | 0.17 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0 | 0 | 0.04 (0.03-0.07) | 0 | 0 | 0.04 (0.03-0.07) | 0.17 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.03-0.07) | 0.02 | 0.02 | 0.04 (0.03-0.07) | 0.17 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.4 | 1.21 | 0.04 (0.03-0.07) | 0.4 | 1.21 | 0.04 (0.03-0.07) | 0.17 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.24 | 0.63 | 0.04 (0.03-0.07) | 0.24 | 0.63 | 0.04 (0.03-0.07) | 0.17 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.23 | 1.03 | 0.04 (0.03-0.07) | 0.23 | 1.03 | 0.04 (0.03-0.07) | 0.17 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.23 | - | 0.04 (0.03-0.07) | 0.23 | - | 0.04 (0.03-0.07) | 0.17 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.73 | 0.04 (0.03-0.07) | 0.04 | 0.73 | 0.04 (0.03-0.07) | 0.17 |
| TOTAL | | 0 | - | 0 | 4.17 | - | 0.04 | 4.17 | - | 0.04 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.7b** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.26 | 0.26 | 0.05 (0.04-0.08) | 0.26 | 0.26 | 0.05 (0.04-0.08) | 0.20 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.04-0.08) | 0.01 | 0.01 | 0.05 (0.04-0.08) | 0.20 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.49 | 0.49 | 0.05 (0.04-0.08) | 0.49 | 0.49 | 0.05 (0.04-0.08) | 0.20 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.21 | 0.21 | 0.05 (0.04-0.08) | 0.21 | 0.21 | 0.05 (0.04-0.08) | 0.20 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.04-0.08) | 0.01 | 0.01 | 0.05 (0.04-0.08) | 0.20 |
| Chausay | SPA | 0 | 0 | 0 | 0.84 | 0.84 | 0.05 (0.04-0.08) | 0.84 | 0.84 | 0.05 (0.04-0.08) | 0.20 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.11 | 0.11 | 0.05 (0.04-0.08) | 0.11 | 0.11 | 0.05 (0.04-0.08) | 0.20 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.04-0.08) | 0.01 | 0.01 | 0.05 (0.04-0.08) | 0.20 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.05 (0.04-0.08) | 0.04 | 0.04 | 0.05 (0.04-0.08) | 0.20 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.62 | 1.62 | 0.05 (0.04-0.08) | 1.62 | 1.62 | 0.05 (0.04-0.08) | 0.20 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0 | 0 | 0.05 (0.04-0.08) | 0 | 0 | 0.05 (0.04-0.08) | 0.20 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.05 (0.04-0.08) | 0.02 | 0.02 | 0.05 (0.04-0.08) | 0.20 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.48 | 1.45 | 0.05 (0.04-0.08) | 0.48 | 1.45 | 0.05 (0.04-0.08) | 0.20 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.29 | 0.76 | 0.05 (0.04-0.08) | 0.29 | 0.76 | 0.05 (0.04-0.08) | 0.20 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.27 | 1.23 | 0.05 (0.04-0.08) | 0.27 | 1.23 | 0.05 (0.04-0.08) | 0.20 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.28 | - | 0.05 (0.04-0.08) | 0.28 | - | 0.05 (0.04-0.08) | 0.20 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.88 | 0.05 (0.04-0.08) | 0.04 | 0.88 | 0.05 (0.04-0.08) | 0.20 |
| TOTAL | | 0 | - | 0 | 4.99 | - | 0.05 | 4.99 | - | 0.05 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.7c** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.28 | 0.28 | 0.05 (0.03-0.09) | 0.28 | 0.28 | 0.05 (0.03-0.09) | 0.13 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.03-0.09) | 0.01 | 0.01 | 0.05 (0.03-0.09) | 0.13 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.52 | 0.52 | 0.05 (0.03-0.09) | 0.52 | 0.52 | 0.05 (0.03-0.09) | 0.13 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.23 | 0.23 | 0.05 (0.03-0.09) | 0.23 | 0.23 | 0.05 (0.03-0.09) | 0.13 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.03-0.09) | 0.01 | 0.01 | 0.05 (0.03-0.09) | 0.13 |
| Chausay | SPA | 0 | 0 | 0 | 0.89 | 0.89 | 0.05 (0.03-0.09) | 0.89 | 0.89 | 0.05 (0.03-0.09) | 0.13 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.12 | 0.12 | 0.05 (0.03-0.09) | 0.12 | 0.12 | 0.05 (0.03-0.09) | 0.13 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.03-0.09) | 0.01 | 0.01 | 0.05 (0.03-0.09) | 0.13 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.05 (0.03-0.09) | 0.05 | 0.05 | 0.05 (0.03-0.09) | 0.13 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.72 | 1.72 | 0.05 (0.03-0.09) | 1.72 | 1.72 | 0.05 (0.03-0.09) | 0.13 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0 | 0 | 0.05 (0.03-0.09) | 0 | 0 | 0.05 (0.03-0.09) | 0.13 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.05 (0.03-0.09) | 0.02 | 0.02 | 0.05 (0.03-0.09) | 0.13 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.51 | 1.53 | 0.05 (0.03-0.09) | 0.51 | 1.53 | 0.05 (0.03-0.09) | 0.13 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.3 | 0.8 | 0.05 (0.03-0.09) | 0.3 | 0.8 | 0.05 (0.03-0.09) | 0.13 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.29 | 1.31 | 0.05 (0.03-0.09) | 0.29 | 1.31 | 0.05 (0.03-0.09) | 0.13 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.3 | - | 0.05 (0.03-0.09) | 0.3 | - | 0.05 (0.03-0.09) | 0.13 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.05 | 0.93 | 0.05 (0.03-0.09) | 0.05 | 0.93 | 0.05 (0.03-0.09) | 0.13 |
| TOTAL | | 0 | - | 0 | 5.29 | - | 0.05 | 5.29 | - | 0.05 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.7d** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.25 | 0.25 | 0.05 (0.03-0.08) | 0.25 | 0.25 | 0.05 (0.03-0.08) | 0.16 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.03-0.08) | 0.01 | 0.01 | 0.05 (0.03-0.08) | 0.16 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.46 | 0.46 | 0.05 (0.03-0.08) | 0.46 | 0.46 | 0.05 (0.03-0.08) | 0.16 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.2 | 0.2 | 0.05 (0.03-0.08) | 0.2 | 0.2 | 0.05 (0.03-0.08) | 0.16 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.03-0.08) | 0.01 | 0.01 | 0.05 (0.03-0.08) | 0.16 |
| Chausay | SPA | 0 | 0 | 0 | 0.8 | 0.8 | 0.05 (0.03-0.08) | 0.8 | 0.8 | 0.05 (0.03-0.08) | 0.16 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.11 | 0.11 | 0.05 (0.03-0.08) | 0.11 | 0.11 | 0.05 (0.03-0.08) | 0.16 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.03-0.08) | 0.01 | 0.01 | 0.05 (0.03-0.08) | 0.16 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.05 (0.03-0.08) | 0.04 | 0.04 | 0.05 (0.03-0.08) | 0.16 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.54 | 1.54 | 0.05 (0.03-0.08) | 1.54 | 1.54 | 0.05 (0.03-0.08) | 0.16 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0 | 0 | 0.05 (0.03-0.08) | 0 | 0 | 0.05 (0.03-0.08) | 0.16 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.05 (0.03-0.08) | 0.02 | 0.02 | 0.05 (0.03-0.08) | 0.16 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.46 | 1.38 | 0.05 (0.03-0.08) | 0.46 | 1.38 | 0.05 (0.03-0.08) | 0.16 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.27 | 0.72 | 0.05 (0.03-0.08) | 0.27 | 0.72 | 0.05 (0.03-0.08) | 0.16 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.26 | 1.17 | 0.05 (0.03-0.08) | 0.26 | 1.17 | 0.05 (0.03-0.08) | 0.16 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.27 | - | 0.05 (0.03-0.08) | 0.27 | - | 0.05 (0.03-0.08) | 0.16 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.84 | 0.05 (0.03-0.08) | 0.04 | 0.84 | 0.05 (0.03-0.08) | 0.16 |
| TOTAL | | 0 | - | 0 | 4.75 | - | 0.05 | 4.75 | - | 0.05 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.8a** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0 (0-0) | 0.03 | 0.03 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Seevogelschutzgebiet Helgoland | SPA | 0.04 | 0.04 | 0 (0-0) | 0.26 | 0.26 | 0 (0-0) | 0.3 | 0.3 | 0 (0-0) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 1.35 | 0.9 | 0 (0-0) | 1.35 | 0.9 | 0 (0-0) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.1 | 0.89 | 0 (0-0) | 0.1 | 0.89 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.55 | 0.96 | 0 (0-0) | 1.55 | 0.96 | 0 (0-0) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.96 | 2.06 | 0 (0-0) | 0.96 | 2.06 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 11.14 | 7.48 | 0 (0-0) | 11.14 | 7.48 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.37 | 2.26 | 0 (0-0) | 1.37 | 2.26 | 0 (0-0) |
| Farne Islands | SPA, SSSI | 0.76 | 0.56 | 0 (0-0) | 3.36 | 2.46 | 0 (0-0) | 4.13 | 3.22 | 0 (0-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.22 | 0.24 | 0 (0-0) | 1.53 | 1.67 | 0 (0-0) | 1.74 | 1.89 | 0 (0-0) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.88 | 0.73 | 0 (0-0) | 4.35 | 1.69 | 0 (0-0) | 6.23 | 3.57 | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.58 | 2.63 | 0 (0-0) | 1.58 | 2.63 | 0 (0-0) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 3.15 | 3.96 | 0 (0-0) | 3.15 | 3.96 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.52 | 1.75 | 0 (0-0) | 0.52 | 1.75 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.63 | 1.4 | 0 (0-0) | 0.63 | 1.4 | 0 (0-0) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 1.25 | 2.64 | 0 (0-0) | 1.25 | 2.64 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 4.92 | 2.68 | 0 (0-0) | 4.92 | 2.68 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 1.55 | 2.73 | 0 (0-0) | 1.55 | 2.73 | 0 (0-0) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.21 | 0.74 | 0 (0-0) | 0.21 | 0.74 | 0 (0-0) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.53 | 0.39 | 0 (0-0) | 3.06 | 2.22 | 0 (0-0) | 3.6 | 2.76 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.43 | 0.66 | 0 (0-0) | 0.43 | 0.66 | 0 (0-0) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.35 | 1.12 | 0 (0-0) | 0.35 | 1.12 | 0 (0-0) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.14 | 3.13 | 0 (0-0) | 1.14 | 3.13 | 0 (0-0) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.85 | 2.95 | 0 (0-0) | 0.85 | 2.95 | 0 (0-0) |
| TOTAL | | 3.44 | - | 0 | 45.64 | - | 0 | 49.08 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.8b** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0 (0-0) | 0.03 | 0.03 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Seevogelschutzgebiet Helgoland | SPA | 0.08 | 0.08 | 0 (0-0) | 0.34 | 0.34 | 0 (0-0) | 0.42 | 0.42 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 1.77 | 1.18 | 0 (0-0) | 1.77 | 1.18 | 0 (0-0) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.13 | 1.16 | 0 (0-0) | 0.13 | 1.16 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 2.03 | 1.25 | 0 (0-0) | 2.03 | 1.25 | 0 (0-0) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.25 | 2.69 | 0 (0-0) | 1.25 | 2.69 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 14.55 | 9.76 | 0 (0-0) | 14.55 | 9.76 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.78 | 2.96 | 0 (0-0) | 1.78 | 2.96 | 0 (0-0) |
| Farne Islands | SPA, SSSI | 1.45 | 1.06 | 0 (0-0) | 4.39 | 3.21 | 0 (0-0) | 5.84 | 4.66 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.41 | 0.45 | 0 (0-0) | 1.99 | 2.18 | 0 (0-0) | 2.4 | 2.6 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.58 | 1.39 | 0 (0-0) | 5.68 | 2.21 | 0 (0-0) | 9.26 | 5.79 | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 2.06 | 3.43 | 0 (0-0) | 2.06 | 3.43 | 0 (0-0) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 4.11 | 5.16 | 0 (0-0) | 4.11 | 5.16 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.68 | 2.29 | 0 (0-0) | 0.68 | 2.29 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.83 | 1.83 | 0 (0-0) | 0.83 | 1.83 | 0 (0-0) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 1.63 | 3.45 | 0 (0-0) | 1.63 | 3.45 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 6.42 | 3.5 | 0 (0-0) | 6.42 | 3.5 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 2.02 | 3.57 | 0 (0-0) | 2.02 | 3.57 | 0 (0-0) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.28 | 0.97 | 0 (0-0) | 0.28 | 0.97 | 0 (0-0) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.01 | 0.73 | 0 (0-0) | 4 | 2.91 | 0 (0-0) | 5.01 | 3.92 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.57 | 0.86 | 0 (0-0) | 0.57 | 0.86 | 0 (0-0) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.45 | 1.46 | 0 (0-0) | 0.45 | 1.46 | 0 (0-0) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.49 | 4.08 | 0 (0-0) | 1.49 | 4.08 | 0 (0-0) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.11 | 3.86 | 0 (0-0) | 1.11 | 3.86 | 0 (0-0) |
| TOTAL | | 6.54 | - | 0 | 59.6 | - | 0 | 66.14 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.8c** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0 (0-0) | 0.02 | 0.02 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Seevogelschutzgebiet Helgoland | SPA | 0.1 | 0.1 | 0 (0-0) | 0.23 | 0.23 | 0 (0-0) | 0.32 | 0.32 | 0.01 (0-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 1.18 | 0.79 | 0 (0-0) | 1.18 | 0.79 | 0 (0-0) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.09 | 0.77 | 0 (0-0) | 0.09 | 0.77 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.36 | 0.84 | 0 (0-0) | 1.36 | 0.84 | 0 (0-0) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.84 | 1.8 | 0 (0-0) | 0.84 | 1.8 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 9.73 | 6.53 | 0 (0-0) | 9.73 | 6.53 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.19 | 1.98 | 0 (0-0) | 1.19 | 1.98 | 0 (0-0) |
| Farne Islands | SPA, SSSI | 1.73 | 1.26 | 0 (0-0) | 2.94 | 2.15 | 0 (0-0) | 4.66 | 3.87 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.49 | 0.54 | 0 (0-0) | 1.33 | 1.46 | 0 (0-0) | 1.82 | 1.95 | 0 (0-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 4.25 | 1.65 | 0.01 (0-0.01) | 3.8 | 1.47 | 0 (0-0) | 8.05 | 5.72 | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.38 | 2.29 | 0 (0-0) | 1.38 | 2.29 | 0 (0-0) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 2.75 | 3.45 | 0 (0-0) | 2.75 | 3.45 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.46 | 1.53 | 0 (0-0) | 0.46 | 1.53 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.55 | 1.22 | 0 (0-0) | 0.55 | 1.22 | 0 (0-0) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 1.09 | 2.31 | 0 (0-0) | 1.09 | 2.31 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 4.29 | 2.34 | 0 (0-0) | 4.29 | 2.34 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 1.35 | 2.38 | 0 (0-0) | 1.35 | 2.38 | 0 (0-0) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.19 | 0.65 | 0 (0-0) | 0.19 | 0.65 | 0 (0-0) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.2 | 0.87 | 0 (0-0) | 2.68 | 1.94 | 0 (0-0) | 3.88 | 3.14 | 0.01 (0-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.38 | 0.58 | 0 (0-0) | 0.38 | 0.58 | 0 (0-0) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.3 | 0.98 | 0 (0-0) | 0.3 | 0.98 | 0 (0-0) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1 | 2.73 | 0 (0-0) | 1 | 2.73 | 0 (0-0) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.74 | 2.58 | 0 (0-0) | 0.74 | 2.58 | 0 (0-0) |
| TOTAL | | 7.76 | - | 0 | 39.85 | - | 0 | 47.61 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.8d** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0 (0-0) | 0.03 | 0.03 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Seevogelschutzgebiet Helgoland | SPA | 0.08 | 0.08 | 0 (0-0) | 0.26 | 0.26 | 0 (0-0) | 0.34 | 0.34 | 0.01 (0-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 1.35 | 0.9 | 0 (0-0) | 1.35 | 0.9 | 0 (0-0) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.1 | 0.89 | 0 (0-0) | 0.1 | 0.89 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.56 | 0.96 | 0 (0-0) | 1.56 | 0.96 | 0 (0-0) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.96 | 2.07 | 0 (0-0) | 0.96 | 2.07 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 11.15 | 7.48 | 0 (0-0) | 11.15 | 7.48 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.37 | 2.27 | 0 (0-0) | 1.37 | 2.27 | 0 (0-0) |
| Farne Islands | SPA, SSSI | 1.34 | 0.98 | 0 (0-0) | 3.36 | 2.46 | 0 (0-0) | 4.7 | 3.8 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.38 | 0.42 | 0 (0-0) | 1.53 | 1.67 | 0 (0-0) | 1.91 | 2.05 | 0 (0-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.29 | 1.28 | 0 (0-0) | 4.36 | 1.69 | 0 (0-0) | 7.65 | 4.98 | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.58 | 2.63 | 0 (0-0) | 1.58 | 2.63 | 0 (0-0) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 3.15 | 3.96 | 0 (0-0) | 3.15 | 3.96 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.53 | 1.75 | 0 (0-0) | 0.53 | 1.75 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.63 | 1.4 | 0 (0-0) | 0.63 | 1.4 | 0 (0-0) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 1.25 | 2.64 | 0 (0-0) | 1.25 | 2.64 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 4.92 | 2.69 | 0 (0-0) | 4.92 | 2.69 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 1.55 | 2.73 | 0 (0-0) | 1.55 | 2.73 | 0 (0-0) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.22 | 0.74 | 0 (0-0) | 0.22 | 0.74 | 0 (0-0) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.93 | 0.68 | 0 (0-0) | 3.07 | 2.23 | 0 (0-0) | 4 | 3.16 | 0.01 (0-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.43 | 0.66 | 0 (0-0) | 0.43 | 0.66 | 0 (0-0) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.35 | 1.12 | 0 (0-0) | 0.35 | 1.12 | 0 (0-0) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.14 | 3.13 | 0 (0-0) | 1.14 | 3.13 | 0 (0-0) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.85 | 2.96 | 0 (0-0) | 0.85 | 2.96 | 0 (0-0) |
| TOTAL | | 6.02 | - | 0 | 45.68 | - | 0 | 51.7 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.9a** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.01 (0.01-0.01) | 0.05 | 0.05 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0.09 | 0.09 | 0 (0-0) | 0.52 | 0.52 | 0.01 (0.01-0.01) | 0.61 | 0.61 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 2.7 | 1.81 | 0.01 (0.01-0.01) | 2.7 | 1.81 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.19 | 1.77 | 0.01 (0.01-0.01) | 0.19 | 1.77 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 3.11 | 1.92 | 0.01 (0.01-0.01) | 3.11 | 1.92 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.92 | 4.13 | 0.01 (0.01-0.01) | 1.92 | 4.13 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 22.28 | 14.95 | 0.01 (0.01-0.01) | 22.28 | 14.95 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.73 | 4.53 | 0.01 (0.01-0.01) | 2.73 | 4.53 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 1.53 | 1.12 | 0 (0-0) | 6.72 | 4.91 | 0.01 (0.01-0.01) | 8.25 | 6.44 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.43 | 0.48 | 0 (0-0) | 3.05 | 3.35 | 0.01 (0.01-0.01) | 3.48 | 3.78 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.76 | 1.46 | 0 (0-0) | 8.7 | 3.38 | 0.01 (0.01-0.01) | 12.46 | 7.14 | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 3.16 | 5.26 | 0.01 (0.01-0.01) | 3.16 | 5.26 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 6.29 | 7.91 | 0.01 (0.01-0.01) | 6.29 | 7.91 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.05 | 3.5 | 0.01 (0.01-0.01) | 1.05 | 3.5 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 1.26 | 2.8 | 0.01 (0.01-0.01) | 1.26 | 2.8 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 2.49 | 5.28 | 0.01 (0.01-0.01) | 2.49 | 5.28 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 9.83 | 5.37 | 0.01 (0.01-0.01) | 9.83 | 5.37 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 3.09 | 5.46 | 0.01 (0.01-0.01) | 3.09 | 5.46 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.43 | 1.49 | 0.01 (0.01-0.01) | 0.43 | 1.49 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.06 | 0.77 | 0 (0-0) | 6.13 | 4.45 | 0.01 (0.01-0.01) | 7.19 | 5.51 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.87 | 1.32 | 0.01 (0.01-0.01) | 0.87 | 1.32 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.7 | 2.24 | 0.01 (0.01-0.01) | 0.7 | 2.24 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 2.29 | 6.25 | 0.01 (0.01-0.01) | 2.29 | 6.25 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.7 | 5.91 | 0.01 (0.01-0.01) | 1.7 | 5.91 | 0.01 (0.01-0.01) |
| TOTAL | | 6.87 | - | 0 | 91.28 | - | 0.01 | 98.16 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.9b** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.01 (0.01-0.01) | 0.07 | 0.07 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0.17 | 0.17 | 0 (0-0) | 0.68 | 0.68 | 0.01 (0.01-0.01) | 0.84 | 0.84 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 3.53 | 2.36 | 0.01 (0.01-0.01) | 3.53 | 2.36 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.25 | 2.31 | 0.01 (0.01-0.01) | 0.25 | 2.31 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 4.06 | 2.51 | 0.01 (0.01-0.01) | 4.06 | 2.51 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 2.5 | 5.39 | 0.01 (0.01-0.01) | 2.5 | 5.39 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 29.09 | 19.52 | 0.01 (0.01-0.01) | 29.09 | 19.52 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 3.57 | 5.91 | 0.01 (0.01-0.01) | 3.57 | 5.91 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 2.91 | 2.13 | 0 (0-0) | 8.78 | 6.42 | 0.01 (0.01-0.01) | 11.69 | 9.33 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.83 | 0.91 | 0 (0-0) | 3.98 | 4.37 | 0.01 (0.01-0.01) | 4.81 | 5.2 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 7.16 | 2.78 | 0.01 (0.01-0.01) | 11.36 | 4.41 | 0.01 (0.01-0.01) | 18.53 | 11.57 | 0.02 (0.02-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 4.13 | 6.86 | 0.01 (0.01-0.01) | 4.13 | 6.86 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 8.22 | 10.33 | 0.01 (0.01-0.01) | 8.22 | 10.33 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.37 | 4.57 | 0.01 (0.01-0.01) | 1.37 | 4.57 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 1.65 | 3.66 | 0.01 (0.01-0.01) | 1.65 | 3.66 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 3.26 | 6.9 | 0.01 (0.01-0.01) | 3.26 | 6.9 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 12.84 | 7.01 | 0.01 (0.01-0.01) | 12.84 | 7.01 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 4.04 | 7.13 | 0.01 (0.01-0.01) | 4.04 | 7.13 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.56 | 1.94 | 0.01 (0.01-0.01) | 0.56 | 1.94 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 2.02 | 1.47 | 0 (0-0) | 8 | 5.81 | 0.01 (0.01-0.01) | 10.03 | 7.83 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.13 | 1.72 | 0.01 (0.01-0.01) | 1.13 | 1.72 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.91 | 2.93 | 0.01 (0.01-0.01) | 0.91 | 2.93 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 2.99 | 8.16 | 0.01 (0.01-0.01) | 2.99 | 8.16 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 2.22 | 7.71 | 0.01 (0.01-0.01) | 2.22 | 7.71 | 0.01 (0.01-0.01) |
| TOTAL | | 13.08 | - | 0 | 119.2 | - | 0.01 | 132.28 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.9c** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0.2 | 0.2 | 0 (0-0) | 0.45 | 0.45 | 0.01 (0.01-0.01) | 0.65 | 0.65 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 2.36 | 1.58 | 0.01 (0.01-0.01) | 2.36 | 1.58 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.17 | 1.55 | 0.01 (0.01-0.01) | 0.17 | 1.55 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 2.71 | 1.68 | 0.01 (0.01-0.01) | 2.71 | 1.68 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.67 | 3.6 | 0.01 (0.01-0.01) | 1.67 | 3.6 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 19.45 | 13.06 | 0.01 (0.01-0.01) | 19.45 | 13.06 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.39 | 3.95 | 0.01 (0.01-0.01) | 2.39 | 3.95 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 3.45 | 2.52 | 0.01 (0-0.01) | 5.87 | 4.29 | 0.01 (0.01-0.01) | 9.32 | 7.74 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.98 | 1.07 | 0 (0-0) | 2.66 | 2.92 | 0.01 (0.01-0.01) | 3.64 | 3.9 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 8.5 | 3.3 | 0.01 (0.01-0.01) | 7.6 | 2.95 | 0.01 (0.01-0.01) | 16.1 | 11.45 | 0.02 (0.01-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 2.76 | 4.59 | 0.01 (0.01-0.01) | 2.76 | 4.59 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 5.5 | 6.91 | 0.01 (0.01-0.01) | 5.5 | 6.91 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.92 | 3.06 | 0.01 (0.01-0.01) | 0.92 | 3.06 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 1.1 | 2.45 | 0.01 (0.01-0.01) | 1.1 | 2.45 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 2.18 | 4.61 | 0.01 (0.01-0.01) | 2.18 | 4.61 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 8.58 | 4.69 | 0.01 (0.01-0.01) | 8.58 | 4.69 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 2.7 | 4.77 | 0.01 (0.01-0.01) | 2.7 | 4.77 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.38 | 1.3 | 0.01 (0.01-0.01) | 0.38 | 1.3 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 2.4 | 1.74 | 0 (0-0) | 5.35 | 3.89 | 0.01 (0.01-0.01) | 7.75 | 6.28 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.76 | 1.15 | 0.01 (0.01-0.01) | 0.76 | 1.15 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.61 | 1.96 | 0.01 (0.01-0.01) | 0.61 | 1.96 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 2 | 5.46 | 0.01 (0.01-0.01) | 2 | 5.46 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.49 | 5.16 | 0.01 (0.01-0.01) | 1.49 | 5.16 | 0.01 (0.01-0.01) |
| TOTAL | | 15.52 | - | 0 | 79.71 | - | 0.01 | 95.23 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.9d** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.01 (0.01-0.01) | 0.05 | 0.05 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0.15 | 0.15 | 0 (0-0) | 0.52 | 0.52 | 0.01 (0.01-0.01) | 0.67 | 0.67 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 2.71 | 1.81 | 0.01 (0.01-0.01) | 2.71 | 1.81 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.2 | 1.77 | 0.01 (0.01-0.01) | 0.2 | 1.77 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 3.11 | 1.92 | 0.01 (0.01-0.01) | 3.11 | 1.92 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.92 | 4.13 | 0.01 (0.01-0.01) | 1.92 | 4.13 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 22.3 | 14.97 | 0.01 (0.01-0.01) | 22.3 | 14.97 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.74 | 4.53 | 0.01 (0.01-0.01) | 2.74 | 4.53 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 2.67 | 1.96 | 0 (0-0) | 6.73 | 4.92 | 0.01 (0.01-0.01) | 9.4 | 7.59 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.76 | 0.83 | 0 (0-0) | 3.05 | 3.35 | 0.01 (0.01-0.01) | 3.81 | 4.11 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 6.59 | 2.56 | 0.01 (0.01-0.01) | 8.71 | 3.38 | 0.01 (0.01-0.01) | 15.3 | 9.97 | 0.01 (0.01-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 3.16 | 5.26 | 0.01 (0.01-0.01) | 3.16 | 5.26 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 6.3 | 7.92 | 0.01 (0.01-0.01) | 6.3 | 7.92 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.05 | 3.51 | 0.01 (0.01-0.01) | 1.05 | 3.51 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 1.27 | 2.81 | 0.01 (0.01-0.01) | 1.27 | 2.81 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 2.5 | 5.29 | 0.01 (0.01-0.01) | 2.5 | 5.29 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 9.84 | 5.37 | 0.01 (0.01-0.01) | 9.84 | 5.37 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 3.1 | 5.47 | 0.01 (0.01-0.01) | 3.1 | 5.47 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.43 | 1.49 | 0.01 (0.01-0.01) | 0.43 | 1.49 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.86 | 1.35 | 0 (0-0) | 6.14 | 4.45 | 0.01 (0.01-0.01) | 8 | 6.31 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.87 | 1.32 | 0.01 (0.01-0.01) | 0.87 | 1.32 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.7 | 2.24 | 0.01 (0.01-0.01) | 0.7 | 2.24 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 2.29 | 6.26 | 0.01 (0.01-0.01) | 2.29 | 6.26 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.7 | 5.91 | 0.01 (0.01-0.01) | 1.7 | 5.91 | 0.01 (0.01-0.01) |
| TOTAL | | 12.04 | - | 0 | 91.37 | - | 0.01 | 103.4 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.10** Apportioning to protected sites of the maximum breeding season numbers of adult common guillemots in flight in the proposed Dogger Bank Teesside A project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Farne Islands | SPA, SSSI | 12.26 (11.17-13.61) | 0.02 (0.02-0.02) |
| Forth Islands | SPA, SSSI | 3.48 (3.17-3.87) | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 30.2 (27.52-33.53) | 0.03 (0.02-0.03) |
| Seevogelschutzgebiet Helgoland | SPA | 0.7 (0.64-0.77) | 0.01 (0.01-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 8.53 (7.77-9.47) | 0.02 (0.02-0.02) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.11a** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Chausay | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.36 | 0.26 | 0.01 (0.01-0.01) | 0.36 | 0.26 | 0.01 (0.01-0.01) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.04 | - | 0.01 (0.01-0.01) | 0.04 | - | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 2.58 | 2.28 | 0.01 (0.01-0.01) | 2.58 | 2.28 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.2 | 0.49 | 0.01 (0.01-0.01) | 0.2 | 0.49 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 0.01 | 0 | 0 (0-0) | 0.08 | 0 | 0.01 (0.01-0.01) | 0.09 | 0.01 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.68 | 0.3 | 0.01 (0.01-0.01) | 0.68 | 0.3 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 0.33 | 0.16 | 0 (0-0) | 2.28 | 1.11 | 0.01 (0.01-0.01) | 2.61 | 1.44 | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.5 | 0.9 | 0.01 (0.01-0.01) | 0.5 | 0.9 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 0.76 | 0.84 | 0.01 (0.01-0.01) | 0.76 | 0.84 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.36 | 0.58 | 0.01 (0.01-0.01) | 0.36 | 0.58 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.03 | 0.02 | 0 (0-0) | 0.46 | 0.32 | 0.01 (0.01-0.01) | 0.48 | 0.34 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.38 | 0.69 | 0.01 (0.01-0.01) | 0.38 | 0.69 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.14 | 0.28 | 0.01 (0.01-0.01) | 0.14 | 0.28 | 0.01 (0.01-0.01) |
| TOTAL | | 0.36 | - | 0 | 8.82 | - | 0.01 | 9.19 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.11b** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Chausay | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.01 | 0.01 | 0.01 (0.01-0.01) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.46 | 0.33 | 0.01 (0.01-0.01) | 0.46 | 0.33 | 0.01 (0.01-0.01) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.06 | - | 0.01 (0.01-0.01) | 0.06 | - | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 3.31 | 2.93 | 0.01 (0.01-0.01) | 3.31 | 2.93 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.25 | 0.63 | 0.01 (0.01-0.01) | 0.25 | 0.63 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 0.01 | 0 | 0 (0-0) | 0.11 | 0 | 0.01 (0.01-0.01) | 0.12 | 0.01 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.88 | 0.39 | 0.01 (0.01-0.01) | 0.88 | 0.39 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 0.74 | 0.36 | 0 (0-0) | 2.93 | 1.42 | 0.01 (0.01-0.01) | 3.67 | 2.16 | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.64 | 1.15 | 0.01 (0.01-0.01) | 0.64 | 1.15 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 0.98 | 1.08 | 0.01 (0.01-0.01) | 0.98 | 1.08 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.46 | 0.74 | 0.01 (0.01-0.01) | 0.46 | 0.74 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.06 | 0.04 | 0 (0-0) | 0.59 | 0.4 | 0.01 (0.01-0.01) | 0.65 | 0.46 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.48 | 0.89 | 0.01 (0.01-0.01) | 0.48 | 0.89 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.18 | 0.36 | 0.01 (0.01-0.01) | 0.18 | 0.36 | 0.01 (0.01-0.01) |
| TOTAL | | 0.81 | - | 0 | 11.33 | - | 0.01 | 12.14 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.11c** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Chausay | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.32 | 0.24 | 0.01 (0.01-0.01) | 0.32 | 0.24 | 0.01 (0.01-0.01) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.04 | - | 0.01 (0.01-0.01) | 0.04 | - | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 2.34 | 2.08 | 0.01 (0.01-0.01) | 2.34 | 2.08 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.18 | 0.45 | 0.01 (0.01-0.01) | 0.18 | 0.45 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 0.03 | 0 | 0 (0-0.01) | 0.08 | 0 | 0.01 (0.01-0.01) | 0.11 | 0.03 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.62 | 0.27 | 0.01 (0.01-0.01) | 0.62 | 0.27 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.66 | 0.81 | 0.01 (0.01-0.01) | 2.07 | 1.01 | 0.01 (0.01-0.01) | 3.74 | 2.67 | 0.01 (0.01-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.45 | 0.81 | 0.01 (0.01-0.01) | 0.45 | 0.81 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 0.69 | 0.76 | 0.01 (0.01-0.01) | 0.69 | 0.76 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.32 | 0.53 | 0.01 (0.01-0.01) | 0.32 | 0.53 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.13 | 0.09 | 0 (0-0) | 0.41 | 0.29 | 0.01 (0.01-0.01) | 0.55 | 0.42 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.34 | 0.63 | 0.01 (0.01-0.01) | 0.34 | 0.63 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.13 | 0.26 | 0.01 (0.01-0.01) | 0.13 | 0.26 | 0.01 (0.01-0.01) |
| TOTAL | | 1.83 | - | 0 | 8.02 | - | 0.01 | 9.85 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.11d** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Chausay | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.35 | 0.26 | 0.01 (0.01-0.01) | 0.35 | 0.26 | 0.01 (0.01-0.01) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.04 | - | 0.01 (0.01-0.01) | 0.04 | - | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 2.56 | 2.27 | 0.01 (0.01-0.01) | 2.56 | 2.27 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.2 | 0.49 | 0.01 (0.01-0.01) | 0.2 | 0.49 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 0.02 | 0 | 0 (0-0) | 0.08 | 0 | 0.01 (0.01-0.01) | 0.1 | 0.02 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.68 | 0.3 | 0.01 (0.01-0.01) | 0.68 | 0.3 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 0.91 | 0.44 | 0 (0-0.01) | 2.26 | 1.1 | 0.01 (0.01-0.01) | 3.17 | 2.01 | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.49 | 0.89 | 0.01 (0.01-0.01) | 0.49 | 0.89 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 0.75 | 0.83 | 0.01 (0.01-0.01) | 0.75 | 0.83 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.35 | 0.57 | 0.01 (0.01-0.01) | 0.35 | 0.57 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.07 | 0.05 | 0 (0-0) | 0.45 | 0.31 | 0.01 (0.01-0.01) | 0.53 | 0.39 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.37 | 0.69 | 0.01 (0.01-0.01) | 0.37 | 0.69 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.14 | 0.28 | 0.01 (0.01-0.01) | 0.14 | 0.28 | 0.01 (0.01-0.01) |
| TOTAL | | 1 | - | 0 | 8.76 | - | 0.01 | 9.76 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.12a** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.71 | 0.52 | 0.01 (0.01-0.02) | 0.71 | 0.52 | 0.01 (0.01-0.02) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.09 | - | 0.01 (0.01-0.02) | 0.09 | - | 0.01 (0.01-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 5.16 | 4.57 | 0.01 (0.01-0.02) | 5.16 | 4.57 | 0.01 (0.01-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.39 | 0.98 | 0.01 (0.01-0.02) | 0.39 | 0.98 | 0.01 (0.01-0.02) |
| Farne Islands | SPA, SSSI | 0.01 | 0 | 0 (0-0) | 0.17 | 0 | 0.01 (0.01-0.02) | 0.18 | 0.01 | 0.02 (0.01-0.02) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.36 | 0.6 | 0.01 (0.01-0.02) | 1.36 | 0.6 | 0.01 (0.01-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 0.66 | 0.32 | 0 (0-0) | 4.56 | 2.22 | 0.01 (0.01-0.02) | 5.23 | 2.88 | 0.02 (0.02-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1 | 1.79 | 0.01 (0.01-0.02) | 1 | 1.79 | 0.01 (0.01-0.02) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.52 | 1.68 | 0.01 (0.01-0.02) | 1.52 | 1.68 | 0.01 (0.01-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.71 | 1.16 | 0.01 (0.01-0.02) | 0.71 | 1.16 | 0.01 (0.01-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.05 | 0.04 | 0 (0-0) | 0.91 | 0.63 | 0.01 (0.01-0.02) | 0.97 | 0.68 | 0.02 (0.01-0.02) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.75 | 1.39 | 0.01 (0.01-0.02) | 0.75 | 1.39 | 0.01 (0.01-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.28 | 0.56 | 0.01 (0.01-0.02) | 0.28 | 0.56 | 0.01 (0.01-0.02) |
| TOTAL | | 0.73 | - | 0 | 17.64 | - | 0.01 | 18.37 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.12b** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.02-0.02) | 0 | 0 | 0.02 (0.02-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.91 | 0.67 | 0.02 (0.02-0.02) | 0.91 | 0.67 | 0.02 (0.02-0.02) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.11 | - | 0.02 (0.02-0.02) | 0.11 | - | 0.02 (0.02-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 6.62 | 5.87 | 0.02 (0.02-0.02) | 6.62 | 5.87 | 0.02 (0.02-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.51 | 1.26 | 0.02 (0.02-0.02) | 0.51 | 1.26 | 0.02 (0.02-0.02) |
| Farne Islands | SPA, SSSI | 0.03 | 0 | 0 (0-0) | 0.22 | 0 | 0.02 (0.02-0.02) | 0.24 | 0.03 | 0.02 (0.02-0.03) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.75 | 0.78 | 0.02 (0.02-0.02) | 1.75 | 0.78 | 0.02 (0.02-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.48 | 0.72 | 0.01 (0.01-0.01) | 5.86 | 2.84 | 0.02 (0.02-0.02) | 7.34 | 4.32 | 0.03 (0.02-0.03) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.28 | 2.3 | 0.02 (0.02-0.02) | 1.28 | 2.3 | 0.02 (0.02-0.02) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.95 | 2.15 | 0.02 (0.02-0.02) | 1.95 | 2.15 | 0.02 (0.02-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.92 | 1.49 | 0.02 (0.02-0.02) | 0.92 | 1.49 | 0.02 (0.02-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.12 | 0.08 | 0 (0-0) | 1.17 | 0.81 | 0.02 (0.02-0.02) | 1.29 | 0.93 | 0.02 (0.02-0.02) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.97 | 1.78 | 0.02 (0.02-0.02) | 0.97 | 1.78 | 0.02 (0.02-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.36 | 0.72 | 0.02 (0.02-0.02) | 0.36 | 0.72 | 0.02 (0.02-0.02) |
| TOTAL | | 1.63 | - | 0 | 22.66 | - | 0.02 | 24.28 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.12c** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.65 | 0.47 | 0.01 (0.01-0.02) | 0.65 | 0.47 | 0.01 (0.01-0.02) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.08 | - | 0.01 (0.01-0.02) | 0.08 | - | 0.01 (0.01-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 4.69 | 4.15 | 0.01 (0.01-0.02) | 4.69 | 4.15 | 0.01 (0.01-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.36 | 0.89 | 0.01 (0.01-0.02) | 0.36 | 0.89 | 0.01 (0.01-0.02) |
| Farne Islands | SPA, SSSI | 0.06 | 0 | 0.01 (0.01-0.01) | 0.15 | 0 | 0.01 (0.01-0.02) | 0.22 | 0.06 | 0.02 (0.02-0.03) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.24 | 0.55 | 0.01 (0.01-0.02) | 1.24 | 0.55 | 0.01 (0.01-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.33 | 1.62 | 0.02 (0.01-0.02) | 4.15 | 2.01 | 0.01 (0.01-0.02) | 7.47 | 5.34 | 0.03 (0.02-0.03) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.91 | 1.63 | 0.01 (0.01-0.02) | 0.91 | 1.63 | 0.01 (0.01-0.02) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.38 | 1.52 | 0.01 (0.01-0.02) | 1.38 | 1.52 | 0.01 (0.01-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.65 | 1.05 | 0.01 (0.01-0.02) | 0.65 | 1.05 | 0.01 (0.01-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.27 | 0.18 | 0.01 (0-0.01) | 0.83 | 0.57 | 0.01 (0.01-0.02) | 1.1 | 0.84 | 0.02 (0.02-0.02) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.68 | 1.26 | 0.01 (0.01-0.02) | 0.68 | 1.26 | 0.01 (0.01-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.25 | 0.51 | 0.01 (0.01-0.02) | 0.25 | 0.51 | 0.01 (0.01-0.02) |
| TOTAL | | 3.66 | - | 0 | 16.04 | - | 0.01 | 19.69 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.12d** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.7 | 0.52 | 0.01 (0.01-0.02) | 0.7 | 0.52 | 0.01 (0.01-0.02) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.09 | - | 0.01 (0.01-0.02) | 0.09 | - | 0.01 (0.01-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 5.12 | 4.54 | 0.01 (0.01-0.02) | 5.12 | 4.54 | 0.01 (0.01-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.39 | 0.98 | 0.01 (0.01-0.02) | 0.39 | 0.98 | 0.01 (0.01-0.02) |
| Farne Islands | SPA, SSSI | 0.04 | 0 | 0 (0-0.01) | 0.17 | 0 | 0.01 (0.01-0.02) | 0.2 | 0.04 | 0.02 (0.02-0.02) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.35 | 0.6 | 0.01 (0.01-0.02) | 1.35 | 0.6 | 0.01 (0.01-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.82 | 0.88 | 0.01 (0.01-0.01) | 4.53 | 2.2 | 0.01 (0.01-0.02) | 6.35 | 4.02 | 0.02 (0.02-0.03) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.99 | 1.78 | 0.01 (0.01-0.02) | 0.99 | 1.78 | 0.01 (0.01-0.02) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.51 | 1.67 | 0.01 (0.01-0.02) | 1.51 | 1.67 | 0.01 (0.01-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.71 | 1.15 | 0.01 (0.01-0.02) | 0.71 | 1.15 | 0.01 (0.01-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.15 | 0.1 | 0 (0-0) | 0.91 | 0.63 | 0.01 (0.01-0.02) | 1.05 | 0.77 | 0.02 (0.02-0.02) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.75 | 1.38 | 0.01 (0.01-0.02) | 0.75 | 1.38 | 0.01 (0.01-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.28 | 0.56 | 0.01 (0.01-0.02) | 0.28 | 0.56 | 0.01 (0.01-0.02) |
| TOTAL | | 2 | - | 0 | 17.52 | - | 0.01 | 19.52 | - | 0.02 |

**Table A9.13** Apportioning to protected sites of the maximum breeding season numbers of adult razorbills in flight in the proposed Dogger Bank Teesside A project using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Farne Islands | SPA, SSSI | 0.38 (0.3-0.48) | 0.05 (0.04-0.06) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 19.84 (15.47-24.57) | 0.07 (0.05-0.08) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.59 (1.24-1.97) | 0.07 (0.05-0.09) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.14a** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.01 | 0.06 | 0 (0-0) | 0.01 | 0.06 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.16 | 0.12 | 0 (0-0) | 0.16 | 0.12 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0 | 0.02 | 0 (0-0) | 0 | 0.02 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.23 | 0 (0-0) | 0.07 | 0.23 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.38 | 0.35 | 0 (0-0) | 0.38 | 0.35 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.63 | 0.14 | 0 (0-0) | 0.63 | 0.14 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0 | - | 0 (0-0) | 0 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.13 | 0.49 | 0 (0-0) | 0.13 | 0.49 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.16 | 0.56 | 0 (0-0) | 0.16 | 0.56 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0 | 0.04 | 0 (0-0) | 0 | 0.04 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.02 | 0 (0-0) | 0.07 | 0.02 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.02 | 0 (0-0) | 0.01 | 0.02 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.35 | 0.48 | 0 (0-0) | 0.35 | 0.48 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 2 | - | 0 | 2 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.14b** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.02 | 0.1 | 0 (0-0) | 0.02 | 0.1 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.27 | 0.2 | 0 (0-0) | 0.27 | 0.2 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0 | 0.03 | 0 (0-0) | 0 | 0.03 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.13 | 0.4 | 0 (0-0) | 0.13 | 0.4 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.63 | 0.6 | 0 (0-0) | 0.63 | 0.6 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.07 | 0.24 | 0 (0-0) | 1.07 | 0.24 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.23 | 0.83 | 0 (0-0) | 0.23 | 0.83 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.27 | 0.95 | 0 (0-0) | 0.27 | 0.95 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.06 | 0 (0-0) | 0.01 | 0.06 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.12 | 0.03 | 0 (0-0) | 0.12 | 0.03 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.04 | 0 (0-0) | 0.01 | 0.04 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.6 | 0.81 | 0 (0-0) | 0.6 | 0.81 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 3.37 | - | 0 | 3.37 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.14c** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0 | 0.03 | 0 (0-0) | 0 | 0.03 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.05 | 0 (0-0) | 0.07 | 0.05 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0 | 0.01 | 0 (0-0) | 0 | 0.01 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.1 | 0 (0-0) | 0.03 | 0.1 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.16 | 0.15 | 0 (0-0) | 0.16 | 0.15 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.27 | 0.06 | 0 (0-0) | 0.27 | 0.06 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0 | - | 0 (0-0) | 0 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.06 | 0.2 | 0 (0-0) | 0.06 | 0.2 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.23 | 0 (0-0) | 0.07 | 0.23 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0 | 0.01 | 0 (0-0) | 0 | 0.01 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.01 | 0 (0-0) | 0.03 | 0.01 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0 | 0.01 | 0 (0-0) | 0 | 0.01 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.15 | 0.2 | 0 (0-0) | 0.15 | 0.2 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 0.84 | - | 0 | 0.84 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.14d** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.01 | 0.06 | 0 (0-0) | 0.01 | 0.06 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.15 | 0.11 | 0 (0-0) | 0.15 | 0.11 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0 | 0.02 | 0 (0-0) | 0 | 0.02 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.22 | 0 (0-0) | 0.07 | 0.22 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.36 | 0.34 | 0 (0-0) | 0.36 | 0.34 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.61 | 0.14 | 0 (0-0) | 0.61 | 0.14 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0 | - | 0 (0-0) | 0 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.13 | 0.47 | 0 (0-0) | 0.13 | 0.47 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.15 | 0.54 | 0 (0-0) | 0.15 | 0.54 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0 | 0.03 | 0 (0-0) | 0 | 0.03 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.02 | 0 (0-0) | 0.07 | 0.02 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.02 | 0 (0-0) | 0.01 | 0.02 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.34 | 0.46 | 0 (0-0) | 0.34 | 0.46 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 1.92 | - | 0 | 1.92 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.15a** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.02 | 0.12 | 0 (0-0) | 0.02 | 0.12 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.32 | 0.23 | 0 (0-0) | 0.32 | 0.23 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.04 | 0 (0-0) | 0.01 | 0.04 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.15 | 0.47 | 0 (0-0) | 0.15 | 0.47 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.75 | 0.71 | 0 (0-0) | 0.75 | 0.71 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.27 | 0.29 | 0 (0-0) | 1.27 | 0.29 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.27 | 0.98 | 0 (0-0) | 0.27 | 0.98 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.32 | 1.12 | 0 (0-0) | 0.32 | 1.12 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.07 | 0 (0-0) | 0.01 | 0.07 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.14 | 0.04 | 0 (0-0) | 0.14 | 0.04 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.05 | 0 (0-0) | 0.02 | 0.05 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.71 | 0.96 | 0 (0-0) | 0.71 | 0.96 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 4 | - | 0 | 4 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.15b** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.03 | 0.2 | 0 (0-0) | 0.03 | 0.2 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.54 | 0.39 | 0 (0-0) | 0.54 | 0.39 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.06 | 0 (0-0) | 0.01 | 0.06 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.25 | 0.79 | 0 (0-0) | 0.25 | 0.79 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 1.27 | 1.2 | 0 (0-0) | 1.27 | 1.2 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 2.14 | 0.48 | 0 (0-0) | 2.14 | 0.48 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.02 | - | 0 (0-0) | 0.02 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.45 | 1.65 | 0 (0-0) | 0.45 | 1.65 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.54 | 1.89 | 0 (0-0) | 0.54 | 1.89 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.12 | 0 (0-0) | 0.01 | 0.12 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.24 | 0.06 | 0 (0-0) | 0.24 | 0.06 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.08 | 0 (0-0) | 0.03 | 0.08 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.2 | 1.62 | 0 (0-0) | 1.2 | 1.62 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 6.75 | - | 0 | 6.75 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.15c** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.01 | 0.05 | 0 (0-0) | 0.01 | 0.05 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.13 | 0.1 | 0 (0-0) | 0.13 | 0.1 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0 | 0.01 | 0 (0-0) | 0 | 0.01 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.06 | 0.2 | 0 (0-0) | 0.06 | 0.2 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.31 | 0.3 | 0 (0-0) | 0.31 | 0.3 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.53 | 0.12 | 0 (0-0) | 0.53 | 0.12 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0 | - | 0 (0-0) | 0 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.11 | 0.41 | 0 (0-0) | 0.11 | 0.41 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.13 | 0.47 | 0 (0-0) | 0.13 | 0.47 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0 | 0.03 | 0 (0-0) | 0 | 0.03 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.06 | 0.01 | 0 (0-0) | 0.06 | 0.01 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.02 | 0 (0-0) | 0.01 | 0.02 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.3 | 0.4 | 0 (0-0) | 0.3 | 0.4 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 1.67 | - | 0 | 1.67 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.15d** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.02 | 0.12 | 0 (0-0) | 0.02 | 0.12 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.31 | 0.22 | 0 (0-0) | 0.31 | 0.22 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.03 | 0 (0-0) | 0.01 | 0.03 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.14 | 0.45 | 0 (0-0) | 0.14 | 0.45 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.72 | 0.68 | 0 (0-0) | 0.72 | 0.68 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.22 | 0.27 | 0 (0-0) | 1.22 | 0.27 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.26 | 0.94 | 0 (0-0) | 0.26 | 0.94 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.31 | 1.08 | 0 (0-0) | 0.31 | 1.08 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.07 | 0 (0-0) | 0.01 | 0.07 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.14 | 0.03 | 0 (0-0) | 0.14 | 0.03 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.05 | 0 (0-0) | 0.02 | 0.05 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.68 | 0.92 | 0 (0-0) | 0.68 | 0.92 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 3.83 | - | 0 | 3.83 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Dogger Bank Teesside B** [top]

**Table A9.16** Apportioning to protected sites of the maximum breeding season numbers of adult northern fulmars in flight in the proposed Dogger Bank Teesside B project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Buchan Ness to Collieston Coast | SPA, SSSI | 8.99 (7.3-10.79) | 0.32 (0.26-0.39) |
| Forth Islands | SPA, SSSI | 4.75 (3.86-5.71) | 0.42 (0.34-0.51) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 42.65 (34.62-51.18) | 2.33 (1.89-2.8) |
| Fowlsheugh | SPA, SSSI | 0.87 (0.7-1.04) | 0.22 (0.18-0.27) |
| Hunstanton Cliffs | SSSI | 1.45 (1.18-1.74) | 0.8 (0.65-0.96) |
| North Berwick Coast (Firth of Forth SPA) | SSSI | 4.55 (3.69-5.45) | 0.42 (0.34-0.5) |
| Seevogelschutzgebiet Helgoland | SPA | 0.61 (0.49-0.73) | 0.33 (0.27-0.4) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 6.69 (5.43-8.02) | 0.19 (0.15-0.22) |
| Weybourne Cliffs | SSSI | 0.23 (0.18-0.27) | 0.63 (0.51-0.75) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.17** Apportioning to protected sites of the maximum breeding season numbers of adult northern gannets in flight in the proposed Dogger Bank Teesside B project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Forth Islands | SPA, SSSI | 45.74 (39.09-53.5) | 0.04 (0.04-0.05) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 24.63 (21.04-28.8) | 0.16 (0.13-0.18) |
| Seevogelschutzgebiet Helgoland | SPA | 0.07 (0.06-0.09) | 0.03 (0.03-0.04) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.18a**. Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 1.58 | 1.58 | 0 (0-0) | 1.58 | 1.58 | 0 (0-0) | 0.04 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0.01) | 0.07 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.29 | 0.09 | 0 (0-0) | 0.29 | 0.09 | 0 (0-0) | 0.04 |
| Forth Islands | SPA, SSSI | 2.82 | 1.1 | 0 (0-0) | 4.48 | 1.74 | 0 (0-0) | 7.29 | 4.56 | 0.01 (0-0.01) | 0.08 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.52 | 0.45 | 0.01 (0.01-0.01) | 0.68 | 0.2 | 0 (0-0) | 2.2 | 1.72 | 0.01 (0.01-0.01) | 0.17 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.97 | 1.32 | 0 (0-0) | 1.97 | 1.32 | 0 (0-0) | 0.04 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.79 | 0.55 | 0 (0-0) | 0.79 | 0.55 | 0 (0-0) | 0.04 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 0.38 | 0.48 | 0 (0-0) | 0.38 | 0.48 | 0 (0-0) | 0.04 |
| TOTAL | | 4.34 | - | 0 | 10.17 | - | 0 | 14.51 | - | 0 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.18b** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 2.89 | 2.89 | 0 (0-0.01) | 2.89 | 2.89 | 0 (0-0.01) | 0.08 |
| Seevogelschutzgebiet Helgoland | SPA | 0.01 | 0.01 | 0 (0-0) | 0.02 | 0.02 | 0 (0-0.01) | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.12 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.53 | 0.17 | 0 (0-0.01) | 0.53 | 0.17 | 0 (0-0.01) | 0.08 |
| Forth Islands | SPA, SSSI | 3.62 | 1.41 | 0 (0-0) | 8.2 | 3.19 | 0 (0-0.01) | 11.82 | 6.81 | 0.01 (0.01-0.01) | 0.13 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.95 | 0.58 | 0.01 (0.01-0.01) | 1.25 | 0.37 | 0 (0-0.01) | 3.2 | 2.32 | 0.02 (0.01-0.02) | 0.25 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 3.6 | 2.42 | 0 (0-0.01) | 3.6 | 2.42 | 0 (0-0.01) | 0.08 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 1.44 | 1.01 | 0 (0-0.01) | 1.44 | 1.01 | 0 (0-0.01) | 0.08 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 0.69 | 0.87 | 0 (0-0.01) | 0.69 | 0.87 | 0 (0-0.01) | 0.08 |
| TOTAL | | 5.58 | - | 0 | 18.63 | - | 0 | 24.2 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.18c** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 6.98 | 6.98 | 0.01 (0.01-0.01) | 6.98 | 6.98 | 0.01 (0.01-0.01) | 0.17 |
| Seevogelschutzgebiet Helgoland | SPA | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.06 | 0.06 | 0.02 (0.02-0.03) | 0.31 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.28 | 0.42 | 0.01 (0.01-0.01) | 1.28 | 0.42 | 0.01 (0.01-0.01) | 0.17 |
| Forth Islands | SPA, SSSI | 13.79 | 5.37 | 0.01 (0.01-0.01) | 19.84 | 7.72 | 0.01 (0.01-0.01) | 33.62 | 21.51 | 0.02 (0.02-0.03) | 0.35 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 7.42 | 2.19 | 0.04 (0.04-0.05) | 3.03 | 0.89 | 0.01 (0.01-0.01) | 10.45 | 8.32 | 0.06 (0.05-0.06) | 0.80 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 8.71 | 5.86 | 0.01 (0.01-0.01) | 8.71 | 5.86 | 0.01 (0.01-0.01) | 0.17 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 3.49 | 2.45 | 0.01 (0.01-0.01) | 3.49 | 2.45 | 0.01 (0.01-0.01) | 0.17 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 1.67 | 2.11 | 0.01 (0.01-0.01) | 1.67 | 2.11 | 0.01 (0.01-0.01) | 0.17 |
| TOTAL | | 21.23 | - | 0.01 | 45.04 | - | 0.01 | 66.27 | - | 0.02 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.18d** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 4.08 | 4.08 | 0.01 (0.01-0.01) | 4.08 | 4.08 | 0.01 (0.01-0.01) | 0.10 |
| Seevogelschutzgebiet Helgoland | SPA | 0.01 | 0.01 | 0.01 (0-0.01) | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.18 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.75 | 0.24 | 0.01 (0.01-0.01) | 0.75 | 0.24 | 0.01 (0.01-0.01) | 0.10 |
| Forth Islands | SPA, SSSI | 7.26 | 2.83 | 0.01 (0.01-0.01) | 11.6 | 4.52 | 0.01 (0.01-0.01) | 18.86 | 11.78 | 0.01 (0.01-0.02) | 0.20 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.91 | 1.15 | 0.02 (0.02-0.03) | 1.77 | 0.52 | 0.01 (0.01-0.01) | 5.68 | 4.43 | 0.03 (0.02-0.04) | 0.43 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 5.09 | 3.43 | 0.01 (0.01-0.01) | 5.09 | 3.43 | 0.01 (0.01-0.01) | 0.10 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 2.04 | 1.43 | 0.01 (0.01-0.01) | 2.04 | 1.43 | 0.01 (0.01-0.01) | 0.10 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 0.98 | 1.23 | 0.01 (0.01-0.01) | 0.98 | 1.23 | 0.01 (0.01-0.01) | 0.10 |
| TOTAL | | 11.19 | - | 0 | 26.34 | - | 0.01 | 37.52 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.19** Apportioning to protected sites of the maximum breeding season numbers of adult black-legged kittiwakes in flight in the proposed Dogger Bank Teesside B project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Durham Coast and Marsden Bay | SSSI | 11.32 (9.98-12.69) | 0.28 (0.25-0.31) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 521.1 (468.46-573.74) | 0.68 (0.61-0.75) |

[1] Impacts are apportioned based on current populations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.20a**. Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.14 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.14 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.31 | 0.31 | 0.01 (0.01-0.01) | 0.31 | 0.31 | 0.01 (0.01-0.01) | 0.14 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0.01 (0.01-0.01) | 0.08 | 0.08 | 0.01 (0.01-0.01) | 0.14 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.17 | - | 0.01 (0.01-0.01) | 0.17 | - | 0.01 (0.01-0.01) | 0.14 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 2.4 | 5.83 | 0.01 (0.01-0.01) | 2.4 | 5.83 | 0.01 (0.01-0.01) | 0.14 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.33 | 0.01 (0.01-0.01) | 0.07 | 0.33 | 0.01 (0.01-0.01) | 0.14 |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.88 | 1.86 | 0.01 (0.01-0.01) | 0.88 | 1.86 | 0.01 (0.01-0.01) | 0.14 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.34 | 1.83 | 0.01 (0.01-0.01) | 0.34 | 1.83 | 0.01 (0.01-0.01) | 0.14 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.21 | - | 0.01 (0.01-0.01) | 0.21 | - | 0.01 (0.01-0.01) | 0.14 |
| Durham Coast and Marsden Bay | SSSI | 0.33 | - | 0.01 (0.01-0.01) | 0.49 | - | 0.01 (0.01-0.01) | 0.82 | - | 0.01 (0.01-0.01) | 0.27 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.1 | - | 0.01 (0.01-0.01) | 0.1 | - | 0.01 (0.01-0.01) | 0.14 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 7.69 | 6.23 | 0.01 (0.01-0.01) | 7.69 | 6.23 | 0.01 (0.01-0.01) | 0.14 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.28 | 3.48 | 0.01 (0.01-0.01) | 0.28 | 3.48 | 0.01 (0.01-0.01) | 0.14 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 0.76 | 1.19 | 0.01 (0.01-0.01) | 0.76 | 1.19 | 0.01 (0.01-0.01) | 0.14 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.72 | 1.61 | 0.01 (0.01-0.01) | 0.72 | 1.61 | 0.01 (0.01-0.01) | 0.14 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 9.16 | 17.15 | 0.01 (0.01-0.01) | 8.53 | 15.97 | 0.01 (0.01-0.01) | 17.69 | 25.13 | 0.02 (0.02-0.02) | 0.34 |
| Foula | SPA | 0 | 0 | 0 | 0.09 | 0.74 | 0.01 (0.01-0.01) | 0.09 | 0.74 | 0.01 (0.01-0.01) | 0.14 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.79 | 7.02 | 0.01 (0.01-0.01) | 1.79 | 7.02 | 0.01 (0.01-0.01) | 0.14 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.05 | 0.18 | 0.01 (0.01-0.01) | 0.05 | 0.18 | 0.01 (0.01-0.01) | 0.14 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.57 | 0.01 (0.01-0.01) | 0.08 | 0.57 | 0.01 (0.01-0.01) | 0.14 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 0.52 | 1.48 | 0.01 (0.01-0.01) | 0.52 | 1.48 | 0.01 (0.01-0.01) | 0.14 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.94 | 2.51 | 0.01 (0.01-0.01) | 1.94 | 2.51 | 0.01 (0.01-0.01) | 0.14 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.1 | 1.34 | 0.01 (0.01-0.01) | 0.1 | 1.34 | 0.01 (0.01-0.01) | 0.14 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.26 | 0.94 | 0.01 (0.01-0.01) | 0.26 | 0.94 | 0.01 (0.01-0.01) | 0.14 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 3.11 | 4.06 | 0.01 (0.01-0.01) | 3.11 | 4.06 | 0.01 (0.01-0.01) | 0.14 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.11 | 0.26 | 0.01 (0.01-0.01) | 0.11 | 0.26 | 0.01 (0.01-0.01) | 0.14 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 2.85 | 6.07 | 0.01 (0.01-0.01) | 2.85 | 6.07 | 0.01 (0.01-0.01) | 0.14 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.05 | 4.58 | 0.01 (0.01-0.01) | 1.05 | 4.58 | 0.01 (0.01-0.01) | 0.14 |
| TOTAL | | 9.48 | - | 0 | 35.02 | - | 0.01 | 44.5 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.20b** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.19 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.01 (0.01-0.01) | 0.05 | 0.05 | 0.01 (0.01-0.01) | 0.19 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.44 | 0.44 | 0.01 (0.01-0.01) | 0.44 | 0.44 | 0.01 (0.01-0.01) | 0.19 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.11 | 0.11 | 0.01 (0.01-0.01) | 0.11 | 0.11 | 0.01 (0.01-0.01) | 0.19 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.24 | - | 0.01 (0.01-0.01) | 0.24 | - | 0.01 (0.01-0.01) | 0.19 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 3.42 | 8.3 | 0.01 (0.01-0.01) | 3.42 | 8.3 | 0.01 (0.01-0.01) | 0.19 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.09 | 0.47 | 0.01 (0.01-0.01) | 0.09 | 0.47 | 0.01 (0.01-0.01) | 0.19 |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.26 | 2.65 | 0.01 (0.01-0.01) | 1.26 | 2.65 | 0.01 (0.01-0.01) | 0.19 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.48 | 2.6 | 0.01 (0.01-0.01) | 0.48 | 2.6 | 0.01 (0.01-0.01) | 0.19 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.3 | - | 0.01 (0.01-0.01) | 0.3 | - | 0.01 (0.01-0.01) | 0.19 |
| Durham Coast and Marsden Bay | SSSI | 0.9 | - | 0.02 (0.02-0.02) | 0.69 | - | 0.01 (0.01-0.01) | 1.59 | - | 0.03 (0.02-0.03) | 0.52 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.14 | - | 0.01 (0.01-0.01) | 0.14 | - | 0.01 (0.01-0.01) | 0.19 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 10.95 | 8.86 | 0.01 (0.01-0.01) | 10.95 | 8.86 | 0.01 (0.01-0.01) | 0.19 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.39 | 4.95 | 0.01 (0.01-0.01) | 0.39 | 4.95 | 0.01 (0.01-0.01) | 0.19 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 1.08 | 1.7 | 0.01 (0.01-0.01) | 1.08 | 1.7 | 0.01 (0.01-0.01) | 0.19 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.03 | 2.29 | 0.01 (0.01-0.01) | 1.03 | 2.29 | 0.01 (0.01-0.01) | 0.19 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 25.07 | 46.95 | 0.03 (0.03-0.03) | 12.14 | 22.74 | 0.01 (0.01-0.01) | 37.22 | 47.81 | 0.04 (0.03-0.04) | 0.72 |
| Foula | SPA | 0 | 0 | 0 | 0.13 | 1.05 | 0.01 (0.01-0.01) | 0.13 | 1.05 | 0.01 (0.01-0.01) | 0.19 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 2.55 | 10 | 0.01 (0.01-0.01) | 2.55 | 10 | 0.01 (0.01-0.01) | 0.19 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.25 | 0.01 (0.01-0.01) | 0.08 | 0.25 | 0.01 (0.01-0.01) | 0.19 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.11 | 0.82 | 0.01 (0.01-0.01) | 0.11 | 0.82 | 0.01 (0.01-0.01) | 0.19 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 0.73 | 2.1 | 0.01 (0.01-0.01) | 0.73 | 2.1 | 0.01 (0.01-0.01) | 0.19 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 2.77 | 3.57 | 0.01 (0.01-0.01) | 2.77 | 3.57 | 0.01 (0.01-0.01) | 0.19 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.14 | 1.91 | 0.01 (0.01-0.01) | 0.14 | 1.91 | 0.01 (0.01-0.01) | 0.19 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.38 | 1.34 | 0.01 (0.01-0.01) | 0.38 | 1.34 | 0.01 (0.01-0.01) | 0.19 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 4.42 | 5.77 | 0.01 (0.01-0.01) | 4.42 | 5.77 | 0.01 (0.01-0.01) | 0.19 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.15 | 0.37 | 0.01 (0.01-0.01) | 0.15 | 0.37 | 0.01 (0.01-0.01) | 0.19 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 4.06 | 8.63 | 0.01 (0.01-0.01) | 4.06 | 8.63 | 0.01 (0.01-0.01) | 0.19 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.49 | 6.52 | 0.01 (0.01-0.01) | 1.49 | 6.52 | 0.01 (0.01-0.01) | 0.19 |
| TOTAL | | 25.97 | - | 0.01 | 49.85 | - | 0.01 | 75.82 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.20c** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.21 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.01 (0.01-0.01) | 0.05 | 0.05 | 0.01 (0.01-0.01) | 0.21 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.47 | 0.47 | 0.01 (0.01-0.01) | 0.47 | 0.47 | 0.01 (0.01-0.01) | 0.21 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.12 | 0.12 | 0.01 (0.01-0.01) | 0.12 | 0.12 | 0.01 (0.01-0.01) | 0.21 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.26 | - | 0.01 (0.01-0.01) | 0.26 | - | 0.01 (0.01-0.01) | 0.21 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 3.72 | 9.04 | 0.01 (0.01-0.01) | 3.72 | 9.04 | 0.01 (0.01-0.01) | 0.21 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.1 | 0.51 | 0.01 (0.01-0.01) | 0.1 | 0.51 | 0.01 (0.01-0.01) | 0.21 |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.37 | 2.88 | 0.01 (0.01-0.01) | 1.37 | 2.88 | 0.01 (0.01-0.01) | 0.21 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.53 | 2.83 | 0.01 (0.01-0.01) | 0.53 | 2.83 | 0.01 (0.01-0.01) | 0.21 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.32 | - | 0.01 (0.01-0.01) | 0.32 | - | 0.01 (0.01-0.01) | 0.21 |
| Durham Coast and Marsden Bay | SSSI | 0.83 | - | 0.02 (0.01-0.02) | 0.75 | - | 0.01 (0.01-0.01) | 1.58 | - | 0.03 (0.02-0.03) | 0.52 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.16 | - | 0.01 (0.01-0.01) | 0.16 | - | 0.01 (0.01-0.01) | 0.21 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 11.91 | 9.65 | 0.01 (0.01-0.01) | 11.91 | 9.65 | 0.01 (0.01-0.01) | 0.21 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.43 | 5.39 | 0.01 (0.01-0.01) | 0.43 | 5.39 | 0.01 (0.01-0.01) | 0.21 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 1.18 | 1.85 | 0.01 (0.01-0.01) | 1.18 | 1.85 | 0.01 (0.01-0.01) | 0.21 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.12 | 2.49 | 0.01 (0.01-0.01) | 1.12 | 2.49 | 0.01 (0.01-0.01) | 0.21 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 23.06 | 43.19 | 0.03 (0.02-0.03) | 13.21 | 24.75 | 0.01 (0.01-0.01) | 36.28 | 47.81 | 0.04 (0.03-0.04) | 0.71 |
| Foula | SPA | 0 | 0 | 0 | 0.14 | 1.14 | 0.01 (0.01-0.01) | 0.14 | 1.14 | 0.01 (0.01-0.01) | 0.21 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 2.77 | 10.88 | 0.01 (0.01-0.01) | 2.77 | 10.88 | 0.01 (0.01-0.01) | 0.21 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.27 | 0.01 (0.01-0.01) | 0.08 | 0.27 | 0.01 (0.01-0.01) | 0.21 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.12 | 0.89 | 0.01 (0.01-0.01) | 0.12 | 0.89 | 0.01 (0.01-0.01) | 0.21 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 0.8 | 2.29 | 0.01 (0.01-0.01) | 0.8 | 2.29 | 0.01 (0.01-0.01) | 0.21 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 3.01 | 3.89 | 0.01 (0.01-0.01) | 3.01 | 3.89 | 0.01 (0.01-0.01) | 0.21 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.15 | 2.08 | 0.01 (0.01-0.01) | 0.15 | 2.08 | 0.01 (0.01-0.01) | 0.21 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.41 | 1.45 | 0.01 (0.01-0.01) | 0.41 | 1.45 | 0.01 (0.01-0.01) | 0.21 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 4.82 | 6.28 | 0.01 (0.01-0.01) | 4.82 | 6.28 | 0.01 (0.01-0.01) | 0.21 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.16 | 0.41 | 0.01 (0.01-0.01) | 0.16 | 0.41 | 0.01 (0.01-0.01) | 0.21 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 4.42 | 9.4 | 0.01 (0.01-0.01) | 4.42 | 9.4 | 0.01 (0.01-0.01) | 0.21 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.62 | 7.09 | 0.01 (0.01-0.01) | 1.62 | 7.09 | 0.01 (0.01-0.01) | 0.21 |
| TOTAL | | 23.89 | - | 0.01 | 54.26 | - | 0.01 | 78.15 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.20d** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0-0.01) | 0.01 | 0.01 | 0.01 (0-0.01) | 0.09 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0-0.01) | 0.03 | 0.03 | 0.01 (0-0.01) | 0.09 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.27 | 0.27 | 0.01 (0-0.01) | 0.27 | 0.27 | 0.01 (0-0.01) | 0.09 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.01 (0-0.01) | 0.07 | 0.07 | 0.01 (0-0.01) | 0.09 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.15 | - | 0.01 (0-0.01) | 0.15 | - | 0.01 (0-0.01) | 0.09 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 2.08 | 5.05 | 0.01 (0-0.01) | 2.08 | 5.05 | 0.01 (0-0.01) | 0.09 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.06 | 0.28 | 0.01 (0-0.01) | 0.06 | 0.28 | 0.01 (0-0.01) | 0.09 |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.76 | 1.61 | 0.01 (0-0.01) | 0.76 | 1.61 | 0.01 (0-0.01) | 0.09 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.29 | 1.58 | 0.01 (0-0.01) | 0.29 | 1.58 | 0.01 (0-0.01) | 0.09 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.18 | - | 0.01 (0-0.01) | 0.18 | - | 0.01 (0-0.01) | 0.09 |
| Durham Coast and Marsden Bay | SSSI | 1.2 | - | 0.02 (0.02-0.03) | 0.42 | - | 0.01 (0-0.01) | 1.62 | - | 0.03 (0.03-0.03) | 0.55 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.09 | - | 0.01 (0-0.01) | 0.09 | - | 0.01 (0-0.01) | 0.09 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 6.65 | 5.39 | 0.01 (0-0.01) | 6.65 | 5.39 | 0.01 (0-0.01) | 0.09 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.24 | 3.01 | 0.01 (0-0.01) | 0.24 | 3.01 | 0.01 (0-0.01) | 0.09 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 0.66 | 1.03 | 0.01 (0-0.01) | 0.66 | 1.03 | 0.01 (0-0.01) | 0.09 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.63 | 1.39 | 0.01 (0-0.01) | 0.63 | 1.39 | 0.01 (0-0.01) | 0.09 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 33.55 | 62.82 | 0.04 (0.03-0.04) | 7.38 | 13.81 | 0.01 (0-0.01) | 40.93 | 47.36 | 0.04 (0.04-0.05) | 0.81 |
| Foula | SPA | 0 | 0 | 0 | 0.08 | 0.64 | 0.01 (0-0.01) | 0.08 | 0.64 | 0.01 (0-0.01) | 0.09 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.55 | 6.07 | 0.01 (0-0.01) | 1.55 | 6.07 | 0.01 (0-0.01) | 0.09 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.05 | 0.15 | 0.01 (0-0.01) | 0.05 | 0.15 | 0.01 (0-0.01) | 0.09 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.5 | 0.01 (0-0.01) | 0.07 | 0.5 | 0.01 (0-0.01) | 0.09 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 0.45 | 1.28 | 0.01 (0-0.01) | 0.45 | 1.28 | 0.01 (0-0.01) | 0.09 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.68 | 2.17 | 0.01 (0-0.01) | 1.68 | 2.17 | 0.01 (0-0.01) | 0.09 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.08 | 1.16 | 0.01 (0-0.01) | 0.08 | 1.16 | 0.01 (0-0.01) | 0.09 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.23 | 0.81 | 0.01 (0-0.01) | 0.23 | 0.81 | 0.01 (0-0.01) | 0.09 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 2.69 | 3.51 | 0.01 (0-0.01) | 2.69 | 3.51 | 0.01 (0-0.01) | 0.09 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.09 | 0.23 | 0.01 (0-0.01) | 0.09 | 0.23 | 0.01 (0-0.01) | 0.09 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 2.47 | 5.25 | 0.01 (0-0.01) | 2.47 | 5.25 | 0.01 (0-0.01) | 0.09 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.91 | 3.96 | 0.01 (0-0.01) | 0.91 | 3.96 | 0.01 (0-0.01) | 0.09 |
| TOTAL | | 34.75 | - | 0.01 | 30.29 | - | 0.01 | 65.04 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.21a**. Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.01 (0.01-0.02) | 0.05 | 0.05 | 0.01 (0.01-0.02) | 0.06 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.06 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0.01-0.02) | 0.03 | 0.03 | 0.01 (0.01-0.02) | 0.06 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.06 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.2 | 0.2 | 0.01 (0.01-0.02) | 0.2 | 0.2 | 0.01 (0.01-0.02) | 0.06 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.06 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0.01-0.02) | 0.02 | 0.02 | 0.01 (0.01-0.02) | 0.06 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.06 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.52 | 1.52 | 0.01 (0.01-0.02) | 1.52 | 1.52 | 0.01 (0.01-0.02) | 0.06 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 7.36 | 7.36 | 0.01 (0.01-0.02) | 7.36 | 7.36 | 0.01 (0.01-0.02) | 0.06 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 2.33 | 2.33 | 0.01 (0.01-0.02) | 2.33 | 2.33 | 0.01 (0.01-0.02) | 0.06 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.65 | 0.65 | 0.01 (0.01-0.02) | 0.65 | 0.65 | 0.01 (0.01-0.02) | 0.06 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 4.47 | 4.47 | 0.01 (0.01-0.02) | 4.47 | 4.47 | 0.01 (0.01-0.02) | 0.06 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 0.8 | 0.8 | 0.01 (0.01-0.02) | 0.8 | 0.8 | 0.01 (0.01-0.02) | 0.06 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 6.07 | 6.07 | 0.01 (0.01-0.02) | 6.07 | 6.07 | 0.01 (0.01-0.02) | 0.06 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.04 | 0.04 | 0.01 (0.01-0.02) | 0.04 | 0.04 | 0.01 (0.01-0.02) | 0.06 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.06 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 0.9 | 6.93 | 0.01 (0.01-0.02) | 0.9 | 6.93 | 0.01 (0.01-0.02) | 0.06 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.64 | 0.48 | 0.01 (0.01-0.02) | 0.64 | 0.48 | 0.01 (0.01-0.02) | 0.06 |
| TOTAL | | 0 | - | 0 | 25.1 | - | 0.01 | 25.1 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.21b** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0-0.01) | 0.03 | 0.03 | 0.01 (0-0.01) | 0.05 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.05 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0-0.01) | 0.02 | 0.02 | 0.01 (0-0.01) | 0.05 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.05 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.12 | 0.12 | 0.01 (0-0.01) | 0.12 | 0.12 | 0.01 (0-0.01) | 0.05 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0-0.01) | 0.01 | 0.01 | 0.01 (0-0.01) | 0.05 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0-0.01) | 0.01 | 0.01 | 0.01 (0-0.01) | 0.05 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.05 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.91 | 0.91 | 0.01 (0-0.01) | 0.91 | 0.91 | 0.01 (0-0.01) | 0.05 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 4.4 | 4.4 | 0.01 (0-0.01) | 4.4 | 4.4 | 0.01 (0-0.01) | 0.05 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 1.39 | 1.39 | 0.01 (0-0.01) | 1.39 | 1.39 | 0.01 (0-0.01) | 0.05 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.39 | 0.39 | 0.01 (0-0.01) | 0.39 | 0.39 | 0.01 (0-0.01) | 0.05 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 2.67 | 2.67 | 0.01 (0-0.01) | 2.67 | 2.67 | 0.01 (0-0.01) | 0.05 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 0.48 | 0.48 | 0.01 (0-0.01) | 0.48 | 0.48 | 0.01 (0-0.01) | 0.05 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 3.63 | 3.63 | 0.01 (0-0.01) | 3.63 | 3.63 | 0.01 (0-0.01) | 0.05 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0-0.01) | 0.02 | 0.02 | 0.01 (0-0.01) | 0.05 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.05 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 0.54 | 4.14 | 0.01 (0-0.01) | 0.54 | 4.14 | 0.01 (0-0.01) | 0.05 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.38 | 0.29 | 0.01 (0-0.01) | 0.38 | 0.29 | 0.01 (0-0.01) | 0.05 |
| TOTAL | | 0 | - | 0 | 15.01 | - | 0.01 | 15.01 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.21c** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0 (0-0.01) | 0.02 | 0.02 | 0 (0-0.01) | 0.05 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) | 0.05 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0.01) | 0.01 | 0.01 | 0 (0-0.01) | 0.05 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) | 0.05 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0 (0-0.01) | 0.08 | 0.08 | 0 (0-0.01) | 0.05 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) | 0.05 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0.01) | 0.01 | 0.01 | 0 (0-0.01) | 0.05 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) | 0.05 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.61 | 0.61 | 0 (0-0.01) | 0.61 | 0.61 | 0 (0-0.01) | 0.05 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 2.98 | 2.98 | 0 (0-0.01) | 2.98 | 2.98 | 0 (0-0.01) | 0.05 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.94 | 0.94 | 0 (0-0.01) | 0.94 | 0.94 | 0 (0-0.01) | 0.05 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.26 | 0.26 | 0 (0-0.01) | 0.26 | 0.26 | 0 (0-0.01) | 0.05 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 1.81 | 1.81 | 0 (0-0.01) | 1.81 | 1.81 | 0 (0-0.01) | 0.05 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 0.32 | 0.32 | 0 (0-0.01) | 0.32 | 0.32 | 0 (0-0.01) | 0.05 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 2.45 | 2.45 | 0 (0-0.01) | 2.45 | 2.45 | 0 (0-0.01) | 0.05 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0.01) | 0.01 | 0.01 | 0 (0-0.01) | 0.05 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) | 0.05 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 0.37 | 2.8 | 0 (0-0.01) | 0.37 | 2.8 | 0 (0-0.01) | 0.05 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.26 | 0.19 | 0 (0-0.01) | 0.26 | 0.19 | 0 (0-0.01) | 0.05 |
| TOTAL | | 0 | - | 0 | 10.16 | - | 0 | 10.16 | - | 0 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.21d** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0-0.01) | 0.03 | 0.03 | 0.01 (0-0.01) | 0.06 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0-0.01) | 0.02 | 0.02 | 0.01 (0-0.01) | 0.06 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.13 | 0.13 | 0.01 (0-0.01) | 0.13 | 0.13 | 0.01 (0-0.01) | 0.06 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0-0.01) | 0.01 | 0.01 | 0.01 (0-0.01) | 0.06 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0-0.01) | 0.01 | 0.01 | 0.01 (0-0.01) | 0.06 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.99 | 0.99 | 0.01 (0-0.01) | 0.99 | 0.99 | 0.01 (0-0.01) | 0.06 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 4.81 | 4.81 | 0.01 (0-0.01) | 4.81 | 4.81 | 0.01 (0-0.01) | 0.06 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 1.52 | 1.52 | 0.01 (0-0.01) | 1.52 | 1.52 | 0.01 (0-0.01) | 0.06 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.43 | 0.43 | 0.01 (0-0.01) | 0.43 | 0.43 | 0.01 (0-0.01) | 0.06 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 2.92 | 2.92 | 0.01 (0-0.01) | 2.92 | 2.92 | 0.01 (0-0.01) | 0.06 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 0.52 | 0.52 | 0.01 (0-0.01) | 0.52 | 0.52 | 0.01 (0-0.01) | 0.06 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 3.97 | 3.97 | 0.01 (0-0.01) | 3.97 | 3.97 | 0.01 (0-0.01) | 0.06 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0-0.01) | 0.02 | 0.02 | 0.01 (0-0.01) | 0.06 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) | 0.06 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 0.59 | 4.53 | 0.01 (0-0.01) | 0.59 | 4.53 | 0.01 (0-0.01) | 0.06 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.42 | 0.31 | 0.01 (0-0.01) | 0.42 | 0.31 | 0.01 (0-0.01) | 0.06 |
| TOTAL | | 0 | - | 0 | 16.4 | - | 0.01 | 16.4 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.22a**. Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.21 | 0.21 | 0.04 (0.03-0.06) | 0.21 | 0.21 | 0.04 (0.03-0.06) | 0.22 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0.04 (0.03-0.06) | 0 | 0 | 0.04 (0.03-0.06) | 0.22 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.38 | 0.38 | 0.04 (0.03-0.06) | 0.38 | 0.38 | 0.04 (0.03-0.06) | 0.22 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.17 | 0.17 | 0.04 (0.03-0.06) | 0.17 | 0.17 | 0.04 (0.03-0.06) | 0.22 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.06) | 0.01 | 0.01 | 0.04 (0.03-0.06) | 0.22 |
| Chausay | SPA | 0 | 0 | 0 | 0.66 | 0.66 | 0.04 (0.03-0.06) | 0.66 | 0.66 | 0.04 (0.03-0.06) | 0.22 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.09 | 0.09 | 0.04 (0.03-0.06) | 0.09 | 0.09 | 0.04 (0.03-0.06) | 0.22 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.06) | 0.01 | 0.01 | 0.04 (0.03-0.06) | 0.22 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.04 (0.03-0.06) | 0.04 | 0.04 | 0.04 (0.03-0.06) | 0.22 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.28 | 1.28 | 0.04 (0.03-0.06) | 1.28 | 1.28 | 0.04 (0.03-0.06) | 0.22 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0 | 0 | 0.04 (0.03-0.06) | 0 | 0 | 0.04 (0.03-0.06) | 0.22 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.03-0.06) | 0.02 | 0.02 | 0.04 (0.03-0.06) | 0.22 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.38 | 1.14 | 0.04 (0.03-0.06) | 0.38 | 1.14 | 0.04 (0.03-0.06) | 0.22 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.23 | 0.6 | 0.04 (0.03-0.06) | 0.23 | 0.6 | 0.04 (0.03-0.06) | 0.22 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.21 | 0.97 | 0.04 (0.03-0.06) | 0.21 | 0.97 | 0.04 (0.03-0.06) | 0.22 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.22 | - | 0.04 (0.03-0.06) | 0.22 | - | 0.04 (0.03-0.06) | 0.22 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.69 | 0.04 (0.03-0.06) | 0.03 | 0.69 | 0.04 (0.03-0.06) | 0.22 |
| TOTAL | | 0 | - | 0 | 3.93 | - | 0.04 | 3.93 | - | 0.04 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.22b** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.23 | 0.23 | 0.05 (0.03-0.06) | 0.23 | 0.23 | 0.05 (0.03-0.06) | 0.22 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.03-0.06) | 0.01 | 0.01 | 0.05 (0.03-0.06) | 0.22 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.43 | 0.43 | 0.05 (0.03-0.06) | 0.43 | 0.43 | 0.05 (0.03-0.06) | 0.22 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.19 | 0.19 | 0.05 (0.03-0.06) | 0.19 | 0.19 | 0.05 (0.03-0.06) | 0.22 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.03-0.06) | 0.01 | 0.01 | 0.05 (0.03-0.06) | 0.22 |
| Chausay | SPA | 0 | 0 | 0 | 0.74 | 0.74 | 0.05 (0.03-0.06) | 0.74 | 0.74 | 0.05 (0.03-0.06) | 0.22 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.1 | 0.1 | 0.05 (0.03-0.06) | 0.1 | 0.1 | 0.05 (0.03-0.06) | 0.22 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.03-0.06) | 0.01 | 0.01 | 0.05 (0.03-0.06) | 0.22 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.05 (0.03-0.06) | 0.04 | 0.04 | 0.05 (0.03-0.06) | 0.22 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.42 | 1.42 | 0.05 (0.03-0.06) | 1.42 | 1.42 | 0.05 (0.03-0.06) | 0.22 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0 | 0 | 0.05 (0.03-0.06) | 0 | 0 | 0.05 (0.03-0.06) | 0.22 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.05 (0.03-0.06) | 0.02 | 0.02 | 0.05 (0.03-0.06) | 0.22 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.42 | 1.27 | 0.05 (0.03-0.06) | 0.42 | 1.27 | 0.05 (0.03-0.06) | 0.22 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.25 | 0.66 | 0.05 (0.03-0.06) | 0.25 | 0.66 | 0.05 (0.03-0.06) | 0.22 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.24 | 1.08 | 0.05 (0.03-0.06) | 0.24 | 1.08 | 0.05 (0.03-0.06) | 0.22 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.24 | - | 0.05 (0.03-0.06) | 0.24 | - | 0.05 (0.03-0.06) | 0.22 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.77 | 0.05 (0.03-0.06) | 0.04 | 0.77 | 0.05 (0.03-0.06) | 0.22 |
| TOTAL | | 0 | - | 0 | 4.37 | - | 0.05 | 4.37 | - | 0.05 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.22c** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.23 | 0.23 | 0.04 (0.03-0.07) | 0.23 | 0.23 | 0.04 (0.03-0.07) | 0.15 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.15 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.42 | 0.42 | 0.04 (0.03-0.07) | 0.42 | 0.42 | 0.04 (0.03-0.07) | 0.15 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.18 | 0.18 | 0.04 (0.03-0.07) | 0.18 | 0.18 | 0.04 (0.03-0.07) | 0.15 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.15 |
| Chausay | SPA | 0 | 0 | 0 | 0.72 | 0.72 | 0.04 (0.03-0.07) | 0.72 | 0.72 | 0.04 (0.03-0.07) | 0.15 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.1 | 0.1 | 0.04 (0.03-0.07) | 0.1 | 0.1 | 0.04 (0.03-0.07) | 0.15 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.01 | 0.01 | 0.04 (0.03-0.07) | 0.15 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.04 (0.03-0.07) | 0.04 | 0.04 | 0.04 (0.03-0.07) | 0.15 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.39 | 1.39 | 0.04 (0.03-0.07) | 1.39 | 1.39 | 0.04 (0.03-0.07) | 0.15 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0 | 0 | 0.04 (0.03-0.07) | 0 | 0 | 0.04 (0.03-0.07) | 0.15 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.03-0.07) | 0.02 | 0.02 | 0.04 (0.03-0.07) | 0.15 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.42 | 1.25 | 0.04 (0.03-0.07) | 0.42 | 1.25 | 0.04 (0.03-0.07) | 0.15 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.25 | 0.65 | 0.04 (0.03-0.07) | 0.25 | 0.65 | 0.04 (0.03-0.07) | 0.15 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.23 | 1.06 | 0.04 (0.03-0.07) | 0.23 | 1.06 | 0.04 (0.03-0.07) | 0.15 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.24 | - | 0.04 (0.03-0.07) | 0.24 | - | 0.04 (0.03-0.07) | 0.15 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.76 | 0.04 (0.03-0.07) | 0.04 | 0.76 | 0.04 (0.03-0.07) | 0.15 |
| TOTAL | | 0 | - | 0 | 4.3 | - | 0.04 | 4.3 | - | 0.04 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.22d** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.22 | 0.22 | 0.04 (0.03-0.06) | 0.22 | 0.22 | 0.04 (0.03-0.06) | 0.19 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.06) | 0.01 | 0.01 | 0.04 (0.03-0.06) | 0.19 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.4 | 0.4 | 0.04 (0.03-0.06) | 0.4 | 0.4 | 0.04 (0.03-0.06) | 0.19 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.18 | 0.18 | 0.04 (0.03-0.06) | 0.18 | 0.18 | 0.04 (0.03-0.06) | 0.19 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.06) | 0.01 | 0.01 | 0.04 (0.03-0.06) | 0.19 |
| Chausay | SPA | 0 | 0 | 0 | 0.69 | 0.69 | 0.04 (0.03-0.06) | 0.69 | 0.69 | 0.04 (0.03-0.06) | 0.19 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.09 | 0.09 | 0.04 (0.03-0.06) | 0.09 | 0.09 | 0.04 (0.03-0.06) | 0.19 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.06) | 0.01 | 0.01 | 0.04 (0.03-0.06) | 0.19 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.04 (0.03-0.06) | 0.04 | 0.04 | 0.04 (0.03-0.06) | 0.19 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.33 | 1.33 | 0.04 (0.03-0.06) | 1.33 | 1.33 | 0.04 (0.03-0.06) | 0.19 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0 | 0 | 0.04 (0.03-0.06) | 0 | 0 | 0.04 (0.03-0.06) | 0.19 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.03-0.06) | 0.02 | 0.02 | 0.04 (0.03-0.06) | 0.19 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.4 | 1.19 | 0.04 (0.03-0.06) | 0.4 | 1.19 | 0.04 (0.03-0.06) | 0.19 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.24 | 0.62 | 0.04 (0.03-0.06) | 0.24 | 0.62 | 0.04 (0.03-0.06) | 0.19 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.22 | 1.02 | 0.04 (0.03-0.06) | 0.22 | 1.02 | 0.04 (0.03-0.06) | 0.19 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.23 | - | 0.04 (0.03-0.06) | 0.23 | - | 0.04 (0.03-0.06) | 0.19 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.72 | 0.04 (0.03-0.06) | 0.04 | 0.72 | 0.04 (0.03-0.06) | 0.19 |
| TOTAL | | 0 | - | 0 | 4.11 | - | 0.04 | 4.11 | - | 0.04 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.23a** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.44 | 0.44 | 0.01 (0.01-0.01) | 0.44 | 0.44 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 2.3 | 1.54 | 0.01 (0.01-0.01) | 2.3 | 1.54 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.17 | 1.51 | 0.01 (0.01-0.01) | 0.17 | 1.51 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 2.64 | 1.63 | 0.01 (0.01-0.01) | 2.64 | 1.63 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.63 | 3.51 | 0.01 (0.01-0.01) | 1.63 | 3.51 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 18.96 | 12.72 | 0.01 (0.01-0.01) | 18.96 | 12.72 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.33 | 3.85 | 0.01 (0.01-0.01) | 2.33 | 3.85 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 1.39 | 1.02 | 0 (0-0) | 5.72 | 4.18 | 0.01 (0.01-0.01) | 7.12 | 5.58 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.37 | 0.4 | 0 (0-0) | 2.6 | 2.85 | 0.01 (0.01-0.01) | 2.96 | 3.22 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.71 | 1.44 | 0 (0-0) | 7.4 | 2.87 | 0.01 (0.01-0.01) | 11.11 | 6.58 | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 2.69 | 4.47 | 0.01 (0.01-0.01) | 2.69 | 4.47 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0.66 | 0.83 | 0 (0-0) | 5.36 | 6.73 | 0.01 (0.01-0.01) | 6.02 | 7.39 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.89 | 2.98 | 0.01 (0.01-0.01) | 0.89 | 2.98 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 1.08 | 2.38 | 0.01 (0.01-0.01) | 1.08 | 2.38 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 2.12 | 4.49 | 0.01 (0.01-0.01) | 2.12 | 4.49 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 8.36 | 4.57 | 0.01 (0.01-0.01) | 8.36 | 4.57 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 2.63 | 4.65 | 0.01 (0.01-0.01) | 2.63 | 4.65 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.37 | 1.26 | 0.01 (0.01-0.01) | 0.37 | 1.26 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.93 | 0.67 | 0 (0-0) | 5.22 | 3.79 | 0.01 (0.01-0.01) | 6.14 | 4.71 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.74 | 1.12 | 0.01 (0.01-0.01) | 0.74 | 1.12 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.59 | 1.91 | 0.01 (0.01-0.01) | 0.59 | 1.91 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.95 | 5.32 | 0.01 (0.01-0.01) | 1.95 | 5.32 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.45 | 5.03 | 0.01 (0.01-0.01) | 1.45 | 5.03 | 0.01 (0.01-0.01) |
| TOTAL | | 7.06 | - | 0 | 77.66 | - | 0.01 | 84.72 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.23b** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.01 (0.01-0.01) | 0.05 | 0.05 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.53 | 0.53 | 0.01 (0.01-0.01) | 0.53 | 0.53 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 2.76 | 1.84 | 0.01 (0.01-0.01) | 2.76 | 1.84 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.2 | 1.81 | 0.01 (0.01-0.01) | 0.2 | 1.81 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 3.17 | 1.96 | 0.01 (0.01-0.01) | 3.17 | 1.96 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.96 | 4.21 | 0.01 (0.01-0.01) | 1.96 | 4.21 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 22.72 | 15.25 | 0.01 (0.01-0.01) | 22.72 | 15.25 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.79 | 4.62 | 0.01 (0.01-0.01) | 2.79 | 4.62 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 2.71 | 1.98 | 0 (0-0) | 6.86 | 5.01 | 0.01 (0.01-0.01) | 9.57 | 7.73 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.72 | 0.79 | 0 (0-0) | 3.11 | 3.41 | 0.01 (0.01-0.01) | 3.83 | 4.13 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 7.21 | 2.8 | 0.01 (0.01-0.01) | 8.87 | 3.44 | 0.01 (0.01-0.01) | 16.09 | 10.66 | 0.02 (0.01-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 3.22 | 5.36 | 0.01 (0.01-0.01) | 3.22 | 5.36 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 1.29 | 1.62 | 0 (0-0) | 6.42 | 8.07 | 0.01 (0.01-0.01) | 7.71 | 9.36 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.07 | 3.57 | 0.01 (0.01-0.01) | 1.07 | 3.57 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 1.29 | 2.86 | 0.01 (0.01-0.01) | 1.29 | 2.86 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 2.54 | 5.39 | 0.01 (0.01-0.01) | 2.54 | 5.39 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 10.03 | 5.47 | 0.01 (0.01-0.01) | 10.03 | 5.47 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 3.15 | 5.57 | 0.01 (0.01-0.01) | 3.15 | 5.57 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.44 | 1.51 | 0.01 (0.01-0.01) | 0.44 | 1.51 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.81 | 1.31 | 0 (0-0) | 6.25 | 4.54 | 0.01 (0.01-0.01) | 8.06 | 6.34 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.88 | 1.34 | 0.01 (0.01-0.01) | 0.88 | 1.34 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.71 | 2.29 | 0.01 (0.01-0.01) | 0.71 | 2.29 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 2.33 | 6.37 | 0.01 (0.01-0.01) | 2.33 | 6.37 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.74 | 6.02 | 0.01 (0.01-0.01) | 1.74 | 6.02 | 0.01 (0.01-0.01) |
| TOTAL | | 13.74 | - | 0 | 93.09 | - | 0.01 | 106.83 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.23c** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0 (0-0.01) | 0.04 | 0.04 | 0 (0-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.36 | 0.36 | 0 (0-0.01) | 0.36 | 0.36 | 0 (0-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0.01) | 0 | 0 | 0 (0-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 1.88 | 1.26 | 0 (0-0.01) | 1.88 | 1.26 | 0 (0-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.14 | 1.23 | 0 (0-0.01) | 0.14 | 1.23 | 0 (0-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 2.17 | 1.34 | 0 (0-0.01) | 2.17 | 1.34 | 0 (0-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.34 | 2.88 | 0 (0-0.01) | 1.34 | 2.88 | 0 (0-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 15.52 | 10.42 | 0 (0-0.01) | 15.52 | 10.42 | 0 (0-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.9 | 3.15 | 0 (0-0.01) | 1.9 | 3.15 | 0 (0-0.01) |
| Farne Islands | SPA, SSSI | 3.14 | 2.3 | 0 (0-0.01) | 4.68 | 3.42 | 0 (0-0.01) | 7.83 | 6.57 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.83 | 0.91 | 0 (0-0) | 2.13 | 2.33 | 0 (0-0.01) | 2.96 | 3.16 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 8.35 | 3.24 | 0.01 (0.01-0.01) | 6.06 | 2.35 | 0 (0-0.01) | 14.41 | 10.7 | 0.01 (0.01-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 2.2 | 3.66 | 0 (0-0.01) | 2.2 | 3.66 | 0 (0-0.01) |
| Fowlsheugh | SPA, SSSI | 1.49 | 1.87 | 0 (0-0) | 4.39 | 5.51 | 0 (0-0.01) | 5.88 | 7 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.73 | 2.44 | 0 (0-0.01) | 0.73 | 2.44 | 0 (0-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.88 | 1.95 | 0 (0-0.01) | 0.88 | 1.95 | 0 (0-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 1.74 | 3.68 | 0 (0-0.01) | 1.74 | 3.68 | 0 (0-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 6.85 | 3.74 | 0 (0-0.01) | 6.85 | 3.74 | 0 (0-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 2.15 | 3.81 | 0 (0-0.01) | 2.15 | 3.81 | 0 (0-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.3 | 1.04 | 0 (0-0.01) | 0.3 | 1.04 | 0 (0-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 2.09 | 1.52 | 0 (0-0) | 4.27 | 3.1 | 0 (0-0.01) | 6.36 | 5.19 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.6 | 0.92 | 0 (0-0.01) | 0.6 | 0.92 | 0 (0-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.48 | 1.56 | 0 (0-0.01) | 0.48 | 1.56 | 0 (0-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.59 | 4.35 | 0 (0-0.01) | 1.59 | 4.35 | 0 (0-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.19 | 4.12 | 0 (0-0.01) | 1.19 | 4.12 | 0 (0-0.01) |
| TOTAL | | 15.9 | - | 0 | 63.6 | - | 0 | 79.5 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.23d** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.42 | 0.42 | 0.01 (0.01-0.01) | 0.42 | 0.42 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 2.18 | 1.46 | 0.01 (0.01-0.01) | 2.18 | 1.46 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.16 | 1.43 | 0.01 (0.01-0.01) | 0.16 | 1.43 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 2.51 | 1.55 | 0.01 (0.01-0.01) | 2.51 | 1.55 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.55 | 3.33 | 0.01 (0.01-0.01) | 1.55 | 3.33 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 17.97 | 12.06 | 0.01 (0.01-0.01) | 17.97 | 12.06 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.2 | 3.65 | 0.01 (0.01-0.01) | 2.2 | 3.65 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 2.46 | 1.8 | 0 (0-0) | 5.42 | 3.96 | 0.01 (0.01-0.01) | 7.88 | 6.42 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.65 | 0.71 | 0 (0-0) | 2.46 | 2.7 | 0.01 (0.01-0.01) | 3.11 | 3.35 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 6.53 | 2.54 | 0.01 (0.01-0.01) | 7.02 | 2.72 | 0.01 (0.01-0.01) | 13.55 | 9.26 | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 2.55 | 4.24 | 0.01 (0.01-0.01) | 2.55 | 4.24 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 1.17 | 1.47 | 0 (0-0) | 5.08 | 6.38 | 0.01 (0.01-0.01) | 6.24 | 7.55 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.85 | 2.83 | 0.01 (0.01-0.01) | 0.85 | 2.83 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 1.02 | 2.26 | 0.01 (0.01-0.01) | 1.02 | 2.26 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 2.01 | 4.26 | 0.01 (0.01-0.01) | 2.01 | 4.26 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 7.93 | 4.33 | 0.01 (0.01-0.01) | 7.93 | 4.33 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 2.49 | 4.4 | 0.01 (0.01-0.01) | 2.49 | 4.4 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.35 | 1.2 | 0.01 (0.01-0.01) | 0.35 | 1.2 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.64 | 1.19 | 0 (0-0) | 4.94 | 3.59 | 0.01 (0.01-0.01) | 6.58 | 5.22 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.7 | 1.06 | 0.01 (0.01-0.01) | 0.7 | 1.06 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.56 | 1.81 | 0.01 (0.01-0.01) | 0.56 | 1.81 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.85 | 5.04 | 0.01 (0.01-0.01) | 1.85 | 5.04 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.37 | 4.76 | 0.01 (0.01-0.01) | 1.37 | 4.76 | 0.01 (0.01-0.01) |
| TOTAL | | 12.44 | - | 0 | 73.62 | - | 0.01 | 86.06 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.24a** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.09 | 0.09 | 0.01 (0.01-0.01) | 0.09 | 0.09 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.88 | 0.88 | 0.01 (0.01-0.01) | 0.88 | 0.88 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 4.6 | 3.07 | 0.01 (0.01-0.01) | 4.6 | 3.07 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.33 | 3.02 | 0.01 (0.01-0.01) | 0.33 | 3.02 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 5.29 | 3.27 | 0.01 (0.01-0.01) | 5.29 | 3.27 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 3.26 | 7.02 | 0.01 (0.01-0.01) | 3.26 | 7.02 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 37.91 | 25.44 | 0.01 (0.01-0.01) | 37.91 | 25.44 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 4.65 | 7.7 | 0.01 (0.01-0.01) | 4.65 | 7.7 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 2.79 | 2.04 | 0 (0-0) | 11.44 | 8.36 | 0.01 (0.01-0.01) | 14.23 | 11.15 | 0.02 (0.01-0.02) |
| Firth of Forth Islands | SPA, SSSI | 0.74 | 0.81 | 0 (0-0) | 5.19 | 5.69 | 0.01 (0.01-0.01) | 5.93 | 6.43 | 0.01 (0.01-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 7.41 | 2.88 | 0.01 (0.01-0.01) | 14.81 | 5.75 | 0.01 (0.01-0.01) | 22.22 | 13.16 | 0.02 (0.02-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 5.38 | 8.94 | 0.01 (0.01-0.01) | 5.38 | 8.94 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 1.32 | 1.66 | 0 (0-0) | 10.71 | 13.46 | 0.01 (0.01-0.01) | 12.04 | 14.79 | 0.01 (0.01-0.02) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.79 | 5.96 | 0.01 (0.01-0.01) | 1.79 | 5.96 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 2.15 | 4.77 | 0.01 (0.01-0.01) | 2.15 | 4.77 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 4.24 | 8.99 | 0.01 (0.01-0.01) | 4.24 | 8.99 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 16.73 | 9.13 | 0.01 (0.01-0.01) | 16.73 | 9.13 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 5.26 | 9.29 | 0.01 (0.01-0.01) | 5.26 | 9.29 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.73 | 2.53 | 0.01 (0.01-0.01) | 0.73 | 2.53 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.86 | 1.35 | 0 (0-0) | 10.43 | 7.57 | 0.01 (0.01-0.01) | 12.29 | 9.43 | 0.02 (0.01-0.02) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.48 | 2.24 | 0.01 (0.01-0.01) | 1.48 | 2.24 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 1.18 | 3.82 | 0.01 (0.01-0.01) | 1.18 | 3.82 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 3.89 | 10.64 | 0.01 (0.01-0.01) | 3.89 | 10.64 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 2.9 | 10.05 | 0.01 (0.01-0.01) | 2.9 | 10.05 | 0.01 (0.01-0.01) |
| TOTAL | | 14.12 | - | 0 | 155.33 | - | 0.01 | 169.45 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.24b** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.1 | 0.1 | 0.01 (0.01-0.02) | 0.1 | 0.1 | 0.01 (0.01-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 1.06 | 1.06 | 0.01 (0.01-0.02) | 1.06 | 1.06 | 0.01 (0.01-0.02) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 5.52 | 3.69 | 0.01 (0.01-0.02) | 5.52 | 3.69 | 0.01 (0.01-0.02) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.4 | 3.61 | 0.01 (0.01-0.02) | 0.4 | 3.61 | 0.01 (0.01-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 6.34 | 3.92 | 0.01 (0.01-0.02) | 6.34 | 3.92 | 0.01 (0.01-0.02) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 3.91 | 8.42 | 0.01 (0.01-0.02) | 3.91 | 8.42 | 0.01 (0.01-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 45.44 | 30.5 | 0.01 (0.01-0.02) | 45.44 | 30.5 | 0.01 (0.01-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 5.57 | 9.23 | 0.01 (0.01-0.02) | 5.57 | 9.23 | 0.01 (0.01-0.02) |
| Farne Islands | SPA, SSSI | 5.43 | 3.97 | 0.01 (0.01-0.01) | 13.71 | 10.02 | 0.01 (0.01-0.02) | 19.14 | 15.45 | 0.02 (0.02-0.02) |
| Firth of Forth Islands | SPA, SSSI | 1.43 | 1.57 | 0 (0-0.01) | 6.22 | 6.83 | 0.01 (0.01-0.02) | 7.66 | 8.26 | 0.02 (0.02-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 14.43 | 5.6 | 0.02 (0.02-0.02) | 17.75 | 6.89 | 0.01 (0.01-0.02) | 32.18 | 21.32 | 0.03 (0.03-0.03) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 6.44 | 10.72 | 0.01 (0.01-0.02) | 6.44 | 10.72 | 0.01 (0.01-0.02) |
| Fowlsheugh | SPA, SSSI | 2.58 | 3.24 | 0 (0-0) | 12.84 | 16.13 | 0.01 (0.01-0.02) | 15.42 | 18.71 | 0.02 (0.02-0.02) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 2.14 | 7.15 | 0.01 (0.01-0.02) | 2.14 | 7.15 | 0.01 (0.01-0.02) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 2.58 | 5.72 | 0.01 (0.01-0.02) | 2.58 | 5.72 | 0.01 (0.01-0.02) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 5.09 | 10.78 | 0.01 (0.01-0.02) | 5.09 | 10.78 | 0.01 (0.01-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 20.05 | 10.95 | 0.01 (0.01-0.02) | 20.05 | 10.95 | 0.01 (0.01-0.02) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 6.31 | 11.14 | 0.01 (0.01-0.02) | 6.31 | 11.14 | 0.01 (0.01-0.02) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.88 | 3.03 | 0.01 (0.01-0.02) | 0.88 | 3.03 | 0.01 (0.01-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 3.61 | 2.62 | 0.01 (0.01-0.01) | 12.5 | 9.08 | 0.01 (0.01-0.02) | 16.12 | 12.69 | 0.02 (0.02-0.02) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.77 | 2.69 | 0.01 (0.01-0.02) | 1.77 | 2.69 | 0.01 (0.01-0.02) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 1.42 | 4.57 | 0.01 (0.01-0.02) | 1.42 | 4.57 | 0.01 (0.01-0.02) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 4.67 | 12.75 | 0.01 (0.01-0.02) | 4.67 | 12.75 | 0.01 (0.01-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 3.47 | 12.05 | 0.01 (0.01-0.02) | 3.47 | 12.05 | 0.01 (0.01-0.02) |
| TOTAL | | 27.48 | - | 0 | 186.18 | - | 0.01 | 213.66 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.24c** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.01 (0.01-0.01) | 0.07 | 0.07 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.72 | 0.72 | 0.01 (0.01-0.01) | 0.72 | 0.72 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 3.77 | 2.52 | 0.01 (0.01-0.01) | 3.77 | 2.52 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.27 | 2.47 | 0.01 (0.01-0.01) | 0.27 | 2.47 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 4.33 | 2.68 | 0.01 (0.01-0.01) | 4.33 | 2.68 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 2.67 | 5.75 | 0.01 (0.01-0.01) | 2.67 | 5.75 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 31.05 | 20.84 | 0.01 (0.01-0.01) | 31.05 | 20.84 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 3.81 | 6.31 | 0.01 (0.01-0.01) | 3.81 | 6.31 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 6.28 | 4.59 | 0.01 (0.01-0.01) | 9.37 | 6.85 | 0.01 (0.01-0.01) | 15.65 | 13.13 | 0.02 (0.02-0.02) |
| Firth of Forth Islands | SPA, SSSI | 1.66 | 1.82 | 0.01 (0.01-0.01) | 4.25 | 4.66 | 0.01 (0.01-0.01) | 5.91 | 6.32 | 0.02 (0.01-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 16.69 | 6.48 | 0.02 (0.02-0.02) | 12.13 | 4.71 | 0.01 (0.01-0.01) | 28.82 | 21.4 | 0.03 (0.03-0.03) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 4.4 | 7.32 | 0.01 (0.01-0.01) | 4.4 | 7.32 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 2.98 | 3.75 | 0 (0-0.01) | 8.77 | 11.02 | 0.01 (0.01-0.01) | 11.75 | 14.01 | 0.01 (0.01-0.02) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.46 | 4.88 | 0.01 (0.01-0.01) | 1.46 | 4.88 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 1.76 | 3.91 | 0.01 (0.01-0.01) | 1.76 | 3.91 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 3.48 | 7.36 | 0.01 (0.01-0.01) | 3.48 | 7.36 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 13.7 | 7.48 | 0.01 (0.01-0.01) | 13.7 | 7.48 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 4.31 | 7.61 | 0.01 (0.01-0.01) | 4.31 | 7.61 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.6 | 2.07 | 0.01 (0.01-0.01) | 0.6 | 2.07 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 4.18 | 3.04 | 0.01 (0.01-0.01) | 8.54 | 6.2 | 0.01 (0.01-0.01) | 12.72 | 10.38 | 0.02 (0.02-0.02) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.21 | 1.84 | 0.01 (0.01-0.01) | 1.21 | 1.84 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.97 | 3.12 | 0.01 (0.01-0.01) | 0.97 | 3.12 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 3.19 | 8.71 | 0.01 (0.01-0.01) | 3.19 | 8.71 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 2.37 | 8.23 | 0.01 (0.01-0.01) | 2.37 | 8.23 | 0.01 (0.01-0.01) |
| TOTAL | | 31.8 | - | 0 | 127.21 | - | 0.01 | 159 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.24d** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0.01 (0.01-0.01) | 0.08 | 0.08 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.84 | 0.84 | 0.01 (0.01-0.01) | 0.84 | 0.84 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 4.36 | 2.91 | 0.01 (0.01-0.01) | 4.36 | 2.91 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.31 | 2.86 | 0.01 (0.01-0.01) | 0.31 | 2.86 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 5.01 | 3.1 | 0.01 (0.01-0.01) | 5.01 | 3.1 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 3.09 | 6.66 | 0.01 (0.01-0.01) | 3.09 | 6.66 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 35.94 | 24.12 | 0.01 (0.01-0.01) | 35.94 | 24.12 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 4.41 | 7.3 | 0.01 (0.01-0.01) | 4.41 | 7.3 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 4.92 | 3.59 | 0.01 (0.01-0.01) | 10.84 | 7.93 | 0.01 (0.01-0.01) | 15.76 | 12.84 | 0.02 (0.02-0.02) |
| Firth of Forth Islands | SPA, SSSI | 1.3 | 1.42 | 0 (0-0) | 4.92 | 5.4 | 0.01 (0.01-0.01) | 6.22 | 6.7 | 0.02 (0.01-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 13.06 | 5.07 | 0.02 (0.01-0.02) | 14.04 | 5.45 | 0.01 (0.01-0.01) | 27.1 | 18.51 | 0.03 (0.02-0.03) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 5.1 | 8.48 | 0.01 (0.01-0.01) | 5.1 | 8.48 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 2.33 | 2.93 | 0 (0-0) | 10.15 | 12.76 | 0.01 (0.01-0.01) | 12.49 | 15.09 | 0.02 (0.01-0.02) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.69 | 5.65 | 0.01 (0.01-0.01) | 1.69 | 5.65 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 2.04 | 4.52 | 0.01 (0.01-0.01) | 2.04 | 4.52 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 4.02 | 8.52 | 0.01 (0.01-0.01) | 4.02 | 8.52 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 15.86 | 8.66 | 0.01 (0.01-0.01) | 15.86 | 8.66 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 4.99 | 8.81 | 0.01 (0.01-0.01) | 4.99 | 8.81 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.69 | 2.4 | 0.01 (0.01-0.01) | 0.69 | 2.4 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 3.27 | 2.38 | 0.01 (0.01-0.01) | 9.89 | 7.18 | 0.01 (0.01-0.01) | 13.16 | 10.45 | 0.02 (0.02-0.02) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.4 | 2.12 | 0.01 (0.01-0.01) | 1.4 | 2.12 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 1.12 | 3.62 | 0.01 (0.01-0.01) | 1.12 | 3.62 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 3.69 | 10.08 | 0.01 (0.01-0.01) | 3.69 | 10.08 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 2.75 | 9.53 | 0.01 (0.01-0.01) | 2.75 | 9.53 | 0.01 (0.01-0.01) |
| TOTAL | | 24.89 | - | 0 | 147.24 | - | 0.01 | 172.12 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.25** Apportioning to protected sites of the maximum breeding season numbers of adult common guillemots in flight in the proposed Dogger Bank Teesside B project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Farne Islands | SPA, SSSI | 22.56 (20.83-24.71) | 0.04 (0.03-0.04) |
| Forth Islands | SPA, SSSI | 5.96 (5.5-6.53) | 0.02 (0.02-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 59.95 (55.35-65.66) | 0.05 (0.05-0.06) |
| Fowlsheugh | SPA, SSSI | 10.71 (9.89-11.73) | 0.02 (0.01-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 15.02 (13.87-16.45) | 0.03 (0.03-0.04) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.26a** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Chausay | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.01 | 0.01 | 0.01 (0.01-0.01) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.01 | 0.01 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.59 | 0.43 | 0.01 (0.01-0.01) | 0.59 | 0.43 | 0.01 (0.01-0.01) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.07 | - | 0.01 (0.01-0.01) | 0.07 | - | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 4.26 | 3.78 | 0.01 (0.01-0.01) | 4.26 | 3.78 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.33 | 0.81 | 0.01 (0.01-0.01) | 0.33 | 0.81 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 0.01 | 0 | 0 (0-0) | 0.14 | 0 | 0.01 (0.01-0.01) | 0.15 | 0.01 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.04 | 0.02 | 0 (0-0) | 1.13 | 0.5 | 0.01 (0.01-0.01) | 1.17 | 0.54 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 0.46 | 0.23 | 0 (0-0) | 3.77 | 1.83 | 0.01 (0.01-0.01) | 4.24 | 2.3 | 0.01 (0.01-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.82 | 1.48 | 0.01 (0.01-0.01) | 0.82 | 1.48 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.26 | 1.39 | 0.01 (0.01-0.01) | 1.26 | 1.39 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.59 | 0.96 | 0.01 (0.01-0.01) | 0.59 | 0.96 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.03 | 0.02 | 0 (0-0) | 0.75 | 0.52 | 0.01 (0.01-0.01) | 0.79 | 0.55 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.62 | 1.15 | 0.01 (0.01-0.01) | 0.62 | 1.15 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.23 | 0.47 | 0.01 (0.01-0.01) | 0.23 | 0.47 | 0.01 (0.01-0.01) |
| TOTAL | | 0.55 | - | 0 | 14.59 | - | 0.01 | 15.14 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.26b** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.67 | 0.49 | 0.01 (0.01-0.02) | 0.67 | 0.49 | 0.01 (0.01-0.02) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.08 | - | 0.01 (0.01-0.02) | 0.08 | - | 0.01 (0.01-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 4.87 | 4.31 | 0.01 (0.01-0.02) | 4.87 | 4.31 | 0.01 (0.01-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.37 | 0.93 | 0.01 (0.01-0.02) | 0.37 | 0.93 | 0.01 (0.01-0.02) |
| Farne Islands | SPA, SSSI | 0.02 | 0 | 0 (0-0) | 0.16 | 0 | 0.01 (0.01-0.02) | 0.18 | 0.02 | 0.02 (0.01-0.02) |
| Firth of Forth Islands | SPA, SSSI | 0.09 | 0.04 | 0 (0-0) | 1.29 | 0.57 | 0.01 (0.01-0.02) | 1.38 | 0.66 | 0.01 (0.01-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.05 | 0.51 | 0 (0-0.01) | 4.31 | 2.09 | 0.01 (0.01-0.02) | 5.36 | 3.14 | 0.02 (0.02-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.94 | 1.69 | 0.01 (0.01-0.02) | 0.94 | 1.69 | 0.01 (0.01-0.02) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.44 | 1.58 | 0.01 (0.01-0.02) | 1.44 | 1.58 | 0.01 (0.01-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.67 | 1.09 | 0.01 (0.01-0.02) | 0.67 | 1.09 | 0.01 (0.01-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.07 | 0.05 | 0 (0-0) | 0.86 | 0.6 | 0.01 (0.01-0.02) | 0.94 | 0.67 | 0.02 (0.01-0.02) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.71 | 1.31 | 0.01 (0.01-0.02) | 0.71 | 1.31 | 0.01 (0.01-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.26 | 0.53 | 0.01 (0.01-0.02) | 0.26 | 0.53 | 0.01 (0.01-0.02) |
| TOTAL | | 1.24 | - | 0 | 16.65 | - | 0.01 | 17.89 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.26c** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Chausay | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.01 | 0.01 | 0.01 (0.01-0.01) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.47 | 0.35 | 0.01 (0.01-0.01) | 0.47 | 0.35 | 0.01 (0.01-0.01) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.06 | - | 0.01 (0.01-0.01) | 0.06 | - | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 3.44 | 3.05 | 0.01 (0.01-0.01) | 3.44 | 3.05 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.26 | 0.66 | 0.01 (0.01-0.01) | 0.26 | 0.66 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 0.04 | 0 | 0.01 (0-0.01) | 0.11 | 0 | 0.01 (0.01-0.01) | 0.15 | 0.04 | 0.01 (0.01-0.02) |
| Firth of Forth Islands | SPA, SSSI | 0.19 | 0.09 | 0 (0-0) | 0.91 | 0.4 | 0.01 (0.01-0.01) | 1.11 | 0.6 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 2.29 | 1.11 | 0.01 (0.01-0.01) | 3.05 | 1.48 | 0.01 (0.01-0.01) | 5.33 | 3.77 | 0.02 (0.02-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.67 | 1.2 | 0.01 (0.01-0.01) | 0.67 | 1.2 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.02 | 1.12 | 0.01 (0.01-0.01) | 1.02 | 1.12 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.48 | 0.77 | 0.01 (0.01-0.01) | 0.48 | 0.77 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.16 | 0.11 | 0 (0-0) | 0.61 | 0.42 | 0.01 (0.01-0.01) | 0.77 | 0.58 | 0.01 (0.01-0.02) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.5 | 0.93 | 0.01 (0.01-0.01) | 0.5 | 0.93 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.19 | 0.38 | 0.01 (0.01-0.01) | 0.19 | 0.38 | 0.01 (0.01-0.01) |
| TOTAL | | 2.68 | - | 0 | 11.78 | - | 0.01 | 14.46 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.26d** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Chausay | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.01 | 0.01 | 0.01 (0.01-0.01) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.01 | 0.01 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.54 | 0.39 | 0.01 (0.01-0.01) | 0.54 | 0.39 | 0.01 (0.01-0.01) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.07 | - | 0.01 (0.01-0.01) | 0.07 | - | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 3.89 | 3.45 | 0.01 (0.01-0.01) | 3.89 | 3.45 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.3 | 0.74 | 0.01 (0.01-0.01) | 0.3 | 0.74 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 0.02 | 0 | 0 (0-0) | 0.13 | 0 | 0.01 (0.01-0.01) | 0.15 | 0.02 | 0.01 (0.01-0.02) |
| Firth of Forth Islands | SPA, SSSI | 0.11 | 0.05 | 0 (0-0) | 1.03 | 0.46 | 0.01 (0.01-0.01) | 1.14 | 0.56 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.26 | 0.61 | 0.01 (0-0.01) | 3.44 | 1.67 | 0.01 (0.01-0.01) | 4.7 | 2.93 | 0.02 (0.01-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.75 | 1.35 | 0.01 (0.01-0.01) | 0.75 | 1.35 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.15 | 1.26 | 0.01 (0.01-0.01) | 1.15 | 1.26 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.54 | 0.87 | 0.01 (0.01-0.01) | 0.54 | 0.87 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.09 | 0.06 | 0 (0-0) | 0.69 | 0.48 | 0.01 (0.01-0.01) | 0.78 | 0.57 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.57 | 1.05 | 0.01 (0.01-0.01) | 0.57 | 1.05 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.21 | 0.42 | 0.01 (0.01-0.01) | 0.21 | 0.42 | 0.01 (0.01-0.01) |
| TOTAL | | 1.48 | - | 0 | 13.31 | - | 0.01 | 14.79 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.27a** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.03) | 0.01 | 0.01 | 0.02 (0.02-0.03) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.03) | 0.01 | 0.01 | 0.02 (0.02-0.03) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.03) | 0.01 | 0.01 | 0.02 (0.02-0.03) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.02-0.03) | 0 | 0 | 0.02 (0.02-0.03) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.03) | 0.01 | 0.01 | 0.02 (0.02-0.03) |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.17 | 0.86 | 0.02 (0.02-0.03) | 1.17 | 0.86 | 0.02 (0.02-0.03) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.14 | - | 0.02 (0.02-0.03) | 0.14 | - | 0.02 (0.02-0.03) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 8.53 | 7.56 | 0.02 (0.02-0.03) | 8.53 | 7.56 | 0.02 (0.02-0.03) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.65 | 1.63 | 0.02 (0.02-0.03) | 0.65 | 1.63 | 0.02 (0.02-0.03) |
| Farne Islands | SPA, SSSI | 0.02 | 0 | 0 (0-0) | 0.28 | 0 | 0.02 (0.02-0.03) | 0.3 | 0.02 | 0.03 (0.02-0.03) |
| Firth of Forth Islands | SPA, SSSI | 0.08 | 0.03 | 0 (0-0) | 2.26 | 1 | 0.02 (0.02-0.03) | 2.34 | 1.08 | 0.03 (0.02-0.03) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 0.93 | 0.45 | 0 (0-0.01) | 7.55 | 3.66 | 0.02 (0.02-0.03) | 8.47 | 4.59 | 0.03 (0.02-0.03) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.65 | 2.97 | 0.02 (0.02-0.03) | 1.65 | 2.97 | 0.02 (0.02-0.03) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 2.52 | 2.77 | 0.02 (0.02-0.03) | 2.52 | 2.77 | 0.02 (0.02-0.03) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.18 | 1.91 | 0.02 (0.02-0.03) | 1.18 | 1.91 | 0.02 (0.02-0.03) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.07 | 0.05 | 0 (0-0) | 1.51 | 1.04 | 0.02 (0.02-0.03) | 1.58 | 1.11 | 0.03 (0.02-0.03) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.24 | 2.3 | 0.02 (0.02-0.03) | 1.24 | 2.3 | 0.02 (0.02-0.03) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.46 | 0.93 | 0.02 (0.02-0.03) | 0.46 | 0.93 | 0.02 (0.02-0.03) |
| TOTAL | | 1.09 | - | 0 | 29.18 | - | 0.02 | 30.27 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.27b** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.03 (0.02-0.03) | 0.01 | 0.01 | 0.03 (0.02-0.03) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.03 (0.02-0.03) | 0.01 | 0.01 | 0.03 (0.02-0.03) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.03 (0.02-0.03) | 0.02 | 0.02 | 0.03 (0.02-0.03) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.03 (0.02-0.03) | 0 | 0 | 0.03 (0.02-0.03) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.03 (0.02-0.03) | 0.01 | 0.01 | 0.03 (0.02-0.03) |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.34 | 0.98 | 0.03 (0.02-0.03) | 1.34 | 0.98 | 0.03 (0.02-0.03) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.16 | - | 0.03 (0.02-0.03) | 0.16 | - | 0.03 (0.02-0.03) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 9.73 | 8.62 | 0.03 (0.02-0.03) | 9.73 | 8.62 | 0.03 (0.02-0.03) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.75 | 1.86 | 0.03 (0.02-0.03) | 0.75 | 1.86 | 0.03 (0.02-0.03) |
| Farne Islands | SPA, SSSI | 0.04 | 0 | 0 (0-0.01) | 0.32 | 0 | 0.03 (0.02-0.03) | 0.36 | 0.04 | 0.03 (0.03-0.04) |
| Firth of Forth Islands | SPA, SSSI | 0.18 | 0.08 | 0 (0-0) | 2.58 | 1.14 | 0.03 (0.02-0.03) | 2.75 | 1.32 | 0.03 (0.03-0.03) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 2.1 | 1.02 | 0.01 (0.01-0.01) | 8.61 | 4.18 | 0.03 (0.02-0.03) | 10.72 | 6.29 | 0.04 (0.03-0.04) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.88 | 3.38 | 0.03 (0.02-0.03) | 1.88 | 3.38 | 0.03 (0.02-0.03) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 2.87 | 3.17 | 0.03 (0.02-0.03) | 2.87 | 3.17 | 0.03 (0.02-0.03) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.35 | 2.18 | 0.03 (0.02-0.03) | 1.35 | 2.18 | 0.03 (0.02-0.03) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.15 | 0.1 | 0 (0-0) | 1.72 | 1.19 | 0.03 (0.02-0.03) | 1.87 | 1.34 | 0.03 (0.03-0.03) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.42 | 2.62 | 0.03 (0.02-0.03) | 1.42 | 2.62 | 0.03 (0.02-0.03) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.52 | 1.06 | 0.03 (0.02-0.03) | 0.52 | 1.06 | 0.03 (0.02-0.03) |
| TOTAL | | 2.47 | - | 0 | 33.31 | - | 0.03 | 35.78 | - | 0.03 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.27c** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.02-0.02) | 0 | 0 | 0.02 (0.02-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.95 | 0.7 | 0.02 (0.02-0.02) | 0.95 | 0.7 | 0.02 (0.02-0.02) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.12 | - | 0.02 (0.02-0.02) | 0.12 | - | 0.02 (0.02-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 6.88 | 6.1 | 0.02 (0.02-0.02) | 6.88 | 6.1 | 0.02 (0.02-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.53 | 1.31 | 0.02 (0.02-0.02) | 0.53 | 1.31 | 0.02 (0.02-0.02) |
| Farne Islands | SPA, SSSI | 0.08 | 0 | 0.01 (0.01-0.01) | 0.22 | 0 | 0.02 (0.02-0.02) | 0.31 | 0.08 | 0.03 (0.03-0.03) |
| Firth of Forth Islands | SPA, SSSI | 0.39 | 0.17 | 0.01 (0-0.01) | 1.82 | 0.81 | 0.02 (0.02-0.02) | 2.21 | 1.19 | 0.03 (0.02-0.03) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 4.57 | 2.22 | 0.02 (0.02-0.03) | 6.09 | 2.96 | 0.02 (0.02-0.02) | 10.67 | 7.53 | 0.04 (0.03-0.05) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.33 | 2.39 | 0.02 (0.02-0.02) | 1.33 | 2.39 | 0.02 (0.02-0.02) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 2.03 | 2.24 | 0.02 (0.02-0.02) | 2.03 | 2.24 | 0.02 (0.02-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.95 | 1.54 | 0.02 (0.02-0.02) | 0.95 | 1.54 | 0.02 (0.02-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.33 | 0.22 | 0.01 (0.01-0.01) | 1.22 | 0.84 | 0.02 (0.02-0.02) | 1.54 | 1.17 | 0.03 (0.02-0.03) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1 | 1.85 | 0.02 (0.02-0.02) | 1 | 1.85 | 0.02 (0.02-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.37 | 0.75 | 0.02 (0.02-0.02) | 0.37 | 0.75 | 0.02 (0.02-0.02) |
| TOTAL | | 5.37 | - | 0.01 | 23.56 | - | 0.02 | 28.93 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.27d** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.02-0.02) | 0 | 0 | 0.02 (0.02-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.07 | 0.79 | 0.02 (0.02-0.02) | 1.07 | 0.79 | 0.02 (0.02-0.02) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.13 | - | 0.02 (0.02-0.02) | 0.13 | - | 0.02 (0.02-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 7.78 | 6.89 | 0.02 (0.02-0.02) | 7.78 | 6.89 | 0.02 (0.02-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.6 | 1.48 | 0.02 (0.02-0.02) | 0.6 | 1.48 | 0.02 (0.02-0.02) |
| Farne Islands | SPA, SSSI | 0.05 | 0 | 0.01 (0-0.01) | 0.25 | 0 | 0.02 (0.02-0.02) | 0.3 | 0.05 | 0.03 (0.02-0.03) |
| Firth of Forth Islands | SPA, SSSI | 0.21 | 0.09 | 0 (0-0) | 2.06 | 0.91 | 0.02 (0.02-0.02) | 2.27 | 1.13 | 0.03 (0.02-0.03) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 2.53 | 1.23 | 0.01 (0.01-0.01) | 6.88 | 3.34 | 0.02 (0.02-0.02) | 9.41 | 5.87 | 0.03 (0.03-0.04) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.5 | 2.7 | 0.02 (0.02-0.02) | 1.5 | 2.7 | 0.02 (0.02-0.02) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 2.29 | 2.53 | 0.02 (0.02-0.02) | 2.29 | 2.53 | 0.02 (0.02-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.08 | 1.74 | 0.02 (0.02-0.02) | 1.08 | 1.74 | 0.02 (0.02-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.18 | 0.12 | 0 (0-0.01) | 1.38 | 0.95 | 0.02 (0.02-0.02) | 1.56 | 1.13 | 0.03 (0.02-0.03) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.13 | 2.09 | 0.02 (0.02-0.02) | 1.13 | 2.09 | 0.02 (0.02-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.42 | 0.85 | 0.02 (0.02-0.02) | 0.42 | 0.85 | 0.02 (0.02-0.02) |
| TOTAL | | 2.97 | - | 0 | 26.61 | - | 0.02 | 29.58 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.28** Apportioning to protected sites of the maximum breeding season numbers of adult razorbills in flight in the proposed Dogger Bank Teesside B project using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Farne Islands | SPA, SSSI | 0.33 (0.26-0.41) | 0.04 (0.03-0.05) |
| Forth Islands | SPA, SSSI | 1.58 (1.23-1.95) | 0.03 (0.03-0.04) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 18.58 (14.49-23.01) | 0.06 (0.05-0.08) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.32 (1.03-1.64) | 0.06 (0.05-0.07) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.29a** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.01 | 0.08 | 0 (0-0) | 0.01 | 0.08 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.21 | 0.15 | 0 (0-0) | 0.21 | 0.15 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0 | 0.02 | 0 (0-0) | 0 | 0.02 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.1 | 0.3 | 0 (0-0) | 0.1 | 0.3 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.48 | 0.45 | 0 (0-0) | 0.48 | 0.45 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.81 | 0.18 | 0 (0-0) | 0.81 | 0.18 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.17 | 0.63 | 0 (0-0) | 0.17 | 0.63 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.21 | 0.72 | 0 (0-0) | 0.21 | 0.72 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.05 | 0 (0-0) | 0.01 | 0.05 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.09 | 0.02 | 0 (0-0) | 0.09 | 0.02 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.03 | 0 (0-0) | 0.01 | 0.03 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.45 | 0.61 | 0 (0-0) | 0.45 | 0.61 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 2.57 | - | 0 | 2.57 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.29b** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.02 | 0.12 | 0 (0-0) | 0.02 | 0.12 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.31 | 0.23 | 0 (0-0) | 0.31 | 0.23 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.03 | 0 (0-0) | 0.01 | 0.03 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.14 | 0.45 | 0 (0-0) | 0.14 | 0.45 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.73 | 0.69 | 0 (0-0) | 0.73 | 0.69 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.23 | 0.28 | 0 (0-0) | 1.23 | 0.28 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.26 | 0.95 | 0 (0-0) | 0.26 | 0.95 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.31 | 1.09 | 0 (0-0) | 0.31 | 1.09 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.07 | 0 (0-0) | 0.01 | 0.07 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.14 | 0.03 | 0 (0-0) | 0.14 | 0.03 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.05 | 0 (0-0) | 0.02 | 0.05 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.69 | 0.93 | 0 (0-0) | 0.69 | 0.93 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 3.87 | - | 0 | 3.87 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.29c** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0 | 0.03 | 0 (0-0) | 0 | 0.03 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.06 | 0 (0-0) | 0.08 | 0.06 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0 | 0.01 | 0 (0-0) | 0 | 0.01 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.12 | 0 (0-0) | 0.04 | 0.12 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.19 | 0.18 | 0 (0-0) | 0.19 | 0.18 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.32 | 0.07 | 0 (0-0) | 0.32 | 0.07 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0 | - | 0 (0-0) | 0 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.25 | 0 (0-0) | 0.07 | 0.25 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.28 | 0 (0-0) | 0.08 | 0.28 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0 | 0.02 | 0 (0-0) | 0 | 0.02 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.01 | 0 (0-0) | 0.04 | 0.01 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0 | 0.01 | 0 (0-0) | 0 | 0.01 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.18 | 0.24 | 0 (0-0) | 0.18 | 0.24 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 1 | - | 0 | 1 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.29d** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.01 | 0.07 | 0 (0-0) | 0.01 | 0.07 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.18 | 0.13 | 0 (0-0) | 0.18 | 0.13 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0 | 0.02 | 0 (0-0) | 0 | 0.02 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.27 | 0 (0-0) | 0.08 | 0.27 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.43 | 0.4 | 0 (0-0) | 0.43 | 0.4 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.72 | 0.16 | 0 (0-0) | 0.72 | 0.16 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.15 | 0.56 | 0 (0-0) | 0.15 | 0.56 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.18 | 0.64 | 0 (0-0) | 0.18 | 0.64 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0 | 0.04 | 0 (0-0) | 0 | 0.04 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.02 | 0 (0-0) | 0.08 | 0.02 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.03 | 0 (0-0) | 0.01 | 0.03 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.4 | 0.54 | 0 (0-0) | 0.4 | 0.54 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 2.27 | - | 0 | 2.27 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.30a** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.02 | 0.15 | 0 (0-0) | 0.02 | 0.15 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.41 | 0.3 | 0 (0-0) | 0.41 | 0.3 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.05 | 0 (0-0) | 0.01 | 0.05 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.19 | 0.6 | 0 (0-0) | 0.19 | 0.6 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.96 | 0.91 | 0 (0-0) | 0.96 | 0.91 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.63 | 0.37 | 0 (0-0) | 1.63 | 0.37 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.34 | 1.26 | 0 (0-0) | 0.34 | 1.26 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.41 | 1.44 | 0 (0-0) | 0.41 | 1.44 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.09 | 0 (0-0) | 0.01 | 0.09 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.19 | 0.05 | 0 (0-0) | 0.19 | 0.05 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.06 | 0 (0-0) | 0.02 | 0.06 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.91 | 1.23 | 0 (0-0) | 0.91 | 1.23 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 5.13 | - | 0 | 5.13 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.30b** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.04 | 0.23 | 0 (0-0) | 0.04 | 0.23 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.62 | 0.45 | 0 (0-0) | 0.62 | 0.45 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.07 | 0 (0-0) | 0.01 | 0.07 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.29 | 0.91 | 0 (0-0) | 0.29 | 0.91 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 1.45 | 1.37 | 0 (0-0) | 1.45 | 1.37 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 2.45 | 0.55 | 0 (0-0) | 2.45 | 0.55 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.02 | - | 0 (0-0) | 0.02 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.52 | 1.9 | 0 (0-0) | 0.52 | 1.9 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.62 | 2.17 | 0 (0-0) | 0.62 | 2.17 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.14 | 0 (0-0) | 0.02 | 0.14 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.28 | 0.07 | 0 (0-0) | 0.28 | 0.07 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.09 | 0 (0-0) | 0.03 | 0.09 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.37 | 1.85 | 0 (0-0) | 1.37 | 1.85 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 7.73 | - | 0 | 7.73 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.30c** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.01 | 0.06 | 0 (0-0) | 0.01 | 0.06 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.16 | 0.12 | 0 (0-0) | 0.16 | 0.12 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0 | 0.02 | 0 (0-0) | 0 | 0.02 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.24 | 0 (0-0) | 0.07 | 0.24 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.38 | 0.36 | 0 (0-0) | 0.38 | 0.36 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.64 | 0.14 | 0 (0-0) | 0.64 | 0.14 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.13 | 0.49 | 0 (0-0) | 0.13 | 0.49 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.16 | 0.56 | 0 (0-0) | 0.16 | 0.56 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0 | 0.04 | 0 (0-0) | 0 | 0.04 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.02 | 0 (0-0) | 0.07 | 0.02 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.02 | 0 (0-0) | 0.01 | 0.02 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.36 | 0.48 | 0 (0-0) | 0.36 | 0.48 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 2.01 | - | 0 | 2.01 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.30d** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.02 | 0.14 | 0 (0-0) | 0.02 | 0.14 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.37 | 0.26 | 0 (0-0) | 0.37 | 0.26 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.04 | 0 (0-0) | 0.01 | 0.04 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.17 | 0.53 | 0 (0-0) | 0.17 | 0.53 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.85 | 0.81 | 0 (0-0) | 0.85 | 0.81 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.44 | 0.32 | 0 (0-0) | 1.44 | 0.32 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.3 | 1.11 | 0 (0-0) | 0.3 | 1.11 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.36 | 1.28 | 0 (0-0) | 0.36 | 1.28 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.08 | 0 (0-0) | 0.01 | 0.08 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.16 | 0.04 | 0 (0-0) | 0.16 | 0.04 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.05 | 0 (0-0) | 0.02 | 0.05 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.81 | 1.09 | 0 (0-0) | 0.81 | 1.09 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 4.55 | - | 0 | 4.55 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**TEESIDE A and B [top]**

**Table A9.31** Apportioning to protected sites of the maximum breeding season numbers of adult northern fulmars in flight in the proposed Dogger Bank Teesside A and B projects, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Buchan Ness to Collieston Coast | SPA, SSSI | 18.77 (15.23-22.52) | 0.68 (0.55-0.81) |
| Forth Islands | SPA, SSSI | 9.93 (8.05-11.91) | 0.88 (0.71-1.06) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 89.06 (72.25-106.87) | 4.87 (3.95-5.85) |
| Fowlsheugh | SPA, SSSI | 1.81 (1.47-2.17) | 0.47 (0.38-0.56) |
| Hunstanton Cliffs | SSSI | 3.03 (2.46-3.63) | 1.66 (1.35-2) |
| North Berwick Coast (Firth of Forth SPA) | SSSI | 9.49 (7.7-11.39) | 0.87 (0.71-1.05) |
| Seevogelschutzgebiet Helgoland | SPA | 1.26 (1.03-1.52) | 0.69 (0.56-0.82) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 17.59 (14.27-21.11) | 0.49 (0.4-0.59) |
| Weybourne Cliffs | SSSI | 0.6 (0.49-0.72) | 1.66 (1.35-2) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.32** Apportioning to protected sites of the maximum breeding season numbers of adult northern gannets in flight in the proposed Dogger Bank Teesside A and B project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| **Sitename** | **Designation** | **Mean between years** | |
|---|---|---|---|
| | | **Number of adults** | **% of current population**[1] |
| Forth Islands | SPA, SSSI | 98.13 (83.44-116.98) | 0.09 (0.08-0.11) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 52.83 (44.92-62.98) | 0.34 (0.29-0.4) |
| Seevogelschutzgebiet Helgoland | SPA | 0.16 (0.14-0.19) | 0.07 (0.06-0.08) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.33a**. Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A and B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 2.76 | 2.76 | 0 (0-0.01) | 2.76 | 2.76 | 0 (0-0.01) | 0.07 |
| Seevogelschutzgebiet Helgoland | SPA | 0.01 | 0.01 | 0 (0-0.01) | 0.02 | 0.02 | 0 (0-0.01) | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.14 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.51 | 0.16 | 0 (0-0.01) | 0.51 | 0.16 | 0 (0-0.01) | 0.07 |
| Forth Islands | SPA, SSSI | 5.43 | 2.11 | 0 (0-0.01) | 7.83 | 3.05 | 0 (0-0.01) | 13.26 | 8.48 | 0.01 (0.01-0.01) | 0.14 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 2.73 | 0.81 | 0.02 (0.01-0.02) | 1.2 | 0.35 | 0 (0-0.01) | 3.92 | 3.08 | 0.02 (0.02-0.02) | 0.30 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 3.44 | 2.32 | 0 (0-0.01) | 3.44 | 2.32 | 0 (0-0.01) | 0.07 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 1.38 | 0.97 | 0 (0-0.01) | 1.38 | 0.97 | 0 (0-0.01) | 0.07 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 0.66 | 0.83 | 0 (0-0.01) | 0.66 | 0.83 | 0 (0-0.01) | 0.07 |
| TOTAL | | 8.16 | - | 0 | 17.79 | - | 0 | 25.95 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.33b** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A and B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 5.2 | 5.2 | 0.01 (0.01-0.01) | 5.2 | 5.2 | 0.01 (0.01-0.01) | 0.14 |
| Seevogelschutzgebiet Helgoland | SPA | 0.01 | 0.01 | 0.01 (0-0.01) | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.02) | 0.23 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.95 | 0.31 | 0.01 (0.01-0.01) | 0.95 | 0.31 | 0.01 (0.01-0.01) | 0.14 |
| Forth Islands | SPA, SSSI | 6.93 | 2.7 | 0.01 (0.01-0.01) | 14.77 | 5.75 | 0.01 (0.01-0.01) | 21.7 | 12.68 | 0.02 (0.01-0.02) | 0.23 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.49 | 1.03 | 0.02 (0.02-0.02) | 2.25 | 0.67 | 0.01 (0.01-0.01) | 5.74 | 4.15 | 0.03 (0.02-0.03) | 0.44 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 6.48 | 4.37 | 0.01 (0.01-0.01) | 6.48 | 4.37 | 0.01 (0.01-0.01) | 0.14 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 2.6 | 1.83 | 0.01 (0.01-0.01) | 2.6 | 1.83 | 0.01 (0.01-0.01) | 0.14 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 1.24 | 1.57 | 0.01 (0.01-0.01) | 1.24 | 1.57 | 0.01 (0.01-0.01) | 0.14 |
| TOTAL | | 10.43 | - | 0 | 33.53 | - | 0.01 | 43.97 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.33c** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A and B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 12.31 | 12.31 | 0.02 (0.02-0.02) | 12.31 | 12.31 | 0.02 (0.02-0.02) | 0.29 |
| Seevogelschutzgebiet Helgoland | SPA | 0.05 | 0.05 | 0.02 (0.02-0.03) | 0.07 | 0.07 | 0.02 (0.02-0.02) | 0.13 | 0.13 | 0.04 (0.04-0.05) | 0.64 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.26 | 0.73 | 0.02 (0.02-0.02) | 2.26 | 0.73 | 0.02 (0.02-0.02) | 0.29 |
| Forth Islands | SPA, SSSI | 27.09 | 10.55 | 0.02 (0.02-0.03) | 34.97 | 13.61 | 0.02 (0.02-0.02) | 62.06 | 40.7 | 0.05 (0.04-0.05) | 0.65 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 13.6 | 4.01 | 0.08 (0.07-0.09) | 5.34 | 1.58 | 0.02 (0.02-0.02) | 18.93 | 15.17 | 0.1 (0.08-0.12) | 1.46 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 15.35 | 10.34 | 0.02 (0.02-0.02) | 15.35 | 10.34 | 0.02 (0.02-0.02) | 0.29 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 6.16 | 4.32 | 0.02 (0.02-0.02) | 6.16 | 4.32 | 0.02 (0.02-0.02) | 0.29 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 2.95 | 3.72 | 0.02 (0.02-0.02) | 2.95 | 3.72 | 0.02 (0.02-0.02) | 0.29 |
| TOTAL | | 40.74 | - | 0.02 | 79.4 | - | 0.02 | 120.13 | - | 0.03 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.33d** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A and B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 7.22 | 7.22 | 0.01 (0.01-0.01) | 7.22 | 7.22 | 0.01 (0.01-0.01) | 0.18 |
| Seevogelschutzgebiet Helgoland | SPA | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.07 | 0.07 | 0.02 (0.02-0.03) | 0.36 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.32 | 0.43 | 0.01 (0.01-0.01) | 1.32 | 0.43 | 0.01 (0.01-0.01) | 0.18 |
| Forth Islands | SPA, SSSI | 14.14 | 5.5 | 0.01 (0.01-0.02) | 20.52 | 7.99 | 0.01 (0.01-0.01) | 34.66 | 22.13 | 0.03 (0.02-0.03) | 0.36 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 7.1 | 2.1 | 0.04 (0.03-0.05) | 3.13 | 0.93 | 0.01 (0.01-0.01) | 10.23 | 8.03 | 0.05 (0.04-0.06) | 0.79 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 9.01 | 6.07 | 0.01 (0.01-0.01) | 9.01 | 6.07 | 0.01 (0.01-0.01) | 0.18 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 3.61 | 2.54 | 0.01 (0.01-0.01) | 3.61 | 2.54 | 0.01 (0.01-0.01) | 0.18 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 1.73 | 2.18 | 0.01 (0.01-0.01) | 1.73 | 2.18 | 0.01 (0.01-0.01) | 0.18 |
| TOTAL | | 21.27 | - | 0.01 | 46.59 | - | 0.01 | 67.86 | - | 0.02 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.34** Apportioning to protected sites of the maximum breeding season numbers of adult black-legged kittiwakes in flight in the proposed Dogger Bank Teesside A and B project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Durham Coast and Marsden Bay | SSSI | 11.32 (9.98-12.69) | 0.28 (0.25-0.31) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 836.51 (746.71-927.63) | 1.1 (0.98-1.22) |

[1] Impacts are apportioned based on current populations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.35a**. Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A and B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.24 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.06 | 0.06 | 0.01 (0.01-0.01) | 0.06 | 0.06 | 0.01 (0.01-0.01) | 0.24 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.51 | 0.51 | 0.01 (0.01-0.01) | 0.51 | 0.51 | 0.01 (0.01-0.01) | 0.24 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.13 | 0.13 | 0.01 (0.01-0.01) | 0.13 | 0.13 | 0.01 (0.01-0.01) | 0.24 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.28 | - | 0.01 (0.01-0.01) | 0.28 | - | 0.01 (0.01-0.01) | 0.24 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 3.98 | 9.67 | 0.01 (0.01-0.01) | 3.98 | 9.67 | 0.01 (0.01-0.01) | 0.24 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.11 | 0.55 | 0.01 (0.01-0.01) | 0.11 | 0.55 | 0.01 (0.01-0.01) | 0.24 |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.46 | 3.08 | 0.01 (0.01-0.01) | 1.46 | 3.08 | 0.01 (0.01-0.01) | 0.24 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.56 | 3.03 | 0.01 (0.01-0.01) | 0.56 | 3.03 | 0.01 (0.01-0.01) | 0.24 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.35 | - | 0.01 (0.01-0.01) | 0.35 | - | 0.01 (0.01-0.01) | 0.24 |
| Durham Coast and Marsden Bay | SSSI | 0.33 | - | 0.01 (0.01-0.01) | 0.81 | - | 0.01 (0.01-0.01) | 1.14 | - | 0.02 (0.02-0.02) | 0.36 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.17 | - | 0.01 (0.01-0.01) | 0.17 | - | 0.01 (0.01-0.01) | 0.24 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 12.74 | 10.32 | 0.01 (0.01-0.01) | 12.74 | 10.32 | 0.01 (0.01-0.01) | 0.24 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.46 | 5.76 | 0.01 (0.01-0.01) | 0.46 | 5.76 | 0.01 (0.01-0.01) | 0.24 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 1.26 | 1.98 | 0.01 (0.01-0.01) | 1.26 | 1.98 | 0.01 (0.01-0.01) | 0.24 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.2 | 2.67 | 0.01 (0.01-0.01) | 1.2 | 2.67 | 0.01 (0.01-0.01) | 0.24 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 14 | 26.22 | 0.02 (0.01-0.02) | 14.13 | 26.46 | 0.01 (0.01-0.01) | 28.13 | 40.47 | 0.03 (0.02-0.03) | 0.54 |
| Foula | SPA | 0 | 0 | 0 | 0.15 | 1.22 | 0.01 (0.01-0.01) | 0.15 | 1.22 | 0.01 (0.01-0.01) | 0.24 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 2.96 | 11.63 | 0.01 (0.01-0.01) | 2.96 | 11.63 | 0.01 (0.01-0.01) | 0.24 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.09 | 0.29 | 0.01 (0.01-0.01) | 0.09 | 0.29 | 0.01 (0.01-0.01) | 0.24 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.13 | 0.95 | 0.01 (0.01-0.01) | 0.13 | 0.95 | 0.01 (0.01-0.01) | 0.24 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 0.85 | 2.44 | 0.01 (0.01-0.01) | 0.85 | 2.44 | 0.01 (0.01-0.01) | 0.24 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 3.22 | 4.16 | 0.01 (0.01-0.01) | 3.22 | 4.16 | 0.01 (0.01-0.01) | 0.24 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.16 | 2.23 | 0.01 (0.01-0.01) | 0.16 | 2.23 | 0.01 (0.01-0.01) | 0.24 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.44 | 1.56 | 0.01 (0.01-0.01) | 0.44 | 1.56 | 0.01 (0.01-0.01) | 0.24 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 5.15 | 6.72 | 0.01 (0.01-0.01) | 5.15 | 6.72 | 0.01 (0.01-0.01) | 0.24 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.17 | 0.43 | 0.01 (0.01-0.01) | 0.17 | 0.43 | 0.01 (0.01-0.01) | 0.24 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 4.73 | 10.05 | 0.01 (0.01-0.01) | 4.73 | 10.05 | 0.01 (0.01-0.01) | 0.24 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.74 | 7.59 | 0.01 (0.01-0.01) | 1.74 | 7.59 | 0.01 (0.01-0.01) | 0.24 |
| TOTAL | | 14.33 | - | 0 | 58.02 | - | 0.01 | 72.35 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.35b** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A and B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.02 (0.01-0.02) | 0.03 | 0.03 | 0.02 (0.01-0.02) | 0.33 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0.02 (0.01-0.02) | 0.08 | 0.08 | 0.02 (0.01-0.02) | 0.33 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.76 | 0.76 | 0.02 (0.01-0.02) | 0.76 | 0.76 | 0.02 (0.01-0.02) | 0.33 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.2 | 0.2 | 0.02 (0.01-0.02) | 0.2 | 0.2 | 0.02 (0.01-0.02) | 0.33 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.42 | - | 0.02 (0.01-0.02) | 0.42 | - | 0.02 (0.01-0.02) | 0.33 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 5.96 | 14.47 | 0.02 (0.01-0.02) | 5.96 | 14.47 | 0.02 (0.01-0.02) | 0.33 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.16 | 0.82 | 0.02 (0.01-0.02) | 0.16 | 0.82 | 0.02 (0.01-0.02) | 0.33 |
| Cape Wrath | SPA | 0 | 0 | 0 | 2.19 | 4.61 | 0.02 (0.01-0.02) | 2.19 | 4.61 | 0.02 (0.01-0.02) | 0.33 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.84 | 4.54 | 0.02 (0.01-0.02) | 0.84 | 4.54 | 0.02 (0.01-0.02) | 0.33 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.52 | - | 0.02 (0.01-0.02) | 0.52 | - | 0.02 (0.01-0.02) | 0.33 |
| Durham Coast and Marsden Bay | SSSI | 0.9 | - | 0.02 (0.02-0.02) | 1.21 | - | 0.02 (0.01-0.02) | 2.11 | - | 0.03 (0.03-0.04) | 0.67 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.25 | - | 0.02 (0.01-0.02) | 0.25 | - | 0.02 (0.01-0.02) | 0.33 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 19.07 | 15.44 | 0.02 (0.01-0.02) | 19.07 | 15.44 | 0.02 (0.01-0.02) | 0.33 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.68 | 8.63 | 0.02 (0.01-0.02) | 0.68 | 8.63 | 0.02 (0.01-0.02) | 0.33 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 1.89 | 2.96 | 0.02 (0.01-0.02) | 1.89 | 2.96 | 0.02 (0.01-0.02) | 0.33 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.79 | 3.99 | 0.02 (0.01-0.02) | 1.79 | 3.99 | 0.02 (0.01-0.02) | 0.33 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 38.72 | 72.5 | 0.04 (0.04-0.05) | 21.15 | 39.6 | 0.02 (0.01-0.02) | 59.86 | 78.32 | 0.06 (0.05-0.07) | 1.16 |
| Foula | SPA | 0 | 0 | 0 | 0.23 | 1.82 | 0.02 (0.01-0.02) | 0.23 | 1.82 | 0.02 (0.01-0.02) | 0.33 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 4.44 | 17.41 | 0.02 (0.01-0.02) | 4.44 | 17.41 | 0.02 (0.01-0.02) | 0.33 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.13 | 0.44 | 0.02 (0.01-0.02) | 0.13 | 0.44 | 0.02 (0.01-0.02) | 0.33 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.19 | 1.43 | 0.02 (0.01-0.02) | 0.19 | 1.43 | 0.02 (0.01-0.02) | 0.33 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 1.28 | 3.66 | 0.02 (0.01-0.02) | 1.28 | 3.66 | 0.02 (0.01-0.02) | 0.33 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 4.82 | 6.22 | 0.02 (0.01-0.02) | 4.82 | 6.22 | 0.02 (0.01-0.02) | 0.33 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.24 | 3.33 | 0.02 (0.01-0.02) | 0.24 | 3.33 | 0.02 (0.01-0.02) | 0.33 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.66 | 2.33 | 0.02 (0.01-0.02) | 0.66 | 2.33 | 0.02 (0.01-0.02) | 0.33 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 7.71 | 10.06 | 0.02 (0.01-0.02) | 7.71 | 10.06 | 0.02 (0.01-0.02) | 0.33 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.26 | 0.65 | 0.02 (0.01-0.02) | 0.26 | 0.65 | 0.02 (0.01-0.02) | 0.33 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 7.08 | 15.04 | 0.02 (0.01-0.02) | 7.08 | 15.04 | 0.02 (0.01-0.02) | 0.33 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 2.6 | 11.35 | 0.02 (0.01-0.02) | 2.6 | 11.35 | 0.02 (0.01-0.02) | 0.33 |
| TOTAL | | 39.61 | - | 0.01 | 86.83 | - | 0.02 | 126.44 | - | 0.02 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.35c** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A and B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.02 (0.01-0.02) | 0.03 | 0.03 | 0.02 (0.01-0.02) | 0.37 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.09 | 0.09 | 0.02 (0.01-0.02) | 0.09 | 0.09 | 0.02 (0.01-0.02) | 0.37 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.81 | 0.81 | 0.02 (0.01-0.02) | 0.81 | 0.81 | 0.02 (0.01-0.02) | 0.37 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.21 | 0.21 | 0.02 (0.01-0.02) | 0.21 | 0.21 | 0.02 (0.01-0.02) | 0.37 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.45 | - | 0.02 (0.01-0.02) | 0.45 | - | 0.02 (0.01-0.02) | 0.37 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 6.33 | 15.36 | 0.02 (0.01-0.02) | 6.33 | 15.36 | 0.02 (0.01-0.02) | 0.37 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.17 | 0.87 | 0.02 (0.01-0.02) | 0.17 | 0.87 | 0.02 (0.01-0.02) | 0.37 |
| Cape Wrath | SPA | 0 | 0 | 0 | 2.32 | 4.89 | 0.02 (0.01-0.02) | 2.32 | 4.89 | 0.02 (0.01-0.02) | 0.37 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.9 | 4.82 | 0.02 (0.01-0.02) | 0.9 | 4.82 | 0.02 (0.01-0.02) | 0.37 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.55 | - | 0.02 (0.01-0.02) | 0.55 | - | 0.02 (0.01-0.02) | 0.37 |
| Durham Coast and Marsden Bay | SSSI | 0.83 | - | 0.02 (0.01-0.02) | 1.28 | - | 0.02 (0.01-0.02) | 2.11 | - | 0.03 (0.03-0.04) | 0.68 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.27 | - | 0.02 (0.01-0.02) | 0.27 | - | 0.02 (0.01-0.02) | 0.37 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 20.25 | 16.4 | 0.02 (0.01-0.02) | 20.25 | 16.4 | 0.02 (0.01-0.02) | 0.37 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.73 | 9.16 | 0.02 (0.01-0.02) | 0.73 | 9.16 | 0.02 (0.01-0.02) | 0.37 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 2.01 | 3.15 | 0.02 (0.01-0.02) | 2.01 | 3.15 | 0.02 (0.01-0.02) | 0.37 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.91 | 4.24 | 0.02 (0.01-0.02) | 1.91 | 4.24 | 0.02 (0.01-0.02) | 0.37 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 35.86 | 67.15 | 0.04 (0.04-0.05) | 22.46 | 42.06 | 0.02 (0.01-0.02) | 58.32 | 77.92 | 0.06 (0.05-0.06) | 1.14 |
| Foula | SPA | 0 | 0 | 0 | 0.24 | 1.94 | 0.02 (0.01-0.02) | 0.24 | 1.94 | 0.02 (0.01-0.02) | 0.37 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 4.71 | 18.49 | 0.02 (0.01-0.02) | 4.71 | 18.49 | 0.02 (0.01-0.02) | 0.37 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.14 | 0.47 | 0.02 (0.01-0.02) | 0.14 | 0.47 | 0.02 (0.01-0.02) | 0.37 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.2 | 1.51 | 0.02 (0.01-0.02) | 0.2 | 1.51 | 0.02 (0.01-0.02) | 0.37 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 1.36 | 3.88 | 0.02 (0.01-0.02) | 1.36 | 3.88 | 0.02 (0.01-0.02) | 0.37 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 5.12 | 6.61 | 0.02 (0.01-0.02) | 5.12 | 6.61 | 0.02 (0.01-0.02) | 0.37 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.26 | 3.54 | 0.02 (0.01-0.02) | 0.26 | 3.54 | 0.02 (0.01-0.02) | 0.37 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.7 | 2.47 | 0.02 (0.01-0.02) | 0.7 | 2.47 | 0.02 (0.01-0.02) | 0.37 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 8.18 | 10.68 | 0.02 (0.01-0.02) | 8.18 | 10.68 | 0.02 (0.01-0.02) | 0.37 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.28 | 0.69 | 0.02 (0.01-0.02) | 0.28 | 0.69 | 0.02 (0.01-0.02) | 0.37 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 7.52 | 15.97 | 0.02 (0.01-0.02) | 7.52 | 15.97 | 0.02 (0.01-0.02) | 0.37 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 2.76 | 12.06 | 0.02 (0.01-0.02) | 2.76 | 12.06 | 0.02 (0.01-0.02) | 0.37 |
| TOTAL | | 36.69 | - | 0.01 | 92.22 | - | 0.02 | 128.9 | - | 0.02 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.35d** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A and B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.17 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.01 (0.01-0.01) | 0.05 | 0.05 | 0.01 (0.01-0.01) | 0.17 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.45 | 0.45 | 0.01 (0.01-0.01) | 0.45 | 0.45 | 0.01 (0.01-0.01) | 0.17 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.12 | 0.12 | 0.01 (0.01-0.01) | 0.12 | 0.12 | 0.01 (0.01-0.01) | 0.17 |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.25 | - | 0.01 (0.01-0.01) | 0.25 | - | 0.01 (0.01-0.01) | 0.17 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 3.54 | 8.6 | 0.01 (0.01-0.01) | 3.54 | 8.6 | 0.01 (0.01-0.01) | 0.17 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.1 | 0.48 | 0.01 (0.01-0.01) | 0.1 | 0.48 | 0.01 (0.01-0.01) | 0.17 |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.3 | 2.74 | 0.01 (0.01-0.01) | 1.3 | 2.74 | 0.01 (0.01-0.01) | 0.17 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.5 | 2.7 | 0.01 (0.01-0.01) | 0.5 | 2.7 | 0.01 (0.01-0.01) | 0.17 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 0.31 | - | 0.01 (0.01-0.01) | 0.31 | - | 0.01 (0.01-0.01) | 0.17 |
| Durham Coast and Marsden Bay | SSSI | 1.2 | - | 0.02 (0.02-0.03) | 0.72 | - | 0.01 (0.01-0.01) | 1.92 | - | 0.03 (0.03-0.04) | 0.62 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.15 | - | 0.01 (0.01-0.01) | 0.15 | - | 0.01 (0.01-0.01) | 0.17 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 11.33 | 9.18 | 0.01 (0.01-0.01) | 11.33 | 9.18 | 0.01 (0.01-0.01) | 0.17 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.41 | 5.13 | 0.01 (0.01-0.01) | 0.41 | 5.13 | 0.01 (0.01-0.01) | 0.17 |
| Farne Islands | SPA, SSSI | 0 | 0 | 0 | 1.12 | 1.76 | 0.01 (0.01-0.01) | 1.12 | 1.76 | 0.01 (0.01-0.01) | 0.17 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.07 | 2.37 | 0.01 (0.01-0.01) | 1.07 | 2.37 | 0.01 (0.01-0.01) | 0.17 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 54.51 | 102.07 | 0.06 (0.05-0.07) | 12.57 | 23.54 | 0.01 (0.01-0.01) | 67.08 | 78.04 | 0.07 (0.06-0.08) | 1.34 |
| Foula | SPA | 0 | 0 | 0 | 0.14 | 1.08 | 0.01 (0.01-0.01) | 0.14 | 1.08 | 0.01 (0.01-0.01) | 0.17 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 2.64 | 10.35 | 0.01 (0.01-0.01) | 2.64 | 10.35 | 0.01 (0.01-0.01) | 0.17 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.26 | 0.01 (0.01-0.01) | 0.08 | 0.26 | 0.01 (0.01-0.01) | 0.17 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.11 | 0.85 | 0.01 (0.01-0.01) | 0.11 | 0.85 | 0.01 (0.01-0.01) | 0.17 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 0.76 | 2.17 | 0.01 (0.01-0.01) | 0.76 | 2.17 | 0.01 (0.01-0.01) | 0.17 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 2.86 | 3.7 | 0.01 (0.01-0.01) | 2.86 | 3.7 | 0.01 (0.01-0.01) | 0.17 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.14 | 1.98 | 0.01 (0.01-0.01) | 0.14 | 1.98 | 0.01 (0.01-0.01) | 0.17 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.39 | 1.38 | 0.01 (0.01-0.01) | 0.39 | 1.38 | 0.01 (0.01-0.01) | 0.17 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 4.58 | 5.98 | 0.01 (0.01-0.01) | 4.58 | 5.98 | 0.01 (0.01-0.01) | 0.17 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.15 | 0.39 | 0.01 (0.01-0.01) | 0.15 | 0.39 | 0.01 (0.01-0.01) | 0.17 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 4.21 | 8.94 | 0.01 (0.01-0.01) | 4.21 | 8.94 | 0.01 (0.01-0.01) | 0.17 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.54 | 6.75 | 0.01 (0.01-0.01) | 1.54 | 6.75 | 0.01 (0.01-0.01) | 0.17 |
| TOTAL | | 55.71 | - | 0.02 | 51.6 | - | 0.01 | 107.31 | - | 0.02 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.36a**. Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.1 | 0.1 | 0.02 (0.01-0.03) | 0.1 | 0.1 | 0.02 (0.01-0.03) | 0.13 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.01-0.03) | 0.01 | 0.01 | 0.02 (0.01-0.03) | 0.13 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.06 | 0.06 | 0.02 (0.01-0.03) | 0.06 | 0.06 | 0.02 (0.01-0.03) | 0.13 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.01-0.03) | 0 | 0 | 0.02 (0.01-0.03) | 0.13 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.4 | 0.4 | 0.02 (0.01-0.03) | 0.4 | 0.4 | 0.02 (0.01-0.03) | 0.13 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.02 (0.01-0.03) | 0.02 | 0.02 | 0.02 (0.01-0.03) | 0.13 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.02 (0.01-0.03) | 0.04 | 0.04 | 0.02 (0.01-0.03) | 0.13 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.01-0.03) | 0 | 0 | 0.02 (0.01-0.03) | 0.13 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 2.99 | 2.99 | 0.02 (0.01-0.03) | 2.99 | 2.99 | 0.02 (0.01-0.03) | 0.13 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 14.53 | 14.53 | 0.02 (0.01-0.03) | 14.53 | 14.53 | 0.02 (0.01-0.03) | 0.13 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 4.59 | 4.59 | 0.02 (0.01-0.03) | 4.59 | 4.59 | 0.02 (0.01-0.03) | 0.13 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 1.28 | 1.28 | 0.02 (0.01-0.03) | 1.28 | 1.28 | 0.02 (0.01-0.03) | 0.13 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 8.82 | 8.82 | 0.02 (0.01-0.03) | 8.82 | 8.82 | 0.02 (0.01-0.03) | 0.13 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 1.58 | 1.58 | 0.02 (0.01-0.03) | 1.58 | 1.58 | 0.02 (0.01-0.03) | 0.13 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 11.97 | 11.97 | 0.02 (0.01-0.03) | 11.97 | 11.97 | 0.02 (0.01-0.03) | 0.13 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.07 | 0.07 | 0.02 (0.01-0.03) | 0.07 | 0.07 | 0.02 (0.01-0.03) | 0.13 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.01-0.03) | 0.01 | 0.01 | 0.02 (0.01-0.03) | 0.13 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 1.79 | 13.67 | 0.02 (0.01-0.03) | 1.79 | 13.67 | 0.02 (0.01-0.03) | 0.13 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.27 | 0.95 | 0.02 (0.01-0.03) | 1.27 | 0.95 | 0.02 (0.01-0.03) | 0.13 |
| TOTAL | | 0 | - | 0 | 49.54 | - | 0.02 | 49.54 | - | 0.02 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.36b** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.06 | 0.06 | 0.01 (0.01-0.02) | 0.06 | 0.06 | 0.01 (0.01-0.02) | 0.12 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.12 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.01 (0.01-0.02) | 0.04 | 0.04 | 0.01 (0.01-0.02) | 0.12 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.12 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.24 | 0.24 | 0.01 (0.01-0.02) | 0.24 | 0.24 | 0.01 (0.01-0.02) | 0.12 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.12 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0.01-0.02) | 0.02 | 0.02 | 0.01 (0.01-0.02) | 0.12 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.12 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.81 | 1.81 | 0.01 (0.01-0.02) | 1.81 | 1.81 | 0.01 (0.01-0.02) | 0.12 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 8.81 | 8.81 | 0.01 (0.01-0.02) | 8.81 | 8.81 | 0.01 (0.01-0.02) | 0.12 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 2.78 | 2.78 | 0.01 (0.01-0.02) | 2.78 | 2.78 | 0.01 (0.01-0.02) | 0.12 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.78 | 0.78 | 0.01 (0.01-0.02) | 0.78 | 0.78 | 0.01 (0.01-0.02) | 0.12 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 5.35 | 5.35 | 0.01 (0.01-0.02) | 5.35 | 5.35 | 0.01 (0.01-0.02) | 0.12 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 0.95 | 0.95 | 0.01 (0.01-0.02) | 0.95 | 0.95 | 0.01 (0.01-0.02) | 0.12 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 7.26 | 7.26 | 0.01 (0.01-0.02) | 7.26 | 7.26 | 0.01 (0.01-0.02) | 0.12 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.04 | 0.04 | 0.01 (0.01-0.02) | 0.04 | 0.04 | 0.01 (0.01-0.02) | 0.12 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.12 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 1.08 | 8.29 | 0.01 (0.01-0.02) | 1.08 | 8.29 | 0.01 (0.01-0.02) | 0.12 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.77 | 0.57 | 0.01 (0.01-0.02) | 0.77 | 0.57 | 0.01 (0.01-0.02) | 0.12 |
| TOTAL | | 0 | - | 0 | 30.02 | - | 0.01 | 30.02 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.36c** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.01 (0-0.02) | 0.04 | 0.04 | 0.01 (0-0.02) | 0.11 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.02) | 0 | 0 | 0.01 (0-0.02) | 0.11 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0-0.02) | 0.02 | 0.02 | 0.01 (0-0.02) | 0.11 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.02) | 0 | 0 | 0.01 (0-0.02) | 0.11 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.17 | 0.17 | 0.01 (0-0.02) | 0.17 | 0.17 | 0.01 (0-0.02) | 0.11 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0-0.02) | 0.01 | 0.01 | 0.01 (0-0.02) | 0.11 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0-0.02) | 0.02 | 0.02 | 0.01 (0-0.02) | 0.11 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.02) | 0 | 0 | 0.01 (0-0.02) | 0.11 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.24 | 1.24 | 0.01 (0-0.02) | 1.24 | 1.24 | 0.01 (0-0.02) | 0.11 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 6 | 6 | 0.01 (0-0.02) | 6 | 6 | 0.01 (0-0.02) | 0.11 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 1.9 | 1.9 | 0.01 (0-0.02) | 1.9 | 1.9 | 0.01 (0-0.02) | 0.11 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.53 | 0.53 | 0.01 (0-0.02) | 0.53 | 0.53 | 0.01 (0-0.02) | 0.11 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 3.65 | 3.65 | 0.01 (0-0.02) | 3.65 | 3.65 | 0.01 (0-0.02) | 0.11 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 0.65 | 0.65 | 0.01 (0-0.02) | 0.65 | 0.65 | 0.01 (0-0.02) | 0.11 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 4.95 | 4.95 | 0.01 (0-0.02) | 4.95 | 4.95 | 0.01 (0-0.02) | 0.11 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0-0.02) | 0.03 | 0.03 | 0.01 (0-0.02) | 0.11 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.02) | 0 | 0 | 0.01 (0-0.02) | 0.11 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 0.74 | 5.65 | 0.01 (0-0.02) | 0.74 | 5.65 | 0.01 (0-0.02) | 0.11 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.52 | 0.39 | 0.01 (0-0.02) | 0.52 | 0.39 | 0.01 (0-0.02) | 0.11 |
| TOTAL | | 0 | - | 0 | 20.47 | - | 0.01 | 20.47 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.36d** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.01 (0.01-0.02) | 0.07 | 0.07 | 0.01 (0.01-0.02) | 0.12 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.12 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.01 (0.01-0.02) | 0.04 | 0.04 | 0.01 (0.01-0.02) | 0.12 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.12 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.27 | 0.27 | 0.01 (0.01-0.02) | 0.27 | 0.27 | 0.01 (0.01-0.02) | 0.12 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.12 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.01 (0.01-0.02) | 0.02 | 0.02 | 0.01 (0.01-0.02) | 0.12 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.02) | 0 | 0 | 0.01 (0.01-0.02) | 0.12 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 1.98 | 1.98 | 0.01 (0.01-0.02) | 1.98 | 1.98 | 0.01 (0.01-0.02) | 0.12 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 9.59 | 9.59 | 0.01 (0.01-0.02) | 9.59 | 9.59 | 0.01 (0.01-0.02) | 0.12 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 3.03 | 3.03 | 0.01 (0.01-0.02) | 3.03 | 3.03 | 0.01 (0.01-0.02) | 0.12 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.85 | 0.85 | 0.01 (0.01-0.02) | 0.85 | 0.85 | 0.01 (0.01-0.02) | 0.12 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 5.82 | 5.82 | 0.01 (0.01-0.02) | 5.82 | 5.82 | 0.01 (0.01-0.02) | 0.12 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 1.04 | 1.04 | 0.01 (0.01-0.02) | 1.04 | 1.04 | 0.01 (0.01-0.02) | 0.12 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 7.9 | 7.9 | 0.01 (0.01-0.02) | 7.9 | 7.9 | 0.01 (0.01-0.02) | 0.12 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.05 | 0.05 | 0.01 (0.01-0.02) | 0.05 | 0.05 | 0.01 (0.01-0.02) | 0.12 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.01 | 0.01 | 0.01 (0.01-0.02) | 0.12 |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 1.18 | 9.03 | 0.01 (0.01-0.02) | 1.18 | 9.03 | 0.01 (0.01-0.02) | 0.12 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.84 | 0.62 | 0.01 (0.01-0.02) | 0.84 | 0.62 | 0.01 (0.01-0.02) | 0.12 |
| TOTAL | | 0 | - | 0 | 32.7 | - | 0.01 | 32.7 | - | 0.01 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.37a**. Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.43 | 0.43 | 0.08 (0.06-0.12) | 0.43 | 0.43 | 0.08 (0.06-0.12) | 0.39 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.08 (0.06-0.12) | 0.01 | 0.01 | 0.08 (0.06-0.12) | 0.39 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.79 | 0.79 | 0.08 (0.06-0.12) | 0.79 | 0.79 | 0.08 (0.06-0.12) | 0.39 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.35 | 0.35 | 0.08 (0.06-0.12) | 0.35 | 0.35 | 0.08 (0.06-0.12) | 0.39 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.08 (0.06-0.12) | 0.02 | 0.02 | 0.08 (0.06-0.12) | 0.39 |
| Chausay | SPA | 0 | 0 | 0 | 1.37 | 1.37 | 0.08 (0.06-0.12) | 1.37 | 1.37 | 0.08 (0.06-0.12) | 0.39 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.18 | 0.18 | 0.08 (0.06-0.12) | 0.18 | 0.18 | 0.08 (0.06-0.12) | 0.39 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.08 (0.06-0.12) | 0.01 | 0.01 | 0.08 (0.06-0.12) | 0.39 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.08 (0.06-0.12) | 0.07 | 0.07 | 0.08 (0.06-0.12) | 0.39 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 2.63 | 2.63 | 0.08 (0.06-0.12) | 2.63 | 2.63 | 0.08 (0.06-0.12) | 0.39 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.08 (0.06-0.12) | 0.01 | 0.01 | 0.08 (0.06-0.12) | 0.39 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.04 | 0.04 | 0.08 (0.06-0.12) | 0.04 | 0.04 | 0.08 (0.06-0.12) | 0.39 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.79 | 2.35 | 0.08 (0.06-0.12) | 0.79 | 2.35 | 0.08 (0.06-0.12) | 0.39 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.47 | 1.23 | 0.08 (0.06-0.12) | 0.47 | 1.23 | 0.08 (0.06-0.12) | 0.39 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.44 | 2 | 0.08 (0.06-0.12) | 0.44 | 2 | 0.08 (0.06-0.12) | 0.39 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.45 | - | 0.08 (0.06-0.12) | 0.45 | - | 0.08 (0.06-0.12) | 0.39 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.07 | 1.43 | 0.08 (0.06-0.12) | 0.07 | 1.43 | 0.08 (0.06-0.12) | 0.39 |
| TOTAL | | 0 | - | 0 | 8.11 | - | 0.08 | 8.11 | - | 0.08 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.37b** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.49 | 0.49 | 0.1 (0.07-0.14) | 0.49 | 0.49 | 0.1 (0.07-0.14) | 0.42 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.1 (0.07-0.14) | 0.01 | 0.01 | 0.1 (0.07-0.14) | 0.42 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.91 | 0.91 | 0.1 (0.07-0.14) | 0.91 | 0.91 | 0.1 (0.07-0.14) | 0.42 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.4 | 0.4 | 0.1 (0.07-0.14) | 0.4 | 0.4 | 0.1 (0.07-0.14) | 0.42 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.1 (0.07-0.14) | 0.02 | 0.02 | 0.1 (0.07-0.14) | 0.42 |
| Chausay | SPA | 0 | 0 | 0 | 1.58 | 1.58 | 0.1 (0.07-0.14) | 1.58 | 1.58 | 0.1 (0.07-0.14) | 0.42 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.21 | 0.21 | 0.1 (0.07-0.14) | 0.21 | 0.21 | 0.1 (0.07-0.14) | 0.42 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.1 (0.07-0.14) | 0.02 | 0.02 | 0.1 (0.07-0.14) | 0.42 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0.1 (0.07-0.14) | 0.08 | 0.08 | 0.1 (0.07-0.14) | 0.42 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 3.04 | 3.04 | 0.1 (0.07-0.14) | 3.04 | 3.04 | 0.1 (0.07-0.14) | 0.42 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.1 (0.07-0.14) | 0.01 | 0.01 | 0.1 (0.07-0.14) | 0.42 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.04 | 0.04 | 0.1 (0.07-0.14) | 0.04 | 0.04 | 0.1 (0.07-0.14) | 0.42 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.91 | 2.71 | 0.1 (0.07-0.14) | 0.91 | 2.71 | 0.1 (0.07-0.14) | 0.42 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.54 | 1.42 | 0.1 (0.07-0.14) | 0.54 | 1.42 | 0.1 (0.07-0.14) | 0.42 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.51 | 2.31 | 0.1 (0.07-0.14) | 0.51 | 2.31 | 0.1 (0.07-0.14) | 0.42 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.52 | - | 0.1 (0.07-0.14) | 0.52 | - | 0.1 (0.07-0.14) | 0.42 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.08 | 1.65 | 0.1 (0.07-0.14) | 0.08 | 1.65 | 0.1 (0.07-0.14) | 0.42 |
| TOTAL | | 0 | - | 0 | 9.36 | - | 0.1 | 9.36 | - | 0.1 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.37c** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.5 | 0.5 | 0.1 (0.06-0.16) | 0.5 | 0.5 | 0.1 (0.06-0.16) | 0.28 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.1 (0.06-0.16) | 0.01 | 0.01 | 0.1 (0.06-0.16) | 0.28 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.94 | 0.94 | 0.1 (0.06-0.16) | 0.94 | 0.94 | 0.1 (0.06-0.16) | 0.28 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.41 | 0.41 | 0.1 (0.06-0.16) | 0.41 | 0.41 | 0.1 (0.06-0.16) | 0.28 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.1 (0.06-0.16) | 0.02 | 0.02 | 0.1 (0.06-0.16) | 0.28 |
| Chausay | SPA | 0 | 0 | 0 | 1.62 | 1.62 | 0.1 (0.06-0.16) | 1.62 | 1.62 | 0.1 (0.06-0.16) | 0.28 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.21 | 0.21 | 0.1 (0.06-0.16) | 0.21 | 0.21 | 0.1 (0.06-0.16) | 0.28 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.1 (0.06-0.16) | 0.02 | 0.02 | 0.1 (0.06-0.16) | 0.28 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.09 | 0.09 | 0.1 (0.06-0.16) | 0.09 | 0.09 | 0.1 (0.06-0.16) | 0.28 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 3.11 | 3.11 | 0.1 (0.06-0.16) | 3.11 | 3.11 | 0.1 (0.06-0.16) | 0.28 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.1 (0.06-0.16) | 0.01 | 0.01 | 0.1 (0.06-0.16) | 0.28 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.04 | 0.04 | 0.1 (0.06-0.16) | 0.04 | 0.04 | 0.1 (0.06-0.16) | 0.28 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.93 | 2.78 | 0.1 (0.06-0.16) | 0.93 | 2.78 | 0.1 (0.06-0.16) | 0.28 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.55 | 1.45 | 0.1 (0.06-0.16) | 0.55 | 1.45 | 0.1 (0.06-0.16) | 0.28 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.52 | 2.37 | 0.1 (0.06-0.16) | 0.52 | 2.37 | 0.1 (0.06-0.16) | 0.28 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.54 | - | 0.1 (0.06-0.16) | 0.54 | - | 0.1 (0.06-0.16) | 0.28 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.08 | 1.69 | 0.1 (0.06-0.16) | 0.08 | 1.69 | 0.1 (0.06-0.16) | 0.28 |
| TOTAL | | 0 | - | 0 | 9.59 | - | 0.1 | 9.59 | - | 0.1 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.37d** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.47 | 0.47 | 0.09 (0.06-0.14) | 0.47 | 0.47 | 0.09 (0.06-0.14) | 0.35 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.09 (0.06-0.14) | 0.01 | 0.01 | 0.09 (0.06-0.14) | 0.35 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 0.86 | 0.86 | 0.09 (0.06-0.14) | 0.86 | 0.86 | 0.09 (0.06-0.14) | 0.35 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.38 | 0.38 | 0.09 (0.06-0.14) | 0.38 | 0.38 | 0.09 (0.06-0.14) | 0.35 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.09 (0.06-0.14) | 0.02 | 0.02 | 0.09 (0.06-0.14) | 0.35 |
| Chausay | SPA | 0 | 0 | 0 | 1.49 | 1.49 | 0.09 (0.06-0.14) | 1.49 | 1.49 | 0.09 (0.06-0.14) | 0.35 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.2 | 0.2 | 0.09 (0.06-0.14) | 0.2 | 0.2 | 0.09 (0.06-0.14) | 0.35 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.09 (0.06-0.14) | 0.02 | 0.02 | 0.09 (0.06-0.14) | 0.35 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0.09 (0.06-0.14) | 0.08 | 0.08 | 0.09 (0.06-0.14) | 0.35 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 2.88 | 2.88 | 0.09 (0.06-0.14) | 2.88 | 2.88 | 0.09 (0.06-0.14) | 0.35 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.09 (0.06-0.14) | 0.01 | 0.01 | 0.09 (0.06-0.14) | 0.35 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.04 | 0.04 | 0.09 (0.06-0.14) | 0.04 | 0.04 | 0.09 (0.06-0.14) | 0.35 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.86 | 2.57 | 0.09 (0.06-0.14) | 0.86 | 2.57 | 0.09 (0.06-0.14) | 0.35 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 0.51 | 1.34 | 0.09 (0.06-0.14) | 0.51 | 1.34 | 0.09 (0.06-0.14) | 0.35 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.48 | 2.19 | 0.09 (0.06-0.14) | 0.48 | 2.19 | 0.09 (0.06-0.14) | 0.35 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 0.5 | - | 0.09 (0.06-0.14) | 0.5 | - | 0.09 (0.06-0.14) | 0.35 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.08 | 1.56 | 0.09 (0.06-0.14) | 0.08 | 1.56 | 0.09 (0.06-0.14) | 0.35 |
| TOTAL | | 0 | - | 0 | 8.86 | - | 0.09 | 8.86 | - | 0.09 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.38a** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.01 (0.01-0.01) | 0.07 | 0.07 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0.04 | 0.04 | 0 (0-0) | 0.7 | 0.7 | 0.01 (0.01-0.01) | 0.74 | 0.74 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 3.65 | 2.44 | 0.01 (0.01-0.01) | 3.65 | 2.44 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.26 | 2.39 | 0.01 (0.01-0.01) | 0.26 | 2.39 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 4.2 | 2.59 | 0.01 (0.01-0.01) | 4.2 | 2.59 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 2.59 | 5.57 | 0.01 (0.01-0.01) | 2.59 | 5.57 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 30.09 | 20.19 | 0.01 (0.01-0.01) | 30.09 | 20.19 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 3.69 | 6.11 | 0.01 (0.01-0.01) | 3.69 | 6.11 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 2.16 | 1.58 | 0 (0-0) | 9.08 | 6.64 | 0.01 (0.01-0.01) | 11.24 | 8.8 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0.59 | 0.64 | 0 (0-0) | 4.12 | 4.52 | 0.01 (0.01-0.01) | 4.71 | 5.11 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 5.59 | 2.17 | 0.01 (0.01-0.01) | 11.75 | 4.56 | 0.01 (0.01-0.01) | 17.34 | 10.15 | 0.02 (0.01-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 4.27 | 7.1 | 0.01 (0.01-0.01) | 4.27 | 7.1 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 0.66 | 0.83 | 0 (0-0) | 8.5 | 10.68 | 0.01 (0.01-0.01) | 9.16 | 11.35 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.42 | 4.73 | 0.01 (0.01-0.01) | 1.42 | 4.73 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 1.71 | 3.79 | 0.01 (0.01-0.01) | 1.71 | 3.79 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 3.37 | 7.14 | 0.01 (0.01-0.01) | 3.37 | 7.14 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 13.28 | 7.25 | 0.01 (0.01-0.01) | 13.28 | 7.25 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 4.18 | 7.38 | 0.01 (0.01-0.01) | 4.18 | 7.38 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.58 | 2.01 | 0.01 (0.01-0.01) | 0.58 | 2.01 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.46 | 1.06 | 0 (0-0) | 8.28 | 6.01 | 0.01 (0.01-0.01) | 9.74 | 7.47 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.17 | 1.78 | 0.01 (0.01-0.01) | 1.17 | 1.78 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.94 | 3.03 | 0.01 (0.01-0.01) | 0.94 | 3.03 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 3.09 | 8.44 | 0.01 (0.01-0.01) | 3.09 | 8.44 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 2.3 | 7.98 | 0.01 (0.01-0.01) | 2.3 | 7.98 | 0.01 (0.01-0.01) |
| TOTAL | | 10.5 | - | 0 | 123.28 | - | 0.01 | 133.78 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.38b** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0.01 (0.01-0.01) | 0.08 | 0.08 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0.08 | 0.08 | 0 (0-0) | 0.87 | 0.87 | 0.01 (0.01-0.01) | 0.95 | 0.95 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 4.52 | 3.02 | 0.01 (0.01-0.01) | 4.52 | 3.02 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.33 | 2.96 | 0.01 (0.01-0.01) | 0.33 | 2.96 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 5.2 | 3.21 | 0.01 (0.01-0.01) | 5.2 | 3.21 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 3.21 | 6.9 | 0.01 (0.01-0.01) | 3.21 | 6.9 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 37.27 | 25.02 | 0.01 (0.01-0.01) | 37.27 | 25.02 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 4.57 | 7.57 | 0.01 (0.01-0.01) | 4.57 | 7.57 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 4.16 | 3.04 | 0.01 (0.01-0.01) | 11.25 | 8.22 | 0.01 (0.01-0.01) | 15.41 | 12.38 | 0.02 (0.02-0.02) |
| Firth of Forth Islands | SPA, SSSI | 1.13 | 1.24 | 0 (0-0) | 5.1 | 5.6 | 0.01 (0.01-0.01) | 6.23 | 6.73 | 0.02 (0.01-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 10.78 | 4.18 | 0.01 (0.01-0.01) | 14.56 | 5.65 | 0.01 (0.01-0.01) | 25.34 | 16.43 | 0.02 (0.02-0.03) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 5.29 | 8.79 | 0.01 (0.01-0.01) | 5.29 | 8.79 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 1.29 | 1.62 | 0 (0-0) | 10.53 | 13.23 | 0.01 (0.01-0.01) | 11.82 | 14.52 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.76 | 5.86 | 0.01 (0.01-0.01) | 1.76 | 5.86 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 2.11 | 4.69 | 0.01 (0.01-0.01) | 2.11 | 4.69 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 4.17 | 8.84 | 0.01 (0.01-0.01) | 4.17 | 8.84 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 16.45 | 8.98 | 0.01 (0.01-0.01) | 16.45 | 8.98 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 5.17 | 9.14 | 0.01 (0.01-0.01) | 5.17 | 9.14 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.72 | 2.49 | 0.01 (0.01-0.01) | 0.72 | 2.49 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 2.81 | 2.04 | 0 (0-0.01) | 10.26 | 7.44 | 0.01 (0.01-0.01) | 13.07 | 10.26 | 0.02 (0.02-0.02) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.45 | 2.2 | 0.01 (0.01-0.01) | 1.45 | 2.2 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 1.16 | 3.75 | 0.01 (0.01-0.01) | 1.16 | 3.75 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 3.83 | 10.46 | 0.01 (0.01-0.01) | 3.83 | 10.46 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 2.85 | 9.88 | 0.01 (0.01-0.01) | 2.85 | 9.88 | 0.01 (0.01-0.01) |
| TOTAL | | 20.25 | - | 0 | 152.71 | - | 0.01 | 172.97 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.38c** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.06 | 0.06 | 0.01 (0.01-0.01) | 0.06 | 0.06 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0.1 | 0.1 | 0 (0-0) | 0.59 | 0.59 | 0.01 (0.01-0.01) | 0.69 | 0.69 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 3.06 | 2.05 | 0.01 (0.01-0.01) | 3.06 | 2.05 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.22 | 2.01 | 0.01 (0.01-0.01) | 0.22 | 2.01 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 3.52 | 2.18 | 0.01 (0.01-0.01) | 3.52 | 2.18 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 2.17 | 4.68 | 0.01 (0.01-0.01) | 2.17 | 4.68 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 25.25 | 16.94 | 0.01 (0.01-0.01) | 25.25 | 16.94 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 3.1 | 5.13 | 0.01 (0.01-0.01) | 3.1 | 5.13 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 4.87 | 3.56 | 0.01 (0.01-0.01) | 7.62 | 5.57 | 0.01 (0.01-0.01) | 12.48 | 10.44 | 0.02 (0.01-0.02) |
| Firth of Forth Islands | SPA, SSSI | 1.32 | 1.45 | 0 (0-0.01) | 3.46 | 3.79 | 0.01 (0.01-0.01) | 4.78 | 5.11 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 12.6 | 4.89 | 0.02 (0.01-0.02) | 9.86 | 3.83 | 0.01 (0.01-0.01) | 22.46 | 16.42 | 0.02 (0.02-0.03) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 3.58 | 5.95 | 0.01 (0.01-0.01) | 3.58 | 5.95 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 1.49 | 1.87 | 0 (0-0) | 7.13 | 8.96 | 0.01 (0.01-0.01) | 8.62 | 10.46 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.19 | 3.97 | 0.01 (0.01-0.01) | 1.19 | 3.97 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 1.43 | 3.18 | 0.01 (0.01-0.01) | 1.43 | 3.18 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 2.83 | 5.99 | 0.01 (0.01-0.01) | 2.83 | 5.99 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 11.14 | 6.08 | 0.01 (0.01-0.01) | 11.14 | 6.08 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 3.5 | 6.19 | 0.01 (0.01-0.01) | 3.5 | 6.19 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.49 | 1.68 | 0.01 (0.01-0.01) | 0.49 | 1.68 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 3.29 | 2.39 | 0.01 (0.01-0.01) | 6.95 | 5.04 | 0.01 (0.01-0.01) | 10.24 | 8.33 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.98 | 1.49 | 0.01 (0.01-0.01) | 0.98 | 1.49 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.79 | 2.54 | 0.01 (0.01-0.01) | 0.79 | 2.54 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 2.59 | 7.08 | 0.01 (0.01-0.01) | 2.59 | 7.08 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.93 | 6.69 | 0.01 (0.01-0.01) | 1.93 | 6.69 | 0.01 (0.01-0.01) |
| TOTAL | | 23.66 | - | 0 | 103.44 | - | 0.01 | 127.1 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.38d** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.01 (0.01-0.01) | 0.07 | 0.07 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0.08 | 0.08 | 0 (0-0) | 0.68 | 0.68 | 0.01 (0.01-0.01) | 0.75 | 0.75 | 0.01 (0.01-0.01) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 3.53 | 2.36 | 0.01 (0.01-0.01) | 3.53 | 2.36 | 0.01 (0.01-0.01) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.25 | 2.32 | 0.01 (0.01-0.01) | 0.25 | 2.32 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 4.06 | 2.51 | 0.01 (0.01-0.01) | 4.06 | 2.51 | 0.01 (0.01-0.01) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 2.51 | 5.39 | 0.01 (0.01-0.01) | 2.51 | 5.39 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 29.12 | 19.54 | 0.01 (0.01-0.01) | 29.12 | 19.54 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 3.57 | 5.92 | 0.01 (0.01-0.01) | 3.57 | 5.92 | 0.01 (0.01-0.01) |
| Farne Islands | SPA, SSSI | 3.79 | 2.77 | 0.01 (0.01-0.01) | 8.79 | 6.42 | 0.01 (0.01-0.01) | 12.58 | 10.22 | 0.02 (0.01-0.02) |
| Firth of Forth Islands | SPA, SSSI | 1.03 | 1.13 | 0 (0-0) | 3.99 | 4.37 | 0.01 (0.01-0.01) | 5.02 | 5.4 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 9.82 | 3.81 | 0.01 (0.01-0.01) | 11.37 | 4.41 | 0.01 (0.01-0.01) | 21.19 | 14.24 | 0.02 (0.02-0.02) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 4.13 | 6.87 | 0.01 (0.01-0.01) | 4.13 | 6.87 | 0.01 (0.01-0.01) |
| Fowlsheugh | SPA, SSSI | 1.17 | 1.47 | 0 (0-0) | 8.23 | 10.34 | 0.01 (0.01-0.01) | 9.39 | 11.51 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.37 | 4.58 | 0.01 (0.01-0.01) | 1.37 | 4.58 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 1.65 | 3.66 | 0.01 (0.01-0.01) | 1.65 | 3.66 | 0.01 (0.01-0.01) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 3.26 | 6.9 | 0.01 (0.01-0.01) | 3.26 | 6.9 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 12.85 | 7.01 | 0.01 (0.01-0.01) | 12.85 | 7.01 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 4.04 | 7.14 | 0.01 (0.01-0.01) | 4.04 | 7.14 | 0.01 (0.01-0.01) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.56 | 1.94 | 0.01 (0.01-0.01) | 0.56 | 1.94 | 0.01 (0.01-0.01) |
| St Abb's Head to Fast Castle | SPA, SSSI | 2.57 | 1.86 | 0 (0-0) | 8.01 | 5.81 | 0.01 (0.01-0.01) | 10.58 | 8.38 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.13 | 1.72 | 0.01 (0.01-0.01) | 1.13 | 1.72 | 0.01 (0.01-0.01) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.91 | 2.93 | 0.01 (0.01-0.01) | 0.91 | 2.93 | 0.01 (0.01-0.01) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 2.99 | 8.17 | 0.01 (0.01-0.01) | 2.99 | 8.17 | 0.01 (0.01-0.01) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 2.22 | 7.72 | 0.01 (0.01-0.01) | 2.22 | 7.72 | 0.01 (0.01-0.01) |
| TOTAL | | 18.45 | - | 0 | 119.3 | - | 0.01 | 137.75 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.39a** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.14 | 0.14 | 0.02 (0.02-0.02) | 0.14 | 0.14 | 0.02 (0.02-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0.09 | 0.09 | 0 (0-0) | 1.4 | 1.4 | 0.02 (0.02-0.02) | 1.49 | 1.49 | 0.02 (0.02-0.02) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.02-0.02) | 0 | 0 | 0.02 (0.02-0.02) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 7.3 | 4.88 | 0.02 (0.02-0.02) | 7.3 | 4.88 | 0.02 (0.02-0.02) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.53 | 4.79 | 0.02 (0.02-0.02) | 0.53 | 4.79 | 0.02 (0.02-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 8.4 | 5.19 | 0.02 (0.02-0.02) | 8.4 | 5.19 | 0.02 (0.02-0.02) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 5.18 | 11.15 | 0.02 (0.02-0.02) | 5.18 | 11.15 | 0.02 (0.02-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 60.18 | 40.39 | 0.02 (0.02-0.02) | 60.18 | 40.39 | 0.02 (0.02-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 7.38 | 12.23 | 0.02 (0.02-0.02) | 7.38 | 12.23 | 0.02 (0.02-0.02) |
| Farne Islands | SPA, SSSI | 4.32 | 3.16 | 0.01 (0.01-0.01) | 18.16 | 13.28 | 0.02 (0.02-0.02) | 22.48 | 17.59 | 0.03 (0.02-0.03) |
| Firth of Forth Islands | SPA, SSSI | 1.17 | 1.28 | 0 (0-0) | 8.24 | 9.04 | 0.02 (0.02-0.02) | 9.41 | 10.21 | 0.02 (0.02-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 11.18 | 4.34 | 0.01 (0.01-0.01) | 23.51 | 9.12 | 0.02 (0.02-0.02) | 34.68 | 20.3 | 0.03 (0.03-0.04) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 8.53 | 14.19 | 0.02 (0.02-0.02) | 8.53 | 14.19 | 0.02 (0.02-0.02) |
| Fowlsheugh | SPA, SSSI | 1.32 | 1.66 | 0 (0-0) | 17 | 21.37 | 0.02 (0.02-0.02) | 18.33 | 22.69 | 0.02 (0.02-0.02) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 2.83 | 9.46 | 0.02 (0.02-0.02) | 2.83 | 9.46 | 0.02 (0.02-0.02) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 3.41 | 7.57 | 0.02 (0.02-0.02) | 3.41 | 7.57 | 0.02 (0.02-0.02) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 6.74 | 14.27 | 0.02 (0.02-0.02) | 6.74 | 14.27 | 0.02 (0.02-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 26.56 | 14.5 | 0.02 (0.02-0.02) | 26.56 | 14.5 | 0.02 (0.02-0.02) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 8.35 | 14.75 | 0.02 (0.02-0.02) | 8.35 | 14.75 | 0.02 (0.02-0.02) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 1.16 | 4.01 | 0.02 (0.02-0.02) | 1.16 | 4.01 | 0.02 (0.02-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 2.92 | 2.12 | 0 (0-0.01) | 16.56 | 12.02 | 0.02 (0.02-0.02) | 19.48 | 14.94 | 0.02 (0.02-0.03) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 2.34 | 3.56 | 0.02 (0.02-0.02) | 2.34 | 3.56 | 0.02 (0.02-0.02) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 1.88 | 6.06 | 0.02 (0.02-0.02) | 1.88 | 6.06 | 0.02 (0.02-0.02) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 6.18 | 16.88 | 0.02 (0.02-0.02) | 6.18 | 16.88 | 0.02 (0.02-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 4.6 | 15.95 | 0.02 (0.02-0.02) | 4.6 | 15.95 | 0.02 (0.02-0.02) |
| TOTAL | | 21 | - | 0 | 246.57 | - | 0.02 | 267.57 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.39b** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.17 | 0.17 | 0.02 (0.02-0.03) | 0.17 | 0.17 | 0.02 (0.02-0.03) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.03) | 0.01 | 0.01 | 0.02 (0.02-0.03) |
| Seevogelschutzgebiet Helgoland | SPA | 0.17 | 0.17 | 0 (0-0) | 1.73 | 1.73 | 0.02 (0.02-0.03) | 1.9 | 1.9 | 0.03 (0.02-0.03) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.03) | 0.01 | 0.01 | 0.02 (0.02-0.03) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 9.05 | 6.05 | 0.02 (0.02-0.03) | 9.05 | 6.05 | 0.02 (0.02-0.03) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.65 | 5.93 | 0.02 (0.02-0.03) | 0.65 | 5.93 | 0.02 (0.02-0.03) |
| Cape Wrath | SPA | 0 | 0 | 0 | 10.4 | 6.42 | 0.02 (0.02-0.03) | 10.4 | 6.42 | 0.02 (0.02-0.03) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 6.41 | 13.81 | 0.02 (0.02-0.03) | 6.41 | 13.81 | 0.02 (0.02-0.03) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 74.55 | 50.03 | 0.02 (0.02-0.03) | 74.55 | 50.03 | 0.02 (0.02-0.03) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 9.14 | 15.15 | 0.02 (0.02-0.03) | 9.14 | 15.15 | 0.02 (0.02-0.03) |
| Farne Islands | SPA, SSSI | 8.32 | 6.09 | 0.01 (0.01-0.01) | 22.5 | 16.45 | 0.02 (0.02-0.03) | 30.82 | 24.77 | 0.04 (0.03-0.04) |
| Firth of Forth Islands | SPA, SSSI | 2.26 | 2.48 | 0.01 (0.01-0.01) | 10.21 | 11.2 | 0.02 (0.02-0.03) | 12.46 | 13.45 | 0.03 (0.03-0.03) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 21.56 | 8.37 | 0.03 (0.02-0.03) | 29.12 | 11.3 | 0.02 (0.02-0.03) | 50.68 | 32.86 | 0.05 (0.05-0.05) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 10.57 | 17.58 | 0.02 (0.02-0.03) | 10.57 | 17.58 | 0.02 (0.02-0.03) |
| Fowlsheugh | SPA, SSSI | 2.57 | 3.23 | 0 (0-0) | 21.06 | 26.47 | 0.02 (0.02-0.03) | 23.64 | 29.04 | 0.03 (0.03-0.03) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 3.51 | 11.72 | 0.02 (0.02-0.03) | 3.51 | 11.72 | 0.02 (0.02-0.03) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 4.23 | 9.38 | 0.02 (0.02-0.03) | 4.23 | 9.38 | 0.02 (0.02-0.03) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 8.35 | 17.68 | 0.02 (0.02-0.03) | 8.35 | 17.68 | 0.02 (0.02-0.03) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 32.89 | 17.96 | 0.02 (0.02-0.03) | 32.89 | 17.96 | 0.02 (0.02-0.03) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 10.35 | 18.27 | 0.02 (0.02-0.03) | 10.35 | 18.27 | 0.02 (0.02-0.03) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 1.44 | 4.97 | 0.02 (0.02-0.03) | 1.44 | 4.97 | 0.02 (0.02-0.03) |
| St Abb's Head to Fast Castle | SPA, SSSI | 5.63 | 4.09 | 0.01 (0.01-0.01) | 20.51 | 14.89 | 0.02 (0.02-0.03) | 26.14 | 20.52 | 0.03 (0.03-0.04) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 2.9 | 4.41 | 0.02 (0.02-0.03) | 2.9 | 4.41 | 0.02 (0.02-0.03) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 2.33 | 7.5 | 0.02 (0.02-0.03) | 2.33 | 7.5 | 0.02 (0.02-0.03) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 7.65 | 20.91 | 0.02 (0.02-0.03) | 7.65 | 20.91 | 0.02 (0.02-0.03) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 5.7 | 19.76 | 0.02 (0.02-0.03) | 5.7 | 19.76 | 0.02 (0.02-0.03) |
| TOTAL | | 40.51 | - | 0 | 305.43 | - | 0.02 | 345.94 | - | 0.03 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.39c** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.11 | 0.11 | 0.02 (0.01-0.02) | 0.11 | 0.11 | 0.02 (0.01-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.01-0.02) | 0.01 | 0.01 | 0.02 (0.01-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0.2 | 0.2 | 0 (0-0) | 1.17 | 1.17 | 0.02 (0.01-0.02) | 1.37 | 1.37 | 0.02 (0.02-0.02) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.01-0.02) | 0 | 0 | 0.02 (0.01-0.02) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 6.13 | 4.1 | 0.02 (0.01-0.02) | 6.13 | 4.1 | 0.02 (0.01-0.02) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.44 | 4.02 | 0.02 (0.01-0.02) | 0.44 | 4.02 | 0.02 (0.01-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 7.04 | 4.35 | 0.02 (0.01-0.02) | 7.04 | 4.35 | 0.02 (0.01-0.02) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 4.34 | 9.35 | 0.02 (0.01-0.02) | 4.34 | 9.35 | 0.02 (0.01-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 50.49 | 33.89 | 0.02 (0.01-0.02) | 50.49 | 33.89 | 0.02 (0.01-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 6.19 | 10.26 | 0.02 (0.01-0.02) | 6.19 | 10.26 | 0.02 (0.01-0.02) |
| Farne Islands | SPA, SSSI | 9.73 | 7.11 | 0.02 (0.01-0.02) | 15.24 | 11.14 | 0.02 (0.01-0.02) | 24.97 | 20.87 | 0.03 (0.03-0.03) |
| Firth of Forth Islands | SPA, SSSI | 2.64 | 2.89 | 0.01 (0.01-0.01) | 6.91 | 7.58 | 0.02 (0.01-0.02) | 9.55 | 10.22 | 0.02 (0.02-0.03) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 25.19 | 9.78 | 0.03 (0.03-0.03) | 19.72 | 7.66 | 0.02 (0.01-0.02) | 44.91 | 32.85 | 0.05 (0.04-0.05) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 7.16 | 11.91 | 0.02 (0.01-0.02) | 7.16 | 11.91 | 0.02 (0.01-0.02) |
| Fowlsheugh | SPA, SSSI | 2.98 | 3.75 | 0 (0-0.01) | 14.27 | 17.93 | 0.02 (0.01-0.02) | 17.25 | 20.91 | 0.02 (0.02-0.02) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 2.38 | 7.94 | 0.02 (0.01-0.02) | 2.38 | 7.94 | 0.02 (0.01-0.02) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 2.86 | 6.35 | 0.02 (0.01-0.02) | 2.86 | 6.35 | 0.02 (0.01-0.02) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 5.65 | 11.97 | 0.02 (0.01-0.02) | 5.65 | 11.97 | 0.02 (0.01-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 22.28 | 12.16 | 0.02 (0.01-0.02) | 22.28 | 12.16 | 0.02 (0.01-0.02) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 7.01 | 12.38 | 0.02 (0.01-0.02) | 7.01 | 12.38 | 0.02 (0.01-0.02) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 0.97 | 3.37 | 0.02 (0.01-0.02) | 0.97 | 3.37 | 0.02 (0.01-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 6.58 | 4.78 | 0.01 (0.01-0.01) | 13.89 | 10.08 | 0.02 (0.01-0.02) | 20.47 | 16.67 | 0.03 (0.02-0.03) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.97 | 2.99 | 0.02 (0.01-0.02) | 1.97 | 2.99 | 0.02 (0.01-0.02) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 1.58 | 5.08 | 0.02 (0.01-0.02) | 1.58 | 5.08 | 0.02 (0.01-0.02) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 5.18 | 14.16 | 0.02 (0.01-0.02) | 5.18 | 14.16 | 0.02 (0.01-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 3.86 | 13.39 | 0.02 (0.01-0.02) | 3.86 | 13.39 | 0.02 (0.01-0.02) |
| TOTAL | | 47.32 | - | 0.01 | 206.88 | - | 0.02 | 254.2 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.39d** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.13 | 0.13 | 0.02 (0.02-0.02) | 0.13 | 0.13 | 0.02 (0.02-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0.15 | 0.15 | 0 (0-0) | 1.35 | 1.35 | 0.02 (0.02-0.02) | 1.51 | 1.51 | 0.02 (0.02-0.02) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.02-0.02) | 0 | 0 | 0.02 (0.02-0.02) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 7.07 | 4.72 | 0.02 (0.02-0.02) | 7.07 | 4.72 | 0.02 (0.02-0.02) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.51 | 4.63 | 0.02 (0.02-0.02) | 0.51 | 4.63 | 0.02 (0.02-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 8.12 | 5.02 | 0.02 (0.02-0.02) | 8.12 | 5.02 | 0.02 (0.02-0.02) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 5.01 | 10.79 | 0.02 (0.02-0.02) | 5.01 | 10.79 | 0.02 (0.02-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 58.23 | 39.08 | 0.02 (0.02-0.02) | 58.23 | 39.08 | 0.02 (0.02-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 7.14 | 11.83 | 0.02 (0.02-0.02) | 7.14 | 11.83 | 0.02 (0.02-0.02) |
| Farne Islands | SPA, SSSI | 7.59 | 5.55 | 0.01 (0.01-0.01) | 17.57 | 12.85 | 0.02 (0.02-0.02) | 25.16 | 20.43 | 0.03 (0.03-0.03) |
| Firth of Forth Islands | SPA, SSSI | 2.06 | 2.26 | 0.01 (0.01-0.01) | 7.97 | 8.75 | 0.02 (0.02-0.02) | 10.03 | 10.8 | 0.03 (0.02-0.03) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 19.64 | 7.62 | 0.02 (0.02-0.03) | 22.75 | 8.83 | 0.02 (0.02-0.02) | 42.39 | 28.47 | 0.04 (0.04-0.05) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 8.26 | 13.74 | 0.02 (0.02-0.02) | 8.26 | 13.74 | 0.02 (0.02-0.02) |
| Fowlsheugh | SPA, SSSI | 2.33 | 2.93 | 0 (0-0) | 16.45 | 20.68 | 0.02 (0.02-0.02) | 18.79 | 23.01 | 0.02 (0.02-0.02) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 2.74 | 9.16 | 0.02 (0.02-0.02) | 2.74 | 9.16 | 0.02 (0.02-0.02) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 3.3 | 7.33 | 0.02 (0.02-0.02) | 3.3 | 7.33 | 0.02 (0.02-0.02) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 6.52 | 13.81 | 0.02 (0.02-0.02) | 6.52 | 13.81 | 0.02 (0.02-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 25.7 | 14.03 | 0.02 (0.02-0.02) | 25.7 | 14.03 | 0.02 (0.02-0.02) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 8.08 | 14.27 | 0.02 (0.02-0.02) | 8.08 | 14.27 | 0.02 (0.02-0.02) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 1.12 | 3.88 | 0.02 (0.02-0.02) | 1.12 | 3.88 | 0.02 (0.02-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 5.13 | 3.72 | 0.01 (0.01-0.01) | 16.02 | 11.63 | 0.02 (0.02-0.02) | 21.15 | 16.76 | 0.03 (0.02-0.03) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 2.27 | 3.44 | 0.02 (0.02-0.02) | 2.27 | 3.44 | 0.02 (0.02-0.02) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 1.82 | 5.86 | 0.02 (0.02-0.02) | 1.82 | 5.86 | 0.02 (0.02-0.02) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 5.98 | 16.34 | 0.02 (0.02-0.02) | 5.98 | 16.34 | 0.02 (0.02-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 4.45 | 15.44 | 0.02 (0.02-0.02) | 4.45 | 15.44 | 0.02 (0.02-0.02) |
| TOTAL | | 36.9 | - | 0 | 238.59 | - | 0.02 | 275.5 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.40** Apportioning to protected sites of the maximum breeding season numbers of adult common guillemots in flight in the proposed Dogger Bank Teesside A and B project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Farne Islands | SPA, SSSI | 35.55 (32.7-39.11) | 0.06 (0.05-0.06) |
| Forth Islands | SPA, SSSI | 9.76 (8.98-10.74) | 0.03 (0.03-0.04) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 90.81 (83.55-99.91) | 0.08 (0.07-0.08) |
| Fowlsheugh | SPA, SSSI | 7.94 (7.31-8.74) | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 1.07 (0.99-1.18) | 0.02 (0.02-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 24.23 (22.29-26.65) | 0.05 (0.05-0.06) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.41a** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.02-0.02) | 0 | 0 | 0.02 (0.02-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.94 | 0.69 | 0.02 (0.02-0.02) | 0.94 | 0.69 | 0.02 (0.02-0.02) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.12 | - | 0.02 (0.02-0.02) | 0.12 | - | 0.02 (0.02-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 6.84 | 6.06 | 0.02 (0.02-0.02) | 6.84 | 6.06 | 0.02 (0.02-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.52 | 1.3 | 0.02 (0.02-0.02) | 0.52 | 1.3 | 0.02 (0.02-0.02) |
| Farne Islands | SPA, SSSI | 0.01 | 0 | 0 (0-0) | 0.22 | 0 | 0.02 (0.02-0.02) | 0.24 | 0.01 | 0.02 (0.02-0.02) |
| Firth of Forth Islands | SPA, SSSI | 0.04 | 0.02 | 0 (0-0) | 1.81 | 0.8 | 0.02 (0.02-0.02) | 1.85 | 0.84 | 0.02 (0.02-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 0.79 | 0.39 | 0 (0-0) | 6.05 | 2.94 | 0.02 (0.02-0.02) | 6.85 | 3.73 | 0.02 (0.02-0.03) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.32 | 2.38 | 0.02 (0.02-0.02) | 1.32 | 2.38 | 0.02 (0.02-0.02) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 2.02 | 2.23 | 0.02 (0.02-0.02) | 2.02 | 2.23 | 0.02 (0.02-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.95 | 1.54 | 0.02 (0.02-0.02) | 0.95 | 1.54 | 0.02 (0.02-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.06 | 0.04 | 0 (0-0) | 1.21 | 0.84 | 0.02 (0.02-0.02) | 1.27 | 0.9 | 0.02 (0.02-0.02) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1 | 1.84 | 0.02 (0.02-0.02) | 1 | 1.84 | 0.02 (0.02-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.37 | 0.75 | 0.02 (0.02-0.02) | 0.37 | 0.75 | 0.02 (0.02-0.02) |
| TOTAL | | 0.91 | - | 0 | 23.42 | - | 0.02 | 24.32 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.41b** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.03) | 0.01 | 0.01 | 0.02 (0.02-0.03) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.03) | 0.01 | 0.01 | 0.02 (0.02-0.03) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.03) | 0.01 | 0.01 | 0.02 (0.02-0.03) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.02-0.03) | 0 | 0 | 0.02 (0.02-0.03) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.03) | 0.01 | 0.01 | 0.02 (0.02-0.03) |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.13 | 0.83 | 0.02 (0.02-0.03) | 1.13 | 0.83 | 0.02 (0.02-0.03) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.14 | - | 0.02 (0.02-0.03) | 0.14 | - | 0.02 (0.02-0.03) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 8.19 | 7.25 | 0.02 (0.02-0.03) | 8.19 | 7.25 | 0.02 (0.02-0.03) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.63 | 1.56 | 0.02 (0.02-0.03) | 0.63 | 1.56 | 0.02 (0.02-0.03) |
| Farne Islands | SPA, SSSI | 0.03 | 0 | 0 (0-0.01) | 0.27 | 0 | 0.02 (0.02-0.03) | 0.3 | 0.03 | 0.03 (0.02-0.03) |
| Firth of Forth Islands | SPA, SSSI | 0.09 | 0.04 | 0 (0-0) | 2.17 | 0.96 | 0.02 (0.02-0.03) | 2.26 | 1.05 | 0.02 (0.02-0.03) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.79 | 0.87 | 0.01 (0.01-0.01) | 7.24 | 3.52 | 0.02 (0.02-0.03) | 9.03 | 5.31 | 0.03 (0.03-0.04) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.58 | 2.85 | 0.02 (0.02-0.03) | 1.58 | 2.85 | 0.02 (0.02-0.03) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 2.42 | 2.66 | 0.02 (0.02-0.03) | 2.42 | 2.66 | 0.02 (0.02-0.03) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.13 | 1.84 | 0.02 (0.02-0.03) | 1.13 | 1.84 | 0.02 (0.02-0.03) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.13 | 0.09 | 0 (0-0) | 1.45 | 1 | 0.02 (0.02-0.03) | 1.58 | 1.14 | 0.03 (0.02-0.03) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.19 | 2.2 | 0.02 (0.02-0.03) | 1.19 | 2.2 | 0.02 (0.02-0.03) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.44 | 0.89 | 0.02 (0.02-0.03) | 0.44 | 0.89 | 0.02 (0.02-0.03) |
| TOTAL | | 2.05 | - | 0 | 28.01 | - | 0.02 | 30.06 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.41c** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.01-0.02) | 0 | 0 | 0.02 (0.01-0.02) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.01-0.02) | 0.01 | 0.01 | 0.02 (0.01-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.01-0.02) | 0.01 | 0.01 | 0.02 (0.01-0.02) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.01-0.02) | 0 | 0 | 0.02 (0.01-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.01-0.02) | 0.01 | 0.01 | 0.02 (0.01-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.8 | 0.58 | 0.02 (0.01-0.02) | 0.8 | 0.58 | 0.02 (0.01-0.02) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.1 | - | 0.02 (0.01-0.02) | 0.1 | - | 0.02 (0.01-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 5.79 | 5.13 | 0.02 (0.01-0.02) | 5.79 | 5.13 | 0.02 (0.01-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.44 | 1.1 | 0.02 (0.01-0.02) | 0.44 | 1.1 | 0.02 (0.01-0.02) |
| Farne Islands | SPA, SSSI | 0.07 | 0 | 0.01 (0.01-0.01) | 0.19 | 0 | 0.02 (0.01-0.02) | 0.26 | 0.07 | 0.03 (0.02-0.03) |
| Firth of Forth Islands | SPA, SSSI | 0.19 | 0.09 | 0 (0-0) | 1.53 | 0.68 | 0.02 (0.01-0.02) | 1.73 | 0.87 | 0.02 (0.02-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.96 | 1.92 | 0.02 (0.01-0.02) | 5.12 | 2.49 | 0.02 (0.01-0.02) | 9.08 | 6.44 | 0.03 (0.03-0.04) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.12 | 2.01 | 0.02 (0.01-0.02) | 1.12 | 2.01 | 0.02 (0.01-0.02) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.71 | 1.88 | 0.02 (0.01-0.02) | 1.71 | 1.88 | 0.02 (0.01-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.8 | 1.3 | 0.02 (0.01-0.02) | 0.8 | 1.3 | 0.02 (0.01-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.3 | 0.2 | 0.01 (0.01-0.01) | 1.02 | 0.71 | 0.02 (0.01-0.02) | 1.32 | 1 | 0.02 (0.02-0.03) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.84 | 1.56 | 0.02 (0.01-0.02) | 0.84 | 1.56 | 0.02 (0.01-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.31 | 0.63 | 0.02 (0.01-0.02) | 0.31 | 0.63 | 0.02 (0.01-0.02) |
| TOTAL | | 4.52 | - | 0.01 | 19.8 | - | 0.02 | 24.32 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.41d** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.02-0.02) | 0 | 0 | 0.02 (0.02-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.02-0.02) | 0.01 | 0.01 | 0.02 (0.02-0.02) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.89 | 0.65 | 0.02 (0.02-0.02) | 0.89 | 0.65 | 0.02 (0.02-0.02) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.11 | - | 0.02 (0.02-0.02) | 0.11 | - | 0.02 (0.02-0.02) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 6.45 | 5.72 | 0.02 (0.02-0.02) | 6.45 | 5.72 | 0.02 (0.02-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.49 | 1.23 | 0.02 (0.02-0.02) | 0.49 | 1.23 | 0.02 (0.02-0.02) |
| Farne Islands | SPA, SSSI | 0.04 | 0 | 0.01 (0-0.01) | 0.21 | 0 | 0.02 (0.02-0.02) | 0.25 | 0.04 | 0.02 (0.02-0.03) |
| Firth of Forth Islands | SPA, SSSI | 0.11 | 0.05 | 0 (0-0) | 1.71 | 0.76 | 0.02 (0.02-0.02) | 1.81 | 0.86 | 0.02 (0.02-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 2.17 | 1.06 | 0.01 (0.01-0.01) | 5.71 | 2.77 | 0.02 (0.02-0.02) | 7.88 | 4.95 | 0.03 (0.02-0.03) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.25 | 2.24 | 0.02 (0.02-0.02) | 1.25 | 2.24 | 0.02 (0.02-0.02) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 1.9 | 2.1 | 0.02 (0.02-0.02) | 1.9 | 2.1 | 0.02 (0.02-0.02) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.89 | 1.45 | 0.02 (0.02-0.02) | 0.89 | 1.45 | 0.02 (0.02-0.02) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.16 | 0.11 | 0 (0-0) | 1.14 | 0.79 | 0.02 (0.02-0.02) | 1.31 | 0.95 | 0.02 (0.02-0.03) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 0.94 | 1.74 | 0.02 (0.02-0.02) | 0.94 | 1.74 | 0.02 (0.02-0.02) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.35 | 0.7 | 0.02 (0.02-0.02) | 0.35 | 0.7 | 0.02 (0.02-0.02) |
| TOTAL | | 2.48 | - | 0 | 22.08 | - | 0.02 | 24.56 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.42a** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.04) | 0.01 | 0.01 | 0.04 (0.03-0.04) |
| Chausay | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.03-0.04) | 0.02 | 0.02 | 0.04 (0.03-0.04) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.03-0.04) | 0.02 | 0.02 | 0.04 (0.03-0.04) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.04 (0.03-0.04) | 0 | 0 | 0.04 (0.03-0.04) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.03-0.04) | 0.02 | 0.02 | 0.04 (0.03-0.04) |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.88 | 1.38 | 0.04 (0.03-0.04) | 1.88 | 1.38 | 0.04 (0.03-0.04) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.23 | - | 0.04 (0.03-0.04) | 0.23 | - | 0.04 (0.03-0.04) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 13.69 | 12.13 | 0.04 (0.03-0.04) | 13.69 | 12.13 | 0.04 (0.03-0.04) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.05 | 2.61 | 0.04 (0.03-0.04) | 1.05 | 2.61 | 0.04 (0.03-0.04) |
| Farne Islands | SPA, SSSI | 0.03 | 0 | 0 (0-0) | 0.45 | 0 | 0.04 (0.03-0.04) | 0.48 | 0.03 | 0.04 (0.04-0.05) |
| Firth of Forth Islands | SPA, SSSI | 0.08 | 0.03 | 0 (0-0) | 3.62 | 1.6 | 0.04 (0.03-0.04) | 3.7 | 1.68 | 0.04 (0.03-0.04) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.59 | 0.77 | 0.01 (0.01-0.01) | 12.11 | 5.88 | 0.04 (0.03-0.04) | 13.7 | 7.47 | 0.05 (0.04-0.05) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 2.64 | 4.76 | 0.04 (0.03-0.04) | 2.64 | 4.76 | 0.04 (0.03-0.04) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 4.04 | 4.45 | 0.04 (0.03-0.04) | 4.04 | 4.45 | 0.04 (0.03-0.04) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.89 | 3.07 | 0.04 (0.03-0.04) | 1.89 | 3.07 | 0.04 (0.03-0.04) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.12 | 0.08 | 0 (0-0) | 2.42 | 1.67 | 0.04 (0.03-0.04) | 2.54 | 1.79 | 0.04 (0.04-0.05) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 2 | 3.68 | 0.04 (0.03-0.04) | 2 | 3.68 | 0.04 (0.03-0.04) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.74 | 1.49 | 0.04 (0.03-0.04) | 0.74 | 1.49 | 0.04 (0.03-0.04) |
| TOTAL | | 1.82 | - | 0 | 46.83 | - | 0.04 | 48.65 | - | 0.04 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.42b** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.04-0.05) | 0.01 | 0.01 | 0.05 (0.04-0.05) |
| Chausay | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.05 (0.04-0.05) | 0.02 | 0.02 | 0.05 (0.04-0.05) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.05 (0.04-0.05) | 0.03 | 0.03 | 0.05 (0.04-0.05) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.04-0.05) | 0.01 | 0.01 | 0.05 (0.04-0.05) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.05 (0.04-0.05) | 0.02 | 0.02 | 0.05 (0.04-0.05) |
| Cape Wrath | SPA | 0 | 0 | 0 | 2.25 | 1.65 | 0.05 (0.04-0.05) | 2.25 | 1.65 | 0.05 (0.04-0.05) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.28 | - | 0.05 (0.04-0.05) | 0.28 | - | 0.05 (0.04-0.05) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 16.37 | 14.51 | 0.05 (0.04-0.05) | 16.37 | 14.51 | 0.05 (0.04-0.05) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.25 | 3.12 | 0.05 (0.04-0.05) | 1.25 | 3.12 | 0.05 (0.04-0.05) |
| Farne Islands | SPA, SSSI | 0.07 | 0 | 0.01 (0.01-0.01) | 0.53 | 0 | 0.05 (0.04-0.05) | 0.6 | 0.07 | 0.05 (0.05-0.06) |
| Firth of Forth Islands | SPA, SSSI | 0.18 | 0.08 | 0 (0-0) | 4.33 | 1.92 | 0.05 (0.04-0.05) | 4.51 | 2.1 | 0.05 (0.04-0.05) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.58 | 1.74 | 0.02 (0.01-0.02) | 14.49 | 7.04 | 0.05 (0.04-0.05) | 18.07 | 10.62 | 0.06 (0.05-0.07) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 3.16 | 5.69 | 0.05 (0.04-0.05) | 3.16 | 5.69 | 0.05 (0.04-0.05) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 4.83 | 5.33 | 0.05 (0.04-0.05) | 4.83 | 5.33 | 0.05 (0.04-0.05) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 2.26 | 3.67 | 0.05 (0.04-0.05) | 2.26 | 3.67 | 0.05 (0.04-0.05) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.27 | 0.19 | 0.01 (0.01-0.01) | 2.9 | 2 | 0.05 (0.04-0.05) | 3.17 | 2.27 | 0.05 (0.05-0.06) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 2.39 | 4.41 | 0.05 (0.04-0.05) | 2.39 | 4.41 | 0.05 (0.04-0.05) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.88 | 1.79 | 0.05 (0.04-0.05) | 0.88 | 1.79 | 0.05 (0.04-0.05) |
| TOTAL | | 4.1 | - | 0.01 | 56.03 | - | 0.05 | 60.12 | - | 0.05 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.42c** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.03 (0.03-0.04) | 0.01 | 0.01 | 0.03 (0.03-0.04) |
| Chausay | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.03 (0.03-0.04) | 0.01 | 0.01 | 0.03 (0.03-0.04) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.03 (0.03-0.04) | 0.02 | 0.02 | 0.03 (0.03-0.04) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.03 (0.03-0.04) | 0 | 0 | 0.03 (0.03-0.04) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.03 (0.03-0.04) | 0.02 | 0.02 | 0.03 (0.03-0.04) |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.59 | 1.17 | 0.03 (0.03-0.04) | 1.59 | 1.17 | 0.03 (0.03-0.04) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.19 | - | 0.03 (0.03-0.04) | 0.19 | - | 0.03 (0.03-0.04) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 11.57 | 10.26 | 0.03 (0.03-0.04) | 11.57 | 10.26 | 0.03 (0.03-0.04) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.89 | 2.21 | 0.03 (0.03-0.04) | 0.89 | 2.21 | 0.03 (0.03-0.04) |
| Farne Islands | SPA, SSSI | 0.15 | 0 | 0.02 (0.02-0.02) | 0.38 | 0 | 0.03 (0.03-0.04) | 0.52 | 0.15 | 0.05 (0.04-0.06) |
| Firth of Forth Islands | SPA, SSSI | 0.39 | 0.17 | 0.01 (0.01-0.01) | 3.06 | 1.36 | 0.03 (0.03-0.04) | 3.45 | 1.74 | 0.04 (0.03-0.04) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 7.91 | 3.84 | 0.04 (0.03-0.05) | 10.24 | 4.97 | 0.03 (0.03-0.04) | 18.15 | 12.89 | 0.07 (0.06-0.08) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 2.24 | 4.02 | 0.03 (0.03-0.04) | 2.24 | 4.02 | 0.03 (0.03-0.04) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 3.41 | 3.76 | 0.03 (0.03-0.04) | 3.41 | 3.76 | 0.03 (0.03-0.04) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.6 | 2.6 | 0.03 (0.03-0.04) | 1.6 | 2.6 | 0.03 (0.03-0.04) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.59 | 0.41 | 0.01 (0.01-0.02) | 2.05 | 1.42 | 0.03 (0.03-0.04) | 2.64 | 2.01 | 0.05 (0.04-0.05) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.69 | 3.12 | 0.03 (0.03-0.04) | 1.69 | 3.12 | 0.03 (0.03-0.04) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.62 | 1.26 | 0.03 (0.03-0.04) | 0.62 | 1.26 | 0.03 (0.03-0.04) |
| TOTAL | | 9.04 | - | 0.01 | 39.6 | - | 0.03 | 48.65 | - | 0.04 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.42d** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.04) | 0.01 | 0.01 | 0.04 (0.03-0.04) |
| Chausay | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.03-0.04) | 0.02 | 0.02 | 0.04 (0.03-0.04) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.03-0.04) | 0.02 | 0.02 | 0.04 (0.03-0.04) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.04 (0.03-0.04) | 0 | 0 | 0.04 (0.03-0.04) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.03-0.04) | 0.02 | 0.02 | 0.04 (0.03-0.04) |
| Cape Wrath | SPA | 0 | 0 | 0 | 1.78 | 1.3 | 0.04 (0.03-0.04) | 1.78 | 1.3 | 0.04 (0.03-0.04) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.22 | - | 0.04 (0.03-0.04) | 0.22 | - | 0.04 (0.03-0.04) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 12.9 | 11.43 | 0.04 (0.03-0.04) | 12.9 | 11.43 | 0.04 (0.03-0.04) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.99 | 2.46 | 0.04 (0.03-0.04) | 0.99 | 2.46 | 0.04 (0.03-0.04) |
| Farne Islands | SPA, SSSI | 0.08 | 0 | 0.01 (0.01-0.01) | 0.42 | 0 | 0.04 (0.03-0.04) | 0.5 | 0.08 | 0.05 (0.04-0.05) |
| Firth of Forth Islands | SPA, SSSI | 0.21 | 0.09 | 0 (0-0) | 3.42 | 1.51 | 0.04 (0.03-0.04) | 3.63 | 1.73 | 0.04 (0.03-0.04) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 4.35 | 2.11 | 0.02 (0.02-0.03) | 11.42 | 5.54 | 0.04 (0.03-0.04) | 15.76 | 9.89 | 0.06 (0.05-0.07) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 2.49 | 4.49 | 0.04 (0.03-0.04) | 2.49 | 4.49 | 0.04 (0.03-0.04) |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 3.81 | 4.2 | 0.04 (0.03-0.04) | 3.81 | 4.2 | 0.04 (0.03-0.04) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.78 | 2.89 | 0.04 (0.03-0.04) | 1.78 | 2.89 | 0.04 (0.03-0.04) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.33 | 0.23 | 0.01 (0.01-0.01) | 2.28 | 1.58 | 0.04 (0.03-0.04) | 2.61 | 1.9 | 0.04 (0.04-0.05) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 1.88 | 3.47 | 0.04 (0.03-0.04) | 1.88 | 3.47 | 0.04 (0.03-0.04) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 0.69 | 1.41 | 0.04 (0.03-0.04) | 0.69 | 1.41 | 0.04 (0.03-0.04) |
| TOTAL | | 4.97 | - | 0.01 | 44.15 | - | 0.04 | 49.12 | - | 0.04 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.43** Apportioning to protected sites of the maximum breeding season numbers of adult razorbills in flight in the proposed Dogger Bank Teesside A and B project using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Farne Islands | SPA, SSSI | 0.83 (0.66-1.01) | 0.11 (0.09-0.13) |
| Forth Islands | SPA, SSSI | 3.92 (3.14-4.79) | 0.09 (0.07-0.11) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 46.19 (36.99-56.42) | 0.15 (0.12-0.19) |
| St Abb's Head to Fast Castle | SPA, SSSI | 3.29 (2.63-4.01) | 0.15 (0.12-0.18) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.44a** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.02 | 0.14 | 0 (0-0) | 0.02 | 0.14 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.37 | 0.27 | 0 (0-0) | 0.37 | 0.27 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.04 | 0 (0-0) | 0.01 | 0.04 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.17 | 0.54 | 0 (0-0) | 0.17 | 0.54 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.86 | 0.81 | 0 (0-0) | 0.86 | 0.81 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.45 | 0.33 | 0 (0-0) | 1.45 | 0.33 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.31 | 1.12 | 0 (0-0) | 0.31 | 1.12 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.37 | 1.28 | 0 (0-0) | 0.37 | 1.28 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.08 | 0 (0-0) | 0.01 | 0.08 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.16 | 0.04 | 0 (0-0) | 0.16 | 0.04 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.05 | 0 (0-0) | 0.02 | 0.05 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.81 | 1.09 | 0 (0-0) | 0.81 | 1.09 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 4.56 | - | 0 | 4.56 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.44b** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.03 | 0.22 | 0 (0-0) | 0.03 | 0.22 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.59 | 0.42 | 0 (0-0) | 0.59 | 0.42 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.06 | 0 (0-0) | 0.01 | 0.06 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.27 | 0.85 | 0 (0-0) | 0.27 | 0.85 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 1.36 | 1.29 | 0 (0-0) | 1.36 | 1.29 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 2.3 | 0.52 | 0 (0-0) | 2.3 | 0.52 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.02 | - | 0 (0-0) | 0.02 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.49 | 1.78 | 0 (0-0) | 0.49 | 1.78 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.58 | 2.04 | 0 (0-0) | 0.58 | 2.04 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.13 | 0 (0-0) | 0.02 | 0.13 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.26 | 0.06 | 0 (0-0) | 0.26 | 0.06 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.09 | 0 (0-0) | 0.03 | 0.09 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.29 | 1.74 | 0 (0-0) | 1.29 | 1.74 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 7.25 | - | 0 | 7.25 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.44c** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.01 | 0.06 | 0 (0-0) | 0.01 | 0.06 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.15 | 0.11 | 0 (0-0) | 0.15 | 0.11 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0 | 0.02 | 0 (0-0) | 0 | 0.02 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.22 | 0 (0-0) | 0.07 | 0.22 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.35 | 0.33 | 0 (0-0) | 0.35 | 0.33 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 0.58 | 0.13 | 0 (0-0) | 0.58 | 0.13 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0 | - | 0 (0-0) | 0 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.12 | 0.45 | 0 (0-0) | 0.12 | 0.45 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.15 | 0.52 | 0 (0-0) | 0.15 | 0.52 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0 | 0.03 | 0 (0-0) | 0 | 0.03 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.02 | 0 (0-0) | 0.07 | 0.02 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.02 | 0 (0-0) | 0.01 | 0.02 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.33 | 0.44 | 0 (0-0) | 0.33 | 0.44 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 1.84 | - | 0 | 1.84 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.44d** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.02 | 0.13 | 0 (0-0) | 0.02 | 0.13 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.34 | 0.24 | 0 (0-0) | 0.34 | 0.24 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.04 | 0 (0-0) | 0.01 | 0.04 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.16 | 0.49 | 0 (0-0) | 0.16 | 0.49 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.79 | 0.74 | 0 (0-0) | 0.79 | 0.74 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.33 | 0.3 | 0 (0-0) | 1.33 | 0.3 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.28 | 1.03 | 0 (0-0) | 0.28 | 1.03 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.34 | 1.18 | 0 (0-0) | 0.34 | 1.18 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.07 | 0 (0-0) | 0.01 | 0.07 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.15 | 0.04 | 0 (0-0) | 0.15 | 0.04 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.05 | 0 (0-0) | 0.02 | 0.05 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.74 | 1 | 0 (0-0) | 0.74 | 1 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 4.19 | - | 0 | 4.19 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.45a** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.04 | 0.27 | 0 (0-0) | 0.04 | 0.27 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.74 | 0.53 | 0 (0-0) | 0.74 | 0.53 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.08 | 0 (0-0) | 0.01 | 0.08 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.34 | 1.07 | 0 (0-0) | 0.34 | 1.07 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 1.72 | 1.62 | 0 (0-0) | 1.72 | 1.62 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 2.9 | 0.65 | 0 (0-0) | 2.9 | 0.65 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.02 | - | 0 (0-0) | 0.02 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.61 | 2.24 | 0 (0-0) | 0.61 | 2.24 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.73 | 2.56 | 0 (0-0) | 0.73 | 2.56 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.16 | 0 (0-0) | 0.02 | 0.16 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.33 | 0.08 | 0 (0-0) | 0.33 | 0.08 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.11 | 0 (0-0) | 0.04 | 0.11 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.62 | 2.19 | 0 (0-0) | 1.62 | 2.19 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 9.13 | - | 0 | 9.13 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.45b** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.07 | 0.44 | 0 (0-0) | 0.07 | 0.44 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 1.17 | 0.84 | 0 (0-0) | 1.17 | 0.84 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.13 | 0 (0-0) | 0.02 | 0.13 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.54 | 1.7 | 0 (0-0) | 0.54 | 1.7 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 2.73 | 2.57 | 0 (0-0) | 2.73 | 2.57 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 4.6 | 1.04 | 0 (0-0) | 4.6 | 1.04 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.04 | - | 0 (0-0) | 0.04 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.97 | 3.55 | 0 (0-0) | 0.97 | 3.55 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.16 | 4.07 | 0 (0-0) | 1.16 | 4.07 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.26 | 0 (0-0) | 0.03 | 0.26 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.52 | 0.13 | 0 (0-0) | 0.52 | 0.13 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.06 | 0.17 | 0 (0-0) | 0.06 | 0.17 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 2.57 | 3.47 | 0 (0-0) | 2.57 | 3.47 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 14.5 | - | 0 | 14.5 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.45c** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.02 | 0.11 | 0 (0-0) | 0.02 | 0.11 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.3 | 0.21 | 0 (0-0) | 0.3 | 0.21 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.03 | 0 (0-0) | 0.01 | 0.03 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.14 | 0.43 | 0 (0-0) | 0.14 | 0.43 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 0.69 | 0.65 | 0 (0-0) | 0.69 | 0.65 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.17 | 0.26 | 0 (0-0) | 1.17 | 0.26 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.01 | - | 0 (0-0) | 0.01 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.25 | 0.9 | 0 (0-0) | 0.25 | 0.9 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.3 | 1.03 | 0 (0-0) | 0.3 | 1.03 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.07 | 0 (0-0) | 0.01 | 0.07 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.13 | 0.03 | 0 (0-0) | 0.13 | 0.03 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.04 | 0 (0-0) | 0.02 | 0.04 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 0.65 | 0.88 | 0 (0-0) | 0.65 | 0.88 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 3.68 | - | 0 | 3.68 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.45d** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.04 | 0.25 | 0 (0-0) | 0.04 | 0.25 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.68 | 0.49 | 0 (0-0) | 0.68 | 0.49 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.07 | 0 (0-0) | 0.01 | 0.07 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.31 | 0.98 | 0 (0-0) | 0.31 | 0.98 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 1.58 | 1.49 | 0 (0-0) | 1.58 | 1.49 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 2.66 | 0.6 | 0 (0-0) | 2.66 | 0.6 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.02 | - | 0 (0-0) | 0.02 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.56 | 2.05 | 0 (0-0) | 0.56 | 2.05 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.67 | 2.35 | 0 (0-0) | 0.67 | 2.35 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.15 | 0 (0-0) | 0.02 | 0.15 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.3 | 0.07 | 0 (0-0) | 0.3 | 0.07 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.1 | 0 (0-0) | 0.03 | 0.1 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.49 | 2.01 | 0 (0-0) | 1.49 | 2.01 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 8.38 | - | 0 | 8.38 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Cumulative Impact Assessment – Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D** [top]

**Table A9.46** Apportioning to protected sites of the maximum breeding season numbers of adult northern fulmars in flight in the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Buchan Ness to Collieston Coast | SPA, SSSI | 53.28 (43.07-64.5) | 1.92 (1.55-2.32) |
| Forth Islands | SPA, SSSI | 28.16 (22.76-34.09) | 2.5 (2.02-3.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 285.25 (230.61-345.37) | 15.6 (12.62-18.89) |
| Fowlsheugh | SPA, SSSI | 5.15 (4.16-6.23) | 1.33 (1.08-1.61) |
| Hunstanton Cliffs | SSSI | 8.85 (7.16-10.72) | 4.86 (3.93-5.89) |
| North Berwick Coast (Firth of Forth SPA) | SSSI | 26.92 (21.76-32.6) | 2.47 (2-3) |
| Seevogelschutzgebiet Helgoland | SPA | 3.79 (3.07-4.59) | 2.06 (1.67-2.5) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 32.51 (26.28-39.36) | 0.91 (0.73-1.1) |
| Weybourne Cliffs | SSSI | 1.75 (1.42-2.12) | 4.86 (3.93-5.89) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.47a** Apportioning to protected sites of the numbers of northern gannets estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 2.24 | 2.24 | 0 (0-0) | 2.24 | 2.24 | 0 (0-0) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) | 0.02 | 0.02 | 0.01 (0-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.41 | 0.13 | 0 (0-0) | 0.41 | 0.13 | 0 (0-0) |
| Forth Islands | SPA, SSSI | 3.1 | 1.21 | 0 (0-0) | 6.35 | 2.47 | 0 (0-0) | 9.45 | 5.57 | 0.01 (0.01-0.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 1.69 | 0.5 | 0.01 (0.01-0.01) | 0.97 | 0.29 | 0 (0-0) | 2.65 | 1.97 | 0.01 (0.01-0.02) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 2.79 | 1.88 | 0 (0-0) | 2.79 | 1.88 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 1.12 | 0.79 | 0 (0-0) | 1.12 | 0.79 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 0.54 | 0.68 | 0 (0-0) | 0.54 | 0.68 | 0 (0-0) |
| TOTAL | | 4.79 | - | 0 | 14.42 | - | 0 | 19.21 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.47b** Apportioning to protected sites of the numbers of northern gannets estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 5.7 | 5.7 | 0.01 (0.01-0.01) | 5.7 | 5.7 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0.01 | 0.01 | 0 (0-0) | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.05 | 0.34 | 0.01 (0.01-0.01) | 1.05 | 0.34 | 0.01 (0.01-0.01) |
| Forth Islands | SPA, SSSI | 6.03 | 2.35 | 0.01 (0-0.01) | 16.21 | 6.31 | 0.01 (0.01-0.01) | 22.24 | 12.34 | 0.02 (0.01-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.25 | 0.96 | 0.02 (0.02-0.02) | 2.47 | 0.73 | 0.01 (0.01-0.01) | 5.73 | 3.98 | 0.03 (0.02-0.03) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 7.12 | 4.79 | 0.01 (0.01-0.01) | 7.12 | 4.79 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 2.85 | 2 | 0.01 (0.01-0.01) | 2.85 | 2 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 1.37 | 1.72 | 0.01 (0.01-0.01) | 1.37 | 1.72 | 0.01 (0.01-0.01) |
| TOTAL | | 9.29 | - | 0 | 36.8 | - | 0.01 | 46.09 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.47c** Apportioning to protected sites of the numbers of northern gannets estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 12.04 | 12.04 | 0.02 (0.02-0.02) | 12.04 | 12.04 | 0.02 (0.02-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.07 | 0.07 | 0.02 (0.02-0.02) | 0.1 | 0.1 | 0.03 (0.03-0.04) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.21 | 0.72 | 0.02 (0.02-0.02) | 2.21 | 0.72 | 0.02 (0.02-0.02) |
| Forth Islands | SPA, SSSI | 19.21 | 7.48 | 0.02 (0.01-0.02) | 34.2 | 13.31 | 0.02 (0.02-0.02) | 53.41 | 32.52 | 0.04 (0.03-0.05) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 10.27 | 3.03 | 0.06 (0.05-0.07) | 5.22 | 1.54 | 0.02 (0.02-0.02) | 15.49 | 11.82 | 0.08 (0.07-0.1) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 15.01 | 10.11 | 0.02 (0.02-0.02) | 15.01 | 10.11 | 0.02 (0.02-0.02) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 6.02 | 4.23 | 0.02 (0.02-0.02) | 6.02 | 4.23 | 0.02 (0.02-0.02) |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 2.88 | 3.64 | 0.02 (0.02-0.02) | 2.88 | 3.64 | 0.02 (0.02-0.02) |
| TOTAL | | 29.51 | - | 0.01 | 77.64 | - | 0.02 | 107.15 | - | 0.03 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.47d** Apportioning to protected sites of the numbers of northern gannets estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 7.02 | 7.02 | 0.01 (0.01-0.01) | 7.02 | 7.02 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0.01 | 0.01 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.06 | 0.06 | 0.02 (0.02-0.02) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.29 | 0.42 | 0.01 (0.01-0.01) | 1.29 | 0.42 | 0.01 (0.01-0.01) |
| Forth Islands | SPA, SSSI | 10.22 | 3.98 | 0.01 (0.01-0.01) | 19.94 | 7.76 | 0.01 (0.01-0.01) | 30.16 | 17.99 | 0.02 (0.02-0.03) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 5.49 | 1.62 | 0.03 (0.03-0.04) | 3.04 | 0.9 | 0.01 (0.01-0.01) | 8.53 | 6.39 | 0.04 (0.04-0.05) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 8.75 | 5.89 | 0.01 (0.01-0.01) | 8.75 | 5.89 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 3.51 | 2.47 | 0.01 (0.01-0.01) | 3.51 | 2.47 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 1.68 | 2.12 | 0.01 (0.01-0.01) | 1.68 | 2.12 | 0.01 (0.01-0.01) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL | | 15.73 | - | 0.01 | 45.27 | - | 0.01 | 61 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.48a** Apportioning to protected sites of the numbers of northern gannets estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 4.47 | 4.47 | 0.01 (0.01-0.01) | 4.47 | 4.47 | 0.01 (0.01-0.01) |
| Seevogelschutzgebiet Helgoland | SPA | 0.01 | 0.01 | 0 (0-0) | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.03 | 0.03 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.82 | 0.27 | 0.01 (0.01-0.01) | 0.82 | 0.27 | 0.01 (0.01-0.01) |
| Forth Islands | SPA, SSSI | 6.2 | 2.41 | 0.01 (0-0.01) | 12.7 | 4.95 | 0.01 (0.01-0.01) | 18.9 | 11.15 | 0.01 (0.01-0.02) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.37 | 1 | 0.02 (0.02-0.02) | 1.94 | 0.57 | 0.01 (0.01-0.01) | 5.31 | 3.94 | 0.03 (0.02-0.03) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 5.58 | 3.76 | 0.01 (0.01-0.01) | 5.58 | 3.76 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 2.24 | 1.57 | 0.01 (0.01-0.01) | 2.24 | 1.57 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 1.07 | 1.35 | 0.01 (0.01-0.01) | 1.07 | 1.35 | 0.01 (0.01-0.01) |
| TOTAL | | 9.58 | - | 0 | 28.84 | - | 0.01 | 38.42 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.48b** Apportioning to protected sites of the numbers of northern gannets estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 11.41 | 11.41 | 0.02 (0.02-0.02) | 11.41 | 11.41 | 0.02 (0.02-0.02) |
| Seevogelschutzgebiet Helgoland | SPA | 0.02 | 0.02 | 0.01 (0.01-0.01) | 0.07 | 0.07 | 0.02 (0.02-0.02) | 0.08 | 0.08 | 0.03 (0.02-0.03) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.09 | 0.68 | 0.02 (0.02-0.02) | 2.09 | 0.68 | 0.02 (0.02-0.02) |
| Forth Islands | SPA, SSSI | 12.05 | 4.69 | 0.01 (0.01-0.01) | 32.42 | 12.62 | 0.02 (0.02-0.02) | 44.47 | 24.67 | 0.03 (0.03-0.04) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 6.5 | 1.92 | 0.04 (0.03-0.05) | 4.95 | 1.46 | 0.02 (0.02-0.02) | 11.45 | 7.97 | 0.06 (0.05-0.07) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 14.23 | 9.58 | 0.02 (0.02-0.02) | 14.23 | 9.58 | 0.02 (0.02-0.02) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 5.71 | 4.01 | 0.02 (0.02-0.02) | 5.71 | 4.01 | 0.02 (0.02-0.02) |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 2.73 | 3.45 | 0.02 (0.02-0.02) | 2.73 | 3.45 | 0.02 (0.02-0.02) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL | | 18.57 | - | 0.01 | 73.61 | - | 0.02 | 92.18 | - | 0.02 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.48c** Apportioning to protected sites of the numbers of northern gannets estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 24.07 | 24.07 | 0.04 (0.03-0.05) | 24.07 | 24.07 | 0.04 (0.03-0.05) |
| Seevogelschutzgebiet Helgoland | SPA | 0.05 | 0.05 | 0.02 (0.02-0.03) | 0.14 | 0.14 | 0.04 (0.03-0.05) | 0.19 | 0.19 | 0.06 (0.05-0.08) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 4.42 | 1.44 | 0.04 (0.03-0.05) | 4.42 | 1.44 | 0.04 (0.03-0.05) |
| Forth Islands | SPA, SSSI | 38.42 | 14.96 | 0.03 (0.03-0.04) | 68.39 | 26.63 | 0.04 (0.03-0.05) | 106.82 | 65.05 | 0.08 (0.06-0.09) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 20.55 | 6.07 | 0.12 (0.1-0.14) | 10.44 | 3.08 | 0.04 (0.03-0.05) | 30.99 | 23.63 | 0.16 (0.14-0.19) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 30.02 | 20.22 | 0.04 (0.03-0.05) | 30.02 | 20.22 | 0.04 (0.03-0.05) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 12.04 | 8.46 | 0.04 (0.03-0.05) | 12.04 | 8.46 | 0.04 (0.03-0.05) |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 5.76 | 7.27 | 0.04 (0.03-0.05) | 5.76 | 7.27 | 0.04 (0.03-0.05) |
| TOTAL | | 59.03 | - | 0.02 | 155.28 | - | 0.04 | 214.31 | - | 0.06 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.48d** Apportioning to protected sites of the numbers of northern gannets estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 14.04 | 14.04 | 0.02 (0.02-0.03) | 14.04 | 14.04 | 0.02 (0.02-0.03) |
| Seevogelschutzgebiet Helgoland | SPA | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.08 | 0.08 | 0.02 (0.02-0.03) | 0.11 | 0.11 | 0.04 (0.03-0.04) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.57 | 0.84 | 0.02 (0.02-0.03) | 2.57 | 0.84 | 0.02 (0.02-0.03) |
| Forth Islands | SPA, SSSI | 20.45 | 7.96 | 0.02 (0.02-0.02) | 39.88 | 15.53 | 0.02 (0.02-0.03) | 60.33 | 35.98 | 0.04 (0.04-0.05) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 10.97 | 3.24 | 0.06 (0.06-0.08) | 6.09 | 1.8 | 0.02 (0.02-0.03) | 17.06 | 12.77 | 0.09 (0.08-0.11) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 17.5 | 11.79 | 0.02 (0.02-0.03) | 17.5 | 11.79 | 0.02 (0.02-0.03) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 7.02 | 4.93 | 0.02 (0.02-0.03) | 7.02 | 4.93 | 0.02 (0.02-0.03) |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 3.36 | 4.24 | 0.02 (0.02-0.03) | 3.36 | 4.24 | 0.02 (0.02-0.03) |
| TOTAL | | 31.45 | - | 0.01 | 90.55 | - | 0.02 | 122 | - | 0.03 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.49** Apportioning to protected sites of the maximum breeding season numbers of adult northern gannets in flight in the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| **Sitename** | **Designation** | **Mean between years** | |
|---|---|---|---|
| | | **Number of adults** | **% of current population**[1] |
| Forth Islands | SPA, SSSI | 313.25 (350.39-371.18) | 0.28 (0.32-0.33) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 168.65 (188.65-199.84) | 1.07 (1.2-1.27) |
| Seevogelschutzgebiet Helgoland | SPA | 0.51 (0.57-0.6) | 0.22 (0.25-0.26) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.50a**. Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 9.43 | 9.43 | 0.02 (0.01-0.02) | 9.43 | 9.43 | 0.02 (0.01-0.02) | 0.24 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.73 | 0.56 | 0.02 (0.01-0.02) | 1.73 | 0.56 | 0.02 (0.01-0.02) | 0.24 |
| Forth Islands | SPA, SSSI | 16.25 | 6.33 | 0.01 (0.01-0.02) | 26.81 | 10.44 | 0.02 (0.01-0.02) | 43.06 | 26.69 | 0.03 (0.03-0.04) | 0.45 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 9.82 | 2.9 | 0.06 (0.05-0.07) | 4.09 | 1.21 | 0.02 (0.01-0.02) | 13.91 | 11.03 | 0.07 (0.06-0.09) | 1.09 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 11.77 | 7.92 | 0.02 (0.01-0.02) | 11.77 | 7.92 | 0.02 (0.01-0.02) | 0.24 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 4.72 | 3.31 | 0.02 (0.01-0.02) | 4.72 | 3.31 | 0.02 (0.01-0.02) | 0.24 |
| Seevogelschutzgebiet Helgoland | SPA | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.06 | 0.06 | 0.02 (0.01-0.02) | 0.08 | 0.08 | 0.03 (0.02-0.03) | 0.41 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 2.26 | 2.85 | 0.02 (0.01-0.02) | 2.26 | 2.85 | 0.02 (0.01-0.02) | 0.24 |
| TOTAL | | 26.1 | - | 0.01 | 60.86 | - | 0.02 | 86.96 | - | 0.02 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.50b** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 16.15 | 16.15 | 0.03 (0.02-0.03) | 16.15 | 16.15 | 0.03 (0.02-0.03) | 0.44 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.96 | 0.96 | 0.03 (0.02-0.03) | 2.96 | 0.96 | 0.03 (0.02-0.03) | 0.44 |
| Forth Islands | SPA, SSSI | 20.36 | 7.93 | 0.02 (0.02-0.02) | 45.89 | 17.87 | 0.03 (0.02-0.03) | 66.25 | 38.23 | 0.05 (0.04-0.05) | 0.71 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 12.26 | 3.62 | 0.07 (0.06-0.09) | 7.01 | 2.07 | 0.03 (0.02-0.03) | 19.27 | 14.33 | 0.1 (0.08-0.12) | 1.51 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 20.14 | 13.57 | 0.03 (0.02-0.03) | 20.14 | 13.57 | 0.03 (0.02-0.03) | 0.44 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 8.08 | 5.67 | 0.03 (0.02-0.03) | 8.08 | 5.67 | 0.03 (0.02-0.03) | 0.44 |
| Seevogelschutzgebiet Helgoland | SPA | 0.03 | 0.03 | 0.01 (0.01-0.02) | 0.09 | 0.09 | 0.03 (0.02-0.03) | 0.13 | 0.13 | 0.04 (0.03-0.05) | 0.65 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 3.87 | 4.88 | 0.03 (0.02-0.03) | 3.87 | 4.88 | 0.03 (0.02-0.03) | 0.44 |
| TOTAL | | 32.66 | - | 0.01 | 104.2 | - | 0.03 | 136.86 | - | 0.04 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.50c** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 40.32 | 40.32 | 0.07 (0.06-0.08) | 40.32 | 40.32 | 0.07 (0.06-0.08) | 0.99 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 7.4 | 2.41 | 0.07 (0.06-0.08) | 7.4 | 2.41 | 0.07 (0.06-0.08) | 0.99 |
| Forth Islands | SPA, SSSI | 76.5 | 29.78 | 0.07 (0.06-0.08) | 114.56 | 44.6 | 0.07 (0.06-0.08) | 191.06 | 121.1 | 0.14 (0.11-0.16) | 1.99 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 45.75 | 13.51 | 0.27 (0.22-0.32) | 17.49 | 5.16 | 0.07 (0.06-0.08) | 63.24 | 50.91 | 0.34 (0.28-0.4) | 4.93 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 50.28 | 33.86 | 0.07 (0.06-0.08) | 50.28 | 33.86 | 0.07 (0.06-0.08) | 0.99 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 20.17 | 14.16 | 0.07 (0.06-0.08) | 20.17 | 14.16 | 0.07 (0.06-0.08) | 0.99 |
| Seevogelschutzgebiet Helgoland | SPA | 0.12 | 0.12 | 0.05 (0.04-0.06) | 0.24 | 0.24 | 0.07 (0.06-0.08) | 0.36 | 0.36 | 0.12 (0.1-0.15) | 1.78 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 9.65 | 12.18 | 0.07 (0.06-0.08) | 9.65 | 12.18 | 0.07 (0.06-0.08) | 0.99 |
| TOTAL | | 122.38 | - | 0.05 | 260.1 | - | 0.07 | 382.48 | - | 0.1 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.50d** Apportioning to protected sites of estimates of the numbers of northern gannet collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 23.61 | 23.61 | 0.04 (0.03-0.05) | 23.61 | 23.61 | 0.04 (0.03-0.05) | 0.60 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 4.33 | 1.41 | 0.04 (0.03-0.05) | 4.33 | 1.41 | 0.04 (0.03-0.05) | 0.60 |
| Forth Islands | SPA, SSSI | 40.58 | 15.8 | 0.04 (0.03-0.04) | 67.09 | 26.12 | 0.04 (0.03-0.05) | 107.67 | 66.7 | 0.08 (0.06-0.09) | 1.13 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 24.33 | 7.19 | 0.14 (0.12-0.17) | 10.24 | 3.02 | 0.04 (0.03-0.05) | 34.57 | 27.36 | 0.18 (0.15-0.22) | 2.69 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 29.45 | 19.83 | 0.04 (0.03-0.05) | 29.45 | 19.83 | 0.04 (0.03-0.05) | 0.60 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 11.81 | 8.29 | 0.04 (0.03-0.05) | 11.81 | 8.29 | 0.04 (0.03-0.05) | 0.60 |
| Seevogelschutzgebiet Helgoland | SPA | 0.07 | 0.07 | 0.03 (0.02-0.03) | 0.14 | 0.14 | 0.04 (0.03-0.05) | 0.2 | 0.2 | 0.07 (0.06-0.08) | 1.02 |
| Sule Skerry and Sule Stack | SPA, SSSI | 0 | 0 | 0 | 5.65 | 7.13 | 0.04 (0.03-0.05) | 5.65 | 7.13 | 0.04 (0.03-0.05) | 0.60 |
| TOTAL | | 64.98 | - | 0.03 | 152.32 | - | 0.04 | 217.29 | - | 0.06 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.51** Apportioning to protected sites of the maximum breeding season numbers of adult black-legged kittiwakes in flight in the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| **Sitename** | **Designation** | **Mean between years** | |
|---|---|---|---|
| | | **Number of adults** | **% of current population**[1] |
| Durham Coast and Marsden Bay | SSSI | 9.12 (8.03-10.22) | 0.22 (0.2-0.25) |
| Farne Islands | SPA, SSSI | 72.25 (11.43-80.27) | 0.91 (0.14-1.01) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3696.72 (585.03-4106.98) | 4.85 (0.77-5.39) |

[1] Impacts are apportioned based on current populations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.52a**. Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 1.05 | - | 0.04 (0.04-0.04) | 1.05 | - | 0.04 (0.04-0.04) | 0.85 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 14.82 | 35.98 | 0.04 (0.04-0.04) | 14.82 | 35.98 | 0.04 (0.04-0.04) | 0.85 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.4 | 2.03 | 0.04 (0.04-0.04) | 0.4 | 2.03 | 0.04 (0.04-0.04) | 0.85 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0.04 (0.04-0.04) | 0.08 | 0.08 | 0.04 (0.04-0.04) | 0.85 |
| Cape Wrath | SPA | 0 | 0 | 0 | 5.44 | 11.46 | 0.04 (0.04-0.04) | 5.44 | 11.46 | 0.04 (0.04-0.04) | 0.85 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 2.1 | 11.28 | 0.04 (0.04-0.04) | 2.1 | 11.28 | 0.04 (0.04-0.04) | 0.85 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.21 | 0.21 | 0.04 (0.04-0.04) | 0.21 | 0.21 | 0.04 (0.04-0.04) | 0.85 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 1.29 | - | 0.04 (0.04-0.04) | 1.29 | - | 0.04 (0.04-0.04) | 0.85 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.63 | - | 0.04 (0.04-0.04) | 0.63 | - | 0.04 (0.04-0.04) | 0.85 |
| Durham Coast and Marsden Bay | SSSI | 2.28 | - | 0.04 (0.04-0.05) | 3 | - | 0.04 (0.04-0.04) | 5.28 | - | 0.08 (0.08-0.1) | 1.72 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 47.43 | 38.4 | 0.04 (0.04-0.04) | 47.43 | 38.4 | 0.04 (0.04-0.04) | 0.85 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.7 | 21.46 | 0.04 (0.04-0.04) | 1.7 | 21.46 | 0.04 (0.04-0.04) | 0.85 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 1.89 | 1.89 | 0.04 (0.04-0.04) | 1.89 | 1.89 | 0.04 (0.04-0.04) | 0.85 |
| Farne Islands | SPA, SSSI | 1.6 | 2.51 | 0.02 (0.02-0.02) | 4.7 | 7.37 | 0.04 (0.04-0.04) | 6.3 | 8.97 | 0.06 (0.05-0.07) | 1.25 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 4.46 | 9.93 | 0.04 (0.04-0.04) | 4.46 | 9.93 | 0.04 (0.04-0.04) | 0.85 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 76.15 | 142.61 | 0.09 (0.08-0.1) | 52.61 | 98.51 | 0.04 (0.04-0.04) | 128.76 | 174.66 | 0.12 (0.11-0.14) | 2.51 |
| Foula | SPA | 0 | 0 | 0 | 0.57 | 4.54 | 0.04 (0.04-0.04) | 0.57 | 4.54 | 0.04 (0.04-0.04) | 0.85 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 11.03 | 43.31 | 0.04 (0.04-0.04) | 11.03 | 43.31 | 0.04 (0.04-0.04) | 0.85 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.33 | 1.09 | 0.04 (0.04-0.04) | 0.33 | 1.09 | 0.04 (0.04-0.04) | 0.85 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.47 | 3.54 | 0.04 (0.04-0.04) | 0.47 | 3.54 | 0.04 (0.04-0.04) | 0.85 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.49 | 0.49 | 0.04 (0.04-0.04) | 0.49 | 0.49 | 0.04 (0.04-0.04) | 0.85 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 3.18 | 9.1 | 0.04 (0.04-0.04) | 3.18 | 9.1 | 0.04 (0.04-0.04) | 0.85 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 11.99 | 15.48 | 0.04 (0.04-0.04) | 11.99 | 15.48 | 0.04 (0.04-0.04) | 0.85 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.6 | 8.29 | 0.04 (0.04-0.04) | 0.6 | 8.29 | 0.04 (0.04-0.04) | 0.85 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 1.63 | 5.79 | 0.04 (0.04-0.04) | 1.63 | 5.79 | 0.04 (0.04-0.04) | 0.85 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 19.17 | 25.01 | 0.04 (0.04-0.04) | 19.17 | 25.01 | 0.04 (0.04-0.04) | 0.85 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.65 | 1.61 | 0.04 (0.04-0.04) | 0.65 | 1.61 | 0.04 (0.04-0.04) | 0.85 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 17.6 | 37.41 | 0.04 (0.04-0.04) | 17.6 | 37.41 | 0.04 (0.04-0.04) | 0.85 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 6.46 | 28.24 | 0.04 (0.04-0.04) | 6.46 | 28.24 | 0.04 (0.04-0.04) | 0.85 |
| TOTAL | | 80.03 | - | 0.02 | 215.99 | - | 0.04 | 296.02 | - | 0.05 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.52b** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 1.49 | - | 0.06 (0.05-0.06) | 1.49 | - | 0.06 (0.05-0.06) | 1.10 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 20.97 | 50.93 | 0.06 (0.05-0.06) | 20.97 | 50.93 | 0.06 (0.05-0.06) | 1.10 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.57 | 2.87 | 0.06 (0.05-0.06) | 0.57 | 2.87 | 0.06 (0.05-0.06) | 1.10 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.11 | 0.11 | 0.06 (0.05-0.06) | 0.11 | 0.11 | 0.06 (0.05-0.06) | 1.10 |
| Cape Wrath | SPA | 0 | 0 | 0 | 7.7 | 16.22 | 0.06 (0.05-0.06) | 7.7 | 16.22 | 0.06 (0.05-0.06) | 1.10 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 2.97 | 15.97 | 0.06 (0.05-0.06) | 2.97 | 15.97 | 0.06 (0.05-0.06) | 1.10 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.3 | 0.3 | 0.06 (0.05-0.06) | 0.3 | 0.3 | 0.06 (0.05-0.06) | 1.10 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 1.82 | - | 0.06 (0.05-0.06) | 1.82 | - | 0.06 (0.05-0.06) | 1.10 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.89 | - | 0.06 (0.05-0.06) | 0.89 | - | 0.06 (0.05-0.06) | 1.10 |
| Durham Coast and Marsden Bay | SSSI | 6.14 | - | 0.12 (0.11-0.14) | 4.25 | - | 0.06 (0.05-0.06) | 10.39 | - | 0.18 (0.16-0.2) | 3.41 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 67.13 | 54.35 | 0.06 (0.05-0.06) | 67.13 | 54.35 | 0.06 (0.05-0.06) | 1.10 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.4 | 30.37 | 0.06 (0.05-0.06) | 2.4 | 30.37 | 0.06 (0.05-0.06) | 1.10 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 2.68 | 2.68 | 0.06 (0.05-0.06) | 2.68 | 2.68 | 0.06 (0.05-0.06) | 1.10 |
| Farne Islands | SPA, SSSI | 4.26 | 6.68 | 0.05 (0.05-0.06) | 6.65 | 10.43 | 0.06 (0.05-0.06) | 10.91 | 14.69 | 0.11 (0.1-0.12) | 2.13 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 6.31 | 14.05 | 0.06 (0.05-0.06) | 6.31 | 14.05 | 0.06 (0.05-0.06) | 1.10 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 205.44 | 384.71 | 0.23 (0.2-0.26) | 74.45 | 139.42 | 0.06 (0.05-0.06) | 279.89 | 344.86 | 0.29 (0.25-0.32) | 5.52 |
| Foula | SPA | 0 | 0 | 0 | 0.8 | 6.42 | 0.06 (0.05-0.06) | 0.8 | 6.42 | 0.06 (0.05-0.06) | 1.10 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 15.61 | 61.29 | 0.06 (0.05-0.06) | 15.61 | 61.29 | 0.06 (0.05-0.06) | 1.10 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.47 | 1.54 | 0.06 (0.05-0.06) | 0.47 | 1.54 | 0.06 (0.05-0.06) | 1.10 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.66 | 5.02 | 0.06 (0.05-0.06) | 0.66 | 5.02 | 0.06 (0.05-0.06) | 1.10 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.69 | 0.69 | 0.06 (0.05-0.06) | 0.69 | 0.69 | 0.06 (0.05-0.06) | 1.10 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 4.5 | 12.88 | 0.06 (0.05-0.06) | 4.5 | 12.88 | 0.06 (0.05-0.06) | 1.10 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 16.97 | 21.91 | 0.06 (0.05-0.06) | 16.97 | 21.91 | 0.06 (0.05-0.06) | 1.10 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.85 | 11.74 | 0.06 (0.05-0.06) | 0.85 | 11.74 | 0.06 (0.05-0.06) | 1.10 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 2.31 | 8.19 | 0.06 (0.05-0.06) | 2.31 | 8.19 | 0.06 (0.05-0.06) | 1.10 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 27.13 | 35.4 | 0.06 (0.05-0.06) | 27.13 | 35.4 | 0.06 (0.05-0.06) | 1.10 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.92 | 2.28 | 0.06 (0.05-0.06) | 0.92 | 2.28 | 0.06 (0.05-0.06) | 1.10 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 24.91 | 52.95 | 0.06 (0.05-0.06) | 24.91 | 52.95 | 0.06 (0.05-0.06) | 1.10 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 9.15 | 39.97 | 0.06 (0.05-0.06) | 9.15 | 39.97 | 0.06 (0.05-0.06) | 1.10 |
| TOTAL | | 215.83 | - | 0.06 | 305.68 | - | 0.06 | 521.52 | - | 0.1 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.52c** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 1.63 | - | 0.06 (0.05-0.07) | 1.63 | - | 0.06 (0.05-0.07) | 1.27 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 22.98 | 55.79 | 0.06 (0.05-0.07) | 22.98 | 55.79 | 0.06 (0.05-0.07) | 1.27 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.62 | 3.15 | 0.06 (0.05-0.07) | 0.62 | 3.15 | 0.06 (0.05-0.07) | 1.27 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.12 | 0.12 | 0.06 (0.05-0.07) | 0.12 | 0.12 | 0.06 (0.05-0.07) | 1.27 |
| Cape Wrath | SPA | 0 | 0 | 0 | 8.44 | 17.77 | 0.06 (0.05-0.07) | 8.44 | 17.77 | 0.06 (0.05-0.07) | 1.27 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 3.25 | 17.5 | 0.06 (0.05-0.07) | 3.25 | 17.5 | 0.06 (0.05-0.07) | 1.27 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.33 | 0.33 | 0.06 (0.05-0.07) | 0.33 | 0.33 | 0.06 (0.05-0.07) | 1.27 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 2 | - | 0.06 (0.05-0.07) | 2 | - | 0.06 (0.05-0.07) | 1.27 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.97 | - | 0.06 (0.05-0.07) | 0.97 | - | 0.06 (0.05-0.07) | 1.27 |
| Durham Coast and Marsden Bay | SSSI | 5.49 | - | 0.11 (0.1-0.12) | 4.66 | - | 0.06 (0.05-0.07) | 10.15 | - | 0.17 (0.15-0.19) | 3.35 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 73.54 | 59.54 | 0.06 (0.05-0.07) | 73.54 | 59.54 | 0.06 (0.05-0.07) | 1.27 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.63 | 33.27 | 0.06 (0.05-0.07) | 2.63 | 33.27 | 0.06 (0.05-0.07) | 1.27 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 2.93 | 2.93 | 0.06 (0.05-0.07) | 2.93 | 2.93 | 0.06 (0.05-0.07) | 1.27 |
| Farne Islands | SPA, SSSI | 3.79 | 5.94 | 0.05 (0.04-0.05) | 7.28 | 11.43 | 0.06 (0.05-0.07) | 11.07 | 15.22 | 0.11 (0.1-0.12) | 2.19 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 6.92 | 15.39 | 0.06 (0.05-0.07) | 6.92 | 15.39 | 0.06 (0.05-0.07) | 1.27 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 184.38 | 345.27 | 0.21 (0.18-0.24) | 81.57 | 152.74 | 0.06 (0.05-0.07) | 265.94 | 337.12 | 0.27 (0.24-0.31) | 5.26 |
| Foula | SPA | 0 | 0 | 0 | 0.88 | 7.04 | 0.06 (0.05-0.07) | 0.88 | 7.04 | 0.06 (0.05-0.07) | 1.27 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 17.11 | 67.15 | 0.06 (0.05-0.07) | 17.11 | 67.15 | 0.06 (0.05-0.07) | 1.27 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.52 | 1.69 | 0.06 (0.05-0.07) | 0.52 | 1.69 | 0.06 (0.05-0.07) | 1.27 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.73 | 5.5 | 0.06 (0.05-0.07) | 0.73 | 5.5 | 0.06 (0.05-0.07) | 1.27 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.76 | 0.76 | 0.06 (0.05-0.07) | 0.76 | 0.76 | 0.06 (0.05-0.07) | 1.27 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 4.93 | 14.11 | 0.06 (0.05-0.07) | 4.93 | 14.11 | 0.06 (0.05-0.07) | 1.27 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 18.59 | 24 | 0.06 (0.05-0.07) | 18.59 | 24 | 0.06 (0.05-0.07) | 1.27 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.93 | 12.86 | 0.06 (0.05-0.07) | 0.93 | 12.86 | 0.06 (0.05-0.07) | 1.27 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 2.53 | 8.98 | 0.06 (0.05-0.07) | 2.53 | 8.98 | 0.06 (0.05-0.07) | 1.27 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 29.72 | 38.79 | 0.06 (0.05-0.07) | 29.72 | 38.79 | 0.06 (0.05-0.07) | 1.27 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 1.01 | 2.5 | 0.06 (0.05-0.07) | 1.01 | 2.5 | 0.06 (0.05-0.07) | 1.27 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 27.29 | 58.01 | 0.06 (0.05-0.07) | 27.29 | 58.01 | 0.06 (0.05-0.07) | 1.27 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 10.02 | 43.79 | 0.06 (0.05-0.07) | 10.02 | 43.79 | 0.06 (0.05-0.07) | 1.27 |
| TOTAL | | 193.66 | - | 0.05 | 334.89 | - | 0.06 | 528.55 | - | 0.1 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.52d** Apportioning to protected sites of estimates of the numbers of black-legged kittiwake collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Brighton to Newhaven Cliffs | SSSI | 0 | - | 0 | 0.94 | - | 0.04 (0.03-0.04) | 0.94 | - | 0.04 (0.03-0.04) | 0.58 |
| Buchan Ness to Collieston Coast | SPA, SSSI | 0 | 0 | 0 | 13.23 | 32.12 | 0.04 (0.03-0.04) | 13.23 | 32.12 | 0.04 (0.03-0.04) | 0.58 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 0.36 | 1.81 | 0.04 (0.03-0.04) | 0.36 | 1.81 | 0.04 (0.03-0.04) | 0.58 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.04 (0.03-0.04) | 0.07 | 0.07 | 0.04 (0.03-0.04) | 0.58 |
| Cape Wrath | SPA | 0 | 0 | 0 | 4.86 | 10.23 | 0.04 (0.03-0.04) | 4.86 | 10.23 | 0.04 (0.03-0.04) | 0.58 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.87 | 10.07 | 0.04 (0.03-0.04) | 1.87 | 10.07 | 0.04 (0.03-0.04) | 0.58 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.19 | 0.19 | 0.04 (0.03-0.04) | 0.19 | 0.19 | 0.04 (0.03-0.04) | 0.58 |
| Dover to Kingsdown Cliffs | SSSI | 0 | - | 0 | 1.15 | - | 0.04 (0.03-0.04) | 1.15 | - | 0.04 (0.03-0.04) | 0.58 |
| Dunbar Coast | SSSI | 0 | - | 0 | 0.56 | - | 0.04 (0.03-0.04) | 0.56 | - | 0.04 (0.03-0.04) | 0.58 |
| Durham Coast and Marsden Bay | SSSI | 6.96 | - | 0.14 (0.12-0.16) | 2.68 | - | 0.04 (0.03-0.04) | 9.64 | - | 0.17 (0.15-0.2) | 3.21 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 42.34 | 34.28 | 0.04 (0.03-0.04) | 42.34 | 34.28 | 0.04 (0.03-0.04) | 0.58 |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.52 | 19.16 | 0.04 (0.03-0.04) | 1.52 | 19.16 | 0.04 (0.03-0.04) | 0.58 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 1.69 | 1.69 | 0.04 (0.03-0.04) | 1.69 | 1.69 | 0.04 (0.03-0.04) | 0.58 |
| Farne Islands | SPA, SSSI | 4.69 | 7.35 | 0.06 (0.05-0.07) | 4.19 | 6.58 | 0.04 (0.03-0.04) | 8.88 | 11.27 | 0.09 (0.08-0.11) | 1.72 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 3.98 | 8.86 | 0.04 (0.03-0.04) | 3.98 | 8.86 | 0.04 (0.03-0.04) | 0.58 |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 237.98 | 445.66 | 0.27 (0.24-0.3) | 46.96 | 87.95 | 0.04 (0.03-0.04) | 284.95 | 325.93 | 0.3 (0.27-0.34) | 5.72 |
| Foula | SPA | 0 | 0 | 0 | 0.51 | 4.05 | 0.04 (0.03-0.04) | 0.51 | 4.05 | 0.04 (0.03-0.04) | 0.58 |
| Fowlsheugh | SPA, SSSI | 0 | 0 | 0 | 9.85 | 38.66 | 0.04 (0.03-0.04) | 9.85 | 38.66 | 0.04 (0.03-0.04) | 0.58 |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.3 | 0.97 | 0.04 (0.03-0.04) | 0.3 | 0.97 | 0.04 (0.03-0.04) | 0.58 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.42 | 3.16 | 0.04 (0.03-0.04) | 0.42 | 3.16 | 0.04 (0.03-0.04) | 0.58 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.44 | 0.44 | 0.04 (0.03-0.04) | 0.44 | 0.44 | 0.04 (0.03-0.04) | 0.58 |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 2.84 | 8.12 | 0.04 (0.03-0.04) | 2.84 | 8.12 | 0.04 (0.03-0.04) | 0.58 |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 10.7 | 13.82 | 0.04 (0.03-0.04) | 10.7 | 13.82 | 0.04 (0.03-0.04) | 0.58 |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.53 | 7.41 | 0.04 (0.03-0.04) | 0.53 | 7.41 | 0.04 (0.03-0.04) | 0.58 |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 1.46 | 5.17 | 0.04 (0.03-0.04) | 1.46 | 5.17 | 0.04 (0.03-0.04) | 0.58 |
| St Abb's Head to Fast Castle | SPA, SSSI | 0 | 0 | 0 | 17.11 | 22.33 | 0.04 (0.03-0.04) | 17.11 | 22.33 | 0.04 (0.03-0.04) | 0.58 |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 0.58 | 1.44 | 0.04 (0.03-0.04) | 0.58 | 1.44 | 0.04 (0.03-0.04) | 0.58 |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 15.71 | 33.4 | 0.04 (0.03-0.04) | 15.71 | 33.4 | 0.04 (0.03-0.04) | 0.58 |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 5.77 | 25.21 | 0.04 (0.03-0.04) | 5.77 | 25.21 | 0.04 (0.03-0.04) | 0.58 |
| TOTAL | | 249.63 | - | 0.07 | 192.83 | - | 0.04 | 442.46 | - | 0.08 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.53a**. Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 4.85 | 37.18 | 0.06 (0.04-0.09) | 4.85 | 37.18 | 0.06 (0.04-0.09) | 0.31 |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.27 | 0.27 | 0.06 (0.04-0.09) | 0.27 | 0.27 | 0.06 (0.04-0.09) | 0.31 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.06 (0.04-0.09) | 0.02 | 0.02 | 0.06 (0.04-0.09) | 0.31 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.16 | 0.16 | 0.06 (0.04-0.09) | 0.16 | 0.16 | 0.06 (0.04-0.09) | 0.31 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.06 (0.04-0.09) | 0 | 0 | 0.06 (0.04-0.09) | 0.31 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 1.09 | 1.09 | 0.06 (0.04-0.09) | 1.09 | 1.09 | 0.06 (0.04-0.09) | 0.31 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 23.99 | 23.99 | 0.06 (0.04-0.09) | 23.99 | 23.99 | 0.06 (0.04-0.09) | 0.31 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 4.28 | 4.28 | 0.06 (0.04-0.09) | 4.28 | 4.28 | 0.06 (0.04-0.09) | 0.31 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.06 | 0.06 | 0.06 (0.04-0.09) | 0.06 | 0.06 | 0.06 (0.04-0.09) | 0.31 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 3.45 | 2.57 | 0.06 (0.04-0.09) | 3.45 | 2.57 | 0.06 (0.04-0.09) | 0.31 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.06 (0.04-0.09) | 0.03 | 0.03 | 0.06 (0.04-0.09) | 0.31 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.1 | 0.1 | 0.06 (0.04-0.09) | 0.1 | 0.1 | 0.06 (0.04-0.09) | 0.31 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.06 (0.04-0.09) | 0.01 | 0.01 | 0.06 (0.04-0.09) | 0.31 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 39.52 | 39.52 | 0.06 (0.04-0.09) | 39.52 | 39.52 | 0.06 (0.04-0.09) | 0.31 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 8.14 | 8.14 | 0.06 (0.04-0.09) | 8.14 | 8.14 | 0.06 (0.04-0.09) | 0.31 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 12.48 | 12.48 | 0.06 (0.04-0.09) | 12.48 | 12.48 | 0.06 (0.04-0.09) | 0.31 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 3.49 | 3.49 | 0.06 (0.04-0.09) | 3.49 | 3.49 | 0.06 (0.04-0.09) | 0.31 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 32.56 | 32.56 | 0.06 (0.04-0.09) | 32.56 | 32.56 | 0.06 (0.04-0.09) | 0.31 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.19 | 0.19 | 0.06 (0.04-0.09) | 0.19 | 0.19 | 0.06 (0.04-0.09) | 0.31 |
| TOTAL | | 0 | - | 0 | 134.7 | - | 0.06 | 134.7 | - | 0.06 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.53b** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 2.91 | 22.3 | 0.03 (0.02-0.06) | 2.91 | 22.3 | 0.03 (0.02-0.06) | 0.28 |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.16 | 0.16 | 0.03 (0.02-0.06) | 0.16 | 0.16 | 0.03 (0.02-0.06) | 0.28 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.03 (0.02-0.06) | 0.01 | 0.01 | 0.03 (0.02-0.06) | 0.28 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.1 | 0.1 | 0.03 (0.02-0.06) | 0.1 | 0.1 | 0.03 (0.02-0.06) | 0.28 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.03 (0.02-0.06) | 0 | 0 | 0.03 (0.02-0.06) | 0.28 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.66 | 0.66 | 0.03 (0.02-0.06) | 0.66 | 0.66 | 0.03 (0.02-0.06) | 0.28 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 14.39 | 14.39 | 0.03 (0.02-0.06) | 14.39 | 14.39 | 0.03 (0.02-0.06) | 0.28 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 2.57 | 2.57 | 0.03 (0.02-0.06) | 2.57 | 2.57 | 0.03 (0.02-0.06) | 0.28 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.03 (0.02-0.06) | 0.04 | 0.04 | 0.03 (0.02-0.06) | 0.28 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 2.07 | 1.54 | 0.03 (0.02-0.06) | 2.07 | 1.54 | 0.03 (0.02-0.06) | 0.28 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.03 (0.02-0.06) | 0.02 | 0.02 | 0.03 (0.02-0.06) | 0.28 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.06 | 0.06 | 0.03 (0.02-0.06) | 0.06 | 0.06 | 0.03 (0.02-0.06) | 0.28 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.03 (0.02-0.06) | 0 | 0 | 0.03 (0.02-0.06) | 0.28 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 23.7 | 23.7 | 0.03 (0.02-0.06) | 23.7 | 23.7 | 0.03 (0.02-0.06) | 0.28 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 4.88 | 4.88 | 0.03 (0.02-0.06) | 4.88 | 4.88 | 0.03 (0.02-0.06) | 0.28 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 7.49 | 7.49 | 0.03 (0.02-0.06) | 7.49 | 7.49 | 0.03 (0.02-0.06) | 0.28 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 2.09 | 2.09 | 0.03 (0.02-0.06) | 2.09 | 2.09 | 0.03 (0.02-0.06) | 0.28 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 19.52 | 19.52 | 0.03 (0.02-0.06) | 19.52 | 19.52 | 0.03 (0.02-0.06) | 0.28 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.11 | 0.11 | 0.03 (0.02-0.06) | 0.11 | 0.11 | 0.03 (0.02-0.06) | 0.28 |
| TOTAL | | 0 | - | 0 | 80.78 | - | 0.03 | 80.78 | - | 0.03 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.53c** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 1.94 | 14.88 | 0.02 (0.01-0.04) | 1.94 | 14.88 | 0.02 (0.01-0.04) | 0.26 |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.11 | 0.11 | 0.02 (0.01-0.04) | 0.11 | 0.11 | 0.02 (0.01-0.04) | 0.26 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.01-0.04) | 0.01 | 0.01 | 0.02 (0.01-0.04) | 0.26 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.02 (0.01-0.04) | 0.07 | 0.07 | 0.02 (0.01-0.04) | 0.26 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.01-0.04) | 0 | 0 | 0.02 (0.01-0.04) | 0.26 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.44 | 0.44 | 0.02 (0.01-0.04) | 0.44 | 0.44 | 0.02 (0.01-0.04) | 0.26 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 9.6 | 9.6 | 0.02 (0.01-0.04) | 9.6 | 9.6 | 0.02 (0.01-0.04) | 0.26 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 1.71 | 1.71 | 0.02 (0.01-0.04) | 1.71 | 1.71 | 0.02 (0.01-0.04) | 0.26 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.02 (0.01-0.04) | 0.02 | 0.02 | 0.02 (0.01-0.04) | 0.26 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 1.38 | 1.03 | 0.02 (0.01-0.04) | 1.38 | 1.03 | 0.02 (0.01-0.04) | 0.26 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.02 (0.01-0.04) | 0.01 | 0.01 | 0.02 (0.01-0.04) | 0.26 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.02 (0.01-0.04) | 0.04 | 0.04 | 0.02 (0.01-0.04) | 0.26 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.02 (0.01-0.04) | 0 | 0 | 0.02 (0.01-0.04) | 0.26 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 15.82 | 15.82 | 0.02 (0.01-0.04) | 15.82 | 15.82 | 0.02 (0.01-0.04) | 0.26 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 3.26 | 3.26 | 0.02 (0.01-0.04) | 3.26 | 3.26 | 0.02 (0.01-0.04) | 0.26 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 5 | 5 | 0.02 (0.01-0.04) | 5 | 5 | 0.02 (0.01-0.04) | 0.26 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 1.4 | 1.4 | 0.02 (0.01-0.04) | 1.4 | 1.4 | 0.02 (0.01-0.04) | 0.26 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 13.03 | 13.03 | 0.02 (0.01-0.04) | 13.03 | 13.03 | 0.02 (0.01-0.04) | 0.26 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.08 | 0.08 | 0.02 (0.01-0.04) | 0.08 | 0.08 | 0.02 (0.01-0.04) | 0.26 |
| TOTAL | | 0 | - | 0 | 53.92 | - | 0.02 | 53.92 | - | 0.02 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.53d** Apportioning to protected sites of estimates of the numbers of lesser black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Alde-Ore Estuary | SPA, RAMSAR, SSSI | 0 | 0 | 0 | 3.16 | 24.24 | 0.04 (0.02-0.06) | 3.16 | 24.24 | 0.04 (0.02-0.06) | 0.29 |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0.18 | 0.18 | 0.04 (0.02-0.06) | 0.18 | 0.18 | 0.04 (0.02-0.06) | 0.29 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.02-0.06) | 0.01 | 0.01 | 0.04 (0.02-0.06) | 0.29 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.11 | 0.11 | 0.04 (0.02-0.06) | 0.11 | 0.11 | 0.04 (0.02-0.06) | 0.29 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0 | 0 | 0.04 (0.02-0.06) | 0 | 0 | 0.04 (0.02-0.06) | 0.29 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.71 | 0.71 | 0.04 (0.02-0.06) | 0.71 | 0.71 | 0.04 (0.02-0.06) | 0.29 |
| Duinen en Lage Land Texel | SPA | 0 | 0 | 0 | 15.64 | 15.64 | 0.04 (0.02-0.06) | 15.64 | 15.64 | 0.04 (0.02-0.06) | 0.29 |
| Duinen Vlieland | SPA | 0 | 0 | 0 | 2.79 | 2.79 | 0.04 (0.02-0.06) | 2.79 | 2.79 | 0.04 (0.02-0.06) | 0.29 |
| Falaise du Bessin Occidental | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.04 (0.02-0.06) | 0.04 | 0.04 | 0.04 (0.02-0.06) | 0.29 |
| Forth Islands | SPA, SSSI | 0 | 0 | 0 | 2.25 | 1.68 | 0.04 (0.02-0.06) | 2.25 | 1.68 | 0.04 (0.02-0.06) | 0.29 |
| Hallands Vadero | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.02-0.06) | 0.02 | 0.02 | 0.04 (0.02-0.06) | 0.29 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.04 (0.02-0.06) | 0.07 | 0.07 | 0.04 (0.02-0.06) | 0.29 |
| Ilots Notre-Dame et Chevret | SPA | 0 | 0 | 0 | 0 | 0 | 0.04 (0.02-0.06) | 0 | 0 | 0.04 (0.02-0.06) | 0.29 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 25.76 | 25.76 | 0.04 (0.02-0.06) | 25.76 | 25.76 | 0.04 (0.02-0.06) | 0.29 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 5.31 | 5.31 | 0.04 (0.02-0.06) | 5.31 | 5.31 | 0.04 (0.02-0.06) | 0.29 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 8.14 | 8.14 | 0.04 (0.02-0.06) | 8.14 | 8.14 | 0.04 (0.02-0.06) | 0.29 |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 2.28 | 2.28 | 0.04 (0.02-0.06) | 2.28 | 2.28 | 0.04 (0.02-0.06) | 0.29 |
| Waddenzee | SPA, RAMSAR | 0 | 0 | 0 | 21.22 | 21.22 | 0.04 (0.02-0.06) | 21.22 | 21.22 | 0.04 (0.02-0.06) | 0.29 |
| Zwanenwater | SPA, RAMSAR | 0 | 0 | 0 | 0.12 | 0.12 | 0.04 (0.02-0.06) | 0.12 | 0.12 | 0.04 (0.02-0.06) | 0.29 |
| TOTAL | | 0 | - | 0 | 87.8 | - | 0.04 | 87.8 | - | 0.04 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.54a**. Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 1.11 | 1.11 | 0.22 (0.15-0.32) | 1.11 | 1.11 | 0.22 (0.15-0.32) | 1.26 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.22 (0.15-0.32) | 0.03 | 0.03 | 0.22 (0.15-0.32) | 1.26 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 2.05 | 2.05 | 0.22 (0.15-0.32) | 2.05 | 2.05 | 0.22 (0.15-0.32) | 1.26 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.9 | 0.9 | 0.22 (0.15-0.32) | 0.9 | 0.9 | 0.22 (0.15-0.32) | 1.26 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 2.04 | 6.1 | 0.22 (0.15-0.32) | 2.04 | 6.1 | 0.22 (0.15-0.32) | 1.26 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.22 (0.15-0.32) | 0.04 | 0.04 | 0.22 (0.15-0.32) | 1.26 |
| Chausay | SPA | 0 | 0 | 0 | 3.54 | 3.54 | 0.22 (0.15-0.32) | 3.54 | 3.54 | 0.22 (0.15-0.32) | 1.26 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.21 | 3.19 | 0.22 (0.15-0.32) | 1.21 | 3.19 | 0.22 (0.15-0.32) | 1.26 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.47 | 0.47 | 0.22 (0.15-0.32) | 0.47 | 0.47 | 0.22 (0.15-0.32) | 1.26 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.14 | 5.2 | 0.22 (0.15-0.32) | 1.14 | 5.2 | 0.22 (0.15-0.32) | 1.26 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 1.18 | - | 0.22 (0.15-0.32) | 1.18 | - | 0.22 (0.15-0.32) | 1.26 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.18 | 3.71 | 0.22 (0.15-0.32) | 0.18 | 3.71 | 0.22 (0.15-0.32) | 1.26 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.22 (0.15-0.32) | 0.04 | 0.04 | 0.22 (0.15-0.32) | 1.26 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.19 | 0.19 | 0.22 (0.15-0.32) | 0.19 | 0.19 | 0.22 (0.15-0.32) | 1.26 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.22 (0.15-0.32) | 0.01 | 0.01 | 0.22 (0.15-0.32) | 1.26 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 6.83 | 6.83 | 0.22 (0.15-0.32) | 6.83 | 6.83 | 0.22 (0.15-0.32) | 1.26 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.09 | 0.09 | 0.22 (0.15-0.32) | 0.09 | 0.09 | 0.22 (0.15-0.32) | 1.26 |
| TOTAL | | 0 | - | 0 | 21.05 | - | 0.22 | 21.05 | - | 0.22 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.54b** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 1.21 | 1.21 | 0.24 (0.17-0.35) | 1.21 | 1.21 | 0.24 (0.17-0.35) | 1.22 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.24 (0.17-0.35) | 0.03 | 0.03 | 0.24 (0.17-0.35) | 1.22 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 2.24 | 2.24 | 0.24 (0.17-0.35) | 2.24 | 2.24 | 0.24 (0.17-0.35) | 1.22 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.99 | 0.99 | 0.24 (0.17-0.35) | 0.99 | 0.99 | 0.24 (0.17-0.35) | 1.22 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 2.23 | 6.66 | 0.24 (0.17-0.35) | 2.23 | 6.66 | 0.24 (0.17-0.35) | 1.22 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.24 (0.17-0.35) | 0.04 | 0.04 | 0.24 (0.17-0.35) | 1.22 |
| Chausay | SPA | 0 | 0 | 0 | 3.87 | 3.87 | 0.24 (0.17-0.35) | 3.87 | 3.87 | 0.24 (0.17-0.35) | 1.22 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.32 | 3.48 | 0.24 (0.17-0.35) | 1.32 | 3.48 | 0.24 (0.17-0.35) | 1.22 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.51 | 0.51 | 0.24 (0.17-0.35) | 0.51 | 0.51 | 0.24 (0.17-0.35) | 1.22 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.24 | 5.68 | 0.24 (0.17-0.35) | 1.24 | 5.68 | 0.24 (0.17-0.35) | 1.22 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 1.29 | - | 0.24 (0.17-0.35) | 1.29 | - | 0.24 (0.17-0.35) | 1.22 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.2 | 4.05 | 0.24 (0.17-0.35) | 0.2 | 4.05 | 0.24 (0.17-0.35) | 1.22 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.24 (0.17-0.35) | 0.04 | 0.04 | 0.24 (0.17-0.35) | 1.22 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.21 | 0.21 | 0.24 (0.17-0.35) | 0.21 | 0.21 | 0.24 (0.17-0.35) | 1.22 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.24 (0.17-0.35) | 0.01 | 0.01 | 0.24 (0.17-0.35) | 1.22 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 7.46 | 7.46 | 0.24 (0.17-0.35) | 7.46 | 7.46 | 0.24 (0.17-0.35) | 1.22 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.1 | 0.1 | 0.24 (0.17-0.35) | 0.1 | 0.1 | 0.24 (0.17-0.35) | 1.22 |
| TOTAL | | 0 | - | 0 | 22.99 | - | 0.24 | 22.99 | - | 0.24 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.54c** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 1.18 | 1.18 | 0.23 (0.14-0.38) | 1.18 | 1.18 | 0.23 (0.14-0.38) | 0.86 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.23 (0.14-0.38) | 0.03 | 0.03 | 0.23 (0.14-0.38) | 0.86 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 2.18 | 2.18 | 0.23 (0.14-0.38) | 2.18 | 2.18 | 0.23 (0.14-0.38) | 0.86 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.96 | 0.96 | 0.23 (0.14-0.38) | 0.96 | 0.96 | 0.23 (0.14-0.38) | 0.86 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 2.17 | 6.5 | 0.23 (0.14-0.38) | 2.17 | 6.5 | 0.23 (0.14-0.38) | 0.86 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.23 (0.14-0.38) | 0.04 | 0.04 | 0.23 (0.14-0.38) | 0.86 |
| Chausay | SPA | 0 | 0 | 0 | 3.77 | 3.77 | 0.23 (0.14-0.38) | 3.77 | 3.77 | 0.23 (0.14-0.38) | 0.86 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.29 | 3.39 | 0.23 (0.14-0.38) | 1.29 | 3.39 | 0.23 (0.14-0.38) | 0.86 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.5 | 0.5 | 0.23 (0.14-0.38) | 0.5 | 0.5 | 0.23 (0.14-0.38) | 0.86 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.21 | 5.54 | 0.23 (0.14-0.38) | 1.21 | 5.54 | 0.23 (0.14-0.38) | 0.86 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 1.25 | - | 0.23 (0.14-0.38) | 1.25 | - | 0.23 (0.14-0.38) | 0.86 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.19 | 3.95 | 0.23 (0.14-0.38) | 0.19 | 3.95 | 0.23 (0.14-0.38) | 0.86 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.23 (0.14-0.38) | 0.04 | 0.04 | 0.23 (0.14-0.38) | 0.86 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.2 | 0.2 | 0.23 (0.14-0.38) | 0.2 | 0.2 | 0.23 (0.14-0.38) | 0.86 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.23 (0.14-0.38) | 0.01 | 0.01 | 0.23 (0.14-0.38) | 0.86 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 7.27 | 7.27 | 0.23 (0.14-0.38) | 7.27 | 7.27 | 0.23 (0.14-0.38) | 0.86 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.1 | 0.1 | 0.23 (0.14-0.38) | 0.1 | 0.1 | 0.23 (0.14-0.38) | 0.86 |
| TOTAL | | 0 | - | 0 | 22.41 | - | 0.23 | 22.41 | - | 0.23 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.54d** Apportioning to protected sites of estimates of the numbers of great black-backed gull collisions associated with the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population | % Background mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 1.14 | 1.14 | 0.22 (0.15-0.34) | 1.14 | 1.14 | 0.22 (0.15-0.34) | 1.07 |
| Baie de Saint-Brieuc-Est | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.22 (0.15-0.34) | 0.03 | 0.03 | 0.22 (0.15-0.34) | 1.07 |
| Baie de Seine Occidentale | SPA | 0 | 0 | 0 | 2.11 | 2.11 | 0.22 (0.15-0.34) | 2.11 | 2.11 | 0.22 (0.15-0.34) | 1.07 |
| Baie du Mont Saint Michel | SPA | 0 | 0 | 0 | 0.93 | 0.93 | 0.22 (0.15-0.34) | 0.93 | 0.93 | 0.22 (0.15-0.34) | 1.07 |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 2.1 | 6.28 | 0.22 (0.15-0.34) | 2.1 | 6.28 | 0.22 (0.15-0.34) | 1.07 |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.22 (0.15-0.34) | 0.04 | 0.04 | 0.22 (0.15-0.34) | 1.07 |
| Chausay | SPA | 0 | 0 | 0 | 3.65 | 3.65 | 0.22 (0.15-0.34) | 3.65 | 3.65 | 0.22 (0.15-0.34) | 1.07 |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 1.24 | 3.28 | 0.22 (0.15-0.34) | 1.24 | 3.28 | 0.22 (0.15-0.34) | 1.07 |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.48 | 0.48 | 0.22 (0.15-0.34) | 0.48 | 0.48 | 0.22 (0.15-0.34) | 1.07 |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.17 | 5.35 | 0.22 (0.15-0.34) | 1.17 | 5.35 | 0.22 (0.15-0.34) | 1.07 |
| Eilean Hoan (North Sutherland Coastal Islands) | SSSI | 0 | - | 0 | 1.21 | - | 0.22 (0.15-0.34) | 1.21 | - | 0.22 (0.15-0.34) | 1.07 |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.19 | 3.82 | 0.22 (0.15-0.34) | 0.19 | 3.82 | 0.22 (0.15-0.34) | 1.07 |
| Ilot du Trevors | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.22 (0.15-0.34) | 0.04 | 0.04 | 0.22 (0.15-0.34) | 1.07 |
| Littoral Seino-Marin | SPA | 0 | 0 | 0 | 0.19 | 0.19 | 0.22 (0.15-0.34) | 0.19 | 0.19 | 0.22 (0.15-0.34) | 1.07 |
| Niedersachsiches Wattenmeer un andrezendes Kustenmeer | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.22 (0.15-0.34) | 0.01 | 0.01 | 0.22 (0.15-0.34) | 1.07 |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 7.03 | 7.03 | 0.22 (0.15-0.34) | 7.03 | 7.03 | 0.22 (0.15-0.34) | 1.07 |
| Ramsar-Gebiet S-H Wattenmeer und angrenzende Kustengebiet | SPA, RAMSAR | 0 | 0 | 0 | 0.09 | 0.09 | 0.22 (0.15-0.34) | 0.09 | 0.09 | 0.22 (0.15-0.34) | 1.07 |
| TOTAL | | 0 | - | 0 | 21.66 | - | 0.22 | 21.66 | - | 0.22 | |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

**Table A9.55a** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.33 | 0.33 | 0.05 (0.04-0.05) | 0.33 | 0.33 | 0.05 (0.04-0.05) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.05 (0.04-0.05) | 0.02 | 0.02 | 0.05 (0.04-0.05) |
| Seevogelschutzgebiet Helgoland | SPA | 0.04 | 0.04 | 0 (0-0) | 3.39 | 3.39 | 0.05 (0.04-0.05) | 3.43 | 3.43 | 0.05 (0.04-0.05) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.04-0.05) | 0.01 | 0.01 | 0.05 (0.04-0.05) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 1.72 | 1.15 | 0.01 (0.01-0.01) | 17.7 | 11.83 | 0.05 (0.04-0.05) | 19.42 | 13.55 | 0.05 (0.05-0.06) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 1.28 | 11.6 | 0.05 (0.04-0.05) | 1.28 | 11.6 | 0.05 (0.04-0.05) |
| Cape Wrath | SPA | 0 | 0 | 0 | 20.34 | 12.56 | 0.05 (0.04-0.05) | 20.34 | 12.56 | 0.05 (0.04-0.05) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 12.55 | 27.01 | 0.05 (0.04-0.05) | 12.55 | 27.01 | 0.05 (0.04-0.05) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 145.81 | 97.86 | 0.05 (0.04-0.05) | 145.81 | 97.86 | 0.05 (0.04-0.05) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 17.89 | 29.62 | 0.05 (0.04-0.05) | 17.89 | 29.62 | 0.05 (0.04-0.05) |
| Farne Islands | SPA, SSSI | 14.45 | 10.57 | 0.02 (0.02-0.02) | 44 | 32.17 | 0.05 (0.04-0.05) | 58.46 | 46.62 | 0.07 (0.06-0.07) |
| Firth of Forth Islands | SPA, SSSI | 3.69 | 4.05 | 0.01 (0.01-0.01) | 19.96 | 21.9 | 0.05 (0.04-0.05) | 23.66 | 25.59 | 0.06 (0.05-0.06) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 40.25 | 15.62 | 0.05 (0.04-0.05) | 56.95 | 22.11 | 0.05 (0.04-0.05) | 97.2 | 62.35 | 0.09 (0.09-0.1) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 20.68 | 34.39 | 0.05 (0.04-0.05) | 20.68 | 34.39 | 0.05 (0.04-0.05) |
| Fowlsheugh | SPA, SSSI | 6.06 | 7.61 | 0.01 (0.01-0.01) | 41.2 | 51.77 | 0.05 (0.04-0.05) | 47.25 | 57.83 | 0.06 (0.05-0.06) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 6.87 | 22.93 | 0.05 (0.04-0.05) | 6.87 | 22.93 | 0.05 (0.04-0.05) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 8.27 | 18.34 | 0.05 (0.04-0.05) | 8.27 | 18.34 | 0.05 (0.04-0.05) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 16.33 | 34.58 | 0.05 (0.04-0.05) | 16.33 | 34.58 | 0.05 (0.04-0.05) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 64.34 | 35.13 | 0.05 (0.04-0.05) | 64.34 | 35.13 | 0.05 (0.04-0.05) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 20.24 | 35.74 | 0.05 (0.04-0.05) | 20.24 | 35.74 | 0.05 (0.04-0.05) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 2.81 | 9.72 | 0.05 (0.04-0.05) | 2.81 | 9.72 | 0.05 (0.04-0.05) |
| St Abb's Head to Fast Castle | SPA, SSSI | 9.39 | 6.81 | 0.02 (0.01-0.02) | 40.12 | 29.12 | 0.05 (0.04-0.05) | 49.5 | 38.51 | 0.06 (0.06-0.07) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 5.68 | 8.62 | 0.05 (0.04-0.05) | 5.68 | 8.62 | 0.05 (0.04-0.05) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 4.55 | 14.67 | 0.05 (0.04-0.05) | 4.55 | 14.67 | 0.05 (0.04-0.05) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 14.97 | 40.9 | 0.05 (0.04-0.05) | 14.97 | 40.9 | 0.05 (0.04-0.05) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 11.14 | 38.66 | 0.05 (0.04-0.05) | 11.14 | 38.66 | 0.05 (0.04-0.05) |
| TOTAL | | 75.6 | - | 0.01 | 597.42 | - | 0.05 | 673.02 | - | 0.05 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.55b** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.4 | 0.4 | 0.05 (0.05-0.06) | 0.4 | 0.4 | 0.05 (0.05-0.06) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.05 (0.05-0.06) | 0.02 | 0.02 | 0.05 (0.05-0.06) |
| Seevogelschutzgebiet Helgoland | SPA | 0.08 | 0.08 | 0 (0-0) | 4.04 | 4.04 | 0.05 (0.05-0.06) | 4.12 | 4.12 | 0.06 (0.05-0.06) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.05 (0.05-0.06) | 0.01 | 0.01 | 0.05 (0.05-0.06) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 3.22 | 2.15 | 0.01 (0.01-0.01) | 21.06 | 14.08 | 0.05 (0.05-0.06) | 24.28 | 17.3 | 0.07 (0.06-0.07) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 1.52 | 13.8 | 0.05 (0.05-0.06) | 1.52 | 13.8 | 0.05 (0.05-0.06) |
| Cape Wrath | SPA | 0 | 0 | 0 | 24.22 | 14.96 | 0.05 (0.05-0.06) | 24.22 | 14.96 | 0.05 (0.05-0.06) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 14.93 | 32.15 | 0.05 (0.05-0.06) | 14.93 | 32.15 | 0.05 (0.05-0.06) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 173.56 | 116.48 | 0.05 (0.05-0.06) | 173.56 | 116.48 | 0.05 (0.05-0.06) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 21.29 | 35.26 | 0.05 (0.05-0.06) | 21.29 | 35.26 | 0.05 (0.05-0.06) |
| Farne Islands | SPA, SSSI | 27.12 | 19.82 | 0.04 (0.04-0.05) | 52.38 | 38.29 | 0.05 (0.05-0.06) | 79.49 | 65.4 | 0.1 (0.09-0.1) |
| Firth of Forth Islands | SPA, SSSI | 6.93 | 7.6 | 0.02 (0.02-0.03) | 23.76 | 26.07 | 0.05 (0.05-0.06) | 30.7 | 33 | 0.08 (0.07-0.08) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 75.41 | 29.27 | 0.09 (0.08-0.1) | 67.79 | 26.31 | 0.05 (0.05-0.06) | 143.2 | 101.72 | 0.14 (0.13-0.16) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 24.61 | 40.94 | 0.05 (0.05-0.06) | 24.61 | 40.94 | 0.05 (0.05-0.06) |
| Fowlsheugh | SPA, SSSI | 11.36 | 14.28 | 0.02 (0.02-0.02) | 49.04 | 61.63 | 0.05 (0.05-0.06) | 60.4 | 72.99 | 0.07 (0.07-0.08) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 8.17 | 27.29 | 0.05 (0.05-0.06) | 8.17 | 27.29 | 0.05 (0.05-0.06) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 9.85 | 21.83 | 0.05 (0.05-0.06) | 9.85 | 21.83 | 0.05 (0.05-0.06) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 19.43 | 41.16 | 0.05 (0.05-0.06) | 19.43 | 41.16 | 0.05 (0.05-0.06) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 76.58 | 41.81 | 0.05 (0.05-0.06) | 76.58 | 41.81 | 0.05 (0.05-0.06) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 24.09 | 42.54 | 0.05 (0.05-0.06) | 24.09 | 42.54 | 0.05 (0.05-0.06) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 3.35 | 11.57 | 0.05 (0.05-0.06) | 3.35 | 11.57 | 0.05 (0.05-0.06) |
| St Abb's Head to Fast Castle | SPA, SSSI | 17.61 | 12.78 | 0.03 (0.03-0.03) | 47.75 | 34.66 | 0.05 (0.05-0.06) | 65.37 | 52.27 | 0.08 (0.08-0.09) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 6.76 | 10.26 | 0.05 (0.05-0.06) | 6.76 | 10.26 | 0.05 (0.05-0.06) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 5.41 | 17.47 | 0.05 (0.05-0.06) | 5.41 | 17.47 | 0.05 (0.05-0.06) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 17.82 | 48.69 | 0.05 (0.05-0.06) | 17.82 | 48.69 | 0.05 (0.05-0.06) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 13.26 | 46.01 | 0.05 (0.05-0.06) | 13.26 | 46.01 | 0.05 (0.05-0.06) |
| TOTAL | | 141.73 | - | 0.02 | 711.1 | - | 0.05 | 852.84 | - | 0.07 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.55c** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.27 | 0.27 | 0.04 (0.03-0.04) | 0.27 | 0.27 | 0.04 (0.03-0.04) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.04) | 0.01 | 0.01 | 0.04 (0.03-0.04) |
| Seevogelschutzgebiet Helgoland | SPA | 0.1 | 0.1 | 0 (0-0) | 2.73 | 2.73 | 0.04 (0.03-0.04) | 2.83 | 2.83 | 0.04 (0.04-0.04) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.03-0.04) | 0.01 | 0.01 | 0.04 (0.03-0.04) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 3.78 | 2.53 | 0.01 (0.01-0.02) | 14.24 | 9.52 | 0.04 (0.03-0.04) | 18.02 | 13.3 | 0.05 (0.05-0.06) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 1.03 | 9.33 | 0.04 (0.03-0.04) | 1.03 | 9.33 | 0.04 (0.03-0.04) |
| Cape Wrath | SPA | 0 | 0 | 0 | 16.37 | 10.11 | 0.04 (0.03-0.04) | 16.37 | 10.11 | 0.04 (0.03-0.04) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 10.1 | 21.74 | 0.04 (0.03-0.04) | 10.1 | 21.74 | 0.04 (0.03-0.04) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 117.34 | 78.75 | 0.04 (0.03-0.04) | 117.34 | 78.75 | 0.04 (0.03-0.04) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 14.39 | 23.84 | 0.04 (0.03-0.04) | 14.39 | 23.84 | 0.04 (0.03-0.04) |
| Farne Islands | SPA, SSSI | 31.59 | 23.1 | 0.05 (0.04-0.05) | 35.41 | 25.89 | 0.04 (0.03-0.04) | 67 | 57.48 | 0.09 (0.08-0.09) |
| Firth of Forth Islands | SPA, SSSI | 8.08 | 8.87 | 0.03 (0.03-0.03) | 16.07 | 17.63 | 0.04 (0.03-0.04) | 24.15 | 25.71 | 0.06 (0.06-0.07) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 87.34 | 33.9 | 0.1 (0.1-0.12) | 45.83 | 17.79 | 0.04 (0.03-0.04) | 133.18 | 105.13 | 0.14 (0.13-0.16) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 16.64 | 27.68 | 0.04 (0.03-0.04) | 16.64 | 27.68 | 0.04 (0.03-0.04) |
| Fowlsheugh | SPA, SSSI | 13.24 | 16.63 | 0.02 (0.02-0.02) | 33.15 | 41.66 | 0.04 (0.03-0.04) | 46.39 | 54.9 | 0.06 (0.05-0.06) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 5.53 | 18.45 | 0.04 (0.03-0.04) | 5.53 | 18.45 | 0.04 (0.03-0.04) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 6.66 | 14.76 | 0.04 (0.03-0.04) | 6.66 | 14.76 | 0.04 (0.03-0.04) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 13.14 | 27.83 | 0.04 (0.03-0.04) | 13.14 | 27.83 | 0.04 (0.03-0.04) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 51.78 | 28.27 | 0.04 (0.03-0.04) | 51.78 | 28.27 | 0.04 (0.03-0.04) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 16.29 | 28.76 | 0.04 (0.03-0.04) | 16.29 | 28.76 | 0.04 (0.03-0.04) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 2.26 | 7.82 | 0.04 (0.03-0.04) | 2.26 | 7.82 | 0.04 (0.03-0.04) |
| St Abb's Head to Fast Castle | SPA, SSSI | 20.53 | 14.9 | 0.04 (0.03-0.04) | 32.29 | 23.43 | 0.04 (0.03-0.04) | 52.81 | 43.96 | 0.07 (0.07-0.08) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 4.57 | 6.94 | 0.04 (0.03-0.04) | 4.57 | 6.94 | 0.04 (0.03-0.04) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 3.66 | 11.81 | 0.04 (0.03-0.04) | 3.66 | 11.81 | 0.04 (0.03-0.04) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 12.05 | 32.92 | 0.04 (0.03-0.04) | 12.05 | 32.92 | 0.04 (0.03-0.04) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 8.97 | 31.11 | 0.04 (0.03-0.04) | 8.97 | 31.11 | 0.04 (0.03-0.04) |
| TOTAL | | 164.66 | - | 0.02 | 480.77 | - | 0.04 | 645.43 | - | 0.05 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.55d** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.31 | 0.31 | 0.04 (0.04-0.05) | 0.31 | 0.31 | 0.04 (0.04-0.05) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.04 (0.04-0.05) | 0.02 | 0.02 | 0.04 (0.04-0.05) |
| Seevogelschutzgebiet Helgoland | SPA | 0.08 | 0.08 | 0 (0-0) | 3.18 | 3.18 | 0.04 (0.04-0.05) | 3.25 | 3.25 | 0.04 (0.04-0.05) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 (0.04-0.05) | 0.01 | 0.01 | 0.04 (0.04-0.05) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 2.94 | 1.97 | 0.01 (0.01-0.01) | 16.58 | 11.08 | 0.04 (0.04-0.05) | 19.53 | 14.03 | 0.05 (0.05-0.06) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 1.2 | 10.87 | 0.04 (0.04-0.05) | 1.2 | 10.87 | 0.04 (0.04-0.05) |
| Cape Wrath | SPA | 0 | 0 | 0 | 19.07 | 11.77 | 0.04 (0.04-0.05) | 19.07 | 11.77 | 0.04 (0.04-0.05) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 11.76 | 25.31 | 0.04 (0.04-0.05) | 11.76 | 25.31 | 0.04 (0.04-0.05) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 136.64 | 91.71 | 0.04 (0.04-0.05) | 136.64 | 91.71 | 0.04 (0.04-0.05) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 16.76 | 27.76 | 0.04 (0.04-0.05) | 16.76 | 27.76 | 0.04 (0.04-0.05) |
| Farne Islands | SPA, SSSI | 24.71 | 18.06 | 0.04 (0.04-0.04) | 41.24 | 30.14 | 0.04 (0.04-0.05) | 65.94 | 54.85 | 0.08 (0.07-0.09) |
| Firth of Forth Islands | SPA, SSSI | 6.32 | 6.93 | 0.02 (0.02-0.02) | 18.71 | 20.52 | 0.04 (0.04-0.05) | 25.03 | 26.84 | 0.06 (0.06-0.07) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 68.57 | 26.62 | 0.08 (0.08-0.09) | 53.37 | 20.72 | 0.04 (0.04-0.05) | 121.95 | 89.29 | 0.13 (0.11-0.14) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 19.38 | 32.23 | 0.04 (0.04-0.05) | 19.38 | 32.23 | 0.04 (0.04-0.05) |
| Fowlsheugh | SPA, SSSI | 10.35 | 13 | 0.02 (0.02-0.02) | 38.61 | 48.52 | 0.04 (0.04-0.05) | 48.96 | 58.87 | 0.06 (0.06-0.07) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 6.43 | 21.49 | 0.04 (0.04-0.05) | 6.43 | 21.49 | 0.04 (0.04-0.05) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 7.75 | 17.19 | 0.04 (0.04-0.05) | 7.75 | 17.19 | 0.04 (0.04-0.05) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 15.3 | 32.4 | 0.04 (0.04-0.05) | 15.3 | 32.4 | 0.04 (0.04-0.05) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 60.3 | 32.92 | 0.04 (0.04-0.05) | 60.3 | 32.92 | 0.04 (0.04-0.05) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 18.97 | 33.49 | 0.04 (0.04-0.05) | 18.97 | 33.49 | 0.04 (0.04-0.05) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 2.64 | 9.11 | 0.04 (0.04-0.05) | 2.64 | 9.11 | 0.04 (0.04-0.05) |
| St Abb's Head to Fast Castle | SPA, SSSI | 16.05 | 11.65 | 0.03 (0.03-0.03) | 37.6 | 27.29 | 0.04 (0.04-0.05) | 53.65 | 43.34 | 0.07 (0.06-0.08) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 5.32 | 8.08 | 0.04 (0.04-0.05) | 5.32 | 8.08 | 0.04 (0.04-0.05) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 4.26 | 13.75 | 0.04 (0.04-0.05) | 4.26 | 13.75 | 0.04 (0.04-0.05) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 14.03 | 38.33 | 0.04 (0.04-0.05) | 14.03 | 38.33 | 0.04 (0.04-0.05) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 10.44 | 36.23 | 0.04 (0.04-0.05) | 10.44 | 36.23 | 0.04 (0.04-0.05) |
| TOTAL | | 129.01 | - | 0.01 | 559.86 | - | 0.04 | 688.87 | - | 0.05 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.56a** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.66 | 0.66 | 0.09 (0.08-0.1) | 0.66 | 0.66 | 0.09 (0.08-0.1) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.09 (0.08-0.1) | 0.03 | 0.03 | 0.09 (0.08-0.1) |
| Seevogelschutzgebiet Helgoland | SPA | 0.09 | 0.09 | 0 (0-0) | 6.78 | 6.78 | 0.09 (0.08-0.1) | 6.87 | 6.87 | 0.09 (0.09-0.1) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.09 (0.08-0.1) | 0.02 | 0.02 | 0.09 (0.08-0.1) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 3.45 | 2.3 | 0.01 (0.01-0.01) | 35.39 | 23.65 | 0.09 (0.08-0.1) | 38.84 | 27.1 | 0.1 (0.1-0.11) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 2.55 | 23.19 | 0.09 (0.08-0.1) | 2.55 | 23.19 | 0.09 (0.08-0.1) |
| Cape Wrath | SPA | 0 | 0 | 0 | 40.69 | 25.13 | 0.09 (0.08-0.1) | 40.69 | 25.13 | 0.09 (0.08-0.1) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 25.09 | 54.02 | 0.09 (0.08-0.1) | 25.09 | 54.02 | 0.09 (0.08-0.1) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 291.62 | 195.72 | 0.09 (0.08-0.1) | 291.62 | 195.72 | 0.09 (0.08-0.1) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 35.77 | 59.25 | 0.09 (0.08-0.1) | 35.77 | 59.25 | 0.09 (0.08-0.1) |
| Farne Islands | SPA, SSSI | 28.91 | 21.13 | 0.04 (0.04-0.05) | 88 | 64.33 | 0.09 (0.08-0.1) | 116.91 | 93.24 | 0.14 (0.13-0.15) |
| Firth of Forth Islands | SPA, SSSI | 7.39 | 8.1 | 0.03 (0.02-0.03) | 39.93 | 43.8 | 0.09 (0.08-0.1) | 47.32 | 51.19 | 0.12 (0.11-0.13) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 80.49 | 31.24 | 0.1 (0.09-0.11) | 113.91 | 44.21 | 0.09 (0.08-0.1) | 194.4 | 124.7 | 0.19 (0.17-0.21) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 41.35 | 68.79 | 0.09 (0.08-0.1) | 41.35 | 68.79 | 0.09 (0.08-0.1) |
| Fowlsheugh | SPA, SSSI | 12.11 | 15.22 | 0.02 (0.02-0.02) | 82.39 | 103.55 | 0.09 (0.08-0.1) | 94.51 | 115.66 | 0.11 (0.1-0.12) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 13.73 | 45.86 | 0.09 (0.08-0.1) | 13.73 | 45.86 | 0.09 (0.08-0.1) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 16.54 | 36.69 | 0.09 (0.08-0.1) | 16.54 | 36.69 | 0.09 (0.08-0.1) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 32.65 | 69.15 | 0.09 (0.08-0.1) | 32.65 | 69.15 | 0.09 (0.08-0.1) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 128.68 | 70.25 | 0.09 (0.08-0.1) | 128.68 | 70.25 | 0.09 (0.08-0.1) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 40.47 | 71.48 | 0.09 (0.08-0.1) | 40.47 | 71.48 | 0.09 (0.08-0.1) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 5.63 | 19.44 | 0.09 (0.08-0.1) | 5.63 | 19.44 | 0.09 (0.08-0.1) |
| St Abb's Head to Fast Castle | SPA, SSSI | 18.77 | 13.62 | 0.03 (0.03-0.03) | 80.24 | 58.24 | 0.09 (0.08-0.1) | 99.01 | 77.01 | 0.12 (0.11-0.13) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 11.35 | 17.24 | 0.09 (0.08-0.1) | 11.35 | 17.24 | 0.09 (0.08-0.1) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 9.1 | 29.35 | 0.09 (0.08-0.1) | 9.1 | 29.35 | 0.09 (0.08-0.1) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 29.95 | 81.81 | 0.09 (0.08-0.1) | 29.95 | 81.81 | 0.09 (0.08-0.1) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 22.28 | 77.31 | 0.09 (0.08-0.1) | 22.28 | 77.31 | 0.09 (0.08-0.1) |
| TOTAL | | 151.2 | - | 0.02 | 1194.83 | - | 0.09 | 1346.03 | - | 0.1 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.56b** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.79 | 0.79 | 0.11 (0.1-0.12) | 0.79 | 0.79 | 0.11 (0.1-0.12) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.11 (0.1-0.12) | 0.04 | 0.04 | 0.11 (0.1-0.12) |
| Seevogelschutzgebiet Helgoland | SPA | 0.17 | 0.17 | 0 (0-0) | 8.07 | 8.07 | 0.11 (0.1-0.12) | 8.24 | 8.24 | 0.11 (0.1-0.12) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.11 (0.1-0.12) | 0.03 | 0.03 | 0.11 (0.1-0.12) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 6.44 | 4.3 | 0.02 (0.02-0.03) | 42.13 | 28.16 | 0.11 (0.1-0.12) | 48.57 | 34.6 | 0.13 (0.12-0.14) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 3.04 | 27.61 | 0.11 (0.1-0.12) | 3.04 | 27.61 | 0.11 (0.1-0.12) |
| Cape Wrath | SPA | 0 | 0 | 0 | 48.43 | 29.91 | 0.11 (0.1-0.12) | 48.43 | 29.91 | 0.11 (0.1-0.12) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 29.87 | 64.3 | 0.11 (0.1-0.12) | 29.87 | 64.3 | 0.11 (0.1-0.12) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 347.12 | 232.96 | 0.11 (0.1-0.12) | 347.12 | 232.96 | 0.11 (0.1-0.12) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 42.58 | 70.52 | 0.11 (0.1-0.12) | 42.58 | 70.52 | 0.11 (0.1-0.12) |
| Farne Islands | SPA, SSSI | 54.23 | 39.64 | 0.08 (0.08-0.09) | 104.75 | 76.58 | 0.11 (0.1-0.12) | 158.98 | 130.81 | 0.19 (0.18-0.21) |
| Firth of Forth Islands | SPA, SSSI | 13.86 | 15.21 | 0.05 (0.04-0.05) | 47.53 | 52.14 | 0.11 (0.1-0.12) | 61.39 | 66 | 0.16 (0.14-0.17) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 150.82 | 58.54 | 0.18 (0.17-0.2) | 135.59 | 52.63 | 0.11 (0.1-0.12) | 286.41 | 203.45 | 0.29 (0.27-0.31) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 49.22 | 81.88 | 0.11 (0.1-0.12) | 49.22 | 81.88 | 0.11 (0.1-0.12) |
| Fowlsheugh | SPA, SSSI | 22.72 | 28.55 | 0.04 (0.03-0.04) | 98.07 | 123.25 | 0.11 (0.1-0.12) | 120.8 | 145.97 | 0.15 (0.14-0.16) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 16.35 | 54.58 | 0.11 (0.1-0.12) | 16.35 | 54.58 | 0.11 (0.1-0.12) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 19.69 | 43.67 | 0.11 (0.1-0.12) | 19.69 | 43.67 | 0.11 (0.1-0.12) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 38.86 | 82.31 | 0.11 (0.1-0.12) | 38.86 | 82.31 | 0.11 (0.1-0.12) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 153.17 | 83.62 | 0.11 (0.1-0.12) | 153.17 | 83.62 | 0.11 (0.1-0.12) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 48.18 | 85.09 | 0.11 (0.1-0.12) | 48.18 | 85.09 | 0.11 (0.1-0.12) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 6.7 | 23.14 | 0.11 (0.1-0.12) | 6.7 | 23.14 | 0.11 (0.1-0.12) |
| St Abb's Head to Fast Castle | SPA, SSSI | 35.23 | 25.57 | 0.06 (0.06-0.07) | 95.51 | 69.32 | 0.11 (0.1-0.12) | 130.73 | 104.55 | 0.17 (0.16-0.18) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 13.51 | 20.52 | 0.11 (0.1-0.12) | 13.51 | 20.52 | 0.11 (0.1-0.12) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 10.83 | 34.93 | 0.11 (0.1-0.12) | 10.83 | 34.93 | 0.11 (0.1-0.12) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 35.64 | 97.38 | 0.11 (0.1-0.12) | 35.64 | 97.38 | 0.11 (0.1-0.12) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 26.52 | 92.03 | 0.11 (0.1-0.12) | 26.52 | 92.03 | 0.11 (0.1-0.12) |
| TOTAL | | 283.47 | - | 0.03 | 1422.21 | - | 0.11 | 1705.68 | - | 0.13 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.56c** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.53 | 0.53 | 0.07 (0.07-0.08) | 0.53 | 0.53 | 0.07 (0.07-0.08) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.07 (0.07-0.08) | 0.03 | 0.03 | 0.07 (0.07-0.08) |
| Seevogelschutzgebiet Helgoland | SPA | 0.2 | 0.2 | 0 (0-0) | 5.46 | 5.46 | 0.07 (0.07-0.08) | 5.65 | 5.65 | 0.08 (0.07-0.08) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.07 (0.07-0.08) | 0.02 | 0.02 | 0.07 (0.07-0.08) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 7.56 | 5.05 | 0.03 (0.03-0.03) | 28.48 | 19.04 | 0.07 (0.07-0.08) | 36.04 | 26.6 | 0.1 (0.09-0.11) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 2.05 | 18.67 | 0.07 (0.07-0.08) | 2.05 | 18.67 | 0.07 (0.07-0.08) |
| Cape Wrath | SPA | 0 | 0 | 0 | 32.74 | 20.22 | 0.07 (0.07-0.08) | 32.74 | 20.22 | 0.07 (0.07-0.08) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 20.19 | 43.47 | 0.07 (0.07-0.08) | 20.19 | 43.47 | 0.07 (0.07-0.08) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 234.68 | 157.5 | 0.07 (0.07-0.08) | 234.68 | 157.5 | 0.07 (0.07-0.08) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 28.79 | 47.68 | 0.07 (0.07-0.08) | 28.79 | 47.68 | 0.07 (0.07-0.08) |
| Farne Islands | SPA, SSSI | 63.19 | 46.19 | 0.1 (0.09-0.11) | 70.82 | 51.77 | 0.07 (0.07-0.08) | 134.01 | 114.96 | 0.17 (0.16-0.19) |
| Firth of Forth Islands | SPA, SSSI | 16.17 | 17.74 | 0.06 (0.05-0.06) | 32.13 | 35.25 | 0.07 (0.07-0.08) | 48.3 | 51.42 | 0.13 (0.12-0.14) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 174.69 | 67.81 | 0.21 (0.19-0.23) | 91.67 | 35.58 | 0.07 (0.07-0.08) | 266.35 | 210.27 | 0.28 (0.26-0.31) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 33.28 | 55.35 | 0.07 (0.07-0.08) | 33.28 | 55.35 | 0.07 (0.07-0.08) |
| Fowlsheugh | SPA, SSSI | 26.47 | 33.27 | 0.04 (0.04-0.05) | 66.31 | 83.33 | 0.07 (0.07-0.08) | 92.78 | 109.8 | 0.12 (0.11-0.13) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 11.05 | 36.9 | 0.07 (0.07-0.08) | 11.05 | 36.9 | 0.07 (0.07-0.08) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 13.31 | 29.52 | 0.07 (0.07-0.08) | 13.31 | 29.52 | 0.07 (0.07-0.08) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 26.28 | 55.65 | 0.07 (0.07-0.08) | 26.28 | 55.65 | 0.07 (0.07-0.08) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 103.56 | 56.54 | 0.07 (0.07-0.08) | 103.56 | 56.54 | 0.07 (0.07-0.08) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 32.57 | 57.53 | 0.07 (0.07-0.08) | 32.57 | 57.53 | 0.07 (0.07-0.08) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 4.53 | 15.65 | 0.07 (0.07-0.08) | 4.53 | 15.65 | 0.07 (0.07-0.08) |
| St Abb's Head to Fast Castle | SPA, SSSI | 41.05 | 29.8 | 0.07 (0.06-0.08) | 64.57 | 46.87 | 0.07 (0.07-0.08) | 105.62 | 87.92 | 0.14 (0.13-0.16) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 9.13 | 13.88 | 0.07 (0.07-0.08) | 9.13 | 13.88 | 0.07 (0.07-0.08) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 7.32 | 23.62 | 0.07 (0.07-0.08) | 7.32 | 23.62 | 0.07 (0.07-0.08) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 24.1 | 65.84 | 0.07 (0.07-0.08) | 24.1 | 65.84 | 0.07 (0.07-0.08) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 17.93 | 62.22 | 0.07 (0.07-0.08) | 17.93 | 62.22 | 0.07 (0.07-0.08) |
| TOTAL | | 329.32 | - | 0.04 | 961.54 | - | 0.07 | 1290.86 | - | 0.1 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.56d** Apportioning to protected sites of the numbers of common guillemots estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.62 | 0.62 | 0.09 (0.08-0.09) | 0.62 | 0.62 | 0.09 (0.08-0.09) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.09 (0.08-0.09) | 0.03 | 0.03 | 0.09 (0.08-0.09) |
| Seevogelschutzgebiet Helgoland | SPA | 0.15 | 0.15 | 0 (0-0) | 6.36 | 6.36 | 0.09 (0.08-0.09) | 6.51 | 6.51 | 0.09 (0.08-0.1) |
| Hallands Vardero | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.09 (0.08-0.09) | 0.02 | 0.02 | 0.09 (0.08-0.09) |
| Buchan Ness to Collieston Coast | SPA, SSSI | 5.88 | 3.93 | 0.02 (0.02-0.02) | 33.17 | 22.17 | 0.09 (0.08-0.09) | 39.05 | 28.05 | 0.11 (0.1-0.12) |
| Calf of Eday | SPA, SSSI | 0 | 0 | 0 | 2.39 | 21.74 | 0.09 (0.08-0.09) | 2.39 | 21.74 | 0.09 (0.08-0.09) |
| Cape Wrath | SPA | 0 | 0 | 0 | 38.13 | 23.55 | 0.09 (0.08-0.09) | 38.13 | 23.55 | 0.09 (0.08-0.09) |
| Copinsay | SPA, SSSI | 0 | 0 | 0 | 23.52 | 50.62 | 0.09 (0.08-0.09) | 23.52 | 50.62 | 0.09 (0.08-0.09) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 273.29 | 183.41 | 0.09 (0.08-0.09) | 273.29 | 183.41 | 0.09 (0.08-0.09) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 33.52 | 55.52 | 0.09 (0.08-0.09) | 33.52 | 55.52 | 0.09 (0.08-0.09) |
| Farne Islands | SPA, SSSI | 49.41 | 36.12 | 0.08 (0.07-0.08) | 82.47 | 60.29 | 0.09 (0.08-0.09) | 131.88 | 109.7 | 0.16 (0.15-0.18) |
| Firth of Forth Islands | SPA, SSSI | 12.63 | 13.86 | 0.04 (0.04-0.05) | 37.42 | 41.05 | 0.09 (0.08-0.09) | 50.05 | 53.68 | 0.13 (0.12-0.14) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 137.15 | 53.23 | 0.16 (0.15-0.18) | 106.75 | 41.43 | 0.09 (0.08-0.09) | 243.89 | 178.58 | 0.25 (0.23-0.27) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 38.75 | 64.46 | 0.09 (0.08-0.09) | 38.75 | 64.46 | 0.09 (0.08-0.09) |
| Fowlsheugh | SPA, SSSI | 20.7 | 26.01 | 0.03 (0.03-0.04) | 77.21 | 97.04 | 0.09 (0.08-0.09) | 97.91 | 117.73 | 0.12 (0.11-0.13) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 12.87 | 42.97 | 0.09 (0.08-0.09) | 12.87 | 42.97 | 0.09 (0.08-0.09) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 15.5 | 34.38 | 0.09 (0.08-0.09) | 15.5 | 34.38 | 0.09 (0.08-0.09) |
| Marwick Head | SPA, SSSI | 0 | 0 | 0 | 30.6 | 64.8 | 0.09 (0.08-0.09) | 30.6 | 64.8 | 0.09 (0.08-0.09) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 120.59 | 65.84 | 0.09 (0.08-0.09) | 120.59 | 65.84 | 0.09 (0.08-0.09) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 37.93 | 66.99 | 0.09 (0.08-0.09) | 37.93 | 66.99 | 0.09 (0.08-0.09) |
| Rousay | SPA, SSSI | 0 | 0 | 0 | 5.27 | 18.22 | 0.09 (0.08-0.09) | 5.27 | 18.22 | 0.09 (0.08-0.09) |
| St Abb's Head to Fast Castle | SPA, SSSI | 32.1 | 23.3 | 0.05 (0.05-0.06) | 75.19 | 54.58 | 0.09 (0.08-0.09) | 107.29 | 86.68 | 0.14 (0.13-0.15) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 10.64 | 16.16 | 0.09 (0.08-0.09) | 10.64 | 16.16 | 0.09 (0.08-0.09) |
| Sumburgh Head | SPA, SSSI | 0 | 0 | 0 | 8.53 | 27.5 | 0.09 (0.08-0.09) | 8.53 | 27.5 | 0.09 (0.08-0.09) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 28.06 | 76.67 | 0.09 (0.08-0.09) | 28.06 | 76.67 | 0.09 (0.08-0.09) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 20.88 | 72.45 | 0.09 (0.08-0.09) | 20.88 | 72.45 | 0.09 (0.08-0.09) |
| TOTAL | | 258.02 | - | 0.03 | 1119.72 | - | 0.09 | 1377.74 | - | 0.11 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.57** Apportioning to protected sites of the maximum breeding season numbers of adult common guillemots in flight in the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects project, using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Buchan Ness to Collieston Coast | SPA, SSSI | 20.83 (17.72-22.82) | 0.07 (0.06-0.08) |
| Farne Islands | SPA, SSSI | 232.39 (197.69-254.56) | 0.36 (0.31-0.4) |
| Forth Islands | SPA, SSSI | 61.7 (52.49-67.59) | 0.21 (0.18-0.23) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 619.89 (527.33-679.02) | 0.52 (0.45-0.57) |
| Fowlsheugh | SPA, SSSI | 87.42 (74.37-95.76) | 0.13 (0.11-0.14) |
| Seevogelschutzgebiet Helgoland | SPA | 2.49 (2.11-2.72) | 0.05 (0.04-0.05) |
| St Abb's Head to Fast Castle | SPA, SSSI | 154.54 (131.46-169.28) | 0.35 (0.3-0.38) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.58a** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.08 (0.07-0.09) | 0.02 | 0.02 | 0.08 (0.07-0.09) |
| Chausay | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.08 (0.07-0.09) | 0.03 | 0.03 | 0.08 (0.07-0.09) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.08 (0.07-0.09) | 0.05 | 0.05 | 0.08 (0.07-0.09) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.08 (0.07-0.09) | 0.01 | 0.01 | 0.08 (0.07-0.09) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.08 (0.07-0.09) | 0.04 | 0.04 | 0.08 (0.07-0.09) |
| Cape Wrath | SPA | 0 | 0 | 0 | 3.96 | 2.91 | 0.08 (0.07-0.09) | 3.96 | 2.91 | 0.08 (0.07-0.09) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.48 | - | 0.08 (0.07-0.09) | 0.48 | - | 0.08 (0.07-0.09) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 28.78 | 25.5 | 0.08 (0.07-0.09) | 28.78 | 25.5 | 0.08 (0.07-0.09) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.2 | 5.49 | 0.08 (0.07-0.09) | 2.2 | 5.49 | 0.08 (0.07-0.09) |
| Farne Islands | SPA, SSSI | 0.06 | 0 | 0.01 (0.01-0.01) | 0.94 | 0 | 0.08 (0.07-0.09) | 1 | 0.06 | 0.09 (0.08-0.1) |
| Firth of Forth Islands | SPA, SSSI | 0.23 | 0.1 | 0 (0-0) | 7.62 | 3.37 | 0.08 (0.07-0.09) | 7.85 | 3.6 | 0.08 (0.07-0.1) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 3.33 | 1.62 | 0.02 (0.01-0.02) | 25.46 | 12.37 | 0.08 (0.07-0.09) | 28.79 | 15.69 | 0.1 (0.08-0.11) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 5.56 | 10.01 | 0.08 (0.07-0.09) | 5.56 | 10.01 | 0.08 (0.07-0.09) |
| Fowlsheugh | SPA, SSSI | 0.12 | 0.13 | 0 (0-0) | 8.49 | 9.36 | 0.08 (0.07-0.09) | 8.61 | 9.48 | 0.08 (0.07-0.09) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 3.98 | 6.46 | 0.08 (0.07-0.09) | 3.98 | 6.46 | 0.08 (0.07-0.09) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.22 | 0.15 | 0.01 (0-0.01) | 5.09 | 3.52 | 0.08 (0.07-0.09) | 5.32 | 3.74 | 0.09 (0.07-0.1) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 4.2 | 7.75 | 0.08 (0.07-0.09) | 4.2 | 7.75 | 0.08 (0.07-0.09) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.55 | 3.14 | 0.08 (0.07-0.09) | 1.55 | 3.14 | 0.08 (0.07-0.09) |
| TOTAL | | 3.96 | - | 0 | 98.48 | - | 0.08 | 102.44 | - | 0.08 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.58b** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.09 (0.08-0.1) | 0.03 | 0.03 | 0.09 (0.08-0.1) |
| Chausay | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.09 (0.08-0.1) | 0.04 | 0.04 | 0.09 (0.08-0.1) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.06 | 0.06 | 0.09 (0.08-0.1) | 0.06 | 0.06 | 0.09 (0.08-0.1) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.09 (0.08-0.1) | 0.01 | 0.01 | 0.09 (0.08-0.1) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.09 (0.08-0.1) | 0.04 | 0.04 | 0.09 (0.08-0.1) |
| Cape Wrath | SPA | 0 | 0 | 0 | 4.49 | 3.29 | 0.09 (0.08-0.1) | 4.49 | 3.29 | 0.09 (0.08-0.1) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.55 | - | 0.09 (0.08-0.1) | 0.55 | - | 0.09 (0.08-0.1) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 32.6 | 28.89 | 0.09 (0.08-0.1) | 32.6 | 28.89 | 0.09 (0.08-0.1) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.5 | 6.22 | 0.09 (0.08-0.1) | 2.5 | 6.22 | 0.09 (0.08-0.1) |
| Farne Islands | SPA, SSSI | 0.12 | 0 | 0.02 (0.01-0.02) | 1.06 | 0 | 0.09 (0.08-0.1) | 1.19 | 0.12 | 0.11 (0.09-0.12) |
| Firth of Forth Islands | SPA, SSSI | 0.51 | 0.22 | 0.01 (0.01-0.01) | 8.63 | 3.82 | 0.09 (0.08-0.1) | 9.13 | 4.33 | 0.1 (0.09-0.11) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 7.24 | 3.52 | 0.03 (0.03-0.04) | 28.84 | 14.01 | 0.09 (0.08-0.1) | 36.08 | 21.25 | 0.13 (0.11-0.14) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 6.3 | 11.34 | 0.09 (0.08-0.1) | 6.3 | 11.34 | 0.09 (0.08-0.1) |
| Fowlsheugh | SPA, SSSI | 0.26 | 0.29 | 0 (0-0) | 9.62 | 10.6 | 0.09 (0.08-0.1) | 9.88 | 10.87 | 0.09 (0.08-0.11) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 4.51 | 7.31 | 0.09 (0.08-0.1) | 4.51 | 7.31 | 0.09 (0.08-0.1) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.49 | 0.34 | 0.01 (0.01-0.01) | 5.77 | 3.99 | 0.09 (0.08-0.1) | 6.26 | 4.47 | 0.1 (0.09-0.12) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 4.76 | 8.78 | 0.09 (0.08-0.1) | 4.76 | 8.78 | 0.09 (0.08-0.1) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.75 | 3.56 | 0.09 (0.08-0.1) | 1.75 | 3.56 | 0.09 (0.08-0.1) |
| TOTAL | | 8.62 | - | 0.01 | 111.55 | - | 0.09 | 120.17 | - | 0.1 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.58c** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.06 (0.05-0.07) | 0.02 | 0.02 | 0.06 (0.05-0.07) |
| Chausay | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.06 (0.05-0.07) | 0.03 | 0.03 | 0.06 (0.05-0.07) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.06 (0.05-0.07) | 0.04 | 0.04 | 0.06 (0.05-0.07) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.06 (0.05-0.07) | 0.01 | 0.01 | 0.06 (0.05-0.07) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.06 (0.05-0.07) | 0.03 | 0.03 | 0.06 (0.05-0.07) |
| Cape Wrath | SPA | 0 | 0 | 0 | 3.03 | 2.22 | 0.06 (0.05-0.07) | 3.03 | 2.22 | 0.06 (0.05-0.07) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.37 | - | 0.06 (0.05-0.07) | 0.37 | - | 0.06 (0.05-0.07) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 22.01 | 19.51 | 0.06 (0.05-0.07) | 22.01 | 19.51 | 0.06 (0.05-0.07) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.69 | 4.2 | 0.06 (0.05-0.07) | 1.69 | 4.2 | 0.06 (0.05-0.07) |
| Farne Islands | SPA, SSSI | 0.28 | 0 | 0.04 (0.03-0.04) | 0.72 | 0 | 0.06 (0.05-0.07) | 0.99 | 0.28 | 0.1 (0.08-0.11) |
| Firth of Forth Islands | SPA, SSSI | 1.11 | 0.49 | 0.02 (0.01-0.02) | 5.83 | 2.58 | 0.06 (0.05-0.07) | 6.94 | 3.69 | 0.08 (0.07-0.09) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 15.89 | 7.72 | 0.08 (0.06-0.09) | 19.48 | 9.46 | 0.06 (0.05-0.07) | 35.37 | 25.35 | 0.14 (0.11-0.16) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 4.25 | 7.65 | 0.06 (0.05-0.07) | 4.25 | 7.65 | 0.06 (0.05-0.07) |
| Fowlsheugh | SPA, SSSI | 0.58 | 0.64 | 0.01 (0.01-0.01) | 6.49 | 7.16 | 0.06 (0.05-0.07) | 7.07 | 7.74 | 0.07 (0.06-0.08) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 3.04 | 4.94 | 0.06 (0.05-0.07) | 3.04 | 4.94 | 0.06 (0.05-0.07) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.08 | 0.74 | 0.03 (0.02-0.03) | 3.9 | 2.69 | 0.06 (0.05-0.07) | 4.97 | 3.77 | 0.09 (0.07-0.1) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 3.21 | 5.93 | 0.06 (0.05-0.07) | 3.21 | 5.93 | 0.06 (0.05-0.07) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.18 | 2.4 | 0.06 (0.05-0.07) | 1.18 | 2.4 | 0.06 (0.05-0.07) |
| TOTAL | | 18.94 | - | 0.02 | 75.33 | - | 0.06 | 94.27 | - | 0.08 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.58d** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.07 (0.06-0.08) | 0.02 | 0.02 | 0.07 (0.06-0.08) |
| Chausay | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.07 (0.06-0.08) | 0.03 | 0.03 | 0.07 (0.06-0.08) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.07 (0.06-0.08) | 0.05 | 0.05 | 0.07 (0.06-0.08) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.07 (0.06-0.08) | 0.01 | 0.01 | 0.07 (0.06-0.08) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.07 (0.06-0.08) | 0.03 | 0.03 | 0.07 (0.06-0.08) |
| Cape Wrath | SPA | 0 | 0 | 0 | 3.53 | 2.59 | 0.07 (0.06-0.08) | 3.53 | 2.59 | 0.07 (0.06-0.08) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.43 | - | 0.07 (0.06-0.08) | 0.43 | - | 0.07 (0.06-0.08) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 25.62 | 22.71 | 0.07 (0.06-0.08) | 25.62 | 22.71 | 0.07 (0.06-0.08) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.96 | 4.89 | 0.07 (0.06-0.08) | 1.96 | 4.89 | 0.07 (0.06-0.08) |
| Farne Islands | SPA, SSSI | 0.15 | 0 | 0.02 (0.02-0.02) | 0.84 | 0 | 0.07 (0.06-0.08) | 0.99 | 0.15 | 0.09 (0.08-0.11) |
| Firth of Forth Islands | SPA, SSSI | 0.61 | 0.27 | 0.01 (0.01-0.01) | 6.78 | 3 | 0.07 (0.06-0.08) | 7.4 | 3.62 | 0.08 (0.07-0.09) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 8.77 | 4.26 | 0.04 (0.03-0.05) | 22.67 | 11.01 | 0.07 (0.06-0.08) | 31.45 | 19.78 | 0.11 (0.1-0.13) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 4.95 | 8.91 | 0.07 (0.06-0.08) | 4.95 | 8.91 | 0.07 (0.06-0.08) |
| Fowlsheugh | SPA, SSSI | 0.32 | 0.35 | 0 (0-0.01) | 7.56 | 8.34 | 0.07 (0.06-0.08) | 7.88 | 8.65 | 0.08 (0.07-0.09) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 3.54 | 5.75 | 0.07 (0.06-0.08) | 3.54 | 5.75 | 0.07 (0.06-0.08) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.59 | 0.41 | 0.01 (0.01-0.02) | 4.54 | 3.13 | 0.07 (0.06-0.08) | 5.13 | 3.73 | 0.09 (0.07-0.1) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 3.74 | 6.9 | 0.07 (0.06-0.08) | 3.74 | 6.9 | 0.07 (0.06-0.08) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 1.38 | 2.8 | 0.07 (0.06-0.08) | 1.38 | 2.8 | 0.07 (0.06-0.08) |
| TOTAL | | 10.45 | - | 0.01 | 87.68 | - | 0.07 | 98.13 | - | 0.08 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.59a** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.16 (0.14-0.18) | 0.05 | 0.05 | 0.16 (0.14-0.18) |
| Chausay | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.16 (0.14-0.18) | 0.07 | 0.07 | 0.16 (0.14-0.18) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.1 | 0.1 | 0.16 (0.14-0.18) | 0.1 | 0.1 | 0.16 (0.14-0.18) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.16 (0.14-0.18) | 0.02 | 0.02 | 0.16 (0.14-0.18) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0.16 (0.14-0.18) | 0.08 | 0.08 | 0.16 (0.14-0.18) |
| Cape Wrath | SPA | 0 | 0 | 0 | 7.93 | 5.81 | 0.16 (0.14-0.18) | 7.93 | 5.81 | 0.16 (0.14-0.18) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.97 | - | 0.16 (0.14-0.18) | 0.97 | - | 0.16 (0.14-0.18) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 57.55 | 51 | 0.16 (0.14-0.18) | 57.55 | 51 | 0.16 (0.14-0.18) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 4.41 | 10.98 | 0.16 (0.14-0.18) | 4.41 | 10.98 | 0.16 (0.14-0.18) |
| Farne Islands | SPA, SSSI | 0.11 | 0 | 0.01 (0.01-0.02) | 1.88 | 0 | 0.16 (0.14-0.18) | 1.99 | 0.11 | 0.18 (0.15-0.2) |
| Firth of Forth Islands | SPA, SSSI | 0.46 | 0.21 | 0.01 (0.01-0.01) | 15.23 | 6.75 | 0.16 (0.14-0.18) | 15.7 | 7.21 | 0.17 (0.15-0.19) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 6.65 | 3.23 | 0.03 (0.03-0.04) | 50.93 | 24.73 | 0.16 (0.14-0.18) | 57.58 | 31.38 | 0.19 (0.17-0.22) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 11.12 | 20.01 | 0.16 (0.14-0.18) | 11.12 | 20.01 | 0.16 (0.14-0.18) |
| Fowlsheugh | SPA, SSSI | 0.24 | 0.27 | 0 (0-0) | 16.98 | 18.72 | 0.16 (0.14-0.18) | 17.22 | 18.97 | 0.16 (0.14-0.19) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 7.96 | 12.91 | 0.16 (0.14-0.18) | 7.96 | 12.91 | 0.16 (0.14-0.18) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.45 | 0.31 | 0.01 (0.01-0.01) | 10.19 | 7.04 | 0.16 (0.14-0.18) | 10.64 | 7.48 | 0.17 (0.15-0.2) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 8.4 | 15.49 | 0.16 (0.14-0.18) | 8.4 | 15.49 | 0.16 (0.14-0.18) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 3.1 | 6.28 | 0.16 (0.14-0.18) | 3.1 | 6.28 | 0.16 (0.14-0.18) |
| TOTAL | | 7.92 | - | 0.01 | 196.95 | - | 0.16 | 204.87 | - | 0.17 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.59b** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.18 (0.16-0.21) | 0.05 | 0.05 | 0.18 (0.16-0.21) |
| Chausay | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0.18 (0.16-0.21) | 0.08 | 0.08 | 0.18 (0.16-0.21) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.11 | 0.11 | 0.18 (0.16-0.21) | 0.11 | 0.11 | 0.18 (0.16-0.21) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.18 (0.16-0.21) | 0.02 | 0.02 | 0.18 (0.16-0.21) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.09 | 0.09 | 0.18 (0.16-0.21) | 0.09 | 0.09 | 0.18 (0.16-0.21) |
| Cape Wrath | SPA | 0 | 0 | 0 | 8.98 | 6.58 | 0.18 (0.16-0.21) | 8.98 | 6.58 | 0.18 (0.16-0.21) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 1.1 | - | 0.18 (0.16-0.21) | 1.1 | - | 0.18 (0.16-0.21) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 65.2 | 57.77 | 0.18 (0.16-0.21) | 65.2 | 57.77 | 0.18 (0.16-0.21) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 4.99 | 12.43 | 0.18 (0.16-0.21) | 4.99 | 12.43 | 0.18 (0.16-0.21) |
| Farne Islands | SPA, SSSI | 0.25 | 0 | 0.03 (0.03-0.04) | 2.13 | 0 | 0.18 (0.16-0.21) | 2.38 | 0.25 | 0.21 (0.19-0.24) |
| Firth of Forth Islands | SPA, SSSI | 1.01 | 0.45 | 0.02 (0.01-0.02) | 17.26 | 7.64 | 0.18 (0.16-0.21) | 18.27 | 8.65 | 0.2 (0.17-0.23) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 14.48 | 7.03 | 0.07 (0.06-0.08) | 57.69 | 28.01 | 0.18 (0.16-0.21) | 72.17 | 42.5 | 0.25 (0.22-0.29) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 12.6 | 22.67 | 0.18 (0.16-0.21) | 12.6 | 22.67 | 0.18 (0.16-0.21) |
| Fowlsheugh | SPA, SSSI | 0.52 | 0.58 | 0.01 (0.01-0.01) | 19.23 | 21.21 | 0.18 (0.16-0.21) | 19.75 | 21.73 | 0.19 (0.17-0.22) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 9.02 | 14.63 | 0.18 (0.16-0.21) | 9.02 | 14.63 | 0.18 (0.16-0.21) |
| St Abb's Head to Fast Castle | SPA, SSSI | 0.97 | 0.67 | 0.02 (0.02-0.03) | 11.54 | 7.97 | 0.18 (0.16-0.21) | 12.52 | 8.95 | 0.2 (0.18-0.23) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 9.51 | 17.55 | 0.18 (0.16-0.21) | 9.51 | 17.55 | 0.18 (0.16-0.21) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 3.51 | 7.12 | 0.18 (0.16-0.21) | 3.51 | 7.12 | 0.18 (0.16-0.21) |
| TOTAL | | 17.24 | - | 0.02 | 223.1 | - | 0.18 | 240.34 | - | 0.2 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.59c** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.12 (0.11-0.14) | 0.04 | 0.04 | 0.12 (0.11-0.14) |
| Chausay | SPA | 0 | 0 | 0 | 0.05 | 0.05 | 0.12 (0.11-0.14) | 0.05 | 0.05 | 0.12 (0.11-0.14) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.08 | 0.08 | 0.12 (0.11-0.14) | 0.08 | 0.08 | 0.12 (0.11-0.14) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0.12 (0.11-0.14) | 0.01 | 0.01 | 0.12 (0.11-0.14) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.06 | 0.06 | 0.12 (0.11-0.14) | 0.06 | 0.06 | 0.12 (0.11-0.14) |
| Cape Wrath | SPA | 0 | 0 | 0 | 6.06 | 4.44 | 0.12 (0.11-0.14) | 6.06 | 4.44 | 0.12 (0.11-0.14) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.74 | - | 0.12 (0.11-0.14) | 0.74 | - | 0.12 (0.11-0.14) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 44.03 | 39.01 | 0.12 (0.11-0.14) | 44.03 | 39.01 | 0.12 (0.11-0.14) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 3.37 | 8.4 | 0.12 (0.11-0.14) | 3.37 | 8.4 | 0.12 (0.11-0.14) |
| Farne Islands | SPA, SSSI | 0.55 | 0 | 0.07 (0.06-0.09) | 1.44 | 0 | 0.12 (0.11-0.14) | 1.99 | 0.55 | 0.19 (0.16-0.23) |
| Firth of Forth Islands | SPA, SSSI | 2.23 | 0.99 | 0.04 (0.03-0.04) | 11.65 | 5.16 | 0.12 (0.11-0.14) | 13.88 | 7.39 | 0.16 (0.14-0.19) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 31.79 | 15.44 | 0.15 (0.12-0.19) | 38.96 | 18.92 | 0.12 (0.11-0.14) | 70.74 | 50.7 | 0.27 (0.23-0.33) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 8.51 | 15.31 | 0.12 (0.11-0.14) | 8.51 | 15.31 | 0.12 (0.11-0.14) |
| Fowlsheugh | SPA, SSSI | 1.16 | 1.28 | 0.02 (0.01-0.02) | 12.99 | 14.32 | 0.12 (0.11-0.14) | 14.15 | 15.48 | 0.14 (0.12-0.16) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 6.09 | 9.88 | 0.12 (0.11-0.14) | 6.09 | 9.88 | 0.12 (0.11-0.14) |
| St Abb's Head to Fast Castle | SPA, SSSI | 2.15 | 1.49 | 0.05 (0.04-0.06) | 7.79 | 5.38 | 0.12 (0.11-0.14) | 9.95 | 7.53 | 0.17 (0.15-0.21) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 6.42 | 11.85 | 0.12 (0.11-0.14) | 6.42 | 11.85 | 0.12 (0.11-0.14) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 2.37 | 4.81 | 0.12 (0.11-0.14) | 2.37 | 4.81 | 0.12 (0.11-0.14) |
| TOTAL | | 37.88 | - | 0.05 | 150.66 | - | 0.12 | 188.53 | - | 0.15 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.59d** Apportioning to protected sites of the numbers of razorbills estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Cap d'Erquy – Cap Frehel | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.14 (0.12-0.16) | 0.04 | 0.04 | 0.14 (0.12-0.16) |
| Chausay | SPA | 0 | 0 | 0 | 0.06 | 0.06 | 0.14 (0.12-0.16) | 0.06 | 0.06 | 0.14 (0.12-0.16) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.09 | 0.09 | 0.14 (0.12-0.16) | 0.09 | 0.09 | 0.14 (0.12-0.16) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0.14 (0.12-0.16) | 0.02 | 0.02 | 0.14 (0.12-0.16) |
| Seevogelschutzgebiet Helgoland | SPA | 0 | 0 | 0 | 0.07 | 0.07 | 0.14 (0.12-0.16) | 0.07 | 0.07 | 0.14 (0.12-0.16) |
| Cape Wrath | SPA | 0 | 0 | 0 | 7.06 | 5.17 | 0.14 (0.12-0.16) | 7.06 | 5.17 | 0.14 (0.12-0.16) |
| Collieston to Whinnyfold Coast | SSSI | 0 | - | 0 | 0.86 | - | 0.14 (0.12-0.16) | 0.86 | - | 0.14 (0.12-0.16) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 51.25 | 45.41 | 0.14 (0.12-0.16) | 51.25 | 45.41 | 0.14 (0.12-0.16) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 3.93 | 9.77 | 0.14 (0.12-0.16) | 3.93 | 9.77 | 0.14 (0.12-0.16) |
| Farne Islands | SPA, SSSI | 0.3 | 0 | 0.04 (0.03-0.05) | 1.67 | 0 | 0.14 (0.12-0.16) | 1.98 | 0.3 | 0.18 (0.16-0.21) |
| Firth of Forth Islands | SPA, SSSI | 1.23 | 0.54 | 0.02 (0.02-0.02) | 13.56 | 6.01 | 0.14 (0.12-0.16) | 14.79 | 7.23 | 0.16 (0.14-0.19) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 17.55 | 8.52 | 0.08 (0.07-0.1) | 45.34 | 22.02 | 0.14 (0.12-0.16) | 62.89 | 39.57 | 0.23 (0.19-0.26) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 9.9 | 17.82 | 0.14 (0.12-0.16) | 9.9 | 17.82 | 0.14 (0.12-0.16) |
| Fowlsheugh | SPA, SSSI | 0.64 | 0.7 | 0.01 (0.01-0.01) | 15.12 | 16.67 | 0.14 (0.12-0.16) | 15.76 | 17.31 | 0.15 (0.13-0.17) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 7.09 | 11.5 | 0.14 (0.12-0.16) | 7.09 | 11.5 | 0.14 (0.12-0.16) |
| St Abb's Head to Fast Castle | SPA, SSSI | 1.18 | 0.82 | 0.03 (0.02-0.03) | 9.07 | 6.27 | 0.14 (0.12-0.16) | 10.26 | 7.45 | 0.17 (0.15-0.2) |
| Troup, Pennan and Lions Heads | SPA, SSSI | 0 | 0 | 0 | 7.48 | 13.8 | 0.14 (0.12-0.16) | 7.48 | 13.8 | 0.14 (0.12-0.16) |
| West Westray | SPA, SSSI | 0 | 0 | 0 | 2.76 | 5.59 | 0.14 (0.12-0.16) | 2.76 | 5.59 | 0.14 (0.12-0.16) |
| TOTAL | | 20.9 | - | 0.03 | 175.37 | - | 0.14 | 196.27 | - | 0.16 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.60** Apportioning to protected sites of the maximum breeding season numbers of adult razorbills in flight in the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects using the mean of 2010, 2010/11 and 2011/12 data, for the purposes of assessing potential barrier effects.

| Sitename | Designation | Mean between years | |
|---|---|---|---|
| | | Number of adults | % of current population[1] |
| Farne Islands | SPA, SSSI | 3.5 (4.28-4.28) | 0.45 (0.55-0.55) |
| Forth Islands | SPA, SSSI | 13.28 (16.23-16.23) | 0.29 (0.36-0.36) |
| Flamborough Head and Bempton Cliffs | SPA, SSSI | 192.36 (235.12-235.12) | 0.64 (0.79-0.79) |
| Fowlsheugh | SPA, SSSI | 4.71 (5.75-5.75) | 0.08 (0.09-0.09) |
| St Abb's Head to Fast Castle | SPA, SSSI | 13.87 (16.95-16.95) | 0.61 (0.75-0.75) |

[1] Impacts are apportioned based on current populations.
[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of breeding birds during the breeding season may originate from outside the GB suite (see section 4 for details).

**Table A9.61a** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0 (0-0) | 0.02 | 0.02 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.1 | 0.66 | 0 (0-0) | 0.1 | 0.66 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 1.76 | 1.27 | 0 (0-0) | 1.76 | 1.27 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.19 | 0 (0-0) | 0.03 | 0.19 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.81 | 2.56 | 0 (0-0) | 0.81 | 2.56 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 4.1 | 3.87 | 0 (0-0) | 4.1 | 3.87 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 6.93 | 1.56 | 0 (0-0) | 6.93 | 1.56 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.05 | - | 0 (0-0) | 0.05 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.46 | 5.35 | 0 (0-0) | 1.46 | 5.35 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.75 | 6.13 | 0 (0-0) | 1.75 | 6.13 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.05 | 0.39 | 0 (0-0) | 0.05 | 0.39 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.79 | 0.19 | 0 (0-0) | 0.79 | 0.19 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.09 | 0.26 | 0 (0-0) | 0.09 | 0.26 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 3.87 | 5.23 | 0 (0-0) | 3.87 | 5.23 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 21.83 | - | 0 | 21.83 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.61b** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0-0.01) | 0.03 | 0.03 | 0.01 (0-0.01) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0-0.01) | 0 | 0 | 0.01 (0-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.15 | 0.95 | 0.01 (0-0.01) | 0.15 | 0.95 | 0.01 (0-0.01) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 2.54 | 1.83 | 0.01 (0-0.01) | 2.54 | 1.83 | 0.01 (0-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.28 | 0.01 (0-0.01) | 0.04 | 0.28 | 0.01 (0-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.17 | 3.69 | 0.01 (0-0.01) | 1.17 | 3.69 | 0.01 (0-0.01) |
| Farne Islands | SPA | 0 | 0 | 0 | 5.91 | 5.57 | 0.01 (0-0.01) | 5.91 | 5.57 | 0.01 (0-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 9.98 | 2.25 | 0.01 (0-0.01) | 9.98 | 2.25 | 0.01 (0-0.01) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.08 | - | 0.01 (0-0.01) | 0.08 | - | 0.01 (0-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 2.11 | 7.7 | 0.01 (0-0.01) | 2.11 | 7.7 | 0.01 (0-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 2.52 | 8.82 | 0.01 (0-0.01) | 2.52 | 8.82 | 0.01 (0-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.56 | 0.01 (0-0.01) | 0.07 | 0.56 | 0.01 (0-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.13 | 0.28 | 0.01 (0-0.01) | 1.13 | 0.28 | 0.01 (0-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.13 | 0.38 | 0.01 (0-0.01) | 0.13 | 0.38 | 0.01 (0-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 5.57 | 7.53 | 0.01 (0-0.01) | 5.57 | 7.53 | 0.01 (0-0.01) |
| TOTAL | | 0 | - | 0 | 31.43 | - | 0.01 | 31.43 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.61c** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.01 | 0.01 | 0 (0-0) | 0.01 | 0.01 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.04 | 0.25 | 0 (0-0) | 0.04 | 0.25 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 0.66 | 0.48 | 0 (0-0) | 0.66 | 0.48 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.01 | 0.07 | 0 (0-0) | 0.01 | 0.07 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.3 | 0.96 | 0 (0-0) | 0.3 | 0.96 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 1.54 | 1.45 | 0 (0-0) | 1.54 | 1.45 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 2.6 | 0.59 | 0 (0-0) | 2.6 | 0.59 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.02 | - | 0 (0-0) | 0.02 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 0.55 | 2.01 | 0 (0-0) | 0.55 | 2.01 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 0.66 | 2.3 | 0 (0-0) | 0.66 | 2.3 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.15 | 0 (0-0) | 0.02 | 0.15 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.3 | 0.07 | 0 (0-0) | 0.3 | 0.07 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.1 | 0 (0-0) | 0.03 | 0.1 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 1.45 | 1.96 | 0 (0-0) | 1.45 | 1.96 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 8.19 | - | 0 | 8.19 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.61d** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during construction and decommissioning of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0 (0-0) | 0.02 | 0.02 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.09 | 0.56 | 0 (0-0) | 0.09 | 0.56 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 1.5 | 1.08 | 0 (0-0) | 1.5 | 1.08 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.17 | 0 (0-0) | 0.03 | 0.17 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.69 | 2.18 | 0 (0-0) | 0.69 | 2.18 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 3.49 | 3.29 | 0 (0-0) | 3.49 | 3.29 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 5.89 | 1.33 | 0 (0-0) | 5.89 | 1.33 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.05 | - | 0 (0-0) | 0.05 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.24 | 4.55 | 0 (0-0) | 1.24 | 4.55 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.49 | 5.21 | 0 (0-0) | 1.49 | 5.21 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.04 | 0.33 | 0 (0-0) | 0.04 | 0.33 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.67 | 0.17 | 0 (0-0) | 0.67 | 0.17 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.22 | 0 (0-0) | 0.08 | 0.22 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 3.29 | 4.44 | 0 (0-0) | 3.29 | 4.44 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 18.55 | - | 0 | 18.55 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.62a** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010 data.

| Sitename | Designation | 2010 breeders[1] | | % population | 2010 non-breeders[1] | | % population | 2010 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.04 | 0.04 | 0.01 (0.01-0.01) | 0.04 | 0.04 | 0.01 (0.01-0.01) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.21 | 1.31 | 0.01 (0.01-0.01) | 0.21 | 1.31 | 0.01 (0.01-0.01) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 3.52 | 2.54 | 0.01 (0.01-0.01) | 3.52 | 2.54 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.06 | 0.39 | 0.01 (0.01-0.01) | 0.06 | 0.39 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.62 | 5.13 | 0.01 (0.01-0.01) | 1.62 | 5.13 | 0.01 (0.01-0.01) |
| Farne Islands | SPA | 0 | 0 | 0 | 8.21 | 7.74 | 0.01 (0.01-0.01) | 8.21 | 7.74 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 13.86 | 3.12 | 0.01 (0.01-0.01) | 13.86 | 3.12 | 0.01 (0.01-0.01) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.11 | - | 0.01 (0.01-0.01) | 0.11 | - | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 2.93 | 10.7 | 0.01 (0.01-0.01) | 2.93 | 10.7 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 3.5 | 12.26 | 0.01 (0.01-0.01) | 3.5 | 12.26 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.09 | 0.78 | 0.01 (0.01-0.01) | 0.09 | 0.78 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.58 | 0.39 | 0.01 (0.01-0.01) | 1.58 | 0.39 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.18 | 0.52 | 0.01 (0.01-0.01) | 0.18 | 0.52 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 7.74 | 10.45 | 0.01 (0.01-0.01) | 7.74 | 10.45 | 0.01 (0.01-0.01) |
| TOTAL | | 0 | - | 0 | 43.65 | - | 0.01 | 43.65 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.62b** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2010/11 data.

| Sitename | Designation | 2010/11 breeders[1] | | % population | 2010/11 non-breeders[1] | | % population | 2010/11 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.06 | 0.06 | 0.01 (0.01-0.01) | 0.06 | 0.06 | 0.01 (0.01-0.01) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.3 | 1.89 | 0.01 (0.01-0.01) | 0.3 | 1.89 | 0.01 (0.01-0.01) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 5.07 | 3.66 | 0.01 (0.01-0.01) | 5.07 | 3.66 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.09 | 0.56 | 0.01 (0.01-0.01) | 0.09 | 0.56 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 2.34 | 7.38 | 0.01 (0.01-0.01) | 2.34 | 7.38 | 0.01 (0.01-0.01) |
| Farne Islands | SPA | 0 | 0 | 0 | 11.82 | 11.14 | 0.01 (0.01-0.01) | 11.82 | 11.14 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 19.95 | 4.49 | 0.01 (0.01-0.01) | 19.95 | 4.49 | 0.01 (0.01-0.01) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.16 | - | 0.01 (0.01-0.01) | 0.16 | - | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 4.22 | 15.4 | 0.01 (0.01-0.01) | 4.22 | 15.4 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 5.05 | 17.65 | 0.01 (0.01-0.01) | 5.05 | 17.65 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.13 | 1.12 | 0.01 (0.01-0.01) | 0.13 | 1.12 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 2.27 | 0.56 | 0.01 (0.01-0.01) | 2.27 | 0.56 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.26 | 0.75 | 0.01 (0.01-0.01) | 0.26 | 0.75 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 11.15 | 15.05 | 0.01 (0.01-0.01) | 11.15 | 15.05 | 0.01 (0.01-0.01) |
| TOTAL | | 0 | - | 0 | 62.86 | - | 0.01 | 62.86 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.62c** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using 2011/12 data.

| Sitename | Designation | 2011/12 breeders[1] | | % population | 2011/12 non-breeders[1] | | % population | 2011/12 total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.02 | 0.02 | 0 (0-0) | 0.02 | 0.02 | 0 (0-0) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0 (0-0) | 0 | 0 | 0 (0-0) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.08 | 0.49 | 0 (0-0) | 0.08 | 0.49 | 0 (0-0) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 1.32 | 0.95 | 0 (0-0) | 1.32 | 0.95 | 0 (0-0) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.02 | 0.15 | 0 (0-0) | 0.02 | 0.15 | 0 (0-0) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 0.61 | 1.92 | 0 (0-0) | 0.61 | 1.92 | 0 (0-0) |
| Farne Islands | SPA | 0 | 0 | 0 | 3.08 | 2.9 | 0 (0-0) | 3.08 | 2.9 | 0 (0-0) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 5.2 | 1.17 | 0 (0-0) | 5.2 | 1.17 | 0 (0-0) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.04 | - | 0 (0-0) | 0.04 | - | 0 (0-0) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 1.1 | 4.01 | 0 (0-0) | 1.1 | 4.01 | 0 (0-0) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 1.31 | 4.6 | 0 (0-0) | 1.31 | 4.6 | 0 (0-0) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.03 | 0.29 | 0 (0-0) | 0.03 | 0.29 | 0 (0-0) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.59 | 0.15 | 0 (0-0) | 0.59 | 0.15 | 0 (0-0) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.07 | 0.2 | 0 (0-0) | 0.07 | 0.2 | 0 (0-0) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 2.9 | 3.92 | 0 (0-0) | 2.9 | 3.92 | 0 (0-0) |
| TOTAL | | 0 | - | 0 | 16.38 | - | 0 | 16.38 | - | 0 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**Table A9.62d** Apportioning to protected sites of the numbers of Atlantic puffins estimated to be displaced and killed from disturbance during operation of the proposed Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects, using mean data.

| Sitename | Designation | Mean breeders[1] | | % population | Mean non-breeders[1] | | % population | Mean total[1] | | % population |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Citation | | Current | Citation | | Current | Citation | |
| Baie de Morlaix | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cote de Granit Rose-Sept Iles | SPA | 0 | 0 | 0 | 0.03 | 0.03 | 0.01 (0.01-0.01) | 0.03 | 0.03 | 0.01 (0.01-0.01) |
| Ouessant-Molene | SPA | 0 | 0 | 0 | 0 | 0 | 0.01 (0.01-0.01) | 0 | 0 | 0.01 (0.01-0.01) |
| Cape Wrath | SPA | 0 | 0 | 0 | 0.18 | 1.12 | 0.01 (0.01-0.01) | 0.18 | 1.12 | 0.01 (0.01-0.01) |
| Coquet Island | SPA, SSSI | 0 | 0 | 0 | 3 | 2.16 | 0.01 (0.01-0.01) | 3 | 2.16 | 0.01 (0.01-0.01) |
| East Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 0.05 | 0.33 | 0.01 (0.01-0.01) | 0.05 | 0.33 | 0.01 (0.01-0.01) |
| Fair Isle | SPA, SSSI | 0 | 0 | 0 | 1.38 | 4.36 | 0.01 (0.01-0.01) | 1.38 | 4.36 | 0.01 (0.01-0.01) |
| Farne Islands | SPA | 0 | 0 | 0 | 6.98 | 6.57 | 0.01 (0.01-0.01) | 6.98 | 6.57 | 0.01 (0.01-0.01) |
| Firth of Forth Islands | SPA, SSSI | 0 | 0 | 0 | 11.78 | 2.65 | 0.01 (0.01-0.01) | 11.78 | 2.65 | 0.01 (0.01-0.01) |
| Flamborough Head | SSSI | 0 | - | 0 | 0.09 | - | 0.01 (0.01-0.01) | 0.09 | - | 0.01 (0.01-0.01) |
| Foula | SPA, SSSI | 0 | 0 | 0 | 2.49 | 9.09 | 0.01 (0.01-0.01) | 2.49 | 9.09 | 0.01 (0.01-0.01) |
| Hermaness, Saxa Vord and Valla Field | SPA, SSSI | 0 | 0 | 0 | 2.98 | 10.42 | 0.01 (0.01-0.01) | 2.98 | 10.42 | 0.01 (0.01-0.01) |
| Hoy | SPA, SSSI | 0 | 0 | 0 | 0.08 | 0.66 | 0.01 (0.01-0.01) | 0.08 | 0.66 | 0.01 (0.01-0.01) |
| North Caithness Cliffs | SPA, SSSI | 0 | 0 | 0 | 1.34 | 0.33 | 0.01 (0.01-0.01) | 1.34 | 0.33 | 0.01 (0.01-0.01) |
| Noss | SPA, SSSI | 0 | 0 | 0 | 0.15 | 0.44 | 0.01 (0.01-0.01) | 0.15 | 0.44 | 0.01 (0.01-0.01) |
| Sule Skerry and Sule Stack | SPA | 0 | 0 | 0 | 6.58 | 8.88 | 0.01 (0.01-0.01) | 6.58 | 8.88 | 0.01 (0.01-0.01) |
| TOTAL | | 0 | - | 0 | 37.1 | - | 0.01 | 37.1 | - | 0.01 |

[1] Impacts are apportioned based on current populations. For context, percentages of populations predicted to be impacted are also applied to citations.

[2] The apportioning of impacts to protected sites follows guidance from JNCC/NE to reflect that a proportion of non-breeding birds during the winter, and non-breeding and breeding birds during the breeding season, may originate from outside the GB suite (see section 4 for details).

[3] Apportioning of impacts also accounts for a potential proportion of the population that may have been diving underwater and thus missed during at-sea surveys.

**APPENDIX 10 Predicted impacts of displacement, for each project and species, based on a range of displacement and mortality rates**

**Dogger Bank Teesside A**
**Dogger Bank Teesside B**
**Dogger Bank Teesside A and B**
**Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D**

A10.1. This appendix gives full matrices for a range of different displacement and mortality rates. Rates used within the assessment are based on species-specific sensitivies (see section 4). The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in a shaded range of green, with dark green suggested as most likely (Furness 2013), with chosen final rates for the assessment indicated by a dark border. Note that while mortality following displacement for auks was suggested as nearer zero for individual projects (Furness 2013), a realistic precautionary rate of 5% is applied (see section 4 for more details). For gannet, mortality following displacement is only considered as greater than zero (5%) for the cumulative level (see section 4).

A10.2. Tables are presented per species for each project – these tables encompasses both displacement (and mortality) for the project area, and a surrounding 2 km buffer summed together giving a total displacement for the project footprint – separate Excel files are available with project and buffers split into separate tables. Different displacement rates are applied for two buffers within the 0-2 km band around the wind farm, one for 0-1 km and one for 1-2 km. Within the 0-1km buffer, a displacement rate of 75% that of the the wind farm is used; for the 1-2km buffer, a displacement rate of 25% that of the wind farm is used (average rate of 50% of the displacement rate for the wind farm over 0-2km). Mortality rates are the same within project and buffer areas.

**Dogger Bank Teesside A [top]**

**Table A10.1a** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 1 (1-1) | 1 (1-1) | 2 (2-3) | 4 (3-4) | 5 (4-6) | 6 (5-7) | 7 (6-9) | 8 (7-10) | 9 (8-11) | 11 (9-13) | 12 (10-14) |
| **20** | 0 | 1 (1-1) | 2 (2-3) | 5 (4-6) | 7 (6-9) | 9 (8-11) | 12 (10-14) | 14 (12-17) | 17 (14-20) | 19 (16-23) | 21 (18-26) | 24 (20-29) |
| **25** | 0 | 1 (1-2) | 3 (3-4) | 6 (5-7) | 9 (8-11) | 12 (10-14) | 15 (13-18) | 18 (15-21) | 21 (18-25) | 24 (20-29) | 27 (23-32) | 30 (25-36) |
| **30** | 0 | 2 (2-2) | 4 (3-4) | 7 (6-9) | 11 (9-13) | 14 (12-17) | 18 (15-21) | 21 (18-26) | 25 (21-30) | 28 (24-34) | 32 (27-39) | 36 (30-43) |
| **40** | 0 | 2 (2-3) | 5 (4-6) | 9 (8-11) | 14 (12-17) | 19 (16-23) | 24 (20-29) | 28 (24-34) | 33 (28-40) | 38 (32-46) | 43 (36-51) | 47 (40-57) |
| **50** | 0 | 3 (3-4) | 6 (5-7) | 12 (10-14) | 18 (15-21) | 24 (20-29) | 30 (25-36) | 36 (30-43) | 42 (35-50) | 47 (40-57) | 53 (45-64) | 59 (50-71) |
| **60** | 0 | 4 (3-4) | 7 (6-9) | 14 (12-17) | 21 (18-26) | 28 (24-34) | 36 (30-43) | 43 (36-51) | 50 (42-60) | 57 (48-69) | 64 (54-77) | 71 (60-86) |
| **70** | 0 | 4 (4-5) | 8 (7-10) | 17 (14-20) | 25 (21-30) | 33 (28-40) | 42 (35-50) | 50 (42-60) | 58 (49-70) | 66 (56-80) | 75 (63-90) | 83 (70-100) |
| **75** | 0 | 4 (4-5) | 9 (8-11) | 18 (15-21) | 27 (23-32) | 36 (30-43) | 45 (38-54) | 53 (45-64) | 62 (53-75) | 71 (60-86) | 80 (68-96) | 89 (75-107) |
| **80** | 0 | 5 (4-6) | 9 (8-11) | 19 (16-23) | 28 (24-34) | 38 (32-46) | 47 (40-57) | 57 (48-69) | 66 (56-80) | 76 (64-91) | 85 (72-103) | 95 (80-114) |
| **90** | 0 | 5 (5-6) | 11 (9-13) | 21 (18-26) | 32 (27-39) | 43 (36-51) | 53 (45-64) | 64 (54-77) | 75 (63-90) | 85 (72-103) | 96 (81-116) | 107 (90-128) |
| **100** | 0 | 6 (5-7) | 12 (10-14) | 24 (20-29) | 36 (30-43) | 47 (40-57) | 59 (50-71) | 71 (60-86) | 83 (70-100) | 95 (80-114) | 107 (90-128) | 119 (101-143) |

**Table A10.1b** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 2 (1-2) | 4 (3-4) | 7 (6-8) | 11 (9-13) | 14 (12-17) | 18 (15-21) | 21 (18-25) | 25 (21-29) | 28 (24-34) | 32 (27-38) | 35 (30-42) |
| 20 | 0 | 4 (3-4) | 7 (6-8) | 14 (12-17) | 21 (18-25) | 28 (24-34) | 35 (30-42) | 42 (36-50) | 49 (41-59) | 56 (47-67) | 63 (53-75) | 70 (59-84) |
| 25 | 0 | 4 (4-5) | 9 (7-10) | 18 (15-21) | 26 (22-31) | 35 (30-42) | 44 (37-52) | 53 (44-63) | 61 (52-73) | 70 (59-84) | 79 (67-94) | 88 (74-105) |
| 30 | 0 | 5 (4-6) | 11 (9-13) | 21 (18-25) | 32 (27-38) | 42 (36-50) | 53 (44-63) | 63 (53-75) | 74 (62-88) | 84 (71-101) | 95 (80-113) | 105 (89-126) |
| 40 | 0 | 7 (6-8) | 14 (12-17) | 28 (24-34) | 42 (36-50) | 56 (47-67) | 70 (59-84) | 84 (71-101) | 98 (83-117) | 112 (95-134) | 126 (107-151) | 140 (119-168) |
| 50 | 0 | 9 (7-10) | 18 (15-21) | 35 (30-42) | 53 (44-63) | 70 (59-84) | 88 (74-105) | 105 (89-126) | 123 (104-147) | 140 (119-168) | 158 (133-189) | 175 (148-210) |
| 60 | 0 | 11 (9-13) | 21 (18-25) | 42 (36-50) | 63 (53-75) | 84 (71-101) | 105 (89-126) | 126 (107-151) | 147 (124-176) | 168 (142-201) | 189 (160-226) | 210 (178-252) |
| 70 | 0 | 12 (10-15) | 25 (21-29) | 49 (41-59) | 74 (62-88) | 98 (83-117) | 123 (104-147) | 147 (124-176) | 172 (145-205) | 196 (166-235) | 221 (187-264) | 245 (207-294) |
| 75 | 0 | 13 (11-16) | 26 (22-31) | 53 (44-63) | 79 (67-94) | 105 (89-126) | 131 (111-157) | 158 (133-189) | 184 (156-220) | 210 (178-252) | 236 (200-283) | 263 (222-315) |
| 80 | 0 | 14 (12-17) | 28 (24-34) | 56 (47-67) | 84 (71-101) | 112 (95-134) | 140 (119-168) | 168 (142-201) | 196 (166-235) | 224 (190-268) | 252 (213-302) | 280 (237-335) |
| 90 | 0 | 16 (13-19) | 32 (27-38) | 63 (53-75) | 95 (80-113) | 126 (107-151) | 158 (133-189) | 189 (160-226) | 221 (187-264) | 252 (213-302) | 284 (240-340) | 315 (267-377) |
| 100 | 0 | 18 (15-21) | 35 (30-42) | 70 (59-84) | 105 (89-126) | 140 (119-168) | 175 (148-210) | 210 (178-252) | 245 (207-294) | 280 (237-335) | 315 (267-377) | 350 (296-419) |

**Table A10.1c** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 4 (3-4) | 7 (6-9) | 14 (12-17) | 21 (18-26) | 28 (24-34) | 36 (30-43) | 43 (36-51) | 50 (42-60) | 57 (47-69) | 64 (53-77) | 71 (59-86) |
| 20 | 0 | 7 (6-9) | 14 (12-17) | 28 (24-34) | 43 (36-51) | 57 (47-69) | 71 (59-86) | 85 (71-103) | 99 (83-120) | 114 (95-137) | 128 (107-154) | 142 (119-171) |
| 25 | 0 | 9 (7-11) | 18 (15-21) | 36 (30-43) | 53 (44-64) | 71 (59-86) | 89 (74-107) | 107 (89-128) | 124 (104-150) | 142 (119-171) | 160 (133-193) | 178 (148-214) |
| 30 | 0 | 11 (9-13) | 21 (18-26) | 43 (36-51) | 64 (53-77) | 85 (71-103) | 107 (89-128) | 128 (107-154) | 149 (125-180) | 170 (142-206) | 192 (160-231) | 213 (178-257) |
| 40 | 0 | 14 (12-17) | 28 (24-34) | 57 (47-69) | 85 (71-103) | 114 (95-137) | 142 (119-171) | 170 (142-206) | 199 (166-240) | 227 (190-274) | 256 (214-308) | 284 (237-343) |
| 50 | 0 | 18 (15-21) | 36 (30-43) | 71 (59-86) | 107 (89-128) | 142 (119-171) | 178 (148-214) | 213 (178-257) | 249 (208-300) | 284 (237-343) | 320 (267-385) | 355 (297-428) |
| 60 | 0 | 21 (18-26) | 43 (36-51) | 85 (71-103) | 128 (107-154) | 170 (142-206) | 213 (178-257) | 256 (214-308) | 298 (249-360) | 341 (285-411) | 383 (320-463) | 426 (356-514) |
| 70 | 0 | 25 (21-30) | 50 (42-60) | 99 (83-120) | 149 (125-180) | 199 (166-240) | 249 (208-300) | 298 (249-360) | 348 (291-420) | 398 (332-480) | 447 (374-540) | 497 (415-600) |
| 75 | 0 | 27 (22-32) | 53 (44-64) | 107 (89-128) | 160 (133-193) | 213 (178-257) | 266 (222-321) | 320 (267-385) | 373 (311-450) | 426 (356-514) | 479 (400-578) | 533 (445-642) |
| 80 | 0 | 28 (24-34) | 57 (47-69) | 114 (95-137) | 170 (142-206) | 227 (190-274) | 284 (237-343) | 341 (285-411) | 398 (332-480) | 455 (380-548) | 511 (427-617) | 568 (475-685) |
| 90 | 0 | 32 (27-39) | 64 (53-77) | 128 (107-154) | 192 (160-231) | 256 (214-308) | 320 (267-385) | 383 (320-463) | 447 (374-540) | 511 (427-617) | 575 (481-694) | 639 (534-771) |
| 100 | 0 | 36 (30-43) | 71 (59-86) | 142 (119-171) | 213 (178-257) | 284 (237-343) | 355 (297-428) | 426 (356-514) | 497 (415-600) | 568 (475-685) | 639 (534-771) | 710 (593-857) |

**Table A10.1d** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 2 (2-2) | 4 (3-5) | 8 (7-10) | 12 (10-15) | 17 (14-20) | 21 (17-25) | 25 (21-30) | 29 (24-35) | 33 (28-40) | 37 (31-45) | 41 (35-50) |
| **20** | 0 | 4 (3-5) | 8 (7-10) | 17 (14-20) | 25 (21-30) | 33 (28-40) | 41 (35-50) | 50 (42-60) | 58 (49-70) | 66 (56-80) | 74 (63-90) | 83 (69-99) |
| **25** | 0 | 5 (4-6) | 10 (9-12) | 21 (17-25) | 31 (26-37) | 41 (35-50) | 52 (43-62) | 62 (52-75) | 72 (61-87) | 83 (69-99) | 93 (78-112) | 103 (87-124) |
| **30** | 0 | 6 (5-7) | 12 (10-15) | 25 (21-30) | 37 (31-45) | 50 (42-60) | 62 (52-75) | 74 (63-90) | 87 (73-104) | 99 (83-119) | 112 (94-134) | 124 (104-149) |
| **40** | 0 | 8 (7-10) | 17 (14-20) | 33 (28-40) | 50 (42-60) | 66 (56-80) | 83 (69-99) | 99 (83-119) | 116 (97-139) | 132 (111-159) | 149 (125-179) | 165 (139-199) |
| **50** | 0 | 10 (9-12) | 21 (17-25) | 41 (35-50) | 62 (52-75) | 83 (69-99) | 103 (87-124) | 124 (104-149) | 145 (122-174) | 165 (139-199) | 186 (156-224) | 207 (174-249) |
| **60** | 0 | 12 (10-15) | 25 (21-30) | 50 (42-60) | 74 (63-90) | 99 (83-119) | 124 (104-149) | 149 (125-179) | 174 (146-209) | 198 (167-239) | 223 (188-269) | 248 (208-298) |
| **70** | 0 | 14 (12-17) | 29 (24-35) | 58 (49-70) | 87 (73-104) | 116 (97-139) | 145 (122-174) | 174 (146-209) | 203 (170-244) | 231 (194-279) | 260 (219-313) | 289 (243-348) |
| **75** | 0 | 15 (13-19) | 31 (26-37) | 62 (52-75) | 93 (78-112) | 124 (104-149) | 155 (130-187) | 186 (156-224) | 217 (182-261) | 248 (208-298) | 279 (234-336) | 310 (260-373) |
| **80** | 0 | 17 (14-20) | 33 (28-40) | 66 (56-80) | 99 (83-119) | 132 (111-159) | 165 (139-199) | 198 (167-239) | 231 (194-279) | 265 (222-318) | 298 (250-358) | 331 (278-398) |
| **90** | 0 | 19 (16-22) | 37 (31-45) | 74 (63-90) | 112 (94-134) | 149 (125-179) | 186 (156-224) | 223 (188-269) | 260 (219-313) | 298 (250-358) | 335 (281-403) | 372 (313-448) |
| **100** | 0 | 21 (17-25) | 41 (35-50) | 83 (69-99) | 124 (104-149) | 165 (139-199) | 207 (174-249) | 248 (208-298) | 289 (243-348) | 331 (278-398) | 372 (313-448) | 413 (347-497) |

**Table A10.2a** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 20 (18-21) | 39 (36-43) | 79 (72-85) | 118 (109-128) | 157 (145-171) | 196 (181-214) | 236 (217-256) | 275 (253-299) | 314 (290-342) | 353 (326-384) | 393 (362-427) |
| **20** | 0 | 39 (36-43) | 79 (72-85) | 157 (145-171) | 236 (217-256) | 314 (290-342) | 393 (362-427) | 471 (434-513) | 550 (507-598) | 628 (579-684) | 707 (651-769) | 785 (724-854) |
| **25** | 0 | 49 (45-53) | 98 (90-107) | 196 (181-214) | 294 (271-320) | 393 (362-427) | 491 (452-534) | 589 (543-641) | 687 (633-748) | 785 (724-854) | 883 (814-961) | 982 (905-1068) |
| **30** | 0 | 59 (54-64) | 118 (109-128) | 236 (217-256) | 353 (326-384) | 471 (434-513) | 589 (543-641) | 707 (651-769) | 825 (760-897) | 942 (869-1025) | 1060 (977-1153) | 1178 (1086-1282) |
| **40** | 0 | 79 (72-85) | 157 (145-171) | 314 (290-342) | 471 (434-513) | 628 (579-684) | 785 (724-854) | 942 (869-1025) | 1099 (1013-1196) | 1256 (1158-1367) | 1413 (1303-1538) | 1570 (1448-1709) |
| **50** | 0 | 98 (90-107) | 196 (181-214) | 393 (362-427) | 589 (543-641) | 785 (724-854) | 982 (905-1068) | 1178 (1086-1282) | 1374 (1267-1495) | 1570 (1448-1709) | 1767 (1629-1922) | 1963 (1809-2136) |
| **60** | 0 | 118 (109-128) | 236 (217-256) | 471 (434-513) | 707 (651-769) | 942 (869-1025) | 1178 (1086-1282) | 1413 (1303-1538) | 1649 (1520-1794) | 1885 (1737-2051) | 2120 (1954-2307) | 2356 (2171-2563) |
| **70** | 0 | 137 (127-150) | 275 (253-299) | 550 (507-598) | 825 (760-897) | 1099 (1013-1196) | 1374 (1267-1495) | 1649 (1520-1794) | 1924 (1773-2093) | 2199 (2027-2392) | 2474 (2280-2691) | 2748 (2533-2990) |
| **75** | 0 | 147 (136-160) | 294 (271-320) | 589 (543-641) | 883 (814-961) | 1178 (1086-1282) | 1472 (1357-1602) | 1767 (1629-1922) | 2061 (1900-2243) | 2356 (2171-2563) | 2650 (2443-2884) | 2945 (2714-3204) |
| **80** | 0 | 157 (145-171) | 314 (290-342) | 628 (579-684) | 942 (869-1025) | 1256 (1158-1367) | 1570 (1448-1709) | 1885 (1737-2051) | 2199 (2027-2392) | 2513 (2316-2734) | 2827 (2606-3076) | 3141 (2895-3418) |
| **90** | 0 | 177 (163-192) | 353 (326-384) | 707 (651-769) | 1060 (977-1153) | 1413 (1303-1538) | 1767 (1629-1922) | 2120 (1954-2307) | 2474 (2280-2691) | 2827 (2606-3076) | 3180 (2931-3460) | 3534 (3257-3845) |
| **100** | 0 | 196 (181-214) | 393 (362-427) | 785 (724-854) | 1178 (1086-1282) | 1570 (1448-1709) | 1963 (1809-2136) | 2356 (2171-2563) | 2748 (2533-2990) | 3141 (2895-3418) | 3534 (3257-3845) | 3926 (3619-4272) |

**Table A10.2b** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 26 (25-29) | 53 (49-57) | 106 (98-115) | 159 (147-172) | 212 (196-230) | 265 (245-287) | 317 (294-345) | 370 (343-402) | 423 (392-460) | 476 (441-517) | 529 (490-575) |
| **20** | 0 | 53 (49-57) | 106 (98-115) | 212 (196-230) | 317 (294-345) | 423 (392-460) | 529 (490-575) | 635 (588-689) | 741 (686-804) | 847 (784-919) | 952 (882-1034) | 1058 (980-1149) |
| **25** | 0 | 66 (61-72) | 132 (123-144) | 265 (245-287) | 397 (368-431) | 529 (490-575) | 661 (613-718) | 794 (735-862) | 926 (858-1005) | 1058 (980-1149) | 1191 (1103-1293) | 1323 (1225-1436) |
| **30** | 0 | 79 (74-86) | 159 (147-172) | 317 (294-345) | 476 (441-517) | 635 (588-689) | 794 (735-862) | 952 (882-1034) | 1111 (1029-1207) | 1270 (1176-1379) | 1429 (1323-1551) | 1587 (1470-1724) |
| **40** | 0 | 106 (98-115) | 212 (196-230) | 423 (392-460) | 635 (588-689) | 847 (784-919) | 1058 (980-1149) | 1270 (1176-1379) | 1482 (1372-1609) | 1693 (1568-1838) | 1905 (1764-2068) | 2117 (1960-2298) |
| **50** | 0 | 132 (123-144) | 265 (245-287) | 529 (490-575) | 794 (735-862) | 1058 (980-1149) | 1323 (1225-1436) | 1587 (1470-1724) | 1852 (1715-2011) | 2117 (1960-2298) | 2381 (2205-2585) | 2646 (2450-2873) |
| **60** | 0 | 159 (147-172) | 317 (294-345) | 635 (588-689) | 952 (882-1034) | 1270 (1176-1379) | 1587 (1470-1724) | 1905 (1764-2068) | 2222 (2058-2413) | 2540 (2352-2758) | 2857 (2646-3102) | 3175 (2940-3447) |
| **70** | 0 | 185 (172-201) | 370 (343-402) | 741 (686-804) | 1111 (1029-1207) | 1482 (1372-1609) | 1852 (1715-2011) | 2222 (2058-2413) | 2593 (2401-2815) | 2963 (2744-3217) | 3333 (3087-3620) | 3704 (3430-4022) |
| **75** | 0 | 198 (184-215) | 397 (368-431) | 794 (735-862) | 1191 (1103-1293) | 1587 (1470-1724) | 1984 (1838-2154) | 2381 (2205-2585) | 2778 (2573-3016) | 3175 (2940-3447) | 3572 (3308-3878) | 3968 (3675-4309) |
| **80** | 0 | 212 (196-230) | 423 (392-460) | 847 (784-919) | 1270 (1176-1379) | 1693 (1568-1838) | 2117 (1960-2298) | 2540 (2352-2758) | 2963 (2744-3217) | 3386 (3136-3677) | 3810 (3528-4137) | 4233 (3920-4596) |
| **90** | 0 | 238 (221-259) | 476 (441-517) | 952 (882-1034) | 1429 (1323-1551) | 1905 (1764-2068) | 2381 (2205-2585) | 2857 (2646-3102) | 3333 (3087-3620) | 3810 (3528-4137) | 4286 (3969-4654) | 4762 (4410-5171) |
| **100** | 0 | 265 (245-287) | 529 (490-575) | 1058 (980-1149) | 1587 (1470-1724) | 2117 (1960-2298) | 2646 (2450-2873) | 3175 (2940-3447) | 3704 (3430-4022) | 4233 (3920-4596) | 4762 (4410-5171) | 5291 (4900-5745) |

**Table A10.2c** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 19 (17-21) | 38 (35-42) | 76 (70-83) | 114 (104-125) | 152 (139-166) | 190 (174-208) | 229 (209-249) | 267 (243-291) | 305 (278-332) | 343 (313-374) | 381 (348-415) |
| **20** | 0 | 38 (35-42) | 76 (70-83) | 152 (139-166) | 229 (209-249) | 305 (278-332) | 381 (348-415) | 457 (417-498) | 533 (487-581) | 609 (556-664) | 686 (626-747) | 762 (696-830) |
| **25** | 0 | 48 (43-52) | 95 (87-104) | 190 (174-208) | 286 (261-311) | 381 (348-415) | 476 (435-519) | 571 (522-623) | 667 (609-727) | 762 (696-830) | 857 (783-934) | 952 (869-1038) |
| **30** | 0 | 57 (52-62) | 114 (104-125) | 229 (209-249) | 343 (313-374) | 457 (417-498) | 571 (522-623) | 686 (626-747) | 800 (730-872) | 914 (835-996) | 1028 (939-1121) | 1143 (1043-1246) |
| **40** | 0 | 76 (70-83) | 152 (139-166) | 305 (278-332) | 457 (417-498) | 609 (556-664) | 762 (696-830) | 914 (835-996) | 1067 (974-1163) | 1219 (1113-1329) | 1371 (1252-1495) | 1524 (1391-1661) |
| **50** | 0 | 95 (87-104) | 190 (174-208) | 381 (348-415) | 571 (522-623) | 762 (696-830) | 952 (869-1038) | 1143 (1043-1246) | 1333 (1217-1453) | 1524 (1391-1661) | 1714 (1565-1868) | 1905 (1739-2076) |
| **60** | 0 | 114 (104-125) | 229 (209-249) | 457 (417-498) | 686 (626-747) | 914 (835-996) | 1143 (1043-1246) | 1371 (1252-1495) | 1600 (1461-1744) | 1828 (1669-1993) | 2057 (1878-2242) | 2286 (2087-2491) |
| **70** | 0 | 133 (122-145) | 267 (243-291) | 533 (487-581) | 800 (730-872) | 1067 (974-1163) | 1333 (1217-1453) | 1600 (1461-1744) | 1866 (1704-2034) | 2133 (1948-2325) | 2400 (2191-2616) | 2666 (2435-2906) |
| **75** | 0 | 143 (130-156) | 286 (261-311) | 571 (522-623) | 857 (783-934) | 1143 (1043-1246) | 1428 (1304-1557) | 1714 (1565-1868) | 2000 (1826-2180) | 2286 (2087-2491) | 2571 (2348-2803) | 2857 (2608-3114) |
| **80** | 0 | 152 (139-166) | 305 (278-332) | 609 (556-664) | 914 (835-996) | 1219 (1113-1329) | 1524 (1391-1661) | 1828 (1669-1993) | 2133 (1948-2325) | 2438 (2226-2657) | 2743 (2504-2989) | 3047 (2782-3322) |
| **90** | 0 | 171 (157-187) | 343 (313-374) | 686 (626-747) | 1028 (939-1121) | 1371 (1252-1495) | 1714 (1565-1868) | 2057 (1878-2242) | 2400 (2191-2616) | 2743 (2504-2989) | 3085 (2817-3363) | 3428 (3130-3737) |
| **100** | 0 | 190 (174-208) | 381 (348-415) | 762 (696-830) | 1143 (1043-1246) | 1524 (1391-1661) | 1905 (1739-2076) | 2286 (2087-2491) | 2666 (2435-2906) | 3047 (2782-3322) | 3428 (3130-3737) | 3809 (3478-4152) |

**Table A10.2d** Predicted impacts of displacement, for great common guillemot for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 21 (19-22) | 41 (38-45) | 83 (76-90) | 124 (114-135) | 165 (152-180) | 207 (190-225) | 248 (228-270) | 290 (267-315) | 331 (305-360) | 372 (343-405) | 414 (381-450) |
| **20** | 0 | 41 (38-45) | 83 (76-90) | 165 (152-180) | 248 (228-270) | 331 (305-360) | 414 (381-450) | 496 (457-540) | 579 (533-630) | 662 (609-720) | 745 (685-810) | 827 (762-900) |
| **25** | 0 | 52 (48-56) | 103 (95-112) | 207 (190-225) | 310 (286-337) | 414 (381-450) | 517 (476-562) | 620 (571-675) | 724 (666-787) | 827 (762-900) | 931 (857-1012) | 1034 (952-1125) |
| **30** | 0 | 62 (57-67) | 124 (114-135) | 248 (228-270) | 372 (343-405) | 496 (457-540) | 620 (571-675) | 745 (685-810) | 869 (800-945) | 993 (914-1080) | 1117 (1028-1215) | 1241 (1142-1350) |
| **40** | 0 | 83 (76-90) | 165 (152-180) | 331 (305-360) | 496 (457-540) | 662 (609-720) | 827 (762-900) | 993 (914-1080) | 1158 (1066-1260) | 1324 (1219-1440) | 1489 (1371-1620) | 1654 (1523-1800) |
| **50** | 0 | 103 (95-112) | 207 (190-225) | 414 (381-450) | 620 (571-675) | 827 (762-900) | 1034 (952-1125) | 1241 (1142-1350) | 1448 (1333-1575) | 1654 (1523-1800) | 1861 (1714-2025) | 2068 (1904-2250) |
| **60** | 0 | 124 (114-135) | 248 (228-270) | 496 (457-540) | 745 (685-810) | 993 (914-1080) | 1241 (1142-1350) | 1489 (1371-1620) | 1737 (1599-1890) | 1985 (1828-2160) | 2234 (2056-2430) | 2482 (2285-2700) |
| **70** | 0 | 145 (133-157) | 290 (267-315) | 579 (533-630) | 869 (800-945) | 1158 (1066-1260) | 1448 (1333-1575) | 1737 (1599-1890) | 2027 (1866-2205) | 2316 (2133-2520) | 2606 (2399-2835) | 2895 (2666-3150) |
| **75** | 0 | 155 (143-169) | 310 (286-337) | 620 (571-675) | 931 (857-1012) | 1241 (1142-1350) | 1551 (1428-1687) | 1861 (1714-2025) | 2171 (1999-2362) | 2482 (2285-2700) | 2792 (2571-3037) | 3102 (2856-3375) |
| **80** | 0 | 165 (152-180) | 331 (305-360) | 662 (609-720) | 993 (914-1080) | 1324 (1219-1440) | 1654 (1523-1800) | 1985 (1828-2160) | 2316 (2133-2520) | 2647 (2437-2880) | 2978 (2742-3240) | 3309 (3047-3600) |
| **90** | 0 | 186 (171-202) | 372 (343-405) | 745 (685-810) | 1117 (1028-1215) | 1489 (1371-1620) | 1861 (1714-2025) | 2234 (2056-2430) | 2606 (2399-2835) | 2978 (2742-3240) | 3350 (3085-3645) | 3723 (3427-4050) |
| **100** | 0 | 207 (190-225) | 414 (381-450) | 827 (762-900) | 1241 (1142-1350) | 1654 (1523-1800) | 2068 (1904-2250) | 2482 (2285-2700) | 2895 (2666-3150) | 3309 (3047-3600) | 3723 (3427-4050) | 4136 (3808-4500) |

**Table A10.3a** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 7 (6-8) | 14 (12-16) | 28 (24-32) | 42 (37-48) | 56 (49-63) | 70 (61-79) | 84 (73-95) | 98 (86-111) | 112 (98-127) | 126 (110-143) | 140 (122-158) |
| **20** | 0 | 14 (12-16) | 28 (24-32) | 56 (49-63) | 84 (73-95) | 112 (98-127) | 140 (122-158) | 168 (147-190) | 196 (171-222) | 223 (196-253) | 251 (220-285) | 279 (245-317) |
| **25** | 0 | 17 (15-20) | 35 (31-40) | 70 (61-79) | 105 (92-119) | 140 (122-158) | 175 (153-198) | 210 (184-238) | 244 (214-277) | 279 (245-317) | 314 (276-356) | 349 (306-396) |
| **30** | 0 | 21 (18-24) | 42 (37-48) | 84 (73-95) | 126 (110-143) | 168 (147-190) | 210 (184-238) | 251 (220-285) | 293 (257-333) | 335 (294-380) | 377 (331-428) | 419 (367-475) |
| **40** | 0 | 28 (24-32) | 56 (49-63) | 112 (98-127) | 168 (147-190) | 223 (196-253) | 279 (245-317) | 335 (294-380) | 391 (343-443) | 447 (392-507) | 503 (441-570) | 559 (490-633) |
| **50** | 0 | 35 (31-40) | 70 (61-79) | 140 (122-158) | 210 (184-238) | 279 (245-317) | 349 (306-396) | 419 (367-475) | 489 (429-554) | 559 (490-633) | 629 (551-713) | 698 (612-792) |
| **60** | 0 | 42 (37-48) | 84 (73-95) | 168 (147-190) | 251 (220-285) | 335 (294-380) | 419 (367-475) | 503 (441-570) | 587 (514-665) | 670 (588-760) | 754 (661-855) | 838 (735-950) |
| **70** | 0 | 49 (43-55) | 98 (86-111) | 196 (171-222) | 293 (257-333) | 391 (343-443) | 489 (429-554) | 587 (514-665) | 684 (600-776) | 782 (686-887) | 880 (771-998) | 978 (857-1109) |
| **75** | 0 | 52 (46-59) | 105 (92-119) | 210 (184-238) | 314 (276-356) | 419 (367-475) | 524 (459-594) | 629 (551-713) | 733 (643-831) | 838 (735-950) | 943 (827-1069) | 1048 (918-1188) |
| **80** | 0 | 56 (49-63) | 112 (98-127) | 223 (196-253) | 335 (294-380) | 447 (392-507) | 559 (490-633) | 670 (588-760) | 782 (686-887) | 894 (784-1014) | 1006 (882-1140) | 1117 (980-1267) |
| **90** | 0 | 63 (55-71) | 126 (110-143) | 251 (220-285) | 377 (331-428) | 503 (441-570) | 629 (551-713) | 754 (661-855) | 880 (771-998) | 1006 (882-1140) | 1131 (992-1283) | 1257 (1102-1425) |
| **100** | 0 | 70 (61-79) | 140 (122-158) | 279 (245-317) | 419 (367-475) | 559 (490-633) | 698 (612-792) | 838 (735-950) | 978 (857-1109) | 1117 (980-1267) | 1257 (1102-1425) | 1397 (1224-1584) |

**Table A10.3b** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 9 (8-10) | 18 (16-21) | 36 (32-41) | 55 (48-62) | 73 (64-83) | 91 (80-103) | 109 (96-124) | 127 (111-144) | 145 (127-165) | 164 (143-186) | 182 (159-206) |
| **20** | 0 | 18 (16-21) | 36 (32-41) | 73 (64-83) | 109 (96-124) | 145 (127-165) | 182 (159-206) | 218 (191-248) | 255 (223-289) | 291 (255-330) | 327 (287-371) | 364 (319-413) |
| **25** | 0 | 23 (20-26) | 45 (40-52) | 91 (80-103) | 136 (119-155) | 182 (159-206) | 227 (199-258) | 273 (239-310) | 318 (279-361) | 364 (319-413) | 409 (358-464) | 455 (398-516) |
| **30** | 0 | 27 (24-31) | 55 (48-62) | 109 (96-124) | 164 (143-186) | 218 (191-248) | 273 (239-310) | 327 (287-371) | 382 (334-433) | 436 (382-495) | 491 (430-557) | 546 (478-619) |
| **40** | 0 | 36 (32-41) | 73 (64-83) | 145 (127-165) | 218 (191-248) | 291 (255-330) | 364 (319-413) | 436 (382-495) | 509 (446-578) | 582 (510-660) | 655 (573-743) | 727 (637-825) |
| **50** | 0 | 45 (40-52) | 91 (80-103) | 182 (159-206) | 273 (239-310) | 364 (319-413) | 455 (398-516) | 546 (478-619) | 636 (557-722) | 727 (637-825) | 818 (717-929) | 909 (796-1032) |
| **60** | 0 | 55 (48-62) | 109 (96-124) | 218 (191-248) | 327 (287-371) | 436 (382-495) | 546 (478-619) | 655 (573-743) | 764 (669-867) | 873 (764-991) | 982 (860-1114) | 1091 (956-1238) |
| **70** | 0 | 64 (56-72) | 127 (111-144) | 255 (223-289) | 382 (334-433) | 509 (446-578) | 636 (557-722) | 764 (669-867) | 891 (780-1011) | 1018 (892-1156) | 1146 (1003-1300) | 1273 (1115-1444) |
| **75** | 0 | 68 (60-77) | 136 (119-155) | 273 (239-310) | 409 (358-464) | 546 (478-619) | 682 (597-774) | 818 (717-929) | 955 (836-1083) | 1091 (956-1238) | 1228 (1075-1393) | 1364 (1194-1548) |
| **80** | 0 | 73 (64-83) | 145 (127-165) | 291 (255-330) | 436 (382-495) | 582 (510-660) | 727 (637-825) | 873 (764-991) | 1018 (892-1156) | 1164 (1019-1321) | 1309 (1147-1486) | 1455 (1274-1651) |
| **90** | 0 | 82 (72-93) | 164 (143-186) | 327 (287-371) | 491 (430-557) | 655 (573-743) | 818 (717-929) | 982 (860-1114) | 1146 (1003-1300) | 1309 (1147-1486) | 1473 (1290-1671) | 1637 (1433-1857) |
| **100** | 0 | 91 (80-103) | 182 (159-206) | 364 (319-413) | 546 (478-619) | 727 (637-825) | 909 (796-1032) | 1091 (956-1238) | 1273 (1115-1444) | 1455 (1274-1651) | 1637 (1433-1857) | 1819 (1593-2064) |

**Table A10.3c** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 7 (6-8) | 14 (12-16) | 28 (23-32) | 41 (35-48) | 55 (47-64) | 69 (59-80) | 83 (70-96) | 96 (82-112) | 110 (94-128) | 124 (106-144) | 138 (117-160) |
| **20** | 0 | 14 (12-16) | 28 (23-32) | 55 (47-64) | 83 (70-96) | 110 (94-128) | 138 (117-160) | 165 (141-193) | 193 (164-225) | 220 (188-257) | 248 (211-289) | 276 (235-321) |
| **25** | 0 | 17 (15-20) | 34 (29-40) | 69 (59-80) | 103 (88-120) | 138 (117-160) | 172 (147-201) | 207 (176-241) | 241 (205-281) | 276 (235-321) | 310 (264-361) | 344 (294-401) |
| **30** | 0 | 21 (18-24) | 41 (35-48) | 83 (70-96) | 124 (106-144) | 165 (141-193) | 207 (176-241) | 248 (211-289) | 289 (247-337) | 331 (282-385) | 372 (317-433) | 413 (352-481) |
| **40** | 0 | 28 (23-32) | 55 (47-64) | 110 (94-128) | 165 (141-193) | 220 (188-257) | 276 (235-321) | 331 (282-385) | 386 (329-449) | 441 (376-513) | 496 (423-578) | 551 (470-642) |
| **50** | 0 | 34 (29-40) | 69 (59-80) | 138 (117-160) | 207 (176-241) | 276 (235-321) | 344 (294-401) | 413 (352-481) | 482 (411-561) | 551 (470-642) | 620 (528-722) | 689 (587-802) |
| **60** | 0 | 41 (35-48) | 83 (70-96) | 165 (141-193) | 248 (211-289) | 331 (282-385) | 413 (352-481) | 496 (423-578) | 579 (493-674) | 661 (564-770) | 744 (634-866) | 827 (705-963) |
| **70** | 0 | 48 (41-56) | 96 (82-112) | 193 (164-225) | 289 (247-337) | 386 (329-449) | 482 (411-561) | 579 (493-674) | 675 (575-786) | 772 (658-898) | 868 (740-1011) | 964 (822-1123) |
| **75** | 0 | 52 (44-60) | 103 (88-120) | 207 (176-241) | 310 (264-361) | 413 (352-481) | 517 (440-602) | 620 (528-722) | 723 (616-842) | 827 (705-963) | 930 (793-1083) | 1033 (881-1203) |
| **80** | 0 | 55 (47-64) | 110 (94-128) | 220 (188-257) | 331 (282-385) | 441 (376-513) | 551 (470-642) | 661 (564-770) | 772 (658-898) | 882 (752-1027) | 992 (845-1155) | 1102 (939-1283) |
| **90** | 0 | 62 (53-72) | 124 (106-144) | 248 (211-289) | 372 (317-433) | 496 (423-578) | 620 (528-722) | 744 (634-866) | 868 (740-1011) | 992 (845-1155) | 1116 (951-1299) | 1240 (1057-1444) |
| **100** | 0 | 69 (59-80) | 138 (117-160) | 276 (235-321) | 413 (352-481) | 551 (470-642) | 689 (587-802) | 827 (705-963) | 964 (822-1123) | 1102 (939-1283) | 1240 (1057-1444) | 1378 (1174-1604) |

**Table A10.3d** Predicted impacts of displacement, for great razorbill for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 7 (6-8) | 14 (12-16) | 29 (25-33) | 43 (37-49) | 57 (50-66) | 72 (62-82) | 86 (75-98) | 100 (87-115) | 115 (99-131) | 129 (112-148) | 143 (124-164) |
| **20** | 0 | 14 (12-16) | 29 (25-33) | 57 (50-66) | 86 (75-98) | 115 (99-131) | 143 (124-164) | 172 (149-197) | 201 (174-230) | 229 (199-262) | 258 (224-295) | 287 (249-328) |
| **25** | 0 | 18 (16-21) | 36 (31-41) | 72 (62-82) | 107 (93-123) | 143 (124-164) | 179 (155-205) | 215 (187-246) | 251 (218-287) | 287 (249-328) | 322 (280-369) | 358 (311-410) |
| **30** | 0 | 21 (19-25) | 43 (37-49) | 86 (75-98) | 129 (112-148) | 172 (149-197) | 215 (187-246) | 258 (224-295) | 301 (261-344) | 344 (298-394) | 387 (336-443) | 430 (373-492) |
| **40** | 0 | 29 (25-33) | 57 (50-66) | 115 (99-131) | 172 (149-197) | 229 (199-262) | 287 (249-328) | 344 (298-394) | 401 (348-459) | 458 (398-525) | 516 (448-590) | 573 (497-656) |
| **50** | 0 | 36 (31-41) | 72 (62-82) | 143 (124-164) | 215 (187-246) | 287 (249-328) | 358 (311-410) | 430 (373-492) | 501 (435-574) | 573 (497-656) | 645 (560-738) | 716 (622-820) |
| **60** | 0 | 43 (37-49) | 86 (75-98) | 172 (149-197) | 258 (224-295) | 344 (298-394) | 430 (373-492) | 516 (448-590) | 602 (522-689) | 688 (597-787) | 774 (672-886) | 860 (746-984) |
| **70** | 0 | 50 (44-57) | 100 (87-115) | 201 (174-230) | 301 (261-344) | 401 (348-459) | 501 (435-574) | 602 (522-689) | 702 (609-804) | 802 (696-919) | 903 (784-1033) | 1003 (871-1148) |
| **75** | 0 | 54 (47-62) | 107 (93-123) | 215 (187-246) | 322 (280-369) | 430 (373-492) | 537 (466-615) | 645 (560-738) | 752 (653-861) | 860 (746-984) | 967 (839-1107) | 1075 (933-1230) |
| **80** | 0 | 57 (50-66) | 115 (99-131) | 229 (199-262) | 344 (298-394) | 458 (398-525) | 573 (497-656) | 688 (597-787) | 802 (696-919) | 917 (796-1050) | 1032 (895-1181) | 1146 (995-1312) |
| **90** | 0 | 64 (56-74) | 129 (112-148) | 258 (224-295) | 387 (336-443) | 516 (448-590) | 645 (560-738) | 774 (672-886) | 903 (784-1033) | 1032 (895-1181) | 1161 (1007-1329) | 1289 (1119-1476) |
| **100** | 0 | 72 (62-82) | 143 (124-164) | 287 (249-328) | 430 (373-492) | 573 (497-656) | 716 (622-820) | 860 (746-984) | 1003 (871-1148) | 1146 (995-1312) | 1289 (1119-1476) | 1433 (1244-1640) |

**Table A10.4a** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 2 (2-3) | 4 (3-6) | 8 (6-11) | 12 (9-17) | 16 (12-22) | 20 (15-28) | 24 (18-34) | 28 (21-39) | 32 (24-45) | 37 (27-50) | 41 (30-56) |
| **20** | 0 | 4 (3-6) | 8 (6-11) | 16 (12-22) | 24 (18-34) | 32 (24-45) | 41 (30-56) | 49 (36-67) | 57 (43-79) | 65 (49-90) | 73 (55-101) | 81 (61-112) |
| **25** | 0 | 5 (4-7) | 10 (8-14) | 20 (15-28) | 30 (23-42) | 41 (30-56) | 51 (38-70) | 61 (46-84) | 71 (53-98) | 81 (61-112) | 91 (68-126) | 102 (76-140) |
| **30** | 0 | 6 (5-8) | 12 (9-17) | 24 (18-34) | 37 (27-50) | 49 (36-67) | 61 (46-84) | 73 (55-101) | 85 (64-118) | 97 (73-135) | 110 (82-151) | 122 (91-168) |
| **40** | 0 | 8 (6-11) | 16 (12-22) | 32 (24-45) | 49 (36-67) | 65 (49-90) | 81 (61-112) | 97 (73-135) | 114 (85-157) | 130 (97-180) | 146 (109-202) | 162 (122-224) |
| **50** | 0 | 10 (8-14) | 20 (15-28) | 41 (30-56) | 61 (46-84) | 81 (61-112) | 102 (76-140) | 122 (91-168) | 142 (106-196) | 162 (122-224) | 183 (137-252) | 203 (152-280) |
| **60** | 0 | 12 (9-17) | 24 (18-34) | 49 (36-67) | 73 (55-101) | 97 (73-135) | 122 (91-168) | 146 (109-202) | 171 (128-236) | 195 (146-269) | 219 (164-303) | 244 (182-337) |
| **70** | 0 | 14 (11-20) | 28 (21-39) | 57 (43-79) | 85 (64-118) | 114 (85-157) | 142 (106-196) | 171 (128-236) | 199 (149-275) | 227 (170-314) | 256 (192-353) | 284 (213-393) |
| **75** | 0 | 15 (11-21) | 30 (23-42) | 61 (46-84) | 91 (68-126) | 122 (91-168) | 152 (114-210) | 183 (137-252) | 213 (160-295) | 244 (182-337) | 274 (205-379) | 305 (228-421) |
| **80** | 0 | 16 (12-22) | 32 (24-45) | 65 (49-90) | 97 (73-135) | 130 (97-180) | 162 (122-224) | 195 (146-269) | 227 (170-314) | 260 (195-359) | 292 (219-404) | 325 (243-449) |
| **90** | 0 | 18 (14-25) | 37 (27-50) | 73 (55-101) | 110 (82-151) | 146 (109-202) | 183 (137-252) | 219 (164-303) | 256 (192-353) | 292 (219-404) | 329 (246-454) | 365 (274-505) |
| **100** | 0 | 20 (15-28) | 41 (30-56) | 81 (61-112) | 122 (91-168) | 162 (122-224) | 203 (152-280) | 244 (182-337) | 284 (213-393) | 325 (243-449) | 365 (274-505) | 406 (304-561) |

**Table A10.4b** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 2 (2-3) | 4 (3-6) | 9 (7-11) | 13 (10-17) | 17 (13-23) | 21 (17-29) | 26 (20-34) | 30 (23-40) | 34 (27-46) | 39 (30-52) | 43 (34-57) |
| **20** | 0 | 4 (3-6) | 9 (7-11) | 17 (13-23) | 26 (20-34) | 34 (27-46) | 43 (34-57) | 51 (40-69) | 60 (47-80) | 69 (54-92) | 77 (60-103) | 86 (67-115) |
| **25** | 0 | 5 (4-7) | 11 (8-14) | 21 (17-29) | 32 (25-43) | 43 (34-57) | 54 (42-72) | 64 (50-86) | 75 (59-100) | 86 (67-115) | 96 (75-129) | 107 (84-143) |
| **30** | 0 | 6 (5-9) | 13 (10-17) | 26 (20-34) | 39 (30-52) | 51 (40-69) | 64 (50-86) | 77 (60-103) | 90 (70-120) | 103 (81-138) | 116 (91-155) | 128 (101-172) |
| **40** | 0 | 9 (7-11) | 17 (13-23) | 34 (27-46) | 51 (40-69) | 69 (54-92) | 86 (67-115) | 103 (81-138) | 120 (94-161) | 137 (107-184) | 154 (121-206) | 171 (134-229) |
| **50** | 0 | 11 (8-14) | 21 (17-29) | 43 (34-57) | 64 (50-86) | 86 (67-115) | 107 (84-143) | 128 (101-172) | 150 (117-201) | 171 (134-229) | 193 (151-258) | 214 (168-287) |
| **60** | 0 | 13 (10-17) | 26 (20-34) | 51 (40-69) | 77 (60-103) | 103 (81-138) | 128 (101-172) | 154 (121-206) | 180 (141-241) | 206 (161-275) | 231 (181-310) | 257 (201-344) |
| **70** | 0 | 15 (12-20) | 30 (23-40) | 60 (47-80) | 90 (70-120) | 120 (94-161) | 150 (117-201) | 180 (141-241) | 210 (164-281) | 240 (188-321) | 270 (211-361) | 300 (235-401) |
| **75** | 0 | 16 (13-22) | 32 (25-43) | 64 (50-86) | 96 (75-129) | 128 (101-172) | 161 (126-215) | 193 (151-258) | 225 (176-301) | 257 (201-344) | 289 (226-387) | 321 (252-430) |
| **80** | 0 | 17 (13-23) | 34 (27-46) | 69 (54-92) | 103 (81-138) | 137 (107-184) | 171 (134-229) | 206 (161-275) | 240 (188-321) | 274 (215-367) | 308 (242-413) | 343 (268-459) |
| **90** | 0 | 19 (15-26) | 39 (30-52) | 77 (60-103) | 116 (91-155) | 154 (121-206) | 193 (151-258) | 231 (181-310) | 270 (211-361) | 308 (242-413) | 347 (272-465) | 385 (302-516) |
| **100** | 0 | 21 (17-29) | 43 (34-57) | 86 (67-115) | 128 (101-172) | 171 (134-229) | 214 (168-287) | 257 (201-344) | 300 (235-401) | 343 (268-459) | 385 (302-516) | 428 (336-574) |

**Table A10.4c** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 1 (1-1) | 1 (1-2) | 3 (2-4) | 4 (4-6) | 6 (5-9) | 7 (6-11) | 9 (7-13) | 10 (8-15) | 12 (9-17) | 13 (11-19) | 15 (12-21) |
| **20** | 0 | 1 (1-2) | 3 (2-4) | 6 (5-9) | 9 (7-13) | 12 (9-17) | 15 (12-21) | 18 (14-26) | 21 (16-30) | 24 (19-34) | 27 (21-38) | 30 (23-43) |
| **25** | 0 | 2 (1-3) | 4 (3-5) | 7 (6-11) | 11 (9-16) | 15 (12-21) | 19 (15-27) | 22 (18-32) | 26 (21-37) | 30 (23-43) | 34 (26-48) | 37 (29-53) |
| **30** | 0 | 2 (2-3) | 4 (4-6) | 9 (7-13) | 13 (11-19) | 18 (14-26) | 22 (18-32) | 27 (21-38) | 31 (25-45) | 36 (28-51) | 40 (32-58) | 45 (35-64) |
| **40** | 0 | 3 (2-4) | 6 (5-9) | 12 (9-17) | 18 (14-26) | 24 (19-34) | 30 (23-43) | 36 (28-51) | 42 (33-60) | 48 (38-68) | 54 (42-77) | 60 (47-85) |
| **50** | 0 | 4 (3-5) | 7 (6-11) | 15 (12-21) | 22 (18-32) | 30 (23-43) | 37 (29-53) | 45 (35-64) | 52 (41-75) | 60 (47-85) | 67 (53-96) | 75 (59-107) |
| **60** | 0 | 4 (4-6) | 9 (7-13) | 18 (14-26) | 27 (21-38) | 36 (28-51) | 45 (35-64) | 54 (42-77) | 63 (49-89) | 72 (56-102) | 81 (63-115) | 90 (70-128) |
| **70** | 0 | 5 (4-7) | 10 (8-15) | 21 (16-30) | 31 (25-45) | 42 (33-60) | 52 (41-75) | 63 (49-89) | 73 (57-104) | 84 (66-119) | 94 (74-134) | 105 (82-149) |
| **75** | 0 | 6 (4-8) | 11 (9-16) | 22 (18-32) | 34 (26-48) | 45 (35-64) | 56 (44-80) | 67 (53-96) | 79 (62-112) | 90 (70-128) | 101 (79-144) | 112 (88-160) |
| **80** | 0 | 6 (5-9) | 12 (9-17) | 24 (19-34) | 36 (28-51) | 48 (38-68) | 60 (47-85) | 72 (56-102) | 84 (66-119) | 96 (75-136) | 108 (84-153) | 120 (94-170) |
| **90** | 0 | 7 (5-10) | 13 (11-19) | 27 (21-38) | 40 (32-58) | 54 (42-77) | 67 (53-96) | 81 (63-115) | 94 (74-134) | 108 (84-153) | 121 (95-173) | 135 (106-192) |
| **100** | 0 | 7 (6-11) | 15 (12-21) | 30 (23-43) | 45 (35-64) | 60 (47-85) | 75 (59-107) | 90 (70-128) | 105 (82-149) | 120 (94-170) | 135 (106-192) | 150 (117-213) |

**Table A10.4d** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 1 (1-2) | 3 (2-4) | 6 (5-8) | 9 (7-12) | 12 (9-16) | 15 (11-20) | 18 (14-25) | 21 (16-29) | 24 (18-33) | 27 (21-37) | 30 (23-41) |
| **20** | 0 | 3 (2-4) | 6 (5-8) | 12 (9-16) | 18 (14-25) | 24 (18-33) | 30 (23-41) | 36 (27-49) | 42 (32-57) | 48 (37-65) | 54 (41-74) | 60 (46-82) |
| **25** | 0 | 4 (3-5) | 7 (6-10) | 15 (11-20) | 22 (17-31) | 30 (23-41) | 37 (29-51) | 45 (34-61) | 52 (40-72) | 60 (46-82) | 67 (51-92) | 75 (57-102) |
| **30** | 0 | 4 (3-6) | 9 (7-12) | 18 (14-25) | 27 (21-37) | 36 (27-49) | 45 (34-61) | 54 (41-74) | 63 (48-86) | 72 (55-98) | 80 (62-110) | 89 (69-123) |
| **40** | 0 | 6 (5-8) | 12 (9-16) | 24 (18-33) | 36 (27-49) | 48 (37-65) | 60 (46-82) | 72 (55-98) | 83 (64-115) | 95 (73-131) | 107 (82-147) | 119 (92-164) |
| **50** | 0 | 7 (6-10) | 15 (11-20) | 30 (23-41) | 45 (34-61) | 60 (46-82) | 75 (57-102) | 89 (69-123) | 104 (80-143) | 119 (92-164) | 134 (103-184) | 149 (114-205) |
| **60** | 0 | 9 (7-12) | 18 (14-25) | 36 (27-49) | 54 (41-74) | 72 (55-98) | 89 (69-123) | 107 (82-147) | 125 (96-172) | 143 (110-196) | 161 (124-221) | 179 (137-246) |
| **70** | 0 | 10 (8-14) | 21 (16-29) | 42 (32-57) | 63 (48-86) | 83 (64-115) | 104 (80-143) | 125 (96-172) | 146 (112-201) | 167 (128-229) | 188 (144-258) | 209 (160-286) |
| **75** | 0 | 11 (9-15) | 22 (17-31) | 45 (34-61) | 67 (51-92) | 89 (69-123) | 112 (86-153) | 134 (103-184) | 156 (120-215) | 179 (137-246) | 201 (154-276) | 224 (172-307) |
| **80** | 0 | 12 (9-16) | 24 (18-33) | 48 (37-65) | 72 (55-98) | 95 (73-131) | 119 (92-164) | 143 (110-196) | 167 (128-229) | 191 (146-262) | 215 (165-295) | 238 (183-327) |
| **90** | 0 | 13 (10-18) | 27 (21-37) | 54 (41-74) | 80 (62-110) | 107 (82-147) | 134 (103-184) | 161 (124-221) | 188 (144-258) | 215 (165-295) | 241 (185-331) | 268 (206-368) |
| **100** | 0 | 15 (11-20) | 30 (23-41) | 60 (46-82) | 89 (69-123) | 119 (92-164) | 149 (114-205) | 179 (137-246) | 209 (160-286) | 238 (183-327) | 268 (206-368) | 298 (229-409) |

**Table A10.5a** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 2 (1-2) | 3 (3-4) | 6 (5-8) | 10 (8-12) | 13 (10-16) | 16 (13-20) | 19 (15-24) | 22 (18-28) | 26 (20-32) | 29 (23-36) | 32 (25-40) |
| **20** | 0 | 3 (3-4) | 6 (5-8) | 13 (10-16) | 19 (15-24) | 26 (20-32) | 32 (25-40) | 38 (30-47) | 45 (35-55) | 51 (40-63) | 58 (46-71) | 64 (51-79) |
| **25** | 0 | 4 (3-5) | 8 (6-10) | 16 (13-20) | 24 (19-30) | 32 (25-40) | 40 (32-49) | 48 (38-59) | 56 (44-69) | 64 (51-79) | 72 (57-89) | 80 (63-99) |
| **30** | 0 | 5 (4-6) | 10 (8-12) | 19 (15-24) | 29 (23-36) | 38 (30-47) | 48 (38-59) | 58 (46-71) | 67 (53-83) | 77 (61-95) | 86 (68-107) | 96 (76-119) |
| **40** | 0 | 6 (5-8) | 13 (10-16) | 26 (20-32) | 38 (30-47) | 51 (40-63) | 64 (51-79) | 77 (61-95) | 90 (71-111) | 102 (81-127) | 115 (91-142) | 128 (101-158) |
| **50** | 0 | 8 (6-10) | 16 (13-20) | 32 (25-40) | 48 (38-59) | 64 (51-79) | 80 (63-99) | 96 (76-119) | 112 (88-139) | 128 (101-158) | 144 (114-178) | 160 (126-198) |
| **60** | 0 | 10 (8-12) | 19 (15-24) | 38 (30-47) | 58 (46-71) | 77 (61-95) | 96 (76-119) | 115 (91-142) | 134 (106-166) | 153 (121-190) | 173 (137-214) | 192 (152-237) |
| **70** | 0 | 11 (9-14) | 22 (18-28) | 45 (35-55) | 67 (53-83) | 90 (71-111) | 112 (88-139) | 134 (106-166) | 157 (124-194) | 179 (142-222) | 201 (159-249) | 224 (177-277) |
| **75** | 0 | 12 (9-15) | 24 (19-30) | 48 (38-59) | 72 (57-89) | 96 (76-119) | 120 (95-148) | 144 (114-178) | 168 (133-208) | 192 (152-237) | 216 (171-267) | 240 (190-297) |
| **80** | 0 | 13 (10-16) | 26 (20-32) | 51 (40-63) | 77 (61-95) | 102 (81-127) | 128 (101-158) | 153 (121-190) | 179 (142-222) | 205 (162-253) | 230 (182-285) | 256 (202-317) |
| **90** | 0 | 14 (11-18) | 29 (23-36) | 58 (46-71) | 86 (68-107) | 115 (91-142) | 144 (114-178) | 173 (137-214) | 201 (159-249) | 230 (182-285) | 259 (205-321) | 288 (228-356) |
| **100** | 0 | 16 (13-20) | 32 (25-40) | 64 (51-79) | 96 (76-119) | 128 (101-158) | 160 (126-198) | 192 (152-237) | 224 (177-277) | 256 (202-317) | 288 (228-356) | 320 (253-396) |

**Table A10.5b** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 3 (2-3) | 5 (5-6) | 11 (9-13) | 16 (14-19) | 22 (18-26) | 27 (23-32) | 32 (27-39) | 38 (32-45) | 43 (36-52) | 49 (41-58) | 54 (45-64) |
| **20** | 0 | 5 (5-6) | 11 (9-13) | 22 (18-26) | 32 (27-39) | 43 (36-52) | 54 (45-64) | 65 (54-77) | 76 (63-90) | 86 (72-103) | 97 (81-116) | 108 (90-129) |
| **25** | 0 | 7 (6-8) | 13 (11-16) | 27 (23-32) | 40 (34-48) | 54 (45-64) | 67 (56-81) | 81 (68-97) | 94 (79-113) | 108 (90-129) | 121 (102-145) | 135 (113-161) |
| **30** | 0 | 8 (7-10) | 16 (14-19) | 32 (27-39) | 49 (41-58) | 65 (54-77) | 81 (68-97) | 97 (81-116) | 113 (95-135) | 130 (108-155) | 146 (122-174) | 162 (135-193) |
| **40** | 0 | 11 (9-13) | 22 (18-26) | 43 (36-52) | 65 (54-77) | 86 (72-103) | 108 (90-129) | 130 (108-155) | 151 (126-180) | 173 (144-206) | 194 (162-232) | 216 (180-258) |
| **50** | 0 | 13 (11-16) | 27 (23-32) | 54 (45-64) | 81 (68-97) | 108 (90-129) | 135 (113-161) | 162 (135-193) | 189 (158-225) | 216 (180-258) | 243 (203-290) | 270 (226-322) |
| **60** | 0 | 16 (14-19) | 32 (27-39) | 65 (54-77) | 97 (81-116) | 130 (108-155) | 162 (135-193) | 194 (162-232) | 227 (190-271) | 259 (217-309) | 292 (244-348) | 324 (271-386) |
| **70** | 0 | 19 (16-23) | 38 (32-45) | 76 (63-90) | 113 (95-135) | 151 (126-180) | 189 (158-225) | 227 (190-271) | 265 (221-316) | 302 (253-361) | 340 (284-406) | 378 (316-451) |
| **75** | 0 | 20 (17-24) | 40 (34-48) | 81 (68-97) | 121 (102-145) | 162 (135-193) | 202 (169-242) | 243 (203-290) | 283 (237-338) | 324 (271-386) | 364 (305-435) | 405 (338-483) |
| **80** | 0 | 22 (18-26) | 43 (36-52) | 86 (72-103) | 130 (108-155) | 173 (144-206) | 216 (180-258) | 259 (217-309) | 302 (253-361) | 345 (289-412) | 389 (325-464) | 432 (361-515) |
| **90** | 0 | 24 (20-29) | 49 (41-58) | 97 (81-116) | 146 (122-174) | 194 (162-232) | 243 (203-290) | 292 (244-348) | 340 (284-406) | 389 (325-464) | 437 (365-522) | 486 (406-580) |
| **100** | 0 | 27 (23-32) | 54 (45-64) | 108 (90-129) | 162 (135-193) | 216 (180-258) | 270 (226-322) | 324 (271-386) | 378 (316-451) | 432 (361-515) | 486 (406-580) | 540 (451-644) |

**Table A10.5c** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 1 (1-1) | 1 (1-2) | 3 (2-3) | 4 (3-5) | 5 (4-7) | 7 (5-8) | 8 (6-10) | 9 (8-12) | 11 (9-13) | 12 (10-15) | 13 (11-17) |
| **20** | 0 | 1 (1-2) | 3 (2-3) | 5 (4-7) | 8 (6-10) | 11 (9-13) | 13 (11-17) | 16 (13-20) | 19 (15-23) | 21 (17-27) | 24 (19-30) | 27 (22-33) |
| **25** | 0 | 2 (1-2) | 3 (3-4) | 7 (5-8) | 10 (8-12) | 13 (11-17) | 17 (13-21) | 20 (16-25) | 23 (19-29) | 27 (22-33) | 30 (24-37) | 33 (27-42) |
| **30** | 0 | 2 (2-2) | 4 (3-5) | 8 (6-10) | 12 (10-15) | 16 (13-20) | 20 (16-25) | 24 (19-30) | 28 (23-35) | 32 (26-40) | 36 (29-45) | 40 (32-50) |
| **40** | 0 | 3 (2-3) | 5 (4-7) | 11 (9-13) | 16 (13-20) | 21 (17-27) | 27 (22-33) | 32 (26-40) | 37 (30-46) | 43 (34-53) | 48 (39-60) | 53 (43-66) |
| **50** | 0 | 3 (3-4) | 7 (5-8) | 13 (11-17) | 20 (16-25) | 27 (22-33) | 33 (27-42) | 40 (32-50) | 47 (38-58) | 53 (43-66) | 60 (48-75) | 67 (54-83) |
| **60** | 0 | 4 (3-5) | 8 (6-10) | 16 (13-20) | 24 (19-30) | 32 (26-40) | 40 (32-50) | 48 (39-60) | 56 (45-70) | 64 (52-80) | 72 (58-90) | 80 (65-100) |
| **70** | 0 | 5 (4-6) | 9 (8-12) | 19 (15-23) | 28 (23-35) | 37 (30-46) | 47 (38-58) | 56 (45-70) | 66 (53-81) | 75 (60-93) | 84 (68-105) | 94 (75-116) |
| **75** | 0 | 5 (4-6) | 10 (8-12) | 20 (16-25) | 30 (24-37) | 40 (32-50) | 50 (40-62) | 60 (48-75) | 70 (57-87) | 80 (65-100) | 90 (73-112) | 100 (81-125) |
| **80** | 0 | 5 (4-7) | 11 (9-13) | 21 (17-27) | 32 (26-40) | 43 (34-53) | 53 (43-66) | 64 (52-80) | 75 (60-93) | 86 (69-106) | 96 (77-120) | 107 (86-133) |
| **90** | 0 | 6 (5-7) | 12 (10-15) | 24 (19-30) | 36 (29-45) | 48 (39-60) | 60 (48-75) | 72 (58-90) | 84 (68-105) | 96 (77-120) | 108 (87-135) | 120 (97-149) |
| **100** | 0 | 7 (5-8) | 13 (11-17) | 27 (22-33) | 40 (32-50) | 53 (43-66) | 67 (54-83) | 80 (65-100) | 94 (75-116) | 107 (86-133) | 120 (97-149) | 134 (108-166) |

**Table A10.5d** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A project plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 2 (1-2) | 3 (3-4) | 6 (5-7) | 9 (8-11) | 12 (10-15) | 15 (13-19) | 18 (15-22) | 21 (18-26) | 25 (20-30) | 28 (23-34) | 31 (25-37) |
| **20** | 0 | 3 (3-4) | 6 (5-7) | 12 (10-15) | 18 (15-22) | 25 (20-30) | 31 (25-37) | 37 (30-45) | 43 (35-52) | 49 (40-60) | 55 (45-67) | 61 (50-75) |
| **25** | 0 | 4 (3-5) | 8 (6-9) | 15 (13-19) | 23 (19-28) | 31 (25-37) | 38 (31-47) | 46 (38-56) | 54 (44-65) | 61 (50-75) | 69 (56-84) | 77 (63-93) |
| **30** | 0 | 5 (4-6) | 9 (8-11) | 18 (15-22) | 28 (23-34) | 37 (30-45) | 46 (38-56) | 55 (45-67) | 64 (53-78) | 74 (60-89) | 83 (68-101) | 92 (75-112) |
| **40** | 0 | 6 (5-7) | 12 (10-15) | 25 (20-30) | 37 (30-45) | 49 (40-60) | 61 (50-75) | 74 (60-89) | 86 (70-104) | 98 (80-119) | 110 (90-134) | 123 (100-149) |
| **50** | 0 | 8 (6-9) | 15 (13-19) | 31 (25-37) | 46 (38-56) | 61 (50-75) | 77 (63-93) | 92 (75-112) | 107 (88-130) | 123 (100-149) | 138 (113-168) | 153 (125-186) |
| **60** | 0 | 9 (8-11) | 18 (15-22) | 37 (30-45) | 55 (45-67) | 74 (60-89) | 92 (75-112) | 110 (90-134) | 129 (105-157) | 147 (120-179) | 166 (135-201) | 184 (150-224) |
| **70** | 0 | 11 (9-13) | 21 (18-26) | 43 (35-52) | 64 (53-78) | 86 (70-104) | 107 (88-130) | 129 (105-157) | 150 (123-183) | 172 (140-209) | 193 (158-235) | 215 (175-261) |
| **75** | 0 | 11 (9-14) | 23 (19-28) | 46 (38-56) | 69 (56-84) | 92 (75-112) | 115 (94-140) | 138 (113-168) | 161 (131-196) | 184 (150-224) | 207 (169-252) | 230 (188-279) |
| **80** | 0 | 12 (10-15) | 25 (20-30) | 49 (40-60) | 74 (60-89) | 98 (80-119) | 123 (100-149) | 147 (120-179) | 172 (140-209) | 196 (160-238) | 221 (180-268) | 245 (200-298) |
| **90** | 0 | 14 (11-17) | 28 (23-34) | 55 (45-67) | 83 (68-101) | 110 (90-134) | 138 (113-168) | 166 (135-201) | 193 (158-235) | 221 (180-268) | 248 (203-302) | 276 (225-335) |
| **100** | 0 | 15 (13-19) | 31 (25-37) | 61 (50-75) | 92 (75-112) | 123 (100-149) | 153 (125-186) | 184 (150-224) | 215 (175-261) | 245 (200-298) | 276 (225-335) | 307 (250-373) |

**Dogger Bank Teesside B** [top]

**Table A10.6a** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 1 (1-1) | 2 (1-2) | 3 (3-4) | 5 (4-6) | 6 (5-8) | 8 (7-9) | 10 (8-11) | 11 (10-13) | 13 (11-15) | 14 (12-17) | 16 (14-19) |
| 20 | 0 | 2 (1-2) | 3 (3-4) | 6 (5-8) | 10 (8-11) | 13 (11-15) | 16 (14-19) | 19 (16-23) | 22 (19-26) | 25 (22-30) | 29 (25-34) | 32 (27-38) |
| 25 | 0 | 2 (2-2) | 4 (3-5) | 8 (7-9) | 12 (10-14) | 16 (14-19) | 20 (17-24) | 24 (20-28) | 28 (24-33) | 32 (27-38) | 36 (31-42) | 40 (34-47) |
| 30 | 0 | 2 (2-3) | 5 (4-6) | 10 (8-11) | 14 (12-17) | 19 (16-23) | 24 (20-28) | 29 (25-34) | 33 (29-40) | 38 (33-45) | 43 (37-51) | 48 (41-56) |
| 40 | 0 | 3 (3-4) | 6 (5-8) | 13 (11-15) | 19 (16-23) | 25 (22-30) | 32 (27-38) | 38 (33-45) | 45 (38-53) | 51 (44-60) | 57 (49-68) | 64 (54-75) |
| 50 | 0 | 4 (3-5) | 8 (7-9) | 16 (14-19) | 24 (20-28) | 32 (27-38) | 40 (34-47) | 48 (41-56) | 56 (48-66) | 64 (54-75) | 72 (61-85) | 80 (68-94) |
| 60 | 0 | 5 (4-6) | 10 (8-11) | 19 (16-23) | 29 (25-34) | 38 (33-45) | 48 (41-56) | 57 (49-68) | 67 (57-79) | 76 (65-90) | 86 (74-102) | 95 (82-113) |
| 70 | 0 | 6 (5-7) | 11 (10-13) | 22 (19-26) | 33 (29-40) | 45 (38-53) | 56 (48-66) | 67 (57-79) | 78 (67-92) | 89 (76-105) | 100 (86-119) | 111 (95-132) |
| 75 | 0 | 6 (5-7) | 12 (10-14) | 24 (20-28) | 36 (31-42) | 48 (41-56) | 60 (51-71) | 72 (61-85) | 83 (72-99) | 95 (82-113) | 107 (92-127) | 119 (102-141) |
| 80 | 0 | 6 (5-8) | 13 (11-15) | 25 (22-30) | 38 (33-45) | 51 (44-60) | 64 (54-75) | 76 (65-90) | 89 (76-105) | 102 (87-120) | 115 (98-136) | 127 (109-151) |
| 90 | 0 | 7 (6-8) | 14 (12-17) | 29 (25-34) | 43 (37-51) | 57 (49-68) | 72 (61-85) | 86 (74-102) | 100 (86-119) | 115 (98-136) | 129 (110-153) | 143 (123-169) |
| 100 | 0 | 8 (7-9) | 16 (14-19) | 32 (27-38) | 48 (41-56) | 64 (54-75) | 80 (68-94) | 95 (82-113) | 111 (95-132) | 127 (109-151) | 143 (123-169) | 159 (136-188) |

**Table A10.6b** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 2 (2-2) | 4 (4-5) | 8 (7-10) | 13 (11-15) | 17 (14-20) | 21 (18-25) | 25 (22-30) | 30 (25-35) | 34 (29-40) | 38 (32-45) | 42 (36-50) |
| 20 | 0 | 4 (4-5) | 8 (7-10) | 17 (14-20) | 25 (22-30) | 34 (29-40) | 42 (36-50) | 51 (43-60) | 59 (51-70) | 67 (58-80) | 76 (65-89) | 84 (72-99) |
| 25 | 0 | 5 (5-6) | 11 (9-12) | 21 (18-25) | 32 (27-37) | 42 (36-50) | 53 (45-62) | 63 (54-75) | 74 (63-87) | 84 (72-99) | 95 (81-112) | 105 (90-124) |
| 30 | 0 | 6 (5-7) | 13 (11-15) | 25 (22-30) | 38 (32-45) | 51 (43-60) | 63 (54-75) | 76 (65-89) | 89 (76-104) | 101 (87-119) | 114 (97-134) | 127 (108-149) |
| 40 | 0 | 8 (7-10) | 17 (14-20) | 34 (29-40) | 51 (43-60) | 67 (58-80) | 84 (72-99) | 101 (87-119) | 118 (101-139) | 135 (115-159) | 152 (130-179) | 169 (144-199) |
| 50 | 0 | 11 (9-12) | 21 (18-25) | 42 (36-50) | 63 (54-75) | 84 (72-99) | 105 (90-124) | 127 (108-149) | 148 (126-174) | 169 (144-199) | 190 (162-224) | 211 (180-248) |
| 60 | 0 | 13 (11-15) | 25 (22-30) | 51 (43-60) | 76 (65-89) | 101 (87-119) | 127 (108-149) | 152 (130-179) | 177 (152-209) | 202 (173-239) | 228 (195-268) | 253 (217-298) |
| 70 | 0 | 15 (13-17) | 30 (25-35) | 59 (51-70) | 89 (76-104) | 118 (101-139) | 148 (126-174) | 177 (152-209) | 207 (177-244) | 236 (202-278) | 266 (227-313) | 295 (253-348) |
| 75 | 0 | 16 (14-19) | 32 (27-37) | 63 (54-75) | 95 (81-112) | 127 (108-149) | 158 (135-186) | 190 (162-224) | 221 (189-261) | 253 (217-298) | 285 (244-335) | 316 (271-373) |
| 80 | 0 | 17 (14-20) | 34 (29-40) | 67 (58-80) | 101 (87-119) | 135 (115-159) | 169 (144-199) | 202 (173-239) | 236 (202-278) | 270 (231-318) | 304 (260-358) | 337 (289-398) |
| 90 | 0 | 19 (16-22) | 38 (32-45) | 76 (65-89) | 114 (97-134) | 152 (130-179) | 190 (162-224) | 228 (195-268) | 266 (227-313) | 304 (260-358) | 342 (292-403) | 380 (325-447) |
| 100 | 0 | 21 (18-25) | 42 (36-50) | 84 (72-99) | 127 (108-149) | 169 (144-199) | 211 (180-248) | 253 (217-298) | 295 (253-348) | 337 (289-398) | 380 (325-447) | 422 (361-497) |

**Table A10.6c** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 5 (4-6) | 9 (8-11) | 19 (16-22) | 28 (24-33) | 37 (31-44) | 47 (39-55) | 56 (47-67) | 65 (55-78) | 75 (63-89) | 84 (71-100) | 93 (79-111) |
| **20** | 0 | 9 (8-11) | 19 (16-22) | 37 (31-44) | 56 (47-67) | 75 (63-89) | 93 (79-111) | 112 (94-133) | 131 (110-155) | 149 (126-178) | 168 (141-200) | 187 (157-222) |
| **25** | 0 | 12 (10-14) | 23 (20-28) | 47 (39-55) | 70 (59-83) | 93 (79-111) | 117 (98-139) | 140 (118-166) | 163 (138-194) | 187 (157-222) | 210 (177-250) | 233 (196-277) |
| **30** | 0 | 14 (12-17) | 28 (24-33) | 56 (47-67) | 84 (71-100) | 112 (94-133) | 140 (118-166) | 168 (141-200) | 196 (165-233) | 224 (189-266) | 252 (212-300) | 280 (236-333) |
| **40** | 0 | 19 (16-22) | 37 (31-44) | 75 (63-89) | 112 (94-133) | 149 (126-178) | 187 (157-222) | 224 (189-266) | 261 (220-311) | 299 (251-355) | 336 (283-399) | 373 (314-444) |
| **50** | 0 | 23 (20-28) | 47 (39-55) | 93 (79-111) | 140 (118-166) | 187 (157-222) | 233 (196-277) | 280 (236-333) | 327 (275-388) | 373 (314-444) | 420 (354-499) | 466 (393-555) |
| **60** | 0 | 28 (24-33) | 56 (47-67) | 112 (94-133) | 168 (141-200) | 224 (189-266) | 280 (236-333) | 336 (283-399) | 392 (330-466) | 448 (377-533) | 504 (424-599) | 560 (472-666) |
| **70** | 0 | 33 (28-39) | 65 (55-78) | 131 (110-155) | 196 (165-233) | 261 (220-311) | 327 (275-388) | 392 (330-466) | 457 (385-544) | 522 (440-621) | 588 (495-699) | 653 (550-777) |
| **75** | 0 | 35 (29-42) | 70 (59-83) | 140 (118-166) | 210 (177-250) | 280 (236-333) | 350 (295-416) | 420 (354-499) | 490 (413-582) | 560 (472-666) | 630 (530-749) | 700 (589-832) |
| **80** | 0 | 37 (31-44) | 75 (63-89) | 149 (126-178) | 224 (189-266) | 299 (251-355) | 373 (314-444) | 448 (377-533) | 522 (440-621) | 597 (503-710) | 672 (566-799) | 746 (629-888) |
| **90** | 0 | 42 (35-50) | 84 (71-100) | 168 (141-200) | 252 (212-300) | 336 (283-399) | 420 (354-499) | 504 (424-599) | 588 (495-699) | 672 (566-799) | 756 (637-899) | 840 (707-998) |
| **100** | 0 | 47 (39-55) | 93 (79-111) | 187 (157-222) | 280 (236-333) | 373 (314-444) | 466 (393-555) | 560 (472-666) | 653 (550-777) | 746 (629-888) | 840 (707-998) | 933 (786-1109) |

**Table A10.6d** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 3 (2-3) | 5 (5-6) | 11 (9-13) | 16 (14-19) | 21 (18-25) | 27 (23-32) | 32 (27-38) | 37 (32-44) | 43 (36-50) | 48 (41-57) | 53 (45-63) |
| **20** | 0 | 5 (5-6) | 11 (9-13) | 21 (18-25) | 32 (27-38) | 43 (36-50) | 53 (45-63) | 64 (54-76) | 75 (63-88) | 85 (72-101) | 96 (81-114) | 106 (90-126) |
| **25** | 0 | 7 (6-8) | 13 (11-16) | 27 (23-32) | 40 (34-47) | 53 (45-63) | 67 (56-79) | 80 (68-95) | 93 (79-110) | 106 (90-126) | 120 (102-142) | 133 (113-158) |
| **30** | 0 | 8 (7-9) | 16 (14-19) | 32 (27-38) | 48 (41-57) | 64 (54-76) | 80 (68-95) | 96 (81-114) | 112 (95-132) | 128 (108-151) | 144 (122-170) | 160 (135-189) |
| **40** | 0 | 11 (9-13) | 21 (18-25) | 43 (36-50) | 64 (54-76) | 85 (72-101) | 106 (90-126) | 128 (108-151) | 149 (126-177) | 170 (144-202) | 192 (163-227) | 213 (181-252) |
| **50** | 0 | 13 (11-16) | 27 (23-32) | 53 (45-63) | 80 (68-95) | 106 (90-126) | 133 (113-158) | 160 (135-189) | 186 (158-221) | 213 (181-252) | 240 (203-284) | 266 (226-315) |
| **60** | 0 | 16 (14-19) | 32 (27-38) | 64 (54-76) | 96 (81-114) | 128 (108-151) | 160 (135-189) | 192 (163-227) | 224 (190-265) | 256 (217-303) | 288 (244-341) | 319 (271-379) |
| **70** | 0 | 19 (16-22) | 37 (32-44) | 75 (63-88) | 112 (95-132) | 149 (126-177) | 186 (158-221) | 224 (190-265) | 261 (221-309) | 298 (253-353) | 335 (284-397) | 373 (316-442) |
| **75** | 0 | 20 (17-24) | 40 (34-47) | 80 (68-95) | 120 (102-142) | 160 (135-189) | 200 (169-237) | 240 (203-284) | 280 (237-331) | 319 (271-379) | 359 (305-426) | 399 (339-473) |
| **80** | 0 | 21 (18-25) | 43 (36-50) | 85 (72-101) | 128 (108-151) | 170 (144-202) | 213 (181-252) | 256 (217-303) | 298 (253-353) | 341 (289-404) | 383 (325-454) | 426 (361-505) |
| **90** | 0 | 24 (20-28) | 48 (41-57) | 96 (81-114) | 144 (122-170) | 192 (163-227) | 240 (203-284) | 288 (244-341) | 335 (284-397) | 383 (325-454) | 431 (366-511) | 479 (406-568) |
| **100** | 0 | 27 (23-32) | 53 (45-63) | 106 (90-126) | 160 (135-189) | 213 (181-252) | 266 (226-315) | 319 (271-379) | 373 (316-442) | 426 (361-505) | 479 (406-568) | 532 (452-631) |

**Table A10.7a** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 34 (31-37) | 68 (63-73) | 136 (125-147) | 203 (188-220) | 271 (250-294) | 339 (313-367) | 407 (375-441) | 474 (438-514) | 542 (500-588) | 610 (563-661) | 678 (626-735) |
| **20** | 0 | 68 (63-73) | 136 (125-147) | 271 (250-294) | 407 (375-441) | 542 (500-588) | 678 (626-735) | 813 (751-881) | 949 (876-1028) | 1084 (1001-1175) | 1220 (1126-1322) | 1356 (1251-1469) |
| **25** | 0 | 85 (78-92) | 169 (156-184) | 339 (313-367) | 508 (469-551) | 678 (626-735) | 847 (782-918) | 1017 (938-1102) | 1186 (1095-1285) | 1356 (1251-1469) | 1525 (1408-1653) | 1694 (1564-1836) |
| **30** | 0 | 102 (94-110) | 203 (188-220) | 407 (375-441) | 610 (563-661) | 813 (751-881) | 1017 (938-1102) | 1220 (1126-1322) | 1423 (1314-1543) | 1627 (1501-1763) | 1830 (1689-1983) | 2033 (1877-2204) |
| **40** | 0 | 136 (125-147) | 271 (250-294) | 542 (500-588) | 813 (751-881) | 1084 (1001-1175) | 1356 (1251-1469) | 1627 (1501-1763) | 1898 (1752-2057) | 2169 (2002-2351) | 2440 (2252-2644) | 2711 (2502-2938) |
| **50** | 0 | 169 (156-184) | 339 (313-367) | 678 (626-735) | 1017 (938-1102) | 1356 (1251-1469) | 1694 (1564-1836) | 2033 (1877-2204) | 2372 (2190-2571) | 2711 (2502-2938) | 3050 (2815-3305) | 3389 (3128-3673) |
| **60** | 0 | 203 (188-220) | 407 (375-441) | 813 (751-881) | 1220 (1126-1322) | 1627 (1501-1763) | 2033 (1877-2204) | 2440 (2252-2644) | 2847 (2628-3085) | 3253 (3003-3526) | 3660 (3378-3966) | 4067 (3754-4407) |
| **70** | 0 | 237 (219-257) | 474 (438-514) | 949 (876-1028) | 1423 (1314-1543) | 1898 (1752-2057) | 2372 (2190-2571) | 2847 (2628-3085) | 3321 (3065-3599) | 3796 (3503-4113) | 4270 (3941-4628) | 4745 (4379-5142) |
| **75** | 0 | 254 (235-275) | 508 (469-551) | 1017 (938-1102) | 1525 (1408-1653) | 2033 (1877-2204) | 2542 (2346-2755) | 3050 (2815-3305) | 3558 (3284-3856) | 4067 (3754-4407) | 4575 (4223-4958) | 5083 (4692-5509) |
| **80** | 0 | 271 (250-294) | 542 (500-588) | 1084 (1001-1175) | 1627 (1501-1763) | 2169 (2002-2351) | 2711 (2502-2938) | 3253 (3003-3526) | 3796 (3503-4113) | 4338 (4004-4701) | 4880 (4504-5289) | 5422 (5005-5876) |
| **90** | 0 | 305 (282-331) | 610 (563-661) | 1220 (1126-1322) | 1830 (1689-1983) | 2440 (2252-2644) | 3050 (2815-3305) | 3660 (3378-3966) | 4270 (3941-4628) | 4880 (4504-5289) | 5490 (5067-5950) | 6100 (5630-6611) |
| **100** | 0 | 339 (313-367) | 678 (626-735) | 1356 (1251-1469) | 2033 (1877-2204) | 2711 (2502-2938) | 3389 (3128-3673) | 4067 (3754-4407) | 4745 (4379-5142) | 5422 (5005-5876) | 6100 (5630-6611) | 6778 (6256-7345) |

**Table A10.7b** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 43 (40-46) | 85 (79-92) | 171 (158-184) | 256 (238-277) | 342 (317-369) | 427 (396-461) | 513 (475-553) | 598 (554-646) | 684 (633-738) | 769 (713-830) | 855 (792-922) |
| **20** | 0 | 85 (79-92) | 171 (158-184) | 342 (317-369) | 513 (475-553) | 684 (633-738) | 855 (792-922) | 1026 (950-1107) | 1197 (1109-1291) | 1367 (1267-1476) | 1538 (1425-1660) | 1709 (1584-1845) |
| **25** | 0 | 107 (99-115) | 214 (198-231) | 427 (396-461) | 641 (594-692) | 855 (792-922) | 1068 (990-1153) | 1282 (1188-1383) | 1496 (1386-1614) | 1709 (1584-1845) | 1923 (1782-2075) | 2137 (1980-2306) |
| **30** | 0 | 128 (119-138) | 256 (238-277) | 513 (475-553) | 769 (713-830) | 1026 (950-1107) | 1282 (1188-1383) | 1538 (1425-1660) | 1795 (1663-1937) | 2051 (1900-2214) | 2308 (2138-2490) | 2564 (2376-2767) |
| **40** | 0 | 171 (158-184) | 342 (317-369) | 684 (633-738) | 1026 (950-1107) | 1367 (1267-1476) | 1709 (1584-1845) | 2051 (1900-2214) | 2393 (2217-2582) | 2735 (2534-2951) | 3077 (2851-3320) | 3419 (3167-3689) |
| **50** | 0 | 214 (198-231) | 427 (396-461) | 855 (792-922) | 1282 (1188-1383) | 1709 (1584-1845) | 2137 (1980-2306) | 2564 (2376-2767) | 2991 (2771-3228) | 3419 (3167-3689) | 3846 (3563-4150) | 4273 (3959-4611) |
| **60** | 0 | 256 (238-277) | 513 (475-553) | 1026 (950-1107) | 1538 (1425-1660) | 2051 (1900-2214) | 2564 (2376-2767) | 3077 (2851-3320) | 3590 (3326-3874) | 4102 (3801-4427) | 4615 (4276-4980) | 5128 (4751-5534) |
| **70** | 0 | 299 (277-323) | 598 (554-646) | 1197 (1109-1291) | 1795 (1663-1937) | 2393 (2217-2582) | 2991 (2771-3228) | 3590 (3326-3874) | 4188 (3880-4519) | 4786 (4434-5165) | 5384 (4989-5810) | 5983 (5543-6456) |
| **75** | 0 | 320 (297-346) | 641 (594-692) | 1282 (1188-1383) | 1923 (1782-2075) | 2564 (2376-2767) | 3205 (2969-3459) | 3846 (3563-4150) | 4487 (4157-4842) | 5128 (4751-5534) | 5769 (5345-6225) | 6410 (5939-6917) |
| **80** | 0 | 342 (317-369) | 684 (633-738) | 1367 (1267-1476) | 2051 (1900-2214) | 2735 (2534-2951) | 3419 (3167-3689) | 4102 (3801-4427) | 4786 (4434-5165) | 5470 (5068-5903) | 6153 (5701-6641) | 6837 (6335-7378) |
| **90** | 0 | 385 (356-415) | 769 (713-830) | 1538 (1425-1660) | 2308 (2138-2490) | 3077 (2851-3320) | 3846 (3563-4150) | 4615 (4276-4980) | 5384 (4989-5810) | 6153 (5701-6641) | 6923 (6414-7471) | 7692 (7127-8301) |
| **100** | 0 | 427 (396-461) | 855 (792-922) | 1709 (1584-1845) | 2564 (2376-2767) | 3419 (3167-3689) | 4273 (3959-4611) | 5128 (4751-5534) | 5983 (5543-6456) | 6837 (6335-7378) | 7692 (7127-8301) | 8547 (7919-9223) |

**Table A10.7c** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 32 (29-35) | 64 (58-69) | 127 (117-138) | 191 (175-208) | 254 (234-277) | 318 (292-346) | 382 (350-415) | 445 (409-484) | 509 (467-553) | 572 (525-623) | 636 (584-692) |
| **20** | 0 | 64 (58-69) | 127 (117-138) | 254 (234-277) | 382 (350-415) | 509 (467-553) | 636 (584-692) | 763 (701-830) | 890 (817-968) | 1018 (934-1107) | 1145 (1051-1245) | 1272 (1168-1383) |
| **25** | 0 | 80 (73-86) | 159 (146-173) | 318 (292-346) | 477 (438-519) | 636 (584-692) | 795 (730-865) | 954 (876-1038) | 1113 (1022-1210) | 1272 (1168-1383) | 1431 (1313-1556) | 1590 (1459-1729) |
| **30** | 0 | 95 (88-104) | 191 (175-208) | 382 (350-415) | 572 (525-623) | 763 (701-830) | 954 (876-1038) | 1145 (1051-1245) | 1336 (1226-1453) | 1526 (1401-1660) | 1717 (1576-1868) | 1908 (1751-2075) |
| **40** | 0 | 127 (117-138) | 254 (234-277) | 509 (467-553) | 763 (701-830) | 1018 (934-1107) | 1272 (1168-1383) | 1526 (1401-1660) | 1781 (1635-1937) | 2035 (1868-2213) | 2290 (2102-2490) | 2544 (2335-2767) |
| **50** | 0 | 159 (146-173) | 318 (292-346) | 636 (584-692) | 954 (876-1038) | 1272 (1168-1383) | 1590 (1459-1729) | 1908 (1751-2075) | 2226 (2043-2421) | 2544 (2335-2767) | 2862 (2627-3113) | 3180 (2919-3458) |
| **60** | 0 | 191 (175-208) | 382 (350-415) | 763 (701-830) | 1145 (1051-1245) | 1526 (1401-1660) | 1908 (1751-2075) | 2290 (2102-2490) | 2671 (2452-2905) | 3053 (2802-3320) | 3434 (3152-3735) | 3816 (3503-4150) |
| **70** | 0 | 223 (204-242) | 445 (409-484) | 890 (817-968) | 1336 (1226-1453) | 1781 (1635-1937) | 2226 (2043-2421) | 2671 (2452-2905) | 3116 (2860-3389) | 3562 (3269-3873) | 4007 (3678-4358) | 4452 (4086-4842) |
| **75** | 0 | 239 (219-259) | 477 (438-519) | 954 (876-1038) | 1431 (1313-1556) | 1908 (1751-2075) | 2385 (2189-2594) | 2862 (2627-3113) | 3339 (3065-3631) | 3816 (3503-4150) | 4293 (3940-4669) | 4770 (4378-5188) |
| **80** | 0 | 254 (234-277) | 509 (467-553) | 1018 (934-1107) | 1526 (1401-1660) | 2035 (1868-2213) | 2544 (2335-2767) | 3053 (2802-3320) | 3562 (3269-3873) | 4071 (3736-4427) | 4579 (4203-4980) | 5088 (4670-5533) |
| **90** | 0 | 286 (263-311) | 572 (525-623) | 1145 (1051-1245) | 1717 (1576-1868) | 2290 (2102-2490) | 2862 (2627-3113) | 3434 (3152-3735) | 4007 (3678-4358) | 4579 (4203-4980) | 5152 (4728-5603) | 5724 (5254-6225) |
| **100** | 0 | 318 (292-346) | 636 (584-692) | 1272 (1168-1383) | 1908 (1751-2075) | 2544 (2335-2767) | 3180 (2919-3458) | 3816 (3503-4150) | 4452 (4086-4842) | 5088 (4670-5533) | 5724 (5254-6225) | 6360 (5838-6917) |

**Table A10.7d** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 34 (32-37) | 69 (64-75) | 138 (127-149) | 207 (191-224) | 275 (254-298) | 344 (318-373) | 413 (381-447) | 482 (445-522) | 551 (508-597) | 620 (572-671) | 688 (635-746) |
| **20** | 0 | 69 (64-75) | 138 (127-149) | 275 (254-298) | 413 (381-447) | 551 (508-597) | 688 (635-746) | 826 (763-895) | 964 (890-1044) | 1102 (1017-1193) | 1239 (1144-1342) | 1377 (1271-1491) |
| **25** | 0 | 86 (79-93) | 172 (159-186) | 344 (318-373) | 516 (477-559) | 688 (635-746) | 861 (794-932) | 1033 (953-1119) | 1205 (1112-1305) | 1377 (1271-1491) | 1549 (1430-1678) | 1721 (1589-1864) |
| **30** | 0 | 103 (95-112) | 207 (191-224) | 413 (381-447) | 620 (572-671) | 826 (763-895) | 1033 (953-1119) | 1239 (1144-1342) | 1446 (1334-1566) | 1652 (1525-1790) | 1859 (1716-2013) | 2065 (1906-2237) |
| **40** | 0 | 138 (127-149) | 275 (254-298) | 551 (508-597) | 826 (763-895) | 1102 (1017-1193) | 1377 (1271-1491) | 1652 (1525-1790) | 1928 (1779-2088) | 2203 (2033-2386) | 2479 (2288-2685) | 2754 (2542-2983) |
| **50** | 0 | 172 (159-186) | 344 (318-373) | 688 (635-746) | 1033 (953-1119) | 1377 (1271-1491) | 1721 (1589-1864) | 2065 (1906-2237) | 2410 (2224-2610) | 2754 (2542-2983) | 3098 (2859-3356) | 3442 (3177-3729) |
| **60** | 0 | 207 (191-224) | 413 (381-447) | 826 (763-895) | 1239 (1144-1342) | 1652 (1525-1790) | 2065 (1906-2237) | 2479 (2288-2685) | 2892 (2669-3132) | 3305 (3050-3579) | 3718 (3431-4027) | 4131 (3813-4474) |
| **70** | 0 | 241 (222-261) | 482 (445-522) | 964 (890-1044) | 1446 (1334-1566) | 1928 (1779-2088) | 2410 (2224-2610) | 2892 (2669-3132) | 3374 (3114-3654) | 3856 (3558-4176) | 4337 (4003-4698) | 4819 (4448-5220) |
| **75** | 0 | 258 (238-280) | 516 (477-559) | 1033 (953-1119) | 1549 (1430-1678) | 2065 (1906-2237) | 2582 (2383-2796) | 3098 (2859-3356) | 3615 (3336-3915) | 4131 (3813-4474) | 4647 (4289-5034) | 5164 (4766-5593) |
| **80** | 0 | 275 (254-298) | 551 (508-597) | 1102 (1017-1193) | 1652 (1525-1790) | 2203 (2033-2386) | 2754 (2542-2983) | 3305 (3050-3579) | 3856 (3558-4176) | 4406 (4067-4773) | 4957 (4575-5369) | 5508 (5083-5966) |
| **90** | 0 | 310 (286-336) | 620 (572-671) | 1239 (1144-1342) | 1859 (1716-2013) | 2479 (2288-2685) | 3098 (2859-3356) | 3718 (3431-4027) | 4337 (4003-4698) | 4957 (4575-5369) | 5577 (5147-6040) | 6196 (5719-6712) |
| **100** | 0 | 344 (318-373) | 688 (635-746) | 1377 (1271-1491) | 2065 (1906-2237) | 2754 (2542-2983) | 3442 (3177-3729) | 4131 (3813-4474) | 4819 (4448-5220) | 5508 (5083-5966) | 6196 (5719-6712) | 6885 (6354-7457) |

**Table A10.8a** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 12 (10-13) | 23 (20-26) | 46 (41-52) | 69 (61-78) | 92 (81-104) | 115 (101-130) | 138 (122-156) | 161 (142-182) | 184 (162-207) | 208 (183-233) | 231 (203-259) |
| **20** | 0 | 23 (20-26) | 46 (41-52) | 92 (81-104) | 138 (122-156) | 184 (162-207) | 231 (203-259) | 277 (243-311) | 323 (284-363) | 369 (325-415) | 415 (365-467) | 461 (406-519) |
| **25** | 0 | 29 (25-32) | 58 (51-65) | 115 (101-130) | 173 (152-194) | 231 (203-259) | 288 (254-324) | 346 (304-389) | 404 (355-454) | 461 (406-519) | 519 (456-583) | 576 (507-648) |
| **30** | 0 | 35 (30-39) | 69 (61-78) | 138 (122-156) | 208 (183-233) | 277 (243-311) | 346 (304-389) | 415 (365-467) | 484 (426-545) | 553 (487-622) | 623 (548-700) | 692 (608-778) |
| **40** | 0 | 46 (41-52) | 92 (81-104) | 184 (162-207) | 277 (243-311) | 369 (325-415) | 461 (406-519) | 553 (487-622) | 646 (568-726) | 738 (649-830) | 830 (730-933) | 922 (811-1037) |
| **50** | 0 | 58 (51-65) | 115 (101-130) | 231 (203-259) | 346 (304-389) | 461 (406-519) | 576 (507-648) | 692 (608-778) | 807 (710-908) | 922 (811-1037) | 1038 (913-1167) | 1153 (1014-1296) |
| **60** | 0 | 69 (61-78) | 138 (122-156) | 277 (243-311) | 415 (365-467) | 553 (487-622) | 692 (608-778) | 830 (730-933) | 968 (852-1089) | 1107 (974-1245) | 1245 (1095-1400) | 1384 (1217-1556) |
| **70** | 0 | 81 (71-91) | 161 (142-182) | 323 (284-363) | 484 (426-545) | 646 (568-726) | 807 (710-908) | 968 (852-1089) | 1130 (994-1271) | 1291 (1136-1452) | 1453 (1278-1634) | 1614 (1420-1815) |
| **75** | 0 | 86 (76-97) | 173 (152-194) | 346 (304-389) | 519 (456-583) | 692 (608-778) | 865 (761-972) | 1038 (913-1167) | 1211 (1065-1361) | 1384 (1217-1556) | 1556 (1369-1750) | 1729 (1521-1945) |
| **80** | 0 | 92 (81-104) | 184 (162-207) | 369 (325-415) | 553 (487-622) | 738 (649-830) | 922 (811-1037) | 1107 (974-1245) | 1291 (1136-1452) | 1476 (1298-1660) | 1660 (1460-1867) | 1845 (1623-2074) |
| **90** | 0 | 104 (91-117) | 208 (183-233) | 415 (365-467) | 623 (548-700) | 830 (730-933) | 1038 (913-1167) | 1245 (1095-1400) | 1453 (1278-1634) | 1660 (1460-1867) | 1868 (1643-2100) | 2075 (1825-2334) |
| **100** | 0 | 115 (101-130) | 231 (203-259) | 461 (406-519) | 692 (608-778) | 922 (811-1037) | 1153 (1014-1296) | 1384 (1217-1556) | 1614 (1420-1815) | 1845 (1623-2074) | 2075 (1825-2334) | 2306 (2028-2593) |

**Table A10.8b** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 13 (12-15) | 27 (24-30) | 54 (47-60) | 80 (71-90) | 107 (95-121) | 134 (118-151) | 161 (142-181) | 187 (166-211) | 214 (189-241) | 241 (213-271) | 268 (236-301) |
| **20** | 0 | 27 (24-30) | 54 (47-60) | 107 (95-121) | 161 (142-181) | 214 (189-241) | 268 (236-301) | 321 (284-362) | 375 (331-422) | 428 (378-482) | 482 (426-543) | 535 (473-603) |
| **25** | 0 | 33 (30-38) | 67 (59-75) | 134 (118-151) | 201 (177-226) | 268 (236-301) | 335 (296-377) | 401 (355-452) | 468 (414-528) | 535 (473-603) | 602 (532-678) | 669 (591-754) |
| **30** | 0 | 40 (35-45) | 80 (71-90) | 161 (142-181) | 241 (213-271) | 321 (284-362) | 401 (355-452) | 482 (426-543) | 562 (497-633) | 642 (568-724) | 723 (638-814) | 803 (709-904) |
| **40** | 0 | 54 (47-60) | 107 (95-121) | 214 (189-241) | 321 (284-362) | 428 (378-482) | 535 (473-603) | 642 (568-724) | 749 (662-844) | 856 (757-965) | 963 (851-1085) | 1070 (946-1206) |
| **50** | 0 | 67 (59-75) | 134 (118-151) | 268 (236-301) | 401 (355-452) | 535 (473-603) | 669 (591-754) | 803 (709-904) | 937 (828-1055) | 1070 (946-1206) | 1204 (1064-1357) | 1338 (1182-1507) |
| **60** | 0 | 80 (71-90) | 161 (142-181) | 321 (284-362) | 482 (426-543) | 642 (568-724) | 803 (709-904) | 963 (851-1085) | 1124 (993-1266) | 1285 (1135-1447) | 1445 (1277-1628) | 1606 (1419-1809) |
| **70** | 0 | 94 (83-106) | 187 (166-211) | 375 (331-422) | 562 (497-633) | 749 (662-844) | 937 (828-1055) | 1124 (993-1266) | 1311 (1159-1477) | 1499 (1324-1688) | 1686 (1490-1899) | 1873 (1655-2110) |
| **75** | 0 | 100 (89-113) | 201 (177-226) | 401 (355-452) | 602 (532-678) | 803 (709-904) | 1004 (887-1131) | 1204 (1064-1357) | 1405 (1242-1583) | 1606 (1419-1809) | 1806 (1596-2035) | 2007 (1774-2261) |
| **80** | 0 | 107 (95-121) | 214 (189-241) | 428 (378-482) | 642 (568-724) | 856 (757-965) | 1070 (946-1206) | 1285 (1135-1447) | 1499 (1324-1688) | 1713 (1513-1930) | 1927 (1703-2171) | 2141 (1892-2412) |
| **90** | 0 | 120 (106-136) | 241 (213-271) | 482 (426-543) | 723 (638-814) | 963 (851-1085) | 1204 (1064-1357) | 1445 (1277-1628) | 1686 (1490-1899) | 1927 (1703-2171) | 2168 (1915-2442) | 2409 (2128-2713) |
| **100** | 0 | 134 (118-151) | 268 (236-301) | 535 (473-603) | 803 (709-904) | 1070 (946-1206) | 1338 (1182-1507) | 1606 (1419-1809) | 1873 (1655-2110) | 2141 (1892-2412) | 2409 (2128-2713) | 2676 (2365-3015) |

**Table A10.8c** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 10 (9-12) | 20 (17-23) | 40 (35-47) | 61 (52-70) | 81 (70-94) | 101 (87-117) | 121 (105-140) | 142 (122-164) | 162 (140-187) | 182 (157-210) | 202 (175-234) |
| **20** | 0 | 20 (17-23) | 40 (35-47) | 81 (70-94) | 121 (105-140) | 162 (140-187) | 202 (175-234) | 243 (210-281) | 283 (245-327) | 324 (280-374) | 364 (315-421) | 405 (350-468) |
| **25** | 0 | 25 (22-29) | 51 (44-58) | 101 (87-117) | 152 (131-175) | 202 (175-234) | 253 (219-292) | 304 (262-351) | 354 (306-409) | 405 (350-468) | 455 (393-526) | 506 (437-585) |
| **30** | 0 | 30 (26-35) | 61 (52-70) | 121 (105-140) | 182 (157-210) | 243 (210-281) | 304 (262-351) | 364 (315-421) | 425 (367-491) | 486 (420-561) | 546 (472-631) | 607 (525-702) |
| **40** | 0 | 40 (35-47) | 81 (70-94) | 162 (140-187) | 243 (210-281) | 324 (280-374) | 405 (350-468) | 486 (420-561) | 567 (490-655) | 648 (560-748) | 729 (630-842) | 810 (699-935) |
| **50** | 0 | 51 (44-58) | 101 (87-117) | 202 (175-234) | 304 (262-351) | 405 (350-468) | 506 (437-585) | 607 (525-702) | 708 (612-818) | 810 (699-935) | 911 (787-1052) | 1012 (874-1169) |
| **60** | 0 | 61 (52-70) | 121 (105-140) | 243 (210-281) | 364 (315-421) | 486 (420-561) | 607 (525-702) | 729 (630-842) | 850 (734-982) | 972 (839-1123) | 1093 (944-1263) | 1214 (1049-1403) |
| **70** | 0 | 71 (61-82) | 142 (122-164) | 283 (245-327) | 425 (367-491) | 567 (490-655) | 708 (612-818) | 850 (734-982) | 992 (857-1146) | 1133 (979-1310) | 1275 (1102-1473) | 1417 (1224-1637) |
| **75** | 0 | 76 (66-88) | 152 (131-175) | 304 (262-351) | 455 (393-526) | 607 (525-702) | 759 (656-877) | 911 (787-1052) | 1063 (918-1228) | 1214 (1049-1403) | 1366 (1180-1579) | 1518 (1312-1754) |
| **80** | 0 | 81 (70-94) | 162 (140-187) | 324 (280-374) | 486 (420-561) | 648 (560-748) | 810 (699-935) | 972 (839-1123) | 1133 (979-1310) | 1295 (1119-1497) | 1457 (1259-1684) | 1619 (1399-1871) |
| **90** | 0 | 91 (79-105) | 182 (157-210) | 364 (315-421) | 546 (472-631) | 729 (630-842) | 911 (787-1052) | 1093 (944-1263) | 1275 (1102-1473) | 1457 (1259-1684) | 1639 (1416-1894) | 1822 (1574-2105) |
| **100** | 0 | 101 (87-117) | 202 (175-234) | 405 (350-468) | 607 (525-702) | 810 (699-935) | 1012 (874-1169) | 1214 (1049-1403) | 1417 (1224-1637) | 1619 (1399-1871) | 1822 (1574-2105) | 2024 (1749-2339) |

**Table A10.8d** Predicted impacts of displacement, for razobill for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 11 (10-12) | 22 (19-25) | 43 (38-49) | 65 (57-74) | 87 (76-99) | 109 (95-123) | 130 (114-148) | 152 (133-173) | 174 (152-198) | 196 (171-222) | 217 (190-247) |
| **20** | 0 | 22 (19-25) | 43 (38-49) | 87 (76-99) | 130 (114-148) | 174 (152-198) | 217 (190-247) | 261 (229-296) | 304 (267-346) | 348 (305-395) | 391 (343-444) | 435 (381-494) |
| **25** | 0 | 27 (24-31) | 54 (48-62) | 109 (95-123) | 163 (143-185) | 217 (190-247) | 272 (238-309) | 326 (286-370) | 380 (333-432) | 435 (381-494) | 489 (428-556) | 544 (476-617) |
| **30** | 0 | 33 (29-37) | 65 (57-74) | 130 (114-148) | 196 (171-222) | 261 (229-296) | 326 (286-370) | 391 (343-444) | 457 (400-519) | 522 (457-593) | 587 (514-667) | 652 (571-741) |
| **40** | 0 | 43 (38-49) | 87 (76-99) | 174 (152-198) | 261 (229-296) | 348 (305-395) | 435 (381-494) | 522 (457-593) | 609 (533-691) | 696 (609-790) | 783 (686-889) | 870 (762-988) |
| **50** | 0 | 54 (48-62) | 109 (95-123) | 217 (190-247) | 326 (286-370) | 435 (381-494) | 544 (476-617) | 652 (571-741) | 761 (667-864) | 870 (762-988) | 978 (857-1111) | 1087 (952-1235) |
| **60** | 0 | 65 (57-74) | 130 (114-148) | 261 (229-296) | 391 (343-444) | 522 (457-593) | 652 (571-741) | 783 (686-889) | 913 (800-1037) | 1044 (914-1185) | 1174 (1028-1333) | 1305 (1143-1482) |
| **70** | 0 | 76 (67-86) | 152 (133-173) | 304 (267-346) | 457 (400-519) | 609 (533-691) | 761 (667-864) | 913 (800-1037) | 1065 (933-1210) | 1218 (1066-1383) | 1370 (1200-1556) | 1522 (1333-1728) |
| **75** | 0 | 82 (71-93) | 163 (143-185) | 326 (286-370) | 489 (428-556) | 652 (571-741) | 815 (714-926) | 978 (857-1111) | 1141 (1000-1296) | 1305 (1143-1482) | 1468 (1285-1667) | 1631 (1428-1852) |
| **80** | 0 | 87 (76-99) | 174 (152-198) | 348 (305-395) | 522 (457-593) | 696 (609-790) | 870 (762-988) | 1044 (914-1185) | 1218 (1066-1383) | 1391 (1219-1580) | 1565 (1371-1778) | 1739 (1524-1975) |
| **90** | 0 | 98 (86-111) | 196 (171-222) | 391 (343-444) | 587 (514-667) | 783 (686-889) | 978 (857-1111) | 1174 (1028-1333) | 1370 (1200-1556) | 1565 (1371-1778) | 1761 (1543-2000) | 1957 (1714-2222) |
| **100** | 0 | 109 (95-123) | 217 (190-247) | 435 (381-494) | 652 (571-741) | 870 (762-988) | 1087 (952-1235) | 1305 (1143-1482) | 1522 (1333-1728) | 1739 (1524-1975) | 1957 (1714-2222) | 2174 (1904-2469) |

**Table A10.9a** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 2 (2-4) | 5 (4-7) | 10 (7-14) | 15 (11-21) | 20 (15-28) | 25 (19-35) | 30 (22-42) | 35 (26-49) | 40 (30-56) | 45 (33-63) | 50 (37-70) |
| **20** | 0 | 5 (4-7) | 10 (7-14) | 20 (15-28) | 30 (22-42) | 40 (30-56) | 50 (37-70) | 60 (45-84) | 69 (52-98) | 79 (59-112) | 89 (67-126) | 99 (74-140) |
| **25** | 0 | 6 (5-9) | 12 (9-18) | 25 (19-35) | 37 (28-53) | 50 (37-70) | 62 (46-88) | 74 (56-105) | 87 (65-123) | 99 (74-140) | 112 (84-158) | 124 (93-176) |
| **30** | 0 | 7 (6-11) | 15 (11-21) | 30 (22-42) | 45 (33-63) | 60 (45-84) | 74 (56-105) | 89 (67-126) | 104 (78-147) | 119 (89-169) | 134 (100-190) | 149 (111-211) |
| **40** | 0 | 10 (7-14) | 20 (15-28) | 40 (30-56) | 60 (45-84) | 79 (59-112) | 99 (74-140) | 119 (89-169) | 139 (104-197) | 159 (119-225) | 179 (134-253) | 198 (148-281) |
| **50** | 0 | 12 (9-18) | 25 (19-35) | 50 (37-70) | 74 (56-105) | 99 (74-140) | 124 (93-176) | 149 (111-211) | 174 (130-246) | 198 (148-281) | 223 (167-316) | 248 (186-351) |
| **60** | 0 | 15 (11-21) | 30 (22-42) | 60 (45-84) | 89 (67-126) | 119 (89-169) | 149 (111-211) | 179 (134-253) | 208 (156-295) | 238 (178-337) | 268 (200-379) | 298 (223-421) |
| **70** | 0 | 17 (13-25) | 35 (26-49) | 69 (52-98) | 104 (78-147) | 139 (104-197) | 174 (130-246) | 208 (156-295) | 243 (182-344) | 278 (208-393) | 313 (234-442) | 347 (260-491) |
| **75** | 0 | 19 (14-26) | 37 (28-53) | 74 (56-105) | 112 (84-158) | 149 (111-211) | 186 (139-263) | 223 (167-316) | 260 (195-369) | 298 (223-421) | 335 (251-474) | 372 (278-527) |
| **80** | 0 | 20 (15-28) | 40 (30-56) | 79 (59-112) | 119 (89-169) | 159 (119-225) | 198 (148-281) | 238 (178-337) | 278 (208-393) | 318 (238-449) | 357 (267-506) | 397 (297-562) |
| **90** | 0 | 22 (17-32) | 45 (33-63) | 89 (67-126) | 134 (100-190) | 179 (134-253) | 223 (167-316) | 268 (200-379) | 313 (234-442) | 357 (267-506) | 402 (301-569) | 447 (334-632) |
| **100** | 0 | 25 (19-35) | 50 (37-70) | 99 (74-140) | 149 (111-211) | 198 (148-281) | 248 (186-351) | 298 (223-421) | 347 (260-491) | 397 (297-562) | 447 (334-632) | 496 (371-702) |

**Table A10.9b** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 2 (2-3) | 4 (3-6) | 9 (7-12) | 13 (10-17) | 17 (14-23) | 21 (17-29) | 26 (20-35) | 30 (24-41) | 34 (27-46) | 39 (30-52) | 43 (34-58) |
| 20 | 0 | 4 (3-6) | 9 (7-12) | 17 (14-23) | 26 (20-35) | 34 (27-46) | 43 (34-58) | 52 (41-70) | 60 (47-81) | 69 (54-93) | 77 (61-104) | 86 (68-116) |
| 25 | 0 | 5 (4-7) | 11 (8-14) | 21 (17-29) | 32 (25-43) | 43 (34-58) | 54 (42-72) | 64 (51-87) | 75 (59-101) | 86 (68-116) | 97 (76-130) | 107 (84-145) |
| 30 | 0 | 6 (5-9) | 13 (10-17) | 26 (20-35) | 39 (30-52) | 52 (41-70) | 64 (51-87) | 77 (61-104) | 90 (71-122) | 103 (81-139) | 116 (91-156) | 129 (101-174) |
| 40 | 0 | 9 (7-12) | 17 (14-23) | 34 (27-46) | 52 (41-70) | 69 (54-93) | 86 (68-116) | 103 (81-139) | 120 (95-162) | 138 (108-185) | 155 (122-209) | 172 (135-232) |
| 50 | 0 | 11 (8-14) | 21 (17-29) | 43 (34-58) | 64 (51-87) | 86 (68-116) | 107 (84-145) | 129 (101-174) | 150 (118-203) | 172 (135-232) | 193 (152-261) | 215 (169-290) |
| 60 | 0 | 13 (10-17) | 26 (20-35) | 52 (41-70) | 77 (61-104) | 103 (81-139) | 129 (101-174) | 155 (122-209) | 181 (142-243) | 206 (162-278) | 232 (183-313) | 258 (203-348) |
| 70 | 0 | 15 (12-20) | 30 (24-41) | 60 (47-81) | 90 (71-122) | 120 (95-162) | 150 (118-203) | 181 (142-243) | 211 (166-284) | 241 (189-324) | 271 (213-365) | 301 (237-405) |
| 75 | 0 | 16 (13-22) | 32 (25-43) | 64 (51-87) | 97 (76-130) | 129 (101-174) | 161 (127-217) | 193 (152-261) | 226 (177-304) | 258 (203-348) | 290 (228-391) | 322 (253-434) |
| 80 | 0 | 17 (14-23) | 34 (27-46) | 69 (54-93) | 103 (81-139) | 138 (108-185) | 172 (135-232) | 206 (162-278) | 241 (189-324) | 275 (216-371) | 309 (243-417) | 344 (270-463) |
| 90 | 0 | 19 (15-26) | 39 (30-52) | 77 (61-104) | 116 (91-156) | 155 (122-209) | 193 (152-261) | 232 (183-313) | 271 (213-365) | 309 (243-417) | 348 (274-469) | 387 (304-521) |
| 100 | 0 | 21 (17-29) | 43 (34-58) | 86 (68-116) | 129 (101-174) | 172 (135-232) | 215 (169-290) | 258 (203-348) | 301 (237-405) | 344 (270-463) | 387 (304-521) | 430 (338-579) |

**Table A10.9c** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 1 (1-1) | 2 (1-2) | 3 (2-4) | 5 (4-6) | 6 (5-8) | 8 (6-11) | 9 (7-13) | 11 (8-15) | 12 (10-17) | 14 (11-19) | 15 (12-21) |
| **20** | 0 | 2 (1-2) | 3 (2-4) | 6 (5-8) | 9 (7-13) | 12 (10-17) | 15 (12-21) | 18 (14-25) | 21 (17-30) | 24 (19-34) | 27 (22-38) | 30 (24-42) |
| **25** | 0 | 2 (2-3) | 4 (3-5) | 8 (6-11) | 11 (9-16) | 15 (12-21) | 19 (15-27) | 23 (18-32) | 27 (21-37) | 30 (24-42) | 34 (27-48) | 38 (30-53) |
| **30** | 0 | 2 (2-3) | 5 (4-6) | 9 (7-13) | 14 (11-19) | 18 (14-25) | 23 (18-32) | 27 (22-38) | 32 (25-45) | 36 (29-51) | 41 (32-57) | 46 (36-64) |
| **40** | 0 | 3 (2-4) | 6 (5-8) | 12 (10-17) | 18 (14-25) | 24 (19-34) | 30 (24-42) | 36 (29-51) | 43 (34-59) | 49 (38-68) | 55 (43-76) | 61 (48-85) |
| **50** | 0 | 4 (3-5) | 8 (6-11) | 15 (12-21) | 23 (18-32) | 30 (24-42) | 38 (30-53) | 46 (36-64) | 53 (42-74) | 61 (48-85) | 68 (54-96) | 76 (60-106) |
| **60** | 0 | 5 (4-6) | 9 (7-13) | 18 (14-25) | 27 (22-38) | 36 (29-51) | 46 (36-64) | 55 (43-76) | 64 (50-89) | 73 (58-102) | 82 (65-115) | 91 (72-127) |
| **70** | 0 | 5 (4-7) | 11 (8-15) | 21 (17-30) | 32 (25-45) | 43 (34-59) | 53 (42-74) | 64 (50-89) | 74 (59-104) | 85 (67-119) | 96 (76-134) | 106 (84-149) |
| **75** | 0 | 6 (5-8) | 11 (9-16) | 23 (18-32) | 34 (27-48) | 46 (36-64) | 57 (45-80) | 68 (54-96) | 80 (63-112) | 91 (72-127) | 103 (81-143) | 114 (90-159) |
| **80** | 0 | 6 (5-8) | 12 (10-17) | 24 (19-34) | 36 (29-51) | 49 (38-68) | 61 (48-85) | 73 (58-102) | 85 (67-119) | 97 (77-136) | 109 (87-153) | 122 (96-170) |
| **90** | 0 | 7 (5-10) | 14 (11-19) | 27 (22-38) | 41 (32-57) | 55 (43-76) | 68 (54-96) | 82 (65-115) | 96 (76-134) | 109 (87-153) | 123 (97-172) | 137 (108-191) |
| **100** | 0 | 8 (6-11) | 15 (12-21) | 30 (24-42) | 46 (36-64) | 61 (48-85) | 76 (60-106) | 91 (72-127) | 106 (84-149) | 122 (96-170) | 137 (108-191) | 152 (120-212) |

**Table A10.9d** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 2 (1-2) | 3 (2-5) | 7 (5-9) | 10 (7-14) | 13 (10-18) | 16 (12-23) | 20 (15-27) | 23 (17-32) | 26 (20-36) | 29 (22-41) | 33 (25-45) |
| **20** | 0 | 3 (2-5) | 7 (5-9) | 13 (10-18) | 20 (15-27) | 26 (20-36) | 33 (25-45) | 39 (30-54) | 46 (35-63) | 52 (40-72) | 59 (45-81) | 65 (50-90) |
| **25** | 0 | 4 (3-6) | 8 (6-11) | 16 (12-23) | 24 (19-34) | 33 (25-45) | 41 (31-57) | 49 (37-68) | 57 (44-79) | 65 (50-90) | 73 (56-102) | 81 (62-113) |
| **30** | 0 | 5 (4-7) | 10 (7-14) | 20 (15-27) | 29 (22-41) | 39 (30-54) | 49 (37-68) | 59 (45-81) | 68 (52-95) | 78 (60-109) | 88 (67-122) | 98 (75-136) |
| **40** | 0 | 7 (5-9) | 13 (10-18) | 26 (20-36) | 39 (30-54) | 52 (40-72) | 65 (50-90) | 78 (60-109) | 91 (70-127) | 104 (80-145) | 117 (90-163) | 130 (100-181) |
| **50** | 0 | 8 (6-11) | 16 (12-23) | 33 (25-45) | 49 (37-68) | 65 (50-90) | 81 (62-113) | 98 (75-136) | 114 (87-158) | 130 (100-181) | 146 (112-204) | 163 (125-226) |
| **60** | 0 | 10 (7-14) | 20 (15-27) | 39 (30-54) | 59 (45-81) | 78 (60-109) | 98 (75-136) | 117 (90-163) | 137 (105-190) | 156 (120-217) | 176 (135-244) | 195 (150-271) |
| **70** | 0 | 11 (9-16) | 23 (17-32) | 46 (35-63) | 68 (52-95) | 91 (70-127) | 114 (87-158) | 137 (105-190) | 159 (122-222) | 182 (140-253) | 205 (157-285) | 228 (175-317) |
| **75** | 0 | 12 (9-17) | 24 (19-34) | 49 (37-68) | 73 (56-102) | 98 (75-136) | 122 (94-170) | 146 (112-204) | 171 (131-238) | 195 (150-271) | 220 (169-305) | 244 (187-339) |
| **80** | 0 | 13 (10-18) | 26 (20-36) | 52 (40-72) | 78 (60-109) | 104 (80-145) | 130 (100-181) | 156 (120-217) | 182 (140-253) | 208 (160-290) | 234 (180-326) | 260 (200-362) |
| **90** | 0 | 15 (11-20) | 29 (22-41) | 59 (45-81) | 88 (67-122) | 117 (90-163) | 146 (112-204) | 176 (135-244) | 205 (157-285) | 234 (180-326) | 264 (202-366) | 293 (225-407) |
| **100** | 0 | 16 (12-23) | 33 (25-45) | 65 (50-90) | 98 (75-136) | 130 (100-181) | 163 (125-226) | 195 (150-271) | 228 (175-317) | 260 (200-362) | 293 (225-407) | 325 (250-452) |

**Table A10.10a** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 2 (2-3) | 4 (3-5) | 8 (7-10) | 12 (10-15) | 16 (13-20) | 21 (17-26) | 25 (20-31) | 29 (23-36) | 33 (27-41) | 37 (30-46) | 41 (33-51) |
| **20** | 0 | 4 (3-5) | 8 (7-10) | 16 (13-20) | 25 (20-31) | 33 (27-41) | 41 (33-51) | 49 (40-61) | 57 (46-72) | 66 (53-82) | 74 (60-92) | 82 (66-102) |
| **25** | 0 | 5 (4-6) | 10 (8-13) | 21 (17-26) | 31 (25-38) | 41 (33-51) | 51 (41-64) | 62 (50-77) | 72 (58-90) | 82 (66-102) | 92 (75-115) | 103 (83-128) |
| **30** | 0 | 6 (5-8) | 12 (10-15) | 25 (20-31) | 37 (30-46) | 49 (40-61) | 62 (50-77) | 74 (60-92) | 86 (70-108) | 99 (80-123) | 111 (90-138) | 123 (99-154) |
| **40** | 0 | 8 (7-10) | 16 (13-20) | 33 (27-41) | 49 (40-61) | 66 (53-82) | 82 (66-102) | 99 (80-123) | 115 (93-143) | 131 (106-164) | 148 (119-184) | 164 (133-205) |
| **50** | 0 | 10 (8-13) | 21 (17-26) | 41 (33-51) | 62 (50-77) | 82 (66-102) | 103 (83-128) | 123 (99-154) | 144 (116-179) | 164 (133-205) | 185 (149-231) | 205 (166-256) |
| **60** | 0 | 12 (10-15) | 25 (20-31) | 49 (40-61) | 74 (60-92) | 99 (80-123) | 123 (99-154) | 148 (119-184) | 172 (139-215) | 197 (159-246) | 222 (179-277) | 246 (199-307) |
| **70** | 0 | 14 (12-18) | 29 (23-36) | 57 (46-72) | 86 (70-108) | 115 (93-143) | 144 (116-179) | 172 (139-215) | 201 (163-251) | 230 (186-287) | 259 (209-323) | 287 (232-359) |
| **75** | 0 | 15 (12-19) | 31 (25-38) | 62 (50-77) | 92 (75-115) | 123 (99-154) | 154 (124-192) | 185 (149-231) | 215 (174-269) | 246 (199-307) | 277 (224-346) | 308 (249-384) |
| **80** | 0 | 16 (13-20) | 33 (27-41) | 66 (53-82) | 99 (80-123) | 131 (106-164) | 164 (133-205) | 197 (159-246) | 230 (186-287) | 263 (212-328) | 296 (239-369) | 328 (265-410) |
| **90** | 0 | 18 (15-23) | 37 (30-46) | 74 (60-92) | 111 (90-138) | 148 (119-184) | 185 (149-231) | 222 (179-277) | 259 (209-323) | 296 (239-369) | 332 (269-415) | 369 (298-461) |
| **100** | 0 | 21 (17-26) | 41 (33-51) | 82 (66-102) | 123 (99-154) | 164 (133-205) | 205 (166-256) | 246 (199-307) | 287 (232-359) | 328 (265-410) | 369 (298-461) | 410 (332-512) |

**Table A10.10b** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 3 (3-4) | 6 (5-7) | 12 (10-15) | 19 (16-22) | 25 (21-30) | 31 (26-37) | 37 (31-45) | 43 (37-52) | 49 (42-60) | 56 (47-67) | 62 (52-75) |
| **20** | 0 | 6 (5-7) | 12 (10-15) | 25 (21-30) | 37 (31-45) | 49 (42-60) | 62 (52-75) | 74 (63-89) | 87 (73-104) | 99 (84-119) | 111 (94-134) | 124 (105-149) |
| **25** | 0 | 8 (7-9) | 15 (13-19) | 31 (26-37) | 46 (39-56) | 62 (52-75) | 77 (66-93) | 93 (79-112) | 108 (92-131) | 124 (105-149) | 139 (118-168) | 155 (131-186) |
| **30** | 0 | 9 (8-11) | 19 (16-22) | 37 (31-45) | 56 (47-67) | 74 (63-89) | 93 (79-112) | 111 (94-134) | 130 (110-157) | 148 (126-179) | 167 (142-201) | 186 (157-224) |
| **40** | 0 | 12 (10-15) | 25 (21-30) | 49 (42-60) | 74 (63-89) | 99 (84-119) | 124 (105-149) | 148 (126-179) | 173 (147-209) | 198 (168-239) | 223 (189-268) | 247 (210-298) |
| **50** | 0 | 15 (13-19) | 31 (26-37) | 62 (52-75) | 93 (79-112) | 124 (105-149) | 155 (131-186) | 186 (157-224) | 217 (183-261) | 247 (210-298) | 278 (236-336) | 309 (262-373) |
| **60** | 0 | 19 (16-22) | 37 (31-45) | 74 (63-89) | 111 (94-134) | 148 (126-179) | 186 (157-224) | 223 (189-268) | 260 (220-313) | 297 (252-358) | 334 (283-403) | 371 (315-447) |
| **70** | 0 | 22 (18-26) | 43 (37-52) | 87 (73-104) | 130 (110-157) | 173 (147-209) | 217 (183-261) | 260 (220-313) | 303 (257-365) | 346 (294-418) | 390 (330-470) | 433 (367-522) |
| **75** | 0 | 23 (20-28) | 46 (39-56) | 93 (79-112) | 139 (118-168) | 186 (157-224) | 232 (197-280) | 278 (236-336) | 325 (275-392) | 371 (315-447) | 418 (354-503) | 464 (393-559) |
| **80** | 0 | 25 (21-30) | 49 (42-60) | 99 (84-119) | 148 (126-179) | 198 (168-239) | 247 (210-298) | 297 (252-358) | 346 (294-418) | 396 (335-477) | 445 (377-537) | 495 (419-597) |
| **90** | 0 | 28 (24-34) | 56 (47-67) | 111 (94-134) | 167 (142-201) | 223 (189-268) | 278 (236-336) | 334 (283-403) | 390 (330-470) | 445 (377-537) | 501 (425-604) | 557 (472-671) |
| **100** | 0 | 31 (26-37) | 62 (52-75) | 124 (105-149) | 186 (157-224) | 247 (210-298) | 309 (262-373) | 371 (315-447) | 433 (367-522) | 495 (419-597) | 557 (472-671) | 619 (524-746) |

**Table A10.10c** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 1 (1-1) | 2 (1-2) | 3 (3-4) | 5 (4-6) | 6 (5-8) | 8 (7-10) | 10 (8-12) | 11 (9-14) | 13 (11-16) | 14 (12-18) | 16 (13-20) |
| **20** | 0 | 2 (1-2) | 3 (3-4) | 6 (5-8) | 10 (8-12) | 13 (11-16) | 16 (13-20) | 19 (16-24) | 22 (18-28) | 26 (21-31) | 29 (24-35) | 32 (26-39) |
| **25** | 0 | 2 (2-2) | 4 (3-5) | 8 (7-10) | 12 (10-15) | 16 (13-20) | 20 (16-25) | 24 (20-29) | 28 (23-34) | 32 (26-39) | 36 (30-44) | 40 (33-49) |
| **30** | 0 | 2 (2-3) | 5 (4-6) | 10 (8-12) | 14 (12-18) | 19 (16-24) | 24 (20-29) | 29 (24-35) | 34 (28-41) | 39 (32-47) | 43 (35-53) | 48 (39-59) |
| **40** | 0 | 3 (3-4) | 6 (5-8) | 13 (11-16) | 19 (16-24) | 26 (21-31) | 32 (26-39) | 39 (32-47) | 45 (37-55) | 51 (42-63) | 58 (47-71) | 64 (53-79) |
| **50** | 0 | 4 (3-5) | 8 (7-10) | 16 (13-20) | 24 (20-29) | 32 (26-39) | 40 (33-49) | 48 (39-59) | 56 (46-69) | 64 (53-79) | 72 (59-88) | 80 (66-98) |
| **60** | 0 | 5 (4-6) | 10 (8-12) | 19 (16-24) | 29 (24-35) | 39 (32-47) | 48 (39-59) | 58 (47-71) | 67 (55-83) | 77 (63-94) | 87 (71-106) | 96 (79-118) |
| **70** | 0 | 6 (5-7) | 11 (9-14) | 22 (18-28) | 34 (28-41) | 45 (37-55) | 56 (46-69) | 67 (55-83) | 79 (64-96) | 90 (74-110) | 101 (83-124) | 112 (92-138) |
| **75** | 0 | 6 (5-7) | 12 (10-15) | 24 (20-29) | 36 (30-44) | 48 (39-59) | 60 (49-74) | 72 (59-88) | 84 (69-103) | 96 (79-118) | 108 (89-133) | 120 (98-147) |
| **80** | 0 | 6 (5-8) | 13 (11-16) | 26 (21-31) | 39 (32-47) | 51 (42-63) | 64 (53-79) | 77 (63-94) | 90 (74-110) | 103 (84-126) | 116 (95-141) | 128 (105-157) |
| **90** | 0 | 7 (6-9) | 14 (12-18) | 29 (24-35) | 43 (35-53) | 58 (47-71) | 72 (59-88) | 87 (71-106) | 101 (83-124) | 116 (95-141) | 130 (106-159) | 145 (118-177) |
| **100** | 0 | 8 (7-10) | 16 (13-20) | 32 (26-39) | 48 (39-59) | 64 (53-79) | 80 (66-98) | 96 (79-118) | 112 (92-138) | 128 (105-157) | 145 (118-177) | 161 (131-196) |

**Table A10.10d** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside B project plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 2 (2-2) | 4 (3-4) | 7 (6-9) | 11 (9-13) | 15 (12-18) | 18 (15-22) | 22 (18-27) | 25 (21-31) | 29 (24-36) | 33 (27-40) | 36 (30-44) |
| **20** | 0 | 4 (3-4) | 7 (6-9) | 15 (12-18) | 22 (18-27) | 29 (24-36) | 36 (30-44) | 44 (36-53) | 51 (42-62) | 58 (48-71) | 65 (54-80) | 73 (60-89) |
| **25** | 0 | 5 (4-6) | 9 (8-11) | 18 (15-22) | 27 (23-33) | 36 (30-44) | 45 (38-56) | 55 (45-67) | 64 (53-78) | 73 (60-89) | 82 (68-100) | 91 (75-111) |
| **30** | 0 | 5 (5-7) | 11 (9-13) | 22 (18-27) | 33 (27-40) | 44 (36-53) | 55 (45-67) | 65 (54-80) | 76 (63-93) | 87 (72-107) | 98 (81-120) | 109 (90-133) |
| **40** | 0 | 7 (6-9) | 15 (12-18) | 29 (24-36) | 44 (36-53) | 58 (48-71) | 73 (60-89) | 87 (72-107) | 102 (84-124) | 116 (96-142) | 131 (109-160) | 145 (121-178) |
| **50** | 0 | 9 (8-11) | 18 (15-22) | 36 (30-44) | 55 (45-67) | 73 (60-89) | 91 (75-111) | 109 (90-133) | 127 (105-155) | 145 (121-178) | 164 (136-200) | 182 (151-222) |
| **60** | 0 | 11 (9-13) | 22 (18-27) | 44 (36-53) | 65 (54-80) | 87 (72-107) | 109 (90-133) | 131 (109-160) | 153 (127-187) | 175 (145-213) | 196 (163-240) | 218 (181-266) |
| **70** | 0 | 13 (11-16) | 25 (21-31) | 51 (42-62) | 76 (63-93) | 102 (84-124) | 127 (105-155) | 153 (127-187) | 178 (148-218) | 204 (169-249) | 229 (190-280) | 255 (211-311) |
| **75** | 0 | 14 (11-17) | 27 (23-33) | 55 (45-67) | 82 (68-100) | 109 (90-133) | 136 (113-167) | 164 (136-200) | 191 (158-233) | 218 (181-266) | 245 (203-300) | 273 (226-333) |
| **80** | 0 | 15 (12-18) | 29 (24-36) | 58 (48-71) | 87 (72-107) | 116 (96-142) | 145 (121-178) | 175 (145-213) | 204 (169-249) | 233 (193-284) | 262 (217-320) | 291 (241-355) |
| **90** | 0 | 16 (14-20) | 33 (27-40) | 65 (54-80) | 98 (81-120) | 131 (109-160) | 164 (136-200) | 196 (163-240) | 229 (190-280) | 262 (217-320) | 295 (244-360) | 327 (271-400) |
| **100** | 0 | 18 (15-22) | 36 (30-44) | 73 (60-89) | 109 (90-133) | 145 (121-178) | 182 (151-222) | 218 (181-266) | 255 (211-311) | 291 (241-355) | 327 (271-400) | 364 (301-444) |

**Dogger Bank Teesside A and B [top]**

**Table A10.11a** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 1 (1-2) | 3 (2-3) | 6 (5-7) | 8 (7-10) | 11 (9-13) | 14 (12-17) | 17 (14-20) | 19 (17-23) | 22 (19-26) | 25 (21-30) | 28 (24-33) |
| **20** | 0 | 3 (2-3) | 6 (5-7) | 11 (9-13) | 17 (14-20) | 22 (19-26) | 28 (24-33) | 33 (28-40) | 39 (33-46) | 44 (38-53) | 50 (43-60) | 56 (47-66) |
| **25** | 0 | 3 (3-4) | 7 (6-8) | 14 (12-17) | 21 (18-25) | 28 (24-33) | 35 (30-41) | 42 (36-50) | 49 (41-58) | 56 (47-66) | 62 (53-74) | 69 (59-83) |
| **30** | 0 | 4 (4-5) | 8 (7-10) | 17 (14-20) | 25 (21-30) | 33 (28-40) | 42 (36-50) | 50 (43-60) | 58 (50-70) | 67 (57-79) | 75 (64-89) | 83 (71-99) |
| **40** | 0 | 6 (5-7) | 11 (9-13) | 22 (19-26) | 33 (28-40) | 44 (38-53) | 56 (47-66) | 67 (57-79) | 78 (66-93) | 89 (76-106) | 100 (85-119) | 111 (95-132) |
| **50** | 0 | 7 (6-8) | 14 (12-17) | 28 (24-33) | 42 (36-50) | 56 (47-66) | 69 (59-83) | 83 (71-99) | 97 (83-116) | 111 (95-132) | 125 (107-149) | 139 (118-166) |
| **60** | 0 | 8 (7-10) | 17 (14-20) | 33 (28-40) | 50 (43-60) | 67 (57-79) | 83 (71-99) | 100 (85-119) | 117 (99-139) | 133 (114-159) | 150 (128-179) | 167 (142-199) |
| **70** | 0 | 10 (8-12) | 19 (17-23) | 39 (33-46) | 58 (50-70) | 78 (66-93) | 97 (83-116) | 117 (99-139) | 136 (116-162) | 156 (133-185) | 175 (149-209) | 194 (166-232) |
| **75** | 0 | 10 (9-12) | 21 (18-25) | 42 (36-50) | 62 (53-74) | 83 (71-99) | 104 (89-124) | 125 (107-149) | 146 (124-174) | 167 (142-199) | 187 (160-223) | 208 (178-248) |
| **80** | 0 | 11 (9-13) | 22 (19-26) | 44 (38-53) | 67 (57-79) | 89 (76-106) | 111 (95-132) | 133 (114-159) | 156 (133-185) | 178 (151-212) | 200 (170-238) | 222 (189-265) |
| **90** | 0 | 12 (11-15) | 25 (21-30) | 50 (43-60) | 75 (64-89) | 100 (85-119) | 125 (107-149) | 150 (128-179) | 175 (149-209) | 200 (170-238) | 225 (192-268) | 250 (213-298) |
| **100** | 0 | 14 (12-17) | 28 (24-33) | 56 (47-66) | 83 (71-99) | 111 (95-132) | 139 (118-166) | 167 (142-199) | 194 (166-232) | 222 (189-265) | 250 (213-298) | 278 (237-331) |

**Table A10.11b** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 4 (3-5) | 8 (7-9) | 15 (13-18) | 23 (20-27) | 31 (26-37) | 39 (33-46) | 46 (39-55) | 54 (46-64) | 62 (53-73) | 69 (59-82) | 77 (66-92) |
| 20 | 0 | 8 (7-9) | 15 (13-18) | 31 (26-37) | 46 (39-55) | 62 (53-73) | 77 (66-92) | 93 (79-110) | 108 (92-128) | 123 (105-147) | 139 (118-165) | 154 (131-183) |
| 25 | 0 | 10 (8-11) | 19 (16-23) | 39 (33-46) | 58 (49-69) | 77 (66-92) | 96 (82-115) | 116 (99-137) | 135 (115-160) | 154 (131-183) | 174 (148-206) | 193 (164-229) |
| 30 | 0 | 12 (10-14) | 23 (20-27) | 46 (39-55) | 69 (59-82) | 93 (79-110) | 116 (99-137) | 139 (118-165) | 162 (138-192) | 185 (158-220) | 208 (177-247) | 232 (197-275) |
| 40 | 0 | 15 (13-18) | 31 (26-37) | 62 (53-73) | 93 (79-110) | 123 (105-147) | 154 (131-183) | 185 (158-220) | 216 (184-257) | 247 (210-293) | 278 (236-330) | 309 (263-367) |
| 50 | 0 | 19 (16-23) | 39 (33-46) | 77 (66-92) | 116 (99-137) | 154 (131-183) | 193 (164-229) | 232 (197-275) | 270 (230-321) | 309 (263-367) | 347 (296-412) | 386 (328-458) |
| 60 | 0 | 23 (20-27) | 46 (39-55) | 93 (79-110) | 139 (118-165) | 185 (158-220) | 232 (197-275) | 278 (236-330) | 324 (276-385) | 370 (315-440) | 417 (355-495) | 463 (394-550) |
| 70 | 0 | 27 (23-32) | 54 (46-64) | 108 (92-128) | 162 (138-192) | 216 (184-257) | 270 (230-321) | 324 (276-385) | 378 (322-449) | 432 (368-513) | 486 (414-577) | 540 (460-642) |
| 75 | 0 | 29 (25-34) | 58 (49-69) | 116 (99-137) | 174 (148-206) | 232 (197-275) | 289 (246-344) | 347 (296-412) | 405 (345-481) | 463 (394-550) | 521 (443-619) | 579 (493-687) |
| 80 | 0 | 31 (26-37) | 62 (53-73) | 123 (105-147) | 185 (158-220) | 247 (210-293) | 309 (263-367) | 370 (315-440) | 432 (368-513) | 494 (420-587) | 556 (473-660) | 617 (525-733) |
| 90 | 0 | 35 (30-41) | 69 (59-82) | 139 (118-165) | 208 (177-247) | 278 (236-330) | 347 (296-412) | 417 (355-495) | 486 (414-577) | 556 (473-660) | 625 (532-742) | 695 (591-825) |
| 100 | 0 | 39 (33-46) | 77 (66-92) | 154 (131-183) | 232 (197-275) | 309 (263-367) | 386 (328-458) | 463 (394-550) | 540 (460-642) | 617 (525-733) | 695 (591-825) | 772 (657-917) |

**Table A10.11c** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 8 (7-10) | 16 (14-20) | 33 (28-39) | 49 (41-59) | 66 (55-79) | 82 (69-98) | 99 (83-118) | 115 (96-138) | 131 (110-157) | 148 (124-177) | 164 (138-197) |
| **20** | 0 | 16 (14-20) | 33 (28-39) | 66 (55-79) | 99 (83-118) | 131 (110-157) | 164 (138-197) | 197 (165-236) | 230 (193-275) | 263 (221-314) | 296 (248-354) | 329 (276-393) |
| **25** | 0 | 21 (17-25) | 41 (34-49) | 82 (69-98) | 123 (103-147) | 164 (138-197) | 205 (172-246) | 247 (207-295) | 288 (241-344) | 329 (276-393) | 370 (310-442) | 411 (345-491) |
| **30** | 0 | 25 (21-29) | 49 (41-59) | 99 (83-118) | 148 (124-177) | 197 (165-236) | 247 (207-295) | 296 (248-354) | 345 (289-413) | 394 (331-472) | 444 (372-531) | 493 (413-590) |
| **40** | 0 | 33 (28-39) | 66 (55-79) | 131 (110-157) | 197 (165-236) | 263 (221-314) | 329 (276-393) | 394 (331-472) | 460 (386-550) | 526 (441-629) | 592 (496-708) | 657 (551-786) |
| **50** | 0 | 41 (34-49) | 82 (69-98) | 164 (138-197) | 247 (207-295) | 329 (276-393) | 411 (345-491) | 493 (413-590) | 575 (482-688) | 657 (551-786) | 740 (620-884) | 822 (689-983) |
| **60** | 0 | 49 (41-59) | 99 (83-118) | 197 (165-236) | 296 (248-354) | 394 (331-472) | 493 (413-590) | 592 (496-708) | 690 (579-826) | 789 (662-943) | 888 (744-1061) | 986 (827-1179) |
| **70** | 0 | 58 (48-69) | 115 (96-138) | 230 (193-275) | 345 (289-413) | 460 (386-550) | 575 (482-688) | 690 (579-826) | 805 (675-963) | 920 (772-1101) | 1035 (868-1238) | 1151 (965-1376) |
| **75** | 0 | 62 (52-74) | 123 (103-147) | 247 (207-295) | 370 (310-442) | 493 (413-590) | 616 (517-737) | 740 (620-884) | 863 (724-1032) | 986 (827-1179) | 1109 (930-1327) | 1233 (1034-1474) |
| **80** | 0 | 66 (55-79) | 131 (110-157) | 263 (221-314) | 394 (331-472) | 526 (441-629) | 657 (551-786) | 789 (662-943) | 920 (772-1101) | 1052 (882-1258) | 1183 (992-1415) | 1315 (1103-1572) |
| **90** | 0 | 74 (62-88) | 148 (124-177) | 296 (248-354) | 444 (372-531) | 592 (496-708) | 740 (620-884) | 888 (744-1061) | 1035 (868-1238) | 1183 (992-1415) | 1331 (1116-1592) | 1479 (1240-1769) |
| **100** | 0 | 82 (69-98) | 164 (138-197) | 329 (276-393) | 493 (413-590) | 657 (551-786) | 822 (689-983) | 986 (827-1179) | 1151 (965-1376) | 1315 (1103-1572) | 1479 (1240-1769) | 1644 (1378-1966) |

**Table A10.11d** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 5 (4-6) | 9 (8-11) | 19 (16-23) | 28 (24-34) | 38 (32-45) | 47 (40-56) | 57 (48-68) | 66 (56-79) | 76 (64-90) | 85 (72-102) | 95 (80-113) |
| **20** | 0 | 9 (8-11) | 19 (16-23) | 38 (32-45) | 57 (48-68) | 76 (64-90) | 95 (80-113) | 114 (96-135) | 132 (112-158) | 151 (128-181) | 170 (144-203) | 189 (160-226) |
| **25** | 0 | 12 (10-14) | 24 (20-28) | 47 (40-56) | 71 (60-85) | 95 (80-113) | 118 (100-141) | 142 (120-169) | 166 (140-197) | 189 (160-226) | 213 (180-254) | 236 (200-282) |
| **30** | 0 | 14 (12-17) | 28 (24-34) | 57 (48-68) | 85 (72-102) | 114 (96-135) | 142 (120-169) | 170 (144-203) | 199 (168-237) | 227 (192-271) | 255 (216-305) | 284 (239-338) |
| **40** | 0 | 19 (16-23) | 38 (32-45) | 76 (64-90) | 114 (96-135) | 151 (128-181) | 189 (160-226) | 227 (192-271) | 265 (224-316) | 303 (255-361) | 341 (287-406) | 378 (319-451) |
| **50** | 0 | 24 (20-28) | 47 (40-56) | 95 (80-113) | 142 (120-169) | 189 (160-226) | 236 (200-282) | 284 (239-338) | 331 (279-395) | 378 (319-451) | 426 (359-508) | 473 (399-564) |
| **60** | 0 | 28 (24-34) | 57 (48-68) | 114 (96-135) | 170 (144-203) | 227 (192-271) | 284 (239-338) | 341 (287-406) | 397 (335-474) | 454 (383-542) | 511 (431-609) | 568 (479-677) |
| **70** | 0 | 33 (28-39) | 66 (56-79) | 132 (112-158) | 199 (168-237) | 265 (224-316) | 331 (279-395) | 397 (335-474) | 464 (391-553) | 530 (447-632) | 596 (503-711) | 662 (559-790) |
| **75** | 0 | 35 (30-42) | 71 (60-85) | 142 (120-169) | 213 (180-254) | 284 (239-338) | 355 (299-423) | 426 (359-508) | 497 (419-592) | 568 (479-677) | 639 (539-762) | 709 (599-846) |
| **80** | 0 | 38 (32-45) | 76 (64-90) | 151 (128-181) | 227 (192-271) | 303 (255-361) | 378 (319-451) | 454 (383-542) | 530 (447-632) | 605 (511-722) | 681 (575-812) | 757 (639-903) |
| **90** | 0 | 43 (36-51) | 85 (72-102) | 170 (144-203) | 255 (216-305) | 341 (287-406) | 426 (359-508) | 511 (431-609) | 596 (503-711) | 681 (575-812) | 766 (647-914) | 851 (718-1015) |
| **100** | 0 | 47 (40-56) | 95 (80-113) | 189 (160-226) | 284 (239-338) | 378 (319-451) | 473 (399-564) | 568 (479-677) | 662 (559-790) | 757 (639-903) | 851 (718-1015) | 946 (798-1128) |

**Table A10.12a** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 54 (49-58) | 107 (99-116) | 214 (197-232) | 321 (296-349) | 428 (395-465) | 535 (494-581) | 642 (592-697) | 749 (691-813) | 856 (790-929) | 963 (889-1046) | 1070 (987-1162) |
| **20** | 0 | 107 (99-116) | 214 (197-232) | 428 (395-465) | 642 (592-697) | 856 (790-929) | 1070 (987-1162) | 1284 (1185-1394) | 1498 (1382-1626) | 1712 (1580-1859) | 1926 (1777-2091) | 2141 (1975-2323) |
| **25** | 0 | 134 (123-145) | 268 (247-290) | 535 (494-581) | 803 (741-871) | 1070 (987-1162) | 1338 (1234-1452) | 1605 (1481-1743) | 1873 (1728-2033) | 2141 (1975-2323) | 2408 (2222-2614) | 2676 (2469-2904) |
| **30** | 0 | 161 (148-174) | 321 (296-349) | 642 (592-697) | 963 (889-1046) | 1284 (1185-1394) | 1605 (1481-1743) | 1926 (1777-2091) | 2248 (2074-2440) | 2569 (2370-2788) | 2890 (2666-3137) | 3211 (2962-3485) |
| **40** | 0 | 214 (197-232) | 428 (395-465) | 856 (790-929) | 1284 (1185-1394) | 1712 (1580-1859) | 2141 (1975-2323) | 2569 (2370-2788) | 2997 (2765-3253) | 3425 (3160-3717) | 3853 (3555-4182) | 4281 (3950-4647) |
| **50** | 0 | 268 (247-290) | 535 (494-581) | 1070 (987-1162) | 1605 (1481-1743) | 2141 (1975-2323) | 2676 (2469-2904) | 3211 (2962-3485) | 3746 (3456-4066) | 4281 (3950-4647) | 4816 (4443-5228) | 5351 (4937-5809) |
| **60** | 0 | 321 (296-349) | 642 (592-697) | 1284 (1185-1394) | 1926 (1777-2091) | 2569 (2370-2788) | 3211 (2962-3485) | 3853 (3555-4182) | 4495 (4147-4879) | 5137 (4740-5576) | 5779 (5332-6273) | 6422 (5925-6970) |
| **70** | 0 | 375 (346-407) | 749 (691-813) | 1498 (1382-1626) | 2248 (2074-2440) | 2997 (2765-3253) | 3746 (3456-4066) | 4495 (4147-4879) | 5244 (4838-5692) | 5993 (5530-6506) | 6743 (6221-7319) | 7492 (6912-8132) |
| **75** | 0 | 401 (370-436) | 803 (741-871) | 1605 (1481-1743) | 2408 (2222-2614) | 3211 (2962-3485) | 4013 (3703-4356) | 4816 (4443-5228) | 5619 (5184-6099) | 6422 (5925-6970) | 7224 (6665-7841) | 8027 (7406-8713) |
| **80** | 0 | 428 (395-465) | 856 (790-929) | 1712 (1580-1859) | 2569 (2370-2788) | 3425 (3160-3717) | 4281 (3950-4647) | 5137 (4740-5576) | 5993 (5530-6506) | 6850 (6320-7435) | 7706 (7110-8364) | 8562 (7900-9294) |
| **90** | 0 | 482 (444-523) | 963 (889-1046) | 1926 (1777-2091) | 2890 (2666-3137) | 3853 (3555-4182) | 4816 (4443-5228) | 5779 (5332-6273) | 6743 (6221-7319) | 7706 (7110-8364) | 8669 (7998-9410) | 9632 (8887-10455) |
| **100** | 0 | 535 (494-581) | 1070 (987-1162) | 2141 (1975-2323) | 3211 (2962-3485) | 4281 (3950-4647) | 5351 (4937-5809) | 6422 (5925-6970) | 7492 (6912-8132) | 8562 (7900-9294) | 9632 (8887-10455) | 10703 (9874-11617) |

**Table A10.12b** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 69 (64-75) | 138 (128-150) | 277 (256-299) | 415 (385-449) | 554 (513-599) | 692 (641-748) | 830 (769-898) | 969 (897-1047) | 1107 (1026-1197) | 1246 (1154-1347) | 1384 (1282-1496) |
| **20** | 0 | 138 (128-150) | 277 (256-299) | 554 (513-599) | 830 (769-898) | 1107 (1026-1197) | 1384 (1282-1496) | 1661 (1538-1796) | 1938 (1795-2095) | 2215 (2051-2394) | 2491 (2308-2693) | 2768 (2564-2993) |
| **25** | 0 | 173 (160-187) | 346 (320-374) | 692 (641-748) | 1038 (961-1122) | 1384 (1282-1496) | 1730 (1602-1870) | 2076 (1923-2245) | 2422 (2243-2619) | 2768 (2564-2993) | 3114 (2884-3367) | 3460 (3205-3741) |
| **30** | 0 | 208 (192-224) | 415 (385-449) | 830 (769-898) | 1246 (1154-1347) | 1661 (1538-1796) | 2076 (1923-2245) | 2491 (2308-2693) | 2907 (2692-3142) | 3322 (3077-3591) | 3737 (3461-4040) | 4152 (3846-4489) |
| **40** | 0 | 277 (256-299) | 554 (513-599) | 1107 (1026-1197) | 1661 (1538-1796) | 2215 (2051-2394) | 2768 (2564-2993) | 3322 (3077-3591) | 3876 (3590-4190) | 4429 (4102-4788) | 4983 (4615-5387) | 5537 (5128-5985) |
| **50** | 0 | 346 (320-374) | 692 (641-748) | 1384 (1282-1496) | 2076 (1923-2245) | 2768 (2564-2993) | 3460 (3205-3741) | 4152 (3846-4489) | 4845 (4487-5237) | 5537 (5128-5985) | 6229 (5769-6734) | 6921 (6410-7482) |
| **60** | 0 | 415 (385-449) | 830 (769-898) | 1661 (1538-1796) | 2491 (2308-2693) | 3322 (3077-3591) | 4152 (3846-4489) | 4983 (4615-5387) | 5813 (5384-6285) | 6644 (6154-7183) | 7474 (6923-8080) | 8305 (7692-8978) |
| **70** | 0 | 484 (449-524) | 969 (897-1047) | 1938 (1795-2095) | 2907 (2692-3142) | 3876 (3590-4190) | 4845 (4487-5237) | 5813 (5384-6285) | 6782 (6282-7332) | 7751 (7179-8380) | 8720 (8077-9427) | 9689 (8974-10475) |
| **75** | 0 | 519 (481-561) | 1038 (961-1122) | 2076 (1923-2245) | 3114 (2884-3367) | 4152 (3846-4489) | 5191 (4807-5611) | 6229 (5769-6734) | 7267 (6730-7856) | 8305 (7692-8978) | 9343 (8653-10100) | 10381 (9615-11223) |
| **80** | 0 | 554 (513-599) | 1107 (1026-1197) | 2215 (2051-2394) | 3322 (3077-3591) | 4429 (4102-4788) | 5537 (5128-5985) | 6644 (6154-7183) | 7751 (7179-8380) | 8859 (8205-9577) | 9966 (9230-10774) | 11073 (10256-11971) |
| **90** | 0 | 623 (577-673) | 1246 (1154-1347) | 2491 (2308-2693) | 3737 (3461-4040) | 4983 (4615-5387) | 6229 (5769-6734) | 7474 (6923-8080) | 8720 (8077-9427) | 9966 (9230-10774) | 11212 (10384-12121) | 12457 (11538-13467) |
| **100** | 0 | 692 (641-748) | 1384 (1282-1496) | 2768 (2564-2993) | 4152 (3846-4489) | 5537 (5128-5985) | 6921 (6410-7482) | 8305 (7692-8978) | 9689 (8974-10475) | 11073 (10256-11971) | 12457 (11538-13467) | 13842 (12820-14964) |

**Table A10.12c** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 51 (47-55) | 102 (93-111) | 203 (186-221) | 305 (280-332) | 407 (373-443) | 508 (466-554) | 610 (559-664) | 712 (652-775) | 813 (745-886) | 915 (839-996) | 1017 (932-1107) |
| **20** | 0 | 102 (93-111) | 203 (186-221) | 407 (373-443) | 610 (559-664) | 813 (745-886) | 1017 (932-1107) | 1220 (1118-1328) | 1424 (1305-1550) | 1627 (1491-1771) | 1830 (1677-1993) | 2034 (1864-2214) |
| **25** | 0 | 127 (116-138) | 254 (233-277) | 508 (466-554) | 763 (699-830) | 1017 (932-1107) | 1271 (1165-1384) | 1525 (1398-1661) | 1779 (1631-1937) | 2034 (1864-2214) | 2288 (2097-2491) | 2542 (2330-2768) |
| **30** | 0 | 153 (140-166) | 305 (280-332) | 610 (559-664) | 915 (839-996) | 1220 (1118-1328) | 1525 (1398-1661) | 1830 (1677-1993) | 2135 (1957-2325) | 2440 (2236-2657) | 2745 (2516-2989) | 3050 (2796-3321) |
| **40** | 0 | 203 (186-221) | 407 (373-443) | 813 (745-886) | 1220 (1118-1328) | 1627 (1491-1771) | 2034 (1864-2214) | 2440 (2236-2657) | 2847 (2609-3100) | 3254 (2982-3542) | 3660 (3355-3985) | 4067 (3727-4428) |
| **50** | 0 | 254 (233-277) | 508 (466-554) | 1017 (932-1107) | 1525 (1398-1661) | 2034 (1864-2214) | 2542 (2330-2768) | 3050 (2796-3321) | 3559 (3262-3875) | 4067 (3727-4428) | 4576 (4193-4982) | 5084 (4659-5535) |
| **60** | 0 | 305 (280-332) | 610 (559-664) | 1220 (1118-1328) | 1830 (1677-1993) | 2440 (2236-2657) | 3050 (2796-3321) | 3660 (3355-3985) | 4271 (3914-4649) | 4881 (4473-5314) | 5491 (5032-5978) | 6101 (5591-6642) |
| **70** | 0 | 356 (326-387) | 712 (652-775) | 1424 (1305-1550) | 2135 (1957-2325) | 2847 (2609-3100) | 3559 (3262-3875) | 4271 (3914-4649) | 4982 (4566-5424) | 5694 (5218-6199) | 6406 (5871-6974) | 7118 (6523-7749) |
| **75** | 0 | 381 (349-415) | 763 (699-830) | 1525 (1398-1661) | 2288 (2097-2491) | 3050 (2796-3321) | 3813 (3494-4151) | 4576 (4193-4982) | 5338 (4892-5812) | 6101 (5591-6642) | 6863 (6290-7472) | 7626 (6989-8303) |
| **80** | 0 | 407 (373-443) | 813 (745-886) | 1627 (1491-1771) | 2440 (2236-2657) | 3254 (2982-3542) | 4067 (3727-4428) | 4881 (4473-5314) | 5694 (5218-6199) | 6508 (5964-7085) | 7321 (6709-7970) | 8134 (7455-8856) |
| **90** | 0 | 458 (419-498) | 915 (839-996) | 1830 (1677-1993) | 2745 (2516-2989) | 3660 (3355-3985) | 4576 (4193-4982) | 5491 (5032-5978) | 6406 (5871-6974) | 7321 (6709-7970) | 8236 (7548-8967) | 9151 (8387-9963) |
| **100** | 0 | 508 (466-554) | 1017 (932-1107) | 2034 (1864-2214) | 3050 (2796-3321) | 4067 (3727-4428) | 5084 (4659-5535) | 6101 (5591-6642) | 7118 (6523-7749) | 8134 (7455-8856) | 9151 (8387-9963) | 10168 (9319-11070) |

**Table A10.12d** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 55 (51-60) | 110 (102-120) | 220 (203-239) | 331 (305-359) | 441 (407-478) | 551 (508-598) | 661 (610-717) | 771 (711-837) | 882 (813-956) | 992 (915-1076) | 1102 (1016-1196) |
| **20** | 0 | 110 (102-120) | 220 (203-239) | 441 (407-478) | 661 (610-717) | 882 (813-956) | 1102 (1016-1196) | 1323 (1220-1435) | 1543 (1423-1674) | 1763 (1626-1913) | 1984 (1829-2152) | 2204 (2033-2391) |
| **25** | 0 | 138 (127-149) | 276 (254-299) | 551 (508-598) | 827 (762-897) | 1102 (1016-1196) | 1378 (1270-1494) | 1653 (1525-1793) | 1929 (1779-2092) | 2204 (2033-2391) | 2480 (2287-2690) | 2755 (2541-2989) |
| **30** | 0 | 165 (152-179) | 331 (305-359) | 661 (610-717) | 992 (915-1076) | 1323 (1220-1435) | 1653 (1525-1793) | 1984 (1829-2152) | 2314 (2134-2511) | 2645 (2439-2869) | 2976 (2744-3228) | 3306 (3049-3587) |
| **40** | 0 | 220 (203-239) | 441 (407-478) | 882 (813-956) | 1323 (1220-1435) | 1763 (1626-1913) | 2204 (2033-2391) | 2645 (2439-2869) | 3086 (2846-3348) | 3527 (3252-3826) | 3968 (3659-4304) | 4408 (4066-4782) |
| **50** | 0 | 276 (254-299) | 551 (508-598) | 1102 (1016-1196) | 1653 (1525-1793) | 2204 (2033-2391) | 2755 (2541-2989) | 3306 (3049-3587) | 3857 (3557-4184) | 4408 (4066-4782) | 4960 (4574-5380) | 5511 (5082-5978) |
| **60** | 0 | 331 (305-359) | 661 (610-717) | 1323 (1220-1435) | 1984 (1829-2152) | 2645 (2439-2869) | 3306 (3049-3587) | 3968 (3659-4304) | 4629 (4269-5021) | 5290 (4879-5739) | 5951 (5488-6456) | 6613 (6098-7173) |
| **70** | 0 | 386 (356-418) | 771 (711-837) | 1543 (1423-1674) | 2314 (2134-2511) | 3086 (2846-3348) | 3857 (3557-4184) | 4629 (4269-5021) | 5400 (4980-5858) | 6172 (5692-6695) | 6943 (6403-7532) | 7715 (7115-8369) |
| **75** | 0 | 413 (381-448) | 827 (762-897) | 1653 (1525-1793) | 2480 (2287-2690) | 3306 (3049-3587) | 4133 (3811-4483) | 4960 (4574-5380) | 5786 (5336-6277) | 6613 (6098-7173) | 7439 (6861-8070) | 8266 (7623-8967) |
| **80** | 0 | 441 (407-478) | 882 (813-956) | 1763 (1626-1913) | 2645 (2439-2869) | 3527 (3252-3826) | 4408 (4066-4782) | 5290 (4879-5739) | 6172 (5692-6695) | 7054 (6505-7652) | 7935 (7318-8608) | 8817 (8131-9565) |
| **90** | 0 | 496 (457-538) | 992 (915-1076) | 1984 (1829-2152) | 2976 (2744-3228) | 3968 (3659-4304) | 4960 (4574-5380) | 5951 (5488-6456) | 6943 (6403-7532) | 7935 (7318-8608) | 8927 (8233-9684) | 9919 (9147-10760) |
| **100** | 0 | 551 (508-598) | 1102 (1016-1196) | 2204 (2033-2391) | 3306 (3049-3587) | 4408 (4066-4782) | 5511 (5082-5978) | 6613 (6098-7173) | 7715 (7115-8369) | 8817 (8131-9565) | 9919 (9147-10760) | 11021 (10164-11956) |

**Table A10.13a** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 19 (16-21) | 37 (33-42) | 74 (65-84) | 111 (98-125) | 148 (130-167) | 185 (163-209) | 222 (195-251) | 259 (228-292) | 296 (260-334) | 333 (293-376) | 370 (325-418) |
| **20** | 0 | 37 (33-42) | 74 (65-84) | 148 (130-167) | 222 (195-251) | 296 (260-334) | 370 (325-418) | 444 (391-501) | 518 (456-585) | 593 (521-668) | 667 (586-752) | 741 (651-835) |
| **25** | 0 | 46 (41-52) | 93 (81-104) | 185 (163-209) | 278 (244-313) | 370 (325-418) | 463 (407-522) | 556 (488-626) | 648 (570-731) | 741 (651-835) | 833 (732-939) | 926 (814-1044) |
| **30** | 0 | 56 (49-63) | 111 (98-125) | 222 (195-251) | 333 (293-376) | 444 (391-501) | 556 (488-626) | 667 (586-752) | 778 (683-877) | 889 (781-1002) | 1000 (879-1127) | 1111 (976-1253) |
| **40** | 0 | 74 (65-84) | 148 (130-167) | 296 (260-334) | 444 (391-501) | 593 (521-668) | 741 (651-835) | 889 (781-1002) | 1037 (911-1169) | 1185 (1041-1336) | 1333 (1172-1503) | 1481 (1302-1670) |
| **50** | 0 | 93 (81-104) | 185 (163-209) | 370 (325-418) | 556 (488-626) | 741 (651-835) | 926 (814-1044) | 1111 (976-1253) | 1296 (1139-1461) | 1481 (1302-1670) | 1667 (1465-1879) | 1852 (1627-2088) |
| **60** | 0 | 111 (98-125) | 222 (195-251) | 444 (391-501) | 667 (586-752) | 889 (781-1002) | 1111 (976-1253) | 1333 (1172-1503) | 1555 (1367-1754) | 1778 (1562-2004) | 2000 (1757-2255) | 2222 (1953-2505) |
| **70** | 0 | 130 (114-146) | 259 (228-292) | 518 (456-585) | 778 (683-877) | 1037 (911-1169) | 1296 (1139-1461) | 1555 (1367-1754) | 1815 (1595-2046) | 2074 (1823-2338) | 2333 (2050-2630) | 2592 (2278-2923) |
| **75** | 0 | 139 (122-157) | 278 (244-313) | 556 (488-626) | 833 (732-939) | 1111 (976-1253) | 1389 (1220-1566) | 1667 (1465-1879) | 1944 (1709-2192) | 2222 (1953-2505) | 2500 (2197-2818) | 2778 (2441-3131) |
| **80** | 0 | 148 (130-167) | 296 (260-334) | 593 (521-668) | 889 (781-1002) | 1185 (1041-1336) | 1481 (1302-1670) | 1778 (1562-2004) | 2074 (1823-2338) | 2370 (2083-2672) | 2667 (2343-3006) | 2963 (2604-3340) |
| **90** | 0 | 167 (146-188) | 333 (293-376) | 667 (586-752) | 1000 (879-1127) | 1333 (1172-1503) | 1667 (1465-1879) | 2000 (1757-2255) | 2333 (2050-2630) | 2667 (2343-3006) | 3000 (2636-3382) | 3333 (2929-3758) |
| **100** | 0 | 185 (163-209) | 370 (325-418) | 741 (651-835) | 1111 (976-1253) | 1481 (1302-1670) | 1852 (1627-2088) | 2222 (1953-2505) | 2592 (2278-2923) | 2963 (2604-3340) | 3333 (2929-3758) | 3704 (3255-4175) |

**Table A10.13b** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 23 (20-25) | 45 (40-51) | 90 (79-102) | 135 (119-152) | 180 (158-203) | 225 (198-254) | 270 (238-305) | 315 (277-356) | 360 (317-406) | 405 (356-457) | 450 (396-508) |
| **20** | 0 | 45 (40-51) | 90 (79-102) | 180 (158-203) | 270 (238-305) | 360 (317-406) | 450 (396-508) | 540 (475-610) | 630 (554-711) | 720 (634-813) | 810 (713-915) | 900 (792-1016) |
| **25** | 0 | 56 (49-64) | 113 (99-127) | 225 (198-254) | 338 (297-381) | 450 (396-508) | 563 (495-635) | 675 (594-762) | 788 (693-889) | 900 (792-1016) | 1013 (891-1143) | 1125 (990-1270) |
| **30** | 0 | 68 (59-76) | 135 (119-152) | 270 (238-305) | 405 (356-457) | 540 (475-610) | 675 (594-762) | 810 (713-915) | 945 (831-1067) | 1080 (950-1219) | 1215 (1069-1372) | 1350 (1188-1524) |
| **40** | 0 | 90 (79-102) | 180 (158-203) | 360 (317-406) | 540 (475-610) | 720 (634-813) | 900 (792-1016) | 1080 (950-1219) | 1260 (1109-1423) | 1440 (1267-1626) | 1620 (1425-1829) | 1800 (1584-2032) |
| **50** | 0 | 113 (99-127) | 225 (198-254) | 450 (396-508) | 675 (594-762) | 900 (792-1016) | 1125 (990-1270) | 1350 (1188-1524) | 1575 (1386-1778) | 1800 (1584-2032) | 2025 (1782-2286) | 2250 (1980-2540) |
| **60** | 0 | 135 (119-152) | 270 (238-305) | 540 (475-610) | 810 (713-915) | 1080 (950-1219) | 1350 (1188-1524) | 1620 (1425-1829) | 1890 (1663-2134) | 2160 (1901-2439) | 2430 (2138-2744) | 2700 (2376-3048) |
| **70** | 0 | 158 (139-178) | 315 (277-356) | 630 (554-711) | 945 (831-1067) | 1260 (1109-1423) | 1575 (1386-1778) | 1890 (1663-2134) | 2205 (1940-2490) | 2520 (2217-2845) | 2835 (2494-3201) | 3150 (2772-3556) |
| **75** | 0 | 169 (148-191) | 338 (297-381) | 675 (594-762) | 1013 (891-1143) | 1350 (1188-1524) | 1688 (1485-1905) | 2025 (1782-2286) | 2363 (2079-2667) | 2700 (2376-3048) | 3038 (2673-3429) | 3375 (2970-3811) |
| **80** | 0 | 180 (158-203) | 360 (317-406) | 720 (634-813) | 1080 (950-1219) | 1440 (1267-1626) | 1800 (1584-2032) | 2160 (1901-2439) | 2520 (2217-2845) | 2880 (2534-3252) | 3240 (2851-3658) | 3600 (3168-4065) |
| **90** | 0 | 203 (178-229) | 405 (356-457) | 810 (713-915) | 1215 (1069-1372) | 1620 (1425-1829) | 2025 (1782-2286) | 2430 (2138-2744) | 2835 (2494-3201) | 3240 (2851-3658) | 3645 (3207-4115) | 4050 (3564-4573) |
| **100** | 0 | 225 (198-254) | 450 (396-508) | 900 (792-1016) | 1350 (1188-1524) | 1800 (1584-2032) | 2250 (1980-2540) | 2700 (2376-3048) | 3150 (2772-3556) | 3600 (3168-4065) | 4050 (3564-4573) | 4500 (3959-5081) |

**Table A10.13c** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 17 (15-20) | 34 (29-39) | 68 (58-79) | 102 (88-118) | 136 (117-158) | 170 (146-197) | 204 (175-236) | 238 (204-276) | 272 (233-315) | 306 (263-355) | 340 (292-394) |
| **20** | 0 | 34 (29-39) | 68 (58-79) | 136 (117-158) | 204 (175-236) | 272 (233-315) | 340 (292-394) | 408 (350-473) | 476 (409-552) | 544 (467-631) | 612 (525-709) | 680 (584-788) |
| **25** | 0 | 43 (36-49) | 85 (73-99) | 170 (146-197) | 255 (219-296) | 340 (292-394) | 425 (365-493) | 510 (438-591) | 595 (511-690) | 680 (584-788) | 765 (657-887) | 851 (730-985) |
| **30** | 0 | 51 (44-59) | 102 (88-118) | 204 (175-236) | 306 (263-355) | 408 (350-473) | 510 (438-591) | 612 (525-709) | 714 (613-828) | 817 (700-946) | 919 (788-1064) | 1021 (875-1182) |
| **40** | 0 | 68 (58-79) | 136 (117-158) | 272 (233-315) | 408 (350-473) | 544 (467-631) | 680 (584-788) | 817 (700-946) | 953 (817-1104) | 1089 (934-1261) | 1225 (1051-1419) | 1361 (1167-1577) |
| **50** | 0 | 85 (73-99) | 170 (146-197) | 340 (292-394) | 510 (438-591) | 680 (584-788) | 851 (730-985) | 1021 (875-1182) | 1191 (1021-1380) | 1361 (1167-1577) | 1531 (1313-1774) | 1701 (1459-1971) |
| **60** | 0 | 102 (88-118) | 204 (175-236) | 408 (350-473) | 612 (525-709) | 817 (700-946) | 1021 (875-1182) | 1225 (1051-1419) | 1429 (1226-1655) | 1633 (1401-1892) | 1837 (1576-2128) | 2041 (1751-2365) |
| **70** | 0 | 119 (102-138) | 238 (204-276) | 476 (409-552) | 714 (613-828) | 953 (817-1104) | 1191 (1021-1380) | 1429 (1226-1655) | 1667 (1430-1931) | 1905 (1634-2207) | 2143 (1839-2483) | 2381 (2043-2759) |
| **75** | 0 | 128 (109-148) | 255 (219-296) | 510 (438-591) | 765 (657-887) | 1021 (875-1182) | 1276 (1094-1478) | 1531 (1313-1774) | 1786 (1532-2069) | 2041 (1751-2365) | 2296 (1970-2661) | 2552 (2189-2956) |
| **80** | 0 | 136 (117-158) | 272 (233-315) | 544 (467-631) | 817 (700-946) | 1089 (934-1261) | 1361 (1167-1577) | 1633 (1401-1892) | 1905 (1634-2207) | 2177 (1868-2523) | 2450 (2101-2838) | 2722 (2335-3153) |
| **90** | 0 | 153 (131-177) | 306 (263-355) | 612 (525-709) | 919 (788-1064) | 1225 (1051-1419) | 1531 (1313-1774) | 1837 (1576-2128) | 2143 (1839-2483) | 2450 (2101-2838) | 2756 (2364-3193) | 3062 (2626-3547) |
| **100** | 0 | 170 (146-197) | 340 (292-394) | 680 (584-788) | 1021 (875-1182) | 1361 (1167-1577) | 1701 (1459-1971) | 2041 (1751-2365) | 2381 (2043-2759) | 2722 (2335-3153) | 3062 (2626-3547) | 3402 (2918-3942) |

**Table A10.13d** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 18 (16-21) | 36 (31-41) | 72 (63-82) | 108 (94-123) | 144 (126-164) | 180 (157-205) | 217 (189-247) | 253 (220-288) | 289 (252-329) | 325 (283-370) | 361 (315-411) |
| **20** | 0 | 36 (31-41) | 72 (63-82) | 144 (126-164) | 217 (189-247) | 289 (252-329) | 361 (315-411) | 433 (378-493) | 505 (441-575) | 577 (504-657) | 650 (567-740) | 722 (630-822) |
| **25** | 0 | 45 (39-51) | 90 (79-103) | 180 (157-205) | 271 (236-308) | 361 (315-411) | 451 (393-514) | 541 (472-616) | 632 (551-719) | 722 (630-822) | 812 (708-924) | 902 (787-1027) |
| **30** | 0 | 54 (47-62) | 108 (94-123) | 217 (189-247) | 325 (283-370) | 433 (378-493) | 541 (472-616) | 650 (567-740) | 758 (661-863) | 866 (755-986) | 974 (850-1109) | 1083 (944-1233) |
| **40** | 0 | 72 (63-82) | 144 (126-164) | 289 (252-329) | 433 (378-493) | 577 (504-657) | 722 (630-822) | 866 (755-986) | 1010 (881-1150) | 1155 (1007-1315) | 1299 (1133-1479) | 1444 (1259-1644) |
| **50** | 0 | 90 (79-103) | 180 (157-205) | 361 (315-411) | 541 (472-616) | 722 (630-822) | 902 (787-1027) | 1083 (944-1233) | 1263 (1102-1438) | 1444 (1259-1644) | 1624 (1417-1849) | 1804 (1574-2054) |
| **60** | 0 | 108 (94-123) | 217 (189-247) | 433 (378-493) | 650 (567-740) | 866 (755-986) | 1083 (944-1233) | 1299 (1133-1479) | 1516 (1322-1726) | 1732 (1511-1972) | 1949 (1700-2219) | 2165 (1889-2465) |
| **70** | 0 | 126 (110-144) | 253 (220-288) | 505 (441-575) | 758 (661-863) | 1010 (881-1150) | 1263 (1102-1438) | 1516 (1322-1726) | 1768 (1542-2013) | 2021 (1763-2301) | 2274 (1983-2589) | 2526 (2203-2876) |
| **75** | 0 | 135 (118-154) | 271 (236-308) | 541 (472-616) | 812 (708-924) | 1083 (944-1233) | 1353 (1180-1541) | 1624 (1417-1849) | 1895 (1653-2157) | 2165 (1889-2465) | 2436 (2125-2773) | 2707 (2361-3082) |
| **80** | 0 | 144 (126-164) | 289 (252-329) | 577 (504-657) | 866 (755-986) | 1155 (1007-1315) | 1444 (1259-1644) | 1732 (1511-1972) | 2021 (1763-2301) | 2310 (2015-2630) | 2598 (2266-2958) | 2887 (2518-3287) |
| **90** | 0 | 162 (142-185) | 325 (283-370) | 650 (567-740) | 974 (850-1109) | 1299 (1133-1479) | 1624 (1417-1849) | 1949 (1700-2219) | 2274 (1983-2589) | 2598 (2266-2958) | 2923 (2550-3328) | 3248 (2833-3698) |
| **100** | 0 | 180 (157-205) | 361 (315-411) | 722 (630-822) | 1083 (944-1233) | 1444 (1259-1644) | 1804 (1574-2054) | 2165 (1889-2465) | 2526 (2203-2876) | 2887 (2518-3287) | 3248 (2833-3698) | 3609 (3148-4109) |

**Table A10.14a** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 5 (3-6) | 9 (7-13) | 18 (13-25) | 27 (20-38) | 36 (27-51) | 45 (34-63) | 54 (40-76) | 63 (47-88) | 72 (54-101) | 81 (61-114) | 90 (67-126) |
| **20** | 0 | 9 (7-13) | 18 (13-25) | 36 (27-51) | 54 (40-76) | 72 (54-101) | 90 (67-126) | 108 (81-152) | 126 (94-177) | 144 (108-202) | 162 (121-227) | 180 (135-253) |
| **25** | 0 | 11 (8-16) | 23 (17-32) | 45 (34-63) | 68 (51-95) | 90 (67-126) | 113 (84-158) | 135 (101-189) | 158 (118-221) | 180 (135-253) | 203 (152-284) | 225 (169-316) |
| **30** | 0 | 14 (10-19) | 27 (20-38) | 54 (40-76) | 81 (61-114) | 108 (81-152) | 135 (101-189) | 162 (121-227) | 189 (142-265) | 216 (162-303) | 243 (182-341) | 270 (202-379) |
| **40** | 0 | 18 (13-25) | 36 (27-51) | 72 (54-101) | 108 (81-152) | 144 (108-202) | 180 (135-253) | 216 (162-303) | 252 (189-354) | 288 (216-404) | 325 (243-455) | 361 (270-505) |
| **50** | 0 | 23 (17-32) | 45 (34-63) | 90 (67-126) | 135 (101-189) | 180 (135-253) | 225 (169-316) | 270 (202-379) | 315 (236-442) | 361 (270-505) | 406 (303-568) | 451 (337-632) |
| **60** | 0 | 27 (20-38) | 54 (40-76) | 108 (81-152) | 162 (121-227) | 216 (162-303) | 270 (202-379) | 325 (243-455) | 379 (283-531) | 433 (324-606) | 487 (364-682) | 541 (404-758) |
| **70** | 0 | 32 (24-44) | 63 (47-88) | 126 (94-177) | 189 (142-265) | 252 (189-354) | 315 (236-442) | 379 (283-531) | 442 (330-619) | 505 (377-707) | 568 (425-796) | 631 (472-884) |
| **75** | 0 | 34 (25-47) | 68 (51-95) | 135 (101-189) | 203 (152-284) | 270 (202-379) | 338 (253-474) | 406 (303-568) | 473 (354-663) | 541 (404-758) | 608 (455-853) | 676 (506-947) |
| **80** | 0 | 36 (27-51) | 72 (54-101) | 144 (108-202) | 216 (162-303) | 288 (216-404) | 361 (270-505) | 433 (324-606) | 505 (377-707) | 577 (431-808) | 649 (485-909) | 721 (539-1011) |
| **90** | 0 | 41 (30-57) | 81 (61-114) | 162 (121-227) | 243 (182-341) | 325 (243-455) | 406 (303-568) | 487 (364-682) | 568 (425-796) | 649 (485-909) | 730 (546-1023) | 811 (607-1137) |
| **100** | 0 | 45 (34-63) | 90 (67-126) | 180 (135-253) | 270 (202-379) | 361 (270-505) | 451 (337-632) | 541 (404-758) | 631 (472-884) | 721 (539-1011) | 811 (607-1137) | 901 (674-1263) |

**Table A10.14b** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 4 (3-6) | 9 (7-12) | 17 (13-23) | 26 (20-35) | 34 (27-46) | 43 (34-58) | 51 (40-69) | 60 (47-81) | 69 (54-92) | 77 (61-104) | 86 (67-116) |
| **20** | 0 | 9 (7-12) | 17 (13-23) | 34 (27-46) | 51 (40-69) | 69 (54-92) | 86 (67-116) | 103 (81-139) | 120 (94-162) | 137 (108-185) | 154 (121-208) | 172 (134-231) |
| **25** | 0 | 11 (8-14) | 21 (17-29) | 43 (34-58) | 64 (50-87) | 86 (67-116) | 107 (84-144) | 129 (101-173) | 150 (118-202) | 172 (134-231) | 193 (151-260) | 214 (168-289) |
| **30** | 0 | 13 (10-17) | 26 (20-35) | 51 (40-69) | 77 (61-104) | 103 (81-139) | 129 (101-173) | 154 (121-208) | 180 (141-243) | 206 (161-277) | 232 (182-312) | 257 (202-347) |
| **40** | 0 | 17 (13-23) | 34 (27-46) | 69 (54-92) | 103 (81-139) | 137 (108-185) | 172 (134-231) | 206 (161-277) | 240 (188-323) | 274 (215-370) | 309 (242-416) | 343 (269-462) |
| **50** | 0 | 21 (17-29) | 43 (34-58) | 86 (67-116) | 129 (101-173) | 172 (134-231) | 214 (168-289) | 257 (202-347) | 300 (235-404) | 343 (269-462) | 386 (303-520) | 429 (336-578) |
| **60** | 0 | 26 (20-35) | 51 (40-69) | 103 (81-139) | 154 (121-208) | 206 (161-277) | 257 (202-347) | 309 (242-416) | 360 (282-485) | 412 (323-554) | 463 (363-624) | 515 (403-693) |
| **70** | 0 | 30 (24-40) | 60 (47-81) | 120 (94-162) | 180 (141-243) | 240 (188-323) | 300 (235-404) | 360 (282-485) | 420 (329-566) | 480 (376-647) | 540 (424-728) | 600 (471-809) |
| **75** | 0 | 32 (25-43) | 64 (50-87) | 129 (101-173) | 193 (151-260) | 257 (202-347) | 322 (252-433) | 386 (303-520) | 450 (353-606) | 515 (403-693) | 579 (454-780) | 643 (504-866) |
| **80** | 0 | 34 (27-46) | 69 (54-92) | 137 (108-185) | 206 (161-277) | 274 (215-370) | 343 (269-462) | 412 (323-554) | 480 (376-647) | 549 (430-739) | 618 (484-832) | 686 (538-924) |
| **90** | 0 | 39 (30-52) | 77 (61-104) | 154 (121-208) | 232 (182-312) | 309 (242-416) | 386 (303-520) | 463 (363-624) | 540 (424-728) | 618 (484-832) | 695 (545-936) | 772 (605-1040) |
| **100** | 0 | 43 (34-58) | 86 (67-116) | 172 (134-231) | 257 (202-347) | 343 (269-462) | 429 (336-578) | 515 (403-693) | 600 (471-809) | 686 (538-924) | 772 (605-1040) | 858 (672-1155) |

**Table A10.14c** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 2 (1-2) | 3 (2-4) | 6 (5-9) | 9 (7-13) | 12 (10-17) | 15 (12-21) | 18 (14-26) | 21 (17-30) | 24 (19-34) | 27 (21-38) | 30 (24-43) |
| **20** | 0 | 3 (2-4) | 6 (5-9) | 12 (10-17) | 18 (14-26) | 24 (19-34) | 30 (24-43) | 36 (29-51) | 42 (33-60) | 48 (38-68) | 54 (43-77) | 60 (48-85) |
| **25** | 0 | 4 (3-5) | 8 (6-11) | 15 (12-21) | 23 (18-32) | 30 (24-43) | 38 (30-53) | 45 (36-64) | 53 (42-74) | 60 (48-85) | 68 (53-96) | 76 (59-106) |
| **30** | 0 | 5 (4-6) | 9 (7-13) | 18 (14-26) | 27 (21-38) | 36 (29-51) | 45 (36-64) | 54 (43-77) | 63 (50-89) | 72 (57-102) | 82 (64-115) | 91 (71-128) |
| **40** | 0 | 6 (5-9) | 12 (10-17) | 24 (19-34) | 36 (29-51) | 48 (38-68) | 60 (48-85) | 72 (57-102) | 85 (67-119) | 97 (76-136) | 109 (86-153) | 121 (95-170) |
| **50** | 0 | 8 (6-11) | 15 (12-21) | 30 (24-43) | 45 (36-64) | 60 (48-85) | 76 (59-106) | 91 (71-128) | 106 (83-149) | 121 (95-170) | 136 (107-192) | 151 (119-213) |
| **60** | 0 | 9 (7-13) | 18 (14-26) | 36 (29-51) | 54 (43-77) | 72 (57-102) | 91 (71-128) | 109 (86-153) | 127 (100-179) | 145 (114-204) | 163 (128-230) | 181 (143-255) |
| **70** | 0 | 11 (8-15) | 21 (17-30) | 42 (33-60) | 63 (50-89) | 85 (67-119) | 106 (83-149) | 127 (100-179) | 148 (116-209) | 169 (133-238) | 190 (150-268) | 211 (166-298) |
| **75** | 0 | 11 (9-16) | 23 (18-32) | 45 (36-64) | 68 (53-96) | 91 (71-128) | 113 (89-160) | 136 (107-192) | 159 (125-223) | 181 (143-255) | 204 (160-287) | 227 (178-319) |
| **80** | 0 | 12 (10-17) | 24 (19-34) | 48 (38-68) | 72 (57-102) | 97 (76-136) | 121 (95-170) | 145 (114-204) | 169 (133-238) | 193 (152-272) | 217 (171-306) | 242 (190-341) |
| **90** | 0 | 14 (11-19) | 27 (21-38) | 54 (43-77) | 82 (64-115) | 109 (86-153) | 136 (107-192) | 163 (128-230) | 190 (150-268) | 217 (171-306) | 245 (192-345) | 272 (214-383) |
| **100** | 0 | 15 (12-21) | 30 (24-43) | 60 (48-85) | 91 (71-128) | 121 (95-170) | 151 (119-213) | 181 (143-255) | 211 (166-298) | 242 (190-341) | 272 (214-383) | 302 (238-426) |

**Table A10.14d** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 3 (2-4) | 6 (5-9) | 12 (10-17) | 19 (14-26) | 25 (19-35) | 31 (24-43) | 37 (29-52) | 44 (33-60) | 50 (38-69) | 56 (43-78) | 62 (48-86) |
| **20** | 0 | 6 (5-9) | 12 (10-17) | 25 (19-35) | 37 (29-52) | 50 (38-69) | 62 (48-86) | 75 (57-104) | 87 (67-121) | 100 (76-138) | 112 (86-155) | 125 (96-173) |
| **25** | 0 | 8 (6-11) | 16 (12-22) | 31 (24-43) | 47 (36-65) | 62 (48-86) | 78 (60-108) | 94 (72-129) | 109 (84-151) | 125 (96-173) | 140 (108-194) | 156 (119-216) |
| **30** | 0 | 9 (7-13) | 19 (14-26) | 37 (29-52) | 56 (43-78) | 75 (57-104) | 94 (72-129) | 112 (86-155) | 131 (100-181) | 150 (115-207) | 168 (129-233) | 187 (143-259) |
| **40** | 0 | 12 (10-17) | 25 (19-35) | 50 (38-69) | 75 (57-104) | 100 (76-138) | 125 (96-173) | 150 (115-207) | 175 (134-242) | 199 (153-276) | 224 (172-311) | 249 (191-345) |
| **50** | 0 | 16 (12-22) | 31 (24-43) | 62 (48-86) | 94 (72-129) | 125 (96-173) | 156 (119-216) | 187 (143-259) | 218 (167-302) | 249 (191-345) | 281 (215-388) | 312 (239-431) |
| **60** | 0 | 19 (14-26) | 37 (29-52) | 75 (57-104) | 112 (86-155) | 150 (115-207) | 187 (143-259) | 224 (172-311) | 262 (201-362) | 299 (229-414) | 337 (258-466) | 374 (287-518) |
| **70** | 0 | 22 (17-30) | 44 (33-60) | 87 (67-121) | 131 (100-181) | 175 (134-242) | 218 (167-302) | 262 (201-362) | 305 (234-423) | 349 (268-483) | 393 (301-543) | 436 (335-604) |
| **75** | 0 | 23 (18-32) | 47 (36-65) | 94 (72-129) | 140 (108-194) | 187 (143-259) | 234 (179-323) | 281 (215-388) | 327 (251-453) | 374 (287-518) | 421 (323-582) | 468 (358-647) |
| **80** | 0 | 25 (19-35) | 50 (38-69) | 100 (76-138) | 150 (115-207) | 199 (153-276) | 249 (191-345) | 299 (229-414) | 349 (268-483) | 399 (306-552) | 449 (344-621) | 499 (382-690) |
| **90** | 0 | 28 (22-39) | 56 (43-78) | 112 (86-155) | 168 (129-233) | 224 (172-311) | 281 (215-388) | 337 (258-466) | 393 (301-543) | 449 (344-621) | 505 (387-699) | 561 (430-776) |
| **100** | 0 | 31 (24-43) | 62 (48-86) | 125 (96-173) | 187 (143-259) | 249 (191-345) | 312 (239-431) | 374 (287-518) | 436 (335-604) | 499 (382-690) | 561 (430-776) | 623 (478-863) |

**Table A10.15a** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 4 (3-5) | 7 (6-9) | 15 (12-18) | 22 (18-27) | 29 (23-36) | 37 (29-45) | 44 (35-54) | 51 (41-64) | 58 (47-73) | 66 (53-82) | 73 (59-91) |
| **20** | 0 | 7 (6-9) | 15 (12-18) | 29 (23-36) | 44 (35-54) | 58 (47-73) | 73 (59-91) | 88 (70-109) | 102 (82-127) | 117 (94-145) | 131 (106-163) | 146 (117-182) |
| **25** | 0 | 9 (7-11) | 18 (15-23) | 37 (29-45) | 55 (44-68) | 73 (59-91) | 91 (73-113) | 110 (88-136) | 128 (103-159) | 146 (117-182) | 164 (132-204) | 183 (147-227) |
| **30** | 0 | 11 (9-14) | 22 (18-27) | 44 (35-54) | 66 (53-82) | 88 (70-109) | 110 (88-136) | 131 (106-163) | 153 (123-191) | 175 (141-218) | 197 (159-245) | 219 (176-272) |
| **40** | 0 | 15 (12-18) | 29 (23-36) | 58 (47-73) | 88 (70-109) | 117 (94-145) | 146 (117-182) | 175 (141-218) | 204 (164-254) | 234 (188-291) | 263 (211-327) | 292 (235-363) |
| **50** | 0 | 18 (15-23) | 37 (29-45) | 73 (59-91) | 110 (88-136) | 146 (117-182) | 183 (147-227) | 219 (176-272) | 256 (206-318) | 292 (235-363) | 329 (264-409) | 365 (294-454) |
| **60** | 0 | 22 (18-27) | 44 (35-54) | 88 (70-109) | 131 (106-163) | 175 (141-218) | 219 (176-272) | 263 (211-327) | 307 (247-381) | 350 (282-436) | 394 (317-490) | 438 (352-545) |
| **70** | 0 | 26 (21-32) | 51 (41-64) | 102 (82-127) | 153 (123-191) | 204 (164-254) | 256 (206-318) | 307 (247-381) | 358 (288-445) | 409 (329-508) | 460 (370-572) | 511 (411-635) |
| **75** | 0 | 27 (22-34) | 55 (44-68) | 110 (88-136) | 164 (132-204) | 219 (176-272) | 274 (220-340) | 329 (264-409) | 383 (308-477) | 438 (352-545) | 493 (396-613) | 548 (440-681) |
| **80** | 0 | 29 (23-36) | 58 (47-73) | 117 (94-145) | 175 (141-218) | 234 (188-291) | 292 (235-363) | 350 (282-436) | 409 (329-508) | 467 (376-581) | 526 (423-654) | 584 (470-726) |
| **90** | 0 | 33 (26-41) | 66 (53-82) | 131 (106-163) | 197 (159-245) | 263 (211-327) | 329 (264-409) | 394 (317-490) | 460 (370-572) | 526 (423-654) | 591 (476-735) | 657 (529-817) |
| **100** | 0 | 37 (29-45) | 73 (59-91) | 146 (117-182) | 219 (176-272) | 292 (235-363) | 365 (294-454) | 438 (352-545) | 511 (411-635) | 584 (470-726) | 657 (529-817) | 730 (587-908) |

**Table A10.15b** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 6 (5-7) | 12 (10-14) | 23 (20-28) | 35 (29-42) | 46 (39-56) | 58 (49-70) | 70 (59-83) | 81 (69-97) | 93 (78-111) | 104 (88-125) | 116 (98-139) |
| **20** | 0 | 12 (10-14) | 23 (20-28) | 46 (39-56) | 70 (59-83) | 93 (78-111) | 116 (98-139) | 139 (118-167) | 162 (137-195) | 186 (157-222) | 209 (176-250) | 232 (196-278) |
| **25** | 0 | 15 (12-17) | 29 (24-35) | 58 (49-70) | 87 (73-104) | 116 (98-139) | 145 (122-174) | 174 (147-209) | 203 (171-243) | 232 (196-278) | 261 (220-313) | 290 (245-348) |
| **30** | 0 | 17 (15-21) | 35 (29-42) | 70 (59-83) | 104 (88-125) | 139 (118-167) | 174 (147-209) | 209 (176-250) | 244 (206-292) | 278 (235-334) | 313 (264-375) | 348 (294-417) |
| **40** | 0 | 23 (20-28) | 46 (39-56) | 93 (78-111) | 139 (118-167) | 186 (157-222) | 232 (196-278) | 278 (235-334) | 325 (274-389) | 371 (313-445) | 418 (353-500) | 464 (392-556) |
| **50** | 0 | 29 (24-35) | 58 (49-70) | 116 (98-139) | 174 (147-209) | 232 (196-278) | 290 (245-348) | 348 (294-417) | 406 (343-487) | 464 (392-556) | 522 (441-626) | 580 (490-695) |
| **60** | 0 | 35 (29-42) | 70 (59-83) | 139 (118-167) | 209 (176-250) | 278 (235-334) | 348 (294-417) | 418 (353-500) | 487 (411-584) | 557 (470-667) | 627 (529-751) | 696 (588-834) |
| **70** | 0 | 41 (34-49) | 81 (69-97) | 162 (137-195) | 244 (206-292) | 325 (274-389) | 406 (343-487) | 487 (411-584) | 569 (480-681) | 650 (549-779) | 731 (617-876) | 812 (686-973) |
| **75** | 0 | 44 (37-52) | 87 (73-104) | 174 (147-209) | 261 (220-313) | 348 (294-417) | 435 (367-521) | 522 (441-626) | 609 (514-730) | 696 (588-834) | 783 (661-938) | 870 (735-1043) |
| **80** | 0 | 46 (39-56) | 93 (78-111) | 186 (157-222) | 278 (235-334) | 371 (313-445) | 464 (392-556) | 557 (470-667) | 650 (549-779) | 743 (627-890) | 835 (705-1001) | 928 (784-1112) |
| **90** | 0 | 52 (44-63) | 104 (88-125) | 209 (176-250) | 313 (264-375) | 418 (353-500) | 522 (441-626) | 627 (529-751) | 731 (617-876) | 835 (705-1001) | 940 (793-1126) | 1044 (882-1251) |
| **100** | 0 | 58 (49-70) | 116 (98-139) | 232 (196-278) | 348 (294-417) | 464 (392-556) | 580 (490-695) | 696 (588-834) | 812 (686-973) | 928 (784-1112) | 1044 (882-1251) | 1160 (979-1390) |

**Table A10.15c** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 1 (1-2) | 3 (2-4) | 6 (5-7) | 9 (7-11) | 12 (10-15) | 15 (12-18) | 18 (14-22) | 21 (17-25) | 24 (19-29) | 26 (22-33) | 29 (24-36) |
| **20** | 0 | 3 (2-4) | 6 (5-7) | 12 (10-15) | 18 (14-22) | 24 (19-29) | 29 (24-36) | 35 (29-44) | 41 (34-51) | 47 (38-58) | 53 (43-65) | 59 (48-73) |
| **25** | 0 | 4 (3-5) | 7 (6-9) | 15 (12-18) | 22 (18-27) | 29 (24-36) | 37 (30-45) | 44 (36-54) | 51 (42-64) | 59 (48-73) | 66 (54-82) | 74 (60-91) |
| **30** | 0 | 4 (4-5) | 9 (7-11) | 18 (14-22) | 26 (22-33) | 35 (29-44) | 44 (36-54) | 53 (43-65) | 62 (50-76) | 71 (58-87) | 79 (65-98) | 88 (72-109) |
| **40** | 0 | 6 (5-7) | 12 (10-15) | 24 (19-29) | 35 (29-44) | 47 (38-58) | 59 (48-73) | 71 (58-87) | 82 (67-102) | 94 (77-116) | 106 (86-131) | 118 (96-145) |
| **50** | 0 | 7 (6-9) | 15 (12-18) | 29 (24-36) | 44 (36-54) | 59 (48-73) | 74 (60-91) | 88 (72-109) | 103 (84-127) | 118 (96-145) | 132 (108-163) | 147 (120-182) |
| **60** | 0 | 9 (7-11) | 18 (14-22) | 35 (29-44) | 53 (43-65) | 71 (58-87) | 88 (72-109) | 106 (86-131) | 124 (101-152) | 141 (115-174) | 159 (130-196) | 176 (144-218) |
| **70** | 0 | 10 (8-13) | 21 (17-25) | 41 (34-51) | 62 (50-76) | 82 (67-102) | 103 (84-127) | 124 (101-152) | 144 (118-178) | 165 (135-203) | 185 (151-229) | 206 (168-254) |
| **75** | 0 | 11 (9-14) | 22 (18-27) | 44 (36-54) | 66 (54-82) | 88 (72-109) | 110 (90-136) | 132 (108-163) | 154 (126-191) | 176 (144-218) | 199 (162-245) | 221 (180-272) |
| **80** | 0 | 12 (10-15) | 24 (19-29) | 47 (38-58) | 71 (58-87) | 94 (77-116) | 118 (96-145) | 141 (115-174) | 165 (135-203) | 188 (154-232) | 212 (173-261) | 235 (192-290) |
| **90** | 0 | 13 (11-16) | 26 (22-33) | 53 (43-65) | 79 (65-98) | 106 (86-131) | 132 (108-163) | 159 (130-196) | 185 (151-229) | 212 (173-261) | 238 (195-294) | 265 (216-327) |
| **100** | 0 | 15 (12-18) | 29 (24-36) | 59 (48-73) | 88 (72-109) | 118 (96-145) | 147 (120-182) | 176 (144-218) | 206 (168-254) | 235 (192-290) | 265 (216-327) | 294 (240-363) |

**Table A10.15d** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A and B projects plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 3 (3-4) | 7 (6-8) | 13 (11-16) | 20 (17-25) | 27 (22-33) | 34 (28-41) | 40 (33-49) | 47 (39-57) | 54 (44-65) | 60 (50-74) | 67 (55-82) |
| **20** | 0 | 7 (6-8) | 13 (11-16) | 27 (22-33) | 40 (33-49) | 54 (44-65) | 67 (55-82) | 80 (66-98) | 94 (78-114) | 107 (89-131) | 121 (100-147) | 134 (111-163) |
| **25** | 0 | 8 (7-10) | 17 (14-20) | 34 (28-41) | 50 (42-61) | 67 (55-82) | 84 (69-102) | 101 (83-123) | 117 (97-143) | 134 (111-163) | 151 (125-184) | 168 (139-204) |
| **30** | 0 | 10 (8-12) | 20 (17-25) | 40 (33-49) | 60 (50-74) | 80 (66-98) | 101 (83-123) | 121 (100-147) | 141 (116-172) | 161 (133-196) | 181 (150-221) | 201 (166-245) |
| **40** | 0 | 13 (11-16) | 27 (22-33) | 54 (44-65) | 80 (66-98) | 107 (89-131) | 134 (111-163) | 161 (133-196) | 188 (155-229) | 215 (177-261) | 241 (199-294) | 268 (222-327) |
| **50** | 0 | 17 (14-20) | 34 (28-41) | 67 (55-82) | 101 (83-123) | 134 (111-163) | 168 (139-204) | 201 (166-245) | 235 (194-286) | 268 (222-327) | 302 (249-368) | 335 (277-408) |
| **60** | 0 | 20 (17-25) | 40 (33-49) | 80 (66-98) | 121 (100-147) | 161 (133-196) | 201 (166-245) | 241 (199-294) | 282 (233-343) | 322 (266-392) | 362 (299-441) | 402 (332-490) |
| **70** | 0 | 23 (19-29) | 47 (39-57) | 94 (78-114) | 141 (116-172) | 188 (155-229) | 235 (194-286) | 282 (233-343) | 329 (272-400) | 376 (310-458) | 423 (349-515) | 469 (388-572) |
| **75** | 0 | 25 (21-31) | 50 (42-61) | 101 (83-123) | 151 (125-184) | 201 (166-245) | 252 (208-306) | 302 (249-368) | 352 (291-429) | 402 (332-490) | 453 (374-551) | 503 (416-613) |
| **80** | 0 | 27 (22-33) | 54 (44-65) | 107 (89-131) | 161 (133-196) | 215 (177-261) | 268 (222-327) | 322 (266-392) | 376 (310-458) | 429 (355-523) | 483 (399-588) | 537 (443-654) |
| **90** | 0 | 30 (25-37) | 60 (50-74) | 121 (100-147) | 181 (150-221) | 241 (199-294) | 302 (249-368) | 362 (299-441) | 423 (349-515) | 483 (399-588) | 543 (449-662) | 604 (499-735) |
| **100** | 0 | 34 (28-41) | 67 (55-82) | 134 (111-163) | 201 (166-245) | 268 (222-327) | 335 (277-408) | 402 (332-490) | 469 (388-572) | 537 (443-654) | 604 (499-735) | 671 (554-817) |

**Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D** [top]

**Table A10.16a** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 5 (4-6) | 10 (9-12) | 20 (17-24) | 31 (26-37) | 41 (35-49) | 51 (43-61) | 61 (52-73) | 72 (61-86) | 82 (70-98) | 92 (78-110) | 102 (87-122) |
| **20** | 0 | 10 (9-12) | 20 (17-24) | 41 (35-49) | 61 (52-73) | 82 (70-98) | 102 (87-122) | 123 (104-147) | 143 (122-171) | 164 (139-196) | 184 (156-220) | 205 (174-244) |
| **25** | 0 | 13 (11-15) | 26 (22-31) | 51 (43-61) | 77 (65-92) | 102 (87-122) | 128 (109-153) | 154 (130-183) | 179 (152-214) | 205 (174-244) | 231 (196-275) | 256 (217-305) |
| **30** | 0 | 15 (13-18) | 31 (26-37) | 61 (52-73) | 92 (78-110) | 123 (104-147) | 154 (130-183) | 184 (156-220) | 215 (182-257) | 246 (209-293) | 277 (235-330) | 307 (261-367) |
| **40** | 0 | 20 (17-24) | 41 (35-49) | 82 (70-98) | 123 (104-147) | 164 (139-196) | 205 (174-244) | 246 (209-293) | 287 (243-342) | 328 (278-391) | 369 (313-440) | 410 (348-489) |
| **50** | 0 | 26 (22-31) | 51 (43-61) | 102 (87-122) | 154 (130-183) | 205 (174-244) | 256 (217-305) | 307 (261-367) | 359 (304-428) | 410 (348-489) | 461 (391-550) | 512 (434-611) |
| **60** | 0 | 31 (26-37) | 61 (52-73) | 123 (104-147) | 184 (156-220) | 246 (209-293) | 307 (261-367) | 369 (313-440) | 430 (365-513) | 492 (417-587) | 553 (469-660) | 615 (521-733) |
| **70** | 0 | 36 (30-43) | 72 (61-86) | 143 (122-171) | 215 (182-257) | 287 (243-342) | 359 (304-428) | 430 (365-513) | 502 (426-599) | 574 (487-684) | 645 (547-770) | 717 (608-855) |
| **75** | 0 | 38 (33-46) | 77 (65-92) | 154 (130-183) | 231 (196-275) | 307 (261-367) | 384 (326-458) | 461 (391-550) | 538 (456-642) | 615 (521-733) | 692 (587-825) | 768 (652-916) |
| **80** | 0 | 41 (35-49) | 82 (70-98) | 164 (139-196) | 246 (209-293) | 328 (278-391) | 410 (348-489) | 492 (417-587) | 574 (487-684) | 656 (556-782) | 738 (626-880) | 820 (695-978) |
| **90** | 0 | 46 (39-55) | 92 (78-110) | 184 (156-220) | 277 (235-330) | 369 (313-440) | 461 (391-550) | 553 (469-660) | 645 (547-770) | 738 (626-880) | 830 (704-990) | 922 (782-1100) |
| **100** | 0 | 51 (43-61) | 102 (87-122) | 205 (174-244) | 307 (261-367) | 410 (348-489) | 512 (434-611) | 615 (521-733) | 717 (608-855) | 820 (695-978) | 922 (782-1100) | 1025 (869-1222) |

**Table A10.16b** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 12 (10-15) | 25 (21-29) | 49 (42-58) | 74 (63-87) | 98 (84-116) | 123 (105-146) | 147 (126-175) | 172 (147-204) | 197 (168-233) | 221 (189-262) | 246 (210-291) |
| **20** | 0 | 25 (21-29) | 49 (42-58) | 98 (84-116) | 147 (126-175) | 197 (168-233) | 246 (210-291) | 295 (252-349) | 344 (293-407) | 393 (335-466) | 442 (377-524) | 492 (419-582) |
| **25** | 0 | 31 (26-36) | 61 (52-73) | 123 (105-146) | 184 (157-218) | 246 (210-291) | 307 (262-364) | 369 (314-437) | 430 (367-509) | 492 (419-582) | 553 (472-655) | 615 (524-728) |
| **30** | 0 | 37 (31-44) | 74 (63-87) | 147 (126-175) | 221 (189-262) | 295 (252-349) | 369 (314-437) | 442 (377-524) | 516 (440-611) | 590 (503-699) | 664 (566-786) | 737 (629-873) |
| **40** | 0 | 49 (42-58) | 98 (84-116) | 197 (168-233) | 295 (252-349) | 393 (335-466) | 492 (419-582) | 590 (503-699) | 688 (587-815) | 787 (671-931) | 885 (755-1048) | 983 (838-1164) |
| **50** | 0 | 61 (52-73) | 123 (105-146) | 246 (210-291) | 369 (314-437) | 492 (419-582) | 615 (524-728) | 737 (629-873) | 860 (734-1019) | 983 (838-1164) | 1106 (943-1310) | 1229 (1048-1455) |
| **60** | 0 | 74 (63-87) | 147 (126-175) | 295 (252-349) | 442 (377-524) | 590 (503-699) | 737 (629-873) | 885 (755-1048) | 1032 (880-1222) | 1180 (1006-1397) | 1327 (1132-1572) | 1475 (1258-1746) |
| **70** | 0 | 86 (73-102) | 172 (147-204) | 344 (293-407) | 516 (440-611) | 688 (587-815) | 860 (734-1019) | 1032 (880-1222) | 1205 (1027-1426) | 1377 (1174-1630) | 1549 (1320-1834) | 1721 (1467-2037) |
| **75** | 0 | 92 (79-109) | 184 (157-218) | 369 (314-437) | 553 (472-655) | 737 (629-873) | 922 (786-1091) | 1106 (943-1310) | 1291 (1100-1528) | 1475 (1258-1746) | 1659 (1415-1965) | 1844 (1572-2183) |
| **80** | 0 | 98 (84-116) | 197 (168-233) | 393 (335-466) | 590 (503-699) | 787 (671-931) | 983 (838-1164) | 1180 (1006-1397) | 1377 (1174-1630) | 1573 (1341-1863) | 1770 (1509-2096) | 1967 (1677-2328) |
| **90** | 0 | 111 (94-131) | 221 (189-262) | 442 (377-524) | 664 (566-786) | 885 (755-1048) | 1106 (943-1310) | 1327 (1132-1572) | 1549 (1320-1834) | 1770 (1509-2096) | 1991 (1698-2357) | 2212 (1886-2619) |
| **100** | 0 | 123 (105-146) | 246 (210-291) | 492 (419-582) | 737 (629-873) | 983 (838-1164) | 1229 (1048-1455) | 1475 (1258-1746) | 1721 (1467-2037) | 1967 (1677-2328) | 2212 (1886-2619) | 2458 (2096-2910) |

**Table A10.16c** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 29 (24-34) | 57 (48-68) | 114 (96-136) | 171 (144-204) | 229 (192-272) | 286 (240-341) | 343 (288-409) | 400 (337-477) | 457 (385-545) | 514 (433-613) | 571 (481-681) |
| **20** | 0 | 57 (48-68) | 114 (96-136) | 229 (192-272) | 343 (288-409) | 457 (385-545) | 571 (481-681) | 686 (577-817) | 800 (673-953) | 914 (769-1090) | 1029 (865-1226) | 1143 (962-1362) |
| **25** | 0 | 71 (60-85) | 143 (120-170) | 286 (240-341) | 429 (361-511) | 571 (481-681) | 714 (601-851) | 857 (721-1022) | 1000 (841-1192) | 1143 (962-1362) | 1286 (1082-1532) | 1429 (1202-1703) |
| **30** | 0 | 86 (72-102) | 171 (144-204) | 343 (288-409) | 514 (433-613) | 686 (577-817) | 857 (721-1022) | 1029 (865-1226) | 1200 (1010-1430) | 1372 (1154-1634) | 1543 (1298-1839) | 1714 (1442-2043) |
| **40** | 0 | 114 (96-136) | 229 (192-272) | 457 (385-545) | 686 (577-817) | 914 (769-1090) | 1143 (962-1362) | 1372 (1154-1634) | 1600 (1346-1907) | 1829 (1539-2179) | 2057 (1731-2452) | 2286 (1923-2724) |
| **50** | 0 | 143 (120-170) | 286 (240-341) | 571 (481-681) | 857 (721-1022) | 1143 (962-1362) | 1429 (1202-1703) | 1714 (1442-2043) | 2000 (1683-2384) | 2286 (1923-2724) | 2572 (2164-3065) | 2857 (2404-3405) |
| **60** | 0 | 171 (144-204) | 343 (288-409) | 686 (577-817) | 1029 (865-1226) | 1372 (1154-1634) | 1714 (1442-2043) | 2057 (1731-2452) | 2400 (2019-2860) | 2743 (2308-3269) | 3086 (2596-3677) | 3429 (2885-4086) |
| **70** | 0 | 200 (168-238) | 400 (337-477) | 800 (673-953) | 1200 (1010-1430) | 1600 (1346-1907) | 2000 (1683-2384) | 2400 (2019-2860) | 2800 (2356-3337) | 3200 (2692-3814) | 3600 (3029-4290) | 4000 (3366-4767) |
| **75** | 0 | 214 (180-255) | 429 (361-511) | 857 (721-1022) | 1286 (1082-1532) | 1714 (1442-2043) | 2143 (1803-2554) | 2572 (2164-3065) | 3000 (2524-3575) | 3429 (2885-4086) | 3858 (3245-4597) | 4286 (3606-5108) |
| **80** | 0 | 229 (192-272) | 457 (385-545) | 914 (769-1090) | 1372 (1154-1634) | 1829 (1539-2179) | 2286 (1923-2724) | 2743 (2308-3269) | 3200 (2692-3814) | 3658 (3077-4358) | 4115 (3462-4903) | 4572 (3846-5448) |
| **90** | 0 | 257 (216-306) | 514 (433-613) | 1029 (865-1226) | 1543 (1298-1839) | 2057 (1731-2452) | 2572 (2164-3065) | 3086 (2596-3677) | 3600 (3029-4290) | 4115 (3462-4903) | 4629 (3894-5516) | 5143 (4327-6129) |
| **100** | 0 | 286 (240-341) | 571 (481-681) | 1143 (962-1362) | 1714 (1442-2043) | 2286 (1923-2724) | 2857 (2404-3405) | 3429 (2885-4086) | 4000 (3366-4767) | 4572 (3846-5448) | 5143 (4327-6129) | 5715 (4808-6810) |

**Table A10.16d** Predicted impacts of displacement, for northern gannet for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 16 (14-19) | 33 (28-39) | 65 (55-77) | 98 (83-116) | 130 (110-155) | 163 (138-193) | 195 (165-232) | 228 (193-271) | 260 (220-309) | 293 (248-348) | 325 (275-387) |
| **20** | 0 | 33 (28-39) | 65 (55-77) | 130 (110-155) | 195 (165-232) | 260 (220-309) | 325 (275-387) | 390 (330-464) | 455 (385-541) | 521 (440-619) | 586 (495-696) | 651 (550-774) |
| **25** | 0 | 41 (34-48) | 81 (69-97) | 163 (138-193) | 244 (206-290) | 325 (275-387) | 407 (344-483) | 488 (413-580) | 569 (481-677) | 651 (550-774) | 732 (619-870) | 813 (688-967) |
| **30** | 0 | 49 (41-58) | 98 (83-116) | 195 (165-232) | 293 (248-348) | 390 (330-464) | 488 (413-580) | 586 (495-696) | 683 (578-812) | 781 (660-928) | 878 (743-1044) | 976 (825-1160) |
| **40** | 0 | 65 (55-77) | 130 (110-155) | 260 (220-309) | 390 (330-464) | 521 (440-619) | 651 (550-774) | 781 (660-928) | 911 (770-1083) | 1041 (880-1238) | 1171 (990-1392) | 1301 (1100-1547) |
| **50** | 0 | 81 (69-97) | 163 (138-193) | 325 (275-387) | 488 (413-580) | 651 (550-774) | 813 (688-967) | 976 (825-1160) | 1139 (963-1354) | 1301 (1100-1547) | 1464 (1238-1741) | 1627 (1375-1934) |
| **60** | 0 | 98 (83-116) | 195 (165-232) | 390 (330-464) | 586 (495-696) | 781 (660-928) | 976 (825-1160) | 1171 (990-1392) | 1366 (1155-1624) | 1562 (1320-1857) | 1757 (1485-2089) | 1952 (1650-2321) |
| **70** | 0 | 114 (96-135) | 228 (193-271) | 455 (385-541) | 683 (578-812) | 911 (770-1083) | 1139 (963-1354) | 1366 (1155-1624) | 1594 (1348-1895) | 1822 (1540-2166) | 2050 (1733-2437) | 2277 (1925-2707) |
| **75** | 0 | 122 (103-145) | 244 (206-290) | 488 (413-580) | 732 (619-870) | 976 (825-1160) | 1220 (1031-1450) | 1464 (1238-1741) | 1708 (1444-2031) | 1952 (1650-2321) | 2196 (1857-2611) | 2440 (2063-2901) |
| **80** | 0 | 130 (110-155) | 260 (220-309) | 521 (440-619) | 781 (660-928) | 1041 (880-1238) | 1301 (1100-1547) | 1562 (1320-1857) | 1822 (1540-2166) | 2082 (1760-2475) | 2342 (1980-2785) | 2603 (2201-3094) |
| **90** | 0 | 146 (124-174) | 293 (248-348) | 586 (495-696) | 878 (743-1044) | 1171 (990-1392) | 1464 (1238-1741) | 1757 (1485-2089) | 2050 (1733-2437) | 2342 (1980-2785) | 2635 (2228-3133) | 2928 (2476-3481) |
| **100** | 0 | 163 (138-193) | 325 (275-387) | 651 (550-774) | 976 (825-1160) | 1301 (1100-1547) | 1627 (1375-1934) | 1952 (1650-2321) | 2277 (1925-2707) | 2603 (2201-3094) | 2928 (2476-3481) | 3253 (2751-3868) |

**Table A10.17a** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 269 (247-293) | 538 (495-586) | 1077 (990-1172) | 1615 (1485-1758) | 2154 (1979-2344) | 2692 (2474-2930) | 3230 (2969-3516) | 3769 (3464-4102) | 4307 (3959-4688) | 4846 (4454-5274) | 5384 (4949-5860) |
| **20** | 0 | 538 (495-586) | 1077 (990-1172) | 2154 (1979-2344) | 3230 (2969-3516) | 4307 (3959-4688) | 5384 (4949-5860) | 6461 (5938-7032) | 7538 (6928-8204) | 8615 (7918-9376) | 9691 (8907-10548) | 10768 (9897-11720) |
| **25** | 0 | 673 (619-733) | 1346 (1237-1465) | 2692 (2474-2930) | 4038 (3711-4395) | 5384 (4949-5860) | 6730 (6186-7325) | 8076 (7423-8790) | 9422 (8660-10255) | 10768 (9897-11720) | 12114 (11134-13185) | 13460 (12371-14650) |
| **30** | 0 | 808 (742-879) | 1615 (1485-1758) | 3230 (2969-3516) | 4846 (4454-5274) | 6461 (5938-7032) | 8076 (7423-8790) | 9691 (8907-10548) | 11307 (10392-12306) | 12922 (11877-14064) | 14537 (13361-15822) | 16152 (14846-17580) |
| **40** | 0 | 1077 (990-1172) | 2154 (1979-2344) | 4307 (3959-4688) | 6461 (5938-7032) | 8615 (7918-9376) | 10768 (9897-11720) | 12922 (11877-14064) | 15076 (13856-16408) | 17229 (15835-18752) | 19383 (17815-21096) | 21536 (19794-23441) |
| **50** | 0 | 1346 (1237-1465) | 2692 (2474-2930) | 5384 (4949-5860) | 8076 (7423-8790) | 10768 (9897-11720) | 13460 (12371-14650) | 16152 (14846-17580) | 18844 (17320-20510) | 21536 (19794-23441) | 24229 (22269-26371) | 26921 (24743-29301) |
| **60** | 0 | 1615 (1485-1758) | 3230 (2969-3516) | 6461 (5938-7032) | 9691 (8907-10548) | 12922 (11877-14064) | 16152 (14846-17580) | 19383 (17815-21096) | 22613 (20784-24613) | 25844 (23753-28129) | 29074 (26722-31645) | 32305 (29691-35161) |
| **70** | 0 | 1884 (1732-2051) | 3769 (3464-4102) | 7538 (6928-8204) | 11307 (10392-12306) | 15076 (13856-16408) | 18844 (17320-20510) | 22613 (20784-24613) | 26382 (24248-28715) | 30151 (27712-32817) | 33920 (31176-36919) | 37689 (34640-41021) |
| **75** | 0 | 2019 (1856-2198) | 4038 (3711-4395) | 8076 (7423-8790) | 12114 (11134-13185) | 16152 (14846-17580) | 20190 (18557-21975) | 24229 (22269-26371) | 28267 (25980-30766) | 32305 (29691-35161) | 36343 (33403-39556) | 40381 (37114-43951) |
| **80** | 0 | 2154 (1979-2344) | 4307 (3959-4688) | 8615 (7918-9376) | 12922 (11877-14064) | 17229 (15835-18752) | 21536 (19794-23441) | 25844 (23753-28129) | 30151 (27712-32817) | 34458 (31671-37505) | 38766 (35630-42193) | 43073 (39589-46881) |
| **90** | 0 | 2423 (2227-2637) | 4846 (4454-5274) | 9691 (8907-10548) | 14537 (13361-15822) | 19383 (17815-21096) | 24229 (22269-26371) | 29074 (26722-31645) | 33920 (31176-36919) | 38766 (35630-42193) | 43611 (40083-47467) | 48457 (44537-52741) |
| **100** | 0 | 2692 (2474-2930) | 5384 (4949-5860) | 10768 (9897-11720) | 16152 (14846-17580) | 21536 (19794-23441) | 26921 (24743-29301) | 32305 (29691-35161) | 37689 (34640-41021) | 43073 (39589-46881) | 48457 (44537-52741) | 53841 (49486-58601) |

**Table A10.17b** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 341 (315-370) | 682 (629-739) | 1365 (1258-1479) | 2047 (1888-2218) | 2729 (2517-2958) | 3411 (3146-3697) | 4094 (3775-4436) | 4776 (4405-5176) | 5458 (5034-5915) | 6140 (5663-6655) | 6823 (6292-7394) |
| 20 | 0 | 682 (629-739) | 1365 (1258-1479) | 2729 (2517-2958) | 4094 (3775-4436) | 5458 (5034-5915) | 6823 (6292-7394) | 8187 (7551-8873) | 9552 (8809-10352) | 10916 (10068-11830) | 12281 (11326-13309) | 13645 (12585-14788) |
| 25 | 0 | 853 (787-924) | 1706 (1573-1848) | 3411 (3146-3697) | 5117 (4719-5545) | 6823 (6292-7394) | 8528 (7865-9242) | 10234 (9439-11091) | 11940 (11012-12939) | 13645 (12585-14788) | 15351 (14158-16636) | 17057 (15731-18485) |
| 30 | 0 | 1023 (944-1109) | 2047 (1888-2218) | 4094 (3775-4436) | 6140 (5663-6655) | 8187 (7551-8873) | 10234 (9439-11091) | 12281 (11326-13309) | 14328 (13214-15527) | 16374 (15102-17746) | 18421 (16989-19964) | 20468 (18877-22182) |
| 40 | 0 | 1365 (1258-1479) | 2729 (2517-2958) | 5458 (5034-5915) | 8187 (7551-8873) | 10916 (10068-11830) | 13645 (12585-14788) | 16374 (15102-17746) | 19104 (17619-20703) | 21833 (20135-23661) | 24562 (22652-26618) | 27291 (25169-29576) |
| 50 | 0 | 1706 (1573-1848) | 3411 (3146-3697) | 6823 (6292-7394) | 10234 (9439-11091) | 13645 (12585-14788) | 17057 (15731-18485) | 20468 (18877-22182) | 23879 (22023-25879) | 27291 (25169-29576) | 30702 (28316-33273) | 34114 (31462-36970) |
| 60 | 0 | 2047 (1888-2218) | 4094 (3775-4436) | 8187 (7551-8873) | 12281 (11326-13309) | 16374 (15102-17746) | 20468 (18877-22182) | 24562 (22652-26618) | 28655 (26428-31055) | 32749 (30203-35491) | 36843 (33979-39928) | 40936 (37754-44364) |
| 70 | 0 | 2388 (2202-2588) | 4776 (4405-5176) | 9552 (8809-10352) | 14328 (13214-15527) | 19104 (17619-20703) | 23879 (22023-25879) | 28655 (26428-31055) | 33431 (30832-36231) | 38207 (35237-41406) | 42983 (39642-46582) | 47759 (44046-51758) |
| 75 | 0 | 2559 (2360-2773) | 5117 (4719-5545) | 10234 (9439-11091) | 15351 (14158-16636) | 20468 (18877-22182) | 25585 (23596-27727) | 30702 (28316-33273) | 35819 (33035-38818) | 40936 (37754-44364) | 46053 (42473-49909) | 51170 (47193-55455) |
| 80 | 0 | 2729 (2517-2958) | 5458 (5034-5915) | 10916 (10068-11830) | 16374 (15102-17746) | 21833 (20135-23661) | 27291 (25169-29576) | 32749 (30203-35491) | 38207 (35237-41406) | 43665 (40271-47322) | 49123 (45305-53237) | 54582 (50339-59152) |
| 90 | 0 | 3070 (2832-3327) | 6140 (5663-6655) | 12281 (11326-13309) | 18421 (16989-19964) | 24562 (22652-26618) | 30702 (28316-33273) | 36843 (33979-39928) | 42983 (39642-46582) | 49123 (45305-53237) | 55264 (50968-59891) | 61404 (56631-66546) |
| 100 | 0 | 3411 (3146-3697) | 6823 (6292-7394) | 13645 (12585-14788) | 20468 (18877-22182) | 27291 (25169-29576) | 34114 (31462-36970) | 40936 (37754-44364) | 47759 (44046-51758) | 54582 (50339-59152) | 61404 (56631-66546) | 68227 (62923-73940) |

**Table A10.17c** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 258 (237-282) | 516 (473-564) | 1033 (946-1129) | 1549 (1419-1693) | 2065 (1892-2257) | 2582 (2366-2822) | 3098 (2839-3386) | 3614 (3312-3950) | 4131 (3785-4515) | 4647 (4258-5079) | 5163 (4731-5643) |
| **20** | 0 | 516 (473-564) | 1033 (946-1129) | 2065 (1892-2257) | 3098 (2839-3386) | 4131 (3785-4515) | 5163 (4731-5643) | 6196 (5677-6772) | 7229 (6624-7900) | 8262 (7570-9029) | 9294 (8516-10158) | 10327 (9462-11286) |
| **25** | 0 | 645 (591-705) | 1291 (1183-1411) | 2582 (2366-2822) | 3873 (3548-4232) | 5163 (4731-5643) | 6454 (5914-7054) | 7745 (7097-8465) | 9036 (8279-9876) | 10327 (9462-11286) | 11618 (10645-12697) | 12909 (11828-14108) |
| **30** | 0 | 775 (710-846) | 1549 (1419-1693) | 3098 (2839-3386) | 4647 (4258-5079) | 6196 (5677-6772) | 7745 (7097-8465) | 9294 (8516-10158) | 10843 (9935-11851) | 12392 (11355-13544) | 13941 (12774-15237) | 15490 (14193-16930) |
| **40** | 0 | 1033 (946-1129) | 2065 (1892-2257) | 4131 (3785-4515) | 6196 (5677-6772) | 8262 (7570-9029) | 10327 (9462-11286) | 12392 (11355-13544) | 14458 (13247-15801) | 16523 (15139-18058) | 18588 (17032-20315) | 20654 (18924-22573) |
| **50** | 0 | 1291 (1183-1411) | 2582 (2366-2822) | 5163 (4731-5643) | 7745 (7097-8465) | 10327 (9462-11286) | 12909 (11828-14108) | 15490 (14193-16930) | 18072 (16559-19751) | 20654 (18924-22573) | 23235 (21290-25394) | 25817 (23655-28216) |
| **60** | 0 | 1549 (1419-1693) | 3098 (2839-3386) | 6196 (5677-6772) | 9294 (8516-10158) | 12392 (11355-13544) | 15490 (14193-16930) | 18588 (17032-20315) | 21686 (19871-23701) | 24785 (22709-27087) | 27883 (25548-30473) | 30981 (28387-33859) |
| **70** | 0 | 1807 (1656-1975) | 3614 (3312-3950) | 7229 (6624-7900) | 10843 (9935-11851) | 14458 (13247-15801) | 18072 (16559-19751) | 21686 (19871-23701) | 25301 (23182-27652) | 28915 (26494-31602) | 32530 (29806-35552) | 36144 (33118-39502) |
| **75** | 0 | 1936 (1774-2116) | 3873 (3548-4232) | 7745 (7097-8465) | 11618 (10645-12697) | 15490 (14193-16930) | 19363 (17742-21162) | 23235 (21290-25394) | 27108 (24838-29627) | 30981 (28387-33859) | 34853 (31935-38092) | 38726 (35483-42324) |
| **80** | 0 | 2065 (1892-2257) | 4131 (3785-4515) | 8262 (7570-9029) | 12392 (11355-13544) | 16523 (15139-18058) | 20654 (18924-22573) | 24785 (22709-27087) | 28915 (26494-31602) | 33046 (30279-36116) | 37177 (34064-40631) | 41308 (37849-45146) |
| **90** | 0 | 2324 (2129-2539) | 4647 (4258-5079) | 9294 (8516-10158) | 13941 (12774-15237) | 18588 (17032-20315) | 23235 (21290-25394) | 27883 (25548-30473) | 32530 (29806-35552) | 37177 (34064-40631) | 41824 (38322-45710) | 46471 (42580-50789) |
| **100** | 0 | 2582 (2366-2822) | 5163 (4731-5643) | 10327 (9462-11286) | 15490 (14193-16930) | 20654 (18924-22573) | 25817 (23655-28216) | 30981 (28387-33859) | 36144 (33118-39502) | 41308 (37849-45146) | 46471 (42580-50789) | 51634 (47311-56432) |

**Table A10.17d** Predicted impacts of displacement, for common guillemot for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 276 (253-300) | 551 (507-600) | 1102 (1014-1199) | 1653 (1521-1799) | 2204 (2027-2399) | 2755 (2534-2998) | 3307 (3041-3598) | 3858 (3548-4197) | 4409 (4055-4797) | 4960 (4562-5397) | 5511 (5068-5996) |
| **20** | 0 | 551 (507-600) | 1102 (1014-1199) | 2204 (2027-2399) | 3307 (3041-3598) | 4409 (4055-4797) | 5511 (5068-5996) | 6613 (6082-7196) | 7715 (7096-8395) | 8818 (8109-9594) | 9920 (9123-10794) | 11022 (10137-11993) |
| **25** | 0 | 689 (634-750) | 1378 (1267-1499) | 2755 (2534-2998) | 4133 (3801-4497) | 5511 (5068-5996) | 6889 (6336-7496) | 8266 (7603-8995) | 9644 (8870-10494) | 11022 (10137-11993) | 12400 (11404-13492) | 13777 (12671-14991) |
| **30** | 0 | 827 (760-899) | 1653 (1521-1799) | 3307 (3041-3598) | 4960 (4562-5397) | 6613 (6082-7196) | 8266 (7603-8995) | 9920 (9123-10794) | 11573 (10644-12592) | 13226 (12164-14391) | 14880 (13685-16190) | 16533 (15205-17989) |
| **40** | 0 | 1102 (1014-1199) | 2204 (2027-2399) | 4409 (4055-4797) | 6613 (6082-7196) | 8818 (8109-9594) | 11022 (10137-11993) | 13226 (12164-14391) | 15431 (14192-16790) | 17635 (16219-19189) | 19839 (18246-21587) | 22044 (20274-23986) |
| **50** | 0 | 1378 (1267-1499) | 2755 (2534-2998) | 5511 (5068-5996) | 8266 (7603-8995) | 11022 (10137-11993) | 13777 (12671-14991) | 16533 (15205-17989) | 19288 (17739-20987) | 22044 (20274-23986) | 24799 (22808-26984) | 27555 (25342-29982) |
| **60** | 0 | 1653 (1521-1799) | 3307 (3041-3598) | 6613 (6082-7196) | 9920 (9123-10794) | 13226 (12164-14391) | 16533 (15205-17989) | 19839 (18246-21587) | 23146 (21287-25185) | 26453 (24328-28783) | 29759 (27369-32381) | 33066 (30410-35978) |
| **70** | 0 | 1929 (1774-2099) | 3858 (3548-4197) | 7715 (7096-8395) | 11573 (10644-12592) | 15431 (14192-16790) | 19288 (17739-20987) | 23146 (21287-25185) | 27004 (24835-29382) | 30861 (28383-33580) | 34719 (31931-37777) | 38577 (35479-41975) |
| **75** | 0 | 2067 (1901-2249) | 4133 (3801-4497) | 8266 (7603-8995) | 12400 (11404-13492) | 16533 (15205-17989) | 20666 (19007-22487) | 24799 (22808-26984) | 28932 (26609-31481) | 33066 (30410-35978) | 37199 (34212-40476) | 41332 (38013-44973) |
| **80** | 0 | 2204 (2027-2399) | 4409 (4055-4797) | 8818 (8109-9594) | 13226 (12164-14391) | 17635 (16219-19189) | 22044 (20274-23986) | 26453 (24328-28783) | 30861 (28383-33580) | 35270 (32438-38377) | 39679 (36493-43174) | 44088 (40547-47971) |
| **90** | 0 | 2480 (2281-2698) | 4960 (4562-5397) | 9920 (9123-10794) | 14880 (13685-16190) | 19839 (18246-21587) | 24799 (22808-26984) | 29759 (27369-32381) | 34719 (31931-37777) | 39679 (36493-43174) | 44639 (41054-48571) | 49599 (45616-53968) |
| **100** | 0 | 2755 (2534-2998) | 5511 (5068-5996) | 11022 (10137-11993) | 16533 (15205-17989) | 22044 (20274-23986) | 27555 (25342-29982) | 33066 (30410-35978) | 38577 (35479-41975) | 44088 (40547-47971) | 49599 (45616-53968) | 55110 (50684-59964) |

**Table A10.18a** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 78 (68-89) | 156 (135-177) | 312 (271-355) | 468 (406-532) | 623 (542-709) | 779 (677-887) | 935 (813-1064) | 1091 (948-1241) | 1247 (1084-1419) | 1403 (1219-1596) | 1558 (1355-1773) |
| **20** | 0 | 156 (135-177) | 312 (271-355) | 623 (542-709) | 935 (813-1064) | 1247 (1084-1419) | 1558 (1355-1773) | 1870 (1626-2128) | 2182 (1897-2483) | 2493 (2168-2837) | 2805 (2439-3192) | 3117 (2710-3547) |
| **25** | 0 | 195 (169-222) | 390 (339-443) | 779 (677-887) | 1169 (1016-1330) | 1558 (1355-1773) | 1948 (1694-2217) | 2338 (2032-2660) | 2727 (2371-3103) | 3117 (2710-3547) | 3506 (3048-3990) | 3896 (3387-4433) |
| **30** | 0 | 234 (203-266) | 468 (406-532) | 935 (813-1064) | 1403 (1219-1596) | 1870 (1626-2128) | 2338 (2032-2660) | 2805 (2439-3192) | 3273 (2845-3724) | 3740 (3252-4256) | 4208 (3658-4788) | 4675 (4065-5320) |
| **40** | 0 | 312 (271-355) | 623 (542-709) | 1247 (1084-1419) | 1870 (1626-2128) | 2493 (2168-2837) | 3117 (2710-3547) | 3740 (3252-4256) | 4363 (3794-4965) | 4987 (4336-5675) | 5610 (4878-6384) | 6233 (5419-7093) |
| **50** | 0 | 390 (339-443) | 779 (677-887) | 1558 (1355-1773) | 2338 (2032-2660) | 3117 (2710-3547) | 3896 (3387-4433) | 4675 (4065-5320) | 5454 (4742-6207) | 6233 (5419-7093) | 7013 (6097-7980) | 7792 (6774-8866) |
| **60** | 0 | 468 (406-532) | 935 (813-1064) | 1870 (1626-2128) | 2805 (2439-3192) | 3740 (3252-4256) | 4675 (4065-5320) | 5610 (4878-6384) | 6545 (5690-7448) | 7480 (6503-8512) | 8415 (7316-9576) | 9350 (8129-10640) |
| **70** | 0 | 545 (474-621) | 1091 (948-1241) | 2182 (1897-2483) | 3273 (2845-3724) | 4363 (3794-4965) | 5454 (4742-6207) | 6545 (5690-7448) | 7636 (6639-8689) | 8727 (7587-9930) | 9818 (8536-11172) | 10909 (9484-12413) |
| **75** | 0 | 584 (508-665) | 1169 (1016-1330) | 2338 (2032-2660) | 3506 (3048-3990) | 4675 (4065-5320) | 5844 (5081-6650) | 7013 (6097-7980) | 8181 (7113-9310) | 9350 (8129-10640) | 10519 (9145-11970) | 11688 (10162-13300) |
| **80** | 0 | 623 (542-709) | 1247 (1084-1419) | 2493 (2168-2837) | 3740 (3252-4256) | 4987 (4336-5675) | 6233 (5419-7093) | 7480 (6503-8512) | 8727 (7587-9930) | 9973 (8671-11349) | 11220 (9755-12768) | 12467 (10839-14186) |
| **90** | 0 | 701 (610-798) | 1403 (1219-1596) | 2805 (2439-3192) | 4208 (3658-4788) | 5610 (4878-6384) | 7013 (6097-7980) | 8415 (7316-9576) | 9818 (8536-11172) | 11220 (9755-12768) | 12623 (10974-14364) | 14025 (12194-15960) |
| **100** | 0 | 779 (677-887) | 1558 (1355-1773) | 3117 (2710-3547) | 4675 (4065-5320) | 6233 (5419-7093) | 7792 (6774-8866) | 9350 (8129-10640) | 10909 (9484-12413) | 12467 (10839-14186) | 14025 (12194-15960) | 15584 (13549-17733) |

**Table A10.18b** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 90 (79-102) | 180 (157-204) | 359 (315-408) | 539 (472-612) | 718 (629-816) | 898 (787-1020) | 1077 (944-1224) | 1257 (1101-1429) | 1436 (1258-1633) | 1616 (1416-1837) | 1795 (1573-2041) |
| **20** | 0 | 180 (157-204) | 359 (315-408) | 718 (629-816) | 1077 (944-1224) | 1436 (1258-1633) | 1795 (1573-2041) | 2154 (1888-2449) | 2513 (2202-2857) | 2872 (2517-3265) | 3231 (2832-3673) | 3590 (3146-4081) |
| **25** | 0 | 224 (197-255) | 449 (393-510) | 898 (787-1020) | 1346 (1180-1531) | 1795 (1573-2041) | 2244 (1966-2551) | 2693 (2360-3061) | 3142 (2753-3571) | 3590 (3146-4081) | 4039 (3539-4592) | 4488 (3933-5102) |
| **30** | 0 | 269 (236-306) | 539 (472-612) | 1077 (944-1224) | 1616 (1416-1837) | 2154 (1888-2449) | 2693 (2360-3061) | 3231 (2832-3673) | 3770 (3304-4286) | 4308 (3775-4898) | 4847 (4247-5510) | 5385 (4719-6122) |
| **40** | 0 | 359 (315-408) | 718 (629-816) | 1436 (1258-1633) | 2154 (1888-2449) | 2872 (2517-3265) | 3590 (3146-4081) | 4308 (3775-4898) | 5026 (4405-5714) | 5745 (5034-6530) | 6463 (5663-7347) | 7181 (6292-8163) |
| **50** | 0 | 449 (393-510) | 898 (787-1020) | 1795 (1573-2041) | 2693 (2360-3061) | 3590 (3146-4081) | 4488 (3933-5102) | 5385 (4719-6122) | 6283 (5506-7143) | 7181 (6292-8163) | 8078 (7079-9183) | 8976 (7865-10204) |
| **60** | 0 | 539 (472-612) | 1077 (944-1224) | 2154 (1888-2449) | 3231 (2832-3673) | 4308 (3775-4898) | 5385 (4719-6122) | 6463 (5663-7347) | 7540 (6607-8571) | 8617 (7551-9795) | 9694 (8495-11020) | 10771 (9439-12244) |
| **70** | 0 | 628 (551-714) | 1257 (1101-1429) | 2513 (2202-2857) | 3770 (3304-4286) | 5026 (4405-5714) | 6283 (5506-7143) | 7540 (6607-8571) | 8796 (7708-10000) | 10053 (8809-11428) | 11310 (9911-12857) | 12566 (11012-14285) |
| **75** | 0 | 673 (590-765) | 1346 (1180-1531) | 2693 (2360-3061) | 4039 (3539-4592) | 5385 (4719-6122) | 6732 (5899-7653) | 8078 (7079-9183) | 9425 (8259-10714) | 10771 (9439-12244) | 12117 (10618-13775) | 13464 (11798-15305) |
| **80** | 0 | 718 (629-816) | 1436 (1258-1633) | 2872 (2517-3265) | 4308 (3775-4898) | 5745 (5034-6530) | 7181 (6292-8163) | 8617 (7551-9795) | 10053 (8809-11428) | 11489 (10068-13061) | 12925 (11326-14693) | 14361 (12585-16326) |
| **90** | 0 | 808 (708-918) | 1616 (1416-1837) | 3231 (2832-3673) | 4847 (4247-5510) | 6463 (5663-7347) | 8078 (7079-9183) | 9694 (8495-11020) | 11310 (9911-12857) | 12925 (11326-14693) | 14541 (12742-16530) | 16156 (14158-18366) |
| **100** | 0 | 898 (787-1020) | 1795 (1573-2041) | 3590 (3146-4081) | 5385 (4719-6122) | 7181 (6292-8163) | 8976 (7865-10204) | 10771 (9439-12244) | 12566 (11012-14285) | 14361 (12585-16326) | 16156 (14158-18366) | 17952 (15731-20407) |

**Table A10.18c** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 65 (56-76) | 131 (113-152) | 261 (225-305) | 392 (338-457) | 523 (451-609) | 654 (564-762) | 784 (676-914) | 915 (789-1067) | 1046 (902-1219) | 1176 (1015-1371) | 1307 (1127-1524) |
| **20** | 0 | 131 (113-152) | 261 (225-305) | 523 (451-609) | 784 (676-914) | 1046 (902-1219) | 1307 (1127-1524) | 1569 (1353-1828) | 1830 (1578-2133) | 2091 (1804-2438) | 2353 (2029-2743) | 2614 (2255-3047) |
| **25** | 0 | 163 (141-190) | 327 (282-381) | 654 (564-762) | 980 (845-1143) | 1307 (1127-1524) | 1634 (1409-1905) | 1961 (1691-2285) | 2287 (1973-2666) | 2614 (2255-3047) | 2941 (2536-3428) | 3268 (2818-3809) |
| **30** | 0 | 196 (169-229) | 392 (338-457) | 784 (676-914) | 1176 (1015-1371) | 1569 (1353-1828) | 1961 (1691-2285) | 2353 (2029-2743) | 2745 (2367-3200) | 3137 (2705-3657) | 3529 (3044-4114) | 3921 (3382-4571) |
| **40** | 0 | 261 (225-305) | 523 (451-609) | 1046 (902-1219) | 1569 (1353-1828) | 2091 (1804-2438) | 2614 (2255-3047) | 3137 (2705-3657) | 3660 (3156-4266) | 4183 (3607-4876) | 4706 (4058-5485) | 5229 (4509-6094) |
| **50** | 0 | 327 (282-381) | 654 (564-762) | 1307 (1127-1524) | 1961 (1691-2285) | 2614 (2255-3047) | 3268 (2818-3809) | 3921 (3382-4571) | 4575 (3945-5333) | 5229 (4509-6094) | 5882 (5073-6856) | 6536 (5636-7618) |
| **60** | 0 | 392 (338-457) | 784 (676-914) | 1569 (1353-1828) | 2353 (2029-2743) | 3137 (2705-3657) | 3921 (3382-4571) | 4706 (4058-5485) | 5490 (4734-6399) | 6274 (5411-7313) | 7059 (6087-8228) | 7843 (6764-9142) |
| **70** | 0 | 457 (395-533) | 915 (789-1067) | 1830 (1578-2133) | 2745 (2367-3200) | 3660 (3156-4266) | 4575 (3945-5333) | 5490 (4734-6399) | 6405 (5524-7466) | 7320 (6313-8532) | 8235 (7102-9599) | 9150 (7891-10665) |
| **75** | 0 | 490 (423-571) | 980 (845-1143) | 1961 (1691-2285) | 2941 (2536-3428) | 3921 (3382-4571) | 4902 (4227-5714) | 5882 (5073-6856) | 6862 (5918-7999) | 7843 (6764-9142) | 8823 (7609-10284) | 9804 (8454-11427) |
| **80** | 0 | 523 (451-609) | 1046 (902-1219) | 2091 (1804-2438) | 3137 (2705-3657) | 4183 (3607-4876) | 5229 (4509-6094) | 6274 (5411-7313) | 7320 (6313-8532) | 8366 (7214-9751) | 9411 (8116-10970) | 10457 (9018-12189) |
| **90** | 0 | 588 (507-686) | 1176 (1015-1371) | 2353 (2029-2743) | 3529 (3044-4114) | 4706 (4058-5485) | 5882 (5073-6856) | 7059 (6087-8228) | 8235 (7102-9599) | 9411 (8116-10970) | 10588 (9131-12341) | 11764 (10145-13713) |
| **100** | 0 | 654 (564-762) | 1307 (1127-1524) | 2614 (2255-3047) | 3921 (3382-4571) | 5229 (4509-6094) | 6536 (5636-7618) | 7843 (6764-9142) | 9150 (7891-10665) | 10457 (9018-12189) | 11764 (10145-13713) | 13071 (11273-15236) |

**Table A10.18d** Predicted impacts of displacement, for razorbill for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 72 (63-82) | 144 (125-165) | 288 (250-330) | 431 (375-495) | 575 (500-659) | 719 (625-824) | 863 (750-989) | 1006 (875-1154) | 1150 (1000-1319) | 1294 (1125-1484) | 1438 (1250-1648) |
| **20** | 0 | 144 (125-165) | 288 (250-330) | 575 (500-659) | 863 (750-989) | 1150 (1000-1319) | 1438 (1250-1648) | 1725 (1500-1978) | 2013 (1750-2308) | 2300 (2000-2637) | 2588 (2250-2967) | 2875 (2500-3297) |
| **25** | 0 | 180 (156-206) | 359 (313-412) | 719 (625-824) | 1078 (938-1236) | 1438 (1250-1648) | 1797 (1563-2060) | 2157 (1875-2473) | 2516 (2188-2885) | 2875 (2500-3297) | 3235 (2813-3709) | 3594 (3125-4121) |
| **30** | 0 | 216 (188-247) | 431 (375-495) | 863 (750-989) | 1294 (1125-1484) | 1725 (1500-1978) | 2157 (1875-2473) | 2588 (2250-2967) | 3019 (2625-3462) | 3450 (3000-3956) | 3882 (3375-4451) | 4313 (3750-4945) |
| **40** | 0 | 288 (250-330) | 575 (500-659) | 1150 (1000-1319) | 1725 (1500-1978) | 2300 (2000-2637) | 2875 (2500-3297) | 3450 (3000-3956) | 4025 (3500-4615) | 4601 (4000-5275) | 5176 (4500-5934) | 5751 (5001-6593) |
| **50** | 0 | 359 (313-412) | 719 (625-824) | 1438 (1250-1648) | 2157 (1875-2473) | 2875 (2500-3297) | 3594 (3125-4121) | 4313 (3750-4945) | 5032 (4375-5769) | 5751 (5001-6593) | 6470 (5626-7418) | 7188 (6251-8242) |
| **60** | 0 | 431 (375-495) | 863 (750-989) | 1725 (1500-1978) | 2588 (2250-2967) | 3450 (3000-3956) | 4313 (3750-4945) | 5176 (4500-5934) | 6038 (5251-6923) | 6901 (6001-7912) | 7763 (6751-8901) | 8626 (7501-9890) |
| **70** | 0 | 503 (438-577) | 1006 (875-1154) | 2013 (1750-2308) | 3019 (2625-3462) | 4025 (3500-4615) | 5032 (4375-5769) | 6038 (5251-6923) | 7045 (6126-8077) | 8051 (7001-9231) | 9057 (7876-10385) | 10064 (8751-11539) |
| **75** | 0 | 539 (469-618) | 1078 (938-1236) | 2157 (1875-2473) | 3235 (2813-3709) | 4313 (3750-4945) | 5391 (4688-6181) | 6470 (5626-7418) | 7548 (6563-8654) | 8626 (7501-9890) | 9704 (8438-11126) | 10783 (9376-12363) |
| **80** | 0 | 575 (500-659) | 1150 (1000-1319) | 2300 (2000-2637) | 3450 (3000-3956) | 4601 (4000-5275) | 5751 (5001-6593) | 6901 (6001-7912) | 8051 (7001-9231) | 9201 (8001-10549) | 10351 (9001-11868) | 11501 (10001-13187) |
| **90** | 0 | 647 (563-742) | 1294 (1125-1484) | 2588 (2250-2967) | 3882 (3375-4451) | 5176 (4500-5934) | 6470 (5626-7418) | 7763 (6751-8901) | 9057 (7876-10385) | 10351 (9001-11868) | 11645 (10126-13352) | 12939 (11251-14835) |
| **100** | 0 | 719 (625-824) | 1438 (1250-1648) | 2875 (2500-3297) | 4313 (3750-4945) | 5751 (5001-6593) | 7188 (6251-8242) | 8626 (7501-9890) | 10064 (8751-11539) | 11501 (10001-13187) | 12939 (11251-14835) | 14377 (12501-16484) |

**Table A10.19a** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 14 (10-20) | 28 (21-39) | 55 (42-78) | 83 (62-117) | 111 (83-156) | 139 (104-195) | 166 (125-234) | 194 (145-274) | 222 (166-313) | 250 (187-352) | 277 (208-391) |
| **20** | 0 | 28 (21-39) | 55 (42-78) | 111 (83-156) | 166 (125-234) | 222 (166-313) | 277 (208-391) | 333 (249-469) | 388 (291-547) | 444 (332-625) | 499 (374-703) | 555 (415-782) |
| **25** | 0 | 35 (26-49) | 69 (52-98) | 139 (104-195) | 208 (156-293) | 277 (208-391) | 347 (260-488) | 416 (311-586) | 485 (363-684) | 555 (415-782) | 624 (467-879) | 693 (519-977) |
| **30** | 0 | 42 (31-59) | 83 (62-117) | 166 (125-234) | 250 (187-352) | 333 (249-469) | 416 (311-586) | 499 (374-703) | 583 (436-821) | 666 (498-938) | 749 (561-1055) | 832 (623-1172) |
| **40** | 0 | 55 (42-78) | 111 (83-156) | 222 (166-313) | 333 (249-469) | 444 (332-625) | 555 (415-782) | 666 (498-938) | 777 (581-1094) | 888 (664-1250) | 999 (747-1407) | 1110 (830-1563) |
| **50** | 0 | 69 (52-98) | 139 (104-195) | 277 (208-391) | 416 (311-586) | 555 (415-782) | 693 (519-977) | 832 (623-1172) | 971 (727-1368) | 1110 (830-1563) | 1248 (934-1758) | 1387 (1038-1954) |
| **60** | 0 | 83 (62-117) | 166 (125-234) | 333 (249-469) | 499 (374-703) | 666 (498-938) | 832 (623-1172) | 999 (747-1407) | 1165 (872-1641) | 1331 (997-1876) | 1498 (1121-2110) | 1664 (1246-2345) |
| **70** | 0 | 97 (73-137) | 194 (145-274) | 388 (291-547) | 583 (436-821) | 777 (581-1094) | 971 (727-1368) | 1165 (872-1641) | 1359 (1017-1915) | 1553 (1163-2188) | 1748 (1308-2462) | 1942 (1453-2735) |
| **75** | 0 | 104 (78-147) | 208 (156-293) | 416 (311-586) | 624 (467-879) | 832 (623-1172) | 1040 (779-1465) | 1248 (934-1758) | 1456 (1090-2051) | 1664 (1246-2345) | 1872 (1401-2638) | 2080 (1557-2931) |
| **80** | 0 | 111 (83-156) | 222 (166-313) | 444 (332-625) | 666 (498-938) | 888 (664-1250) | 1110 (830-1563) | 1331 (997-1876) | 1553 (1163-2188) | 1775 (1329-2501) | 1997 (1495-2813) | 2219 (1661-3126) |
| **90** | 0 | 125 (93-176) | 250 (187-352) | 499 (374-703) | 749 (561-1055) | 999 (747-1407) | 1248 (934-1758) | 1498 (1121-2110) | 1748 (1308-2462) | 1997 (1495-2813) | 2247 (1682-3165) | 2497 (1869-3517) |
| **100** | 0 | 139 (104-195) | 277 (208-391) | 555 (415-782) | 832 (623-1172) | 1110 (830-1563) | 1387 (1038-1954) | 1664 (1246-2345) | 1942 (1453-2735) | 2219 (1661-3126) | 2497 (1869-3517) | 2774 (2076-3908) |

**Table A10.19b** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 11 (9-15) | 23 (18-30) | 45 (36-60) | 68 (54-91) | 90 (71-121) | 113 (89-151) | 136 (107-181) | 158 (125-211) | 181 (143-242) | 204 (161-272) | 226 (179-302) |
| **20** | 0 | 23 (18-30) | 45 (36-60) | 90 (71-121) | 136 (107-181) | 181 (143-242) | 226 (179-302) | 271 (214-362) | 317 (250-423) | 362 (286-483) | 407 (322-544) | 452 (357-604) |
| **25** | 0 | 28 (22-38) | 57 (45-75) | 113 (89-151) | 170 (134-226) | 226 (179-302) | 283 (223-377) | 339 (268-453) | 396 (313-528) | 452 (357-604) | 509 (402-679) | 565 (447-755) |
| **30** | 0 | 34 (27-45) | 68 (54-91) | 136 (107-181) | 204 (161-272) | 271 (214-362) | 339 (268-453) | 407 (322-544) | 475 (375-634) | 543 (429-725) | 611 (482-815) | 678 (536-906) |
| **40** | 0 | 45 (36-60) | 90 (71-121) | 181 (143-242) | 271 (214-362) | 362 (286-483) | 452 (357-604) | 543 (429-725) | 633 (500-846) | 724 (572-966) | 814 (643-1087) | 905 (715-1208) |
| **50** | 0 | 57 (45-75) | 113 (89-151) | 226 (179-302) | 339 (268-453) | 452 (357-604) | 565 (447-755) | 678 (536-906) | 791 (625-1057) | 905 (715-1208) | 1018 (804-1359) | 1131 (893-1510) |
| **60** | 0 | 68 (54-91) | 136 (107-181) | 271 (214-362) | 407 (322-544) | 543 (429-725) | 678 (536-906) | 814 (643-1087) | 950 (750-1268) | 1085 (858-1450) | 1221 (965-1631) | 1357 (1072-1812) |
| **70** | 0 | 79 (63-106) | 158 (125-211) | 317 (250-423) | 475 (375-634) | 633 (500-846) | 791 (625-1057) | 950 (750-1268) | 1108 (876-1480) | 1266 (1001-1691) | 1425 (1126-1903) | 1583 (1251-2114) |
| **75** | 0 | 85 (67-113) | 170 (134-226) | 339 (268-453) | 509 (402-679) | 678 (536-906) | 848 (670-1132) | 1018 (804-1359) | 1187 (938-1585) | 1357 (1072-1812) | 1526 (1206-2038) | 1696 (1340-2265) |
| **80** | 0 | 90 (71-121) | 181 (143-242) | 362 (286-483) | 543 (429-725) | 724 (572-966) | 905 (715-1208) | 1085 (858-1450) | 1266 (1001-1691) | 1447 (1144-1933) | 1628 (1287-2174) | 1809 (1430-2416) |
| **90** | 0 | 102 (80-136) | 204 (161-272) | 407 (322-544) | 611 (482-815) | 814 (643-1087) | 1018 (804-1359) | 1221 (965-1631) | 1425 (1126-1903) | 1628 (1287-2174) | 1832 (1447-2446) | 2035 (1608-2718) |
| **100** | 0 | 113 (89-151) | 226 (179-302) | 452 (357-604) | 678 (536-906) | 905 (715-1208) | 1131 (893-1510) | 1357 (1072-1812) | 1583 (1251-2114) | 1809 (1430-2416) | 2035 (1608-2718) | 2261 (1787-3020) |

**Table A10.19c** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 4 (3-6) | 9 (7-12) | 17 (14-24) | 26 (21-36) | 35 (28-48) | 44 (35-60) | 52 (42-72) | 61 (49-84) | 70 (56-96) | 78 (62-109) | 87 (69-121) |
| **20** | 0 | 9 (7-12) | 17 (14-24) | 35 (28-48) | 52 (42-72) | 70 (56-96) | 87 (69-121) | 105 (83-145) | 122 (97-169) | 139 (111-193) | 157 (125-217) | 174 (139-241) |
| **25** | 0 | 11 (9-15) | 22 (17-30) | 44 (35-60) | 65 (52-90) | 87 (69-121) | 109 (87-151) | 131 (104-181) | 152 (122-211) | 174 (139-241) | 196 (156-271) | 218 (174-301) |
| **30** | 0 | 13 (10-18) | 26 (21-36) | 52 (42-72) | 78 (62-109) | 105 (83-145) | 131 (104-181) | 157 (125-217) | 183 (146-253) | 209 (167-289) | 235 (187-326) | 261 (208-362) |
| **40** | 0 | 17 (14-24) | 35 (28-48) | 70 (56-96) | 105 (83-145) | 139 (111-193) | 174 (139-241) | 209 (167-289) | 244 (194-338) | 279 (222-386) | 314 (250-434) | 348 (278-482) |
| **50** | 0 | 22 (17-30) | 44 (35-60) | 87 (69-121) | 131 (104-181) | 174 (139-241) | 218 (174-301) | 261 (208-362) | 305 (243-422) | 348 (278-482) | 392 (312-543) | 435 (347-603) |
| **60** | 0 | 26 (21-36) | 52 (42-72) | 105 (83-145) | 157 (125-217) | 209 (167-289) | 261 (208-362) | 314 (250-434) | 366 (292-506) | 418 (333-579) | 470 (375-651) | 523 (417-724) |
| **70** | 0 | 30 (24-42) | 61 (49-84) | 122 (97-169) | 183 (146-253) | 244 (194-338) | 305 (243-422) | 366 (292-506) | 427 (340-591) | 488 (389-675) | 549 (437-760) | 610 (486-844) |
| **75** | 0 | 33 (26-45) | 65 (52-90) | 131 (104-181) | 196 (156-271) | 261 (208-362) | 327 (260-452) | 392 (312-543) | 457 (365-633) | 523 (417-724) | 588 (469-814) | 653 (521-904) |
| **80** | 0 | 35 (28-48) | 70 (56-96) | 139 (111-193) | 209 (167-289) | 279 (222-386) | 348 (278-482) | 418 (333-579) | 488 (389-675) | 557 (444-772) | 627 (500-868) | 697 (555-965) |
| **90** | 0 | 39 (31-54) | 78 (62-109) | 157 (125-217) | 235 (187-326) | 314 (250-434) | 392 (312-543) | 470 (375-651) | 549 (437-760) | 627 (500-868) | 705 (562-977) | 784 (625-1085) |
| **100** | 0 | 44 (35-60) | 87 (69-121) | 174 (139-241) | 261 (208-362) | 348 (278-482) | 435 (347-603) | 523 (417-724) | 610 (486-844) | 697 (555-965) | 784 (625-1085) | 871 (694-1206) |

**Table A10.19d** Predicted impacts of displacement, for little auk for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 9 (7-12) | 18 (14-25) | 36 (28-50) | 54 (41-75) | 72 (55-99) | 90 (69-124) | 108 (83-149) | 126 (97-174) | 144 (111-199) | 162 (124-224) | 180 (138-249) |
| **20** | 0 | 18 (14-25) | 36 (28-50) | 72 (55-99) | 108 (83-149) | 144 (111-199) | 180 (138-249) | 216 (166-298) | 252 (194-348) | 288 (221-398) | 324 (249-448) | 360 (277-497) |
| **25** | 0 | 22 (17-31) | 45 (35-62) | 90 (69-124) | 135 (104-186) | 180 (138-249) | 225 (173-311) | 270 (207-373) | 315 (242-435) | 360 (277-497) | 405 (311-559) | 450 (346-622) |
| **30** | 0 | 27 (21-37) | 54 (41-75) | 108 (83-149) | 162 (124-224) | 216 (166-298) | 270 (207-373) | 324 (249-448) | 378 (290-522) | 432 (332-597) | 486 (373-671) | 539 (415-746) |
| **40** | 0 | 36 (28-50) | 72 (55-99) | 144 (111-199) | 216 (166-298) | 288 (221-398) | 360 (277-497) | 432 (332-597) | 503 (387-696) | 575 (442-796) | 647 (498-895) | 719 (553-995) |
| **50** | 0 | 45 (35-62) | 90 (69-124) | 180 (138-249) | 270 (207-373) | 360 (277-497) | 450 (346-622) | 539 (415-746) | 629 (484-870) | 719 (553-995) | 809 (622-1119) | 899 (691-1243) |
| **60** | 0 | 54 (41-75) | 108 (83-149) | 216 (166-298) | 324 (249-448) | 432 (332-597) | 539 (415-746) | 647 (498-895) | 755 (581-1044) | 863 (664-1194) | 971 (747-1343) | 1079 (830-1492) |
| **70** | 0 | 63 (48-87) | 126 (97-174) | 252 (194-348) | 378 (290-522) | 503 (387-696) | 629 (484-870) | 755 (581-1044) | 881 (677-1218) | 1007 (774-1393) | 1133 (871-1567) | 1259 (968-1741) |
| **75** | 0 | 67 (52-93) | 135 (104-186) | 270 (207-373) | 405 (311-559) | 539 (415-746) | 674 (518-932) | 809 (622-1119) | 944 (726-1305) | 1079 (830-1492) | 1214 (933-1678) | 1349 (1037-1865) |
| **80** | 0 | 72 (55-99) | 144 (111-199) | 288 (221-398) | 432 (332-597) | 575 (442-796) | 719 (553-995) | 863 (664-1194) | 1007 (774-1393) | 1151 (885-1591) | 1295 (995-1790) | 1439 (1106-1989) |
| **90** | 0 | 81 (62-112) | 162 (124-224) | 324 (249-448) | 486 (373-671) | 647 (498-895) | 809 (622-1119) | 971 (747-1343) | 1133 (871-1567) | 1295 (995-1790) | 1457 (1120-2014) | 1618 (1244-2238) |
| **100** | 0 | 90 (69-124) | 180 (138-249) | 360 (277-497) | 539 (415-746) | 719 (553-995) | 899 (691-1243) | 1079 (830-1492) | 1259 (968-1741) | 1439 (1106-1989) | 1618 (1244-2238) | 1798 (1383-2487) |

**Table A10.20a** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 17 (14-22) | 35 (28-43) | 70 (57-87) | 105 (85-130) | 140 (113-174) | 175 (142-217) | 210 (170-261) | 244 (198-304) | 279 (227-348) | 314 (255-391) | 349 (283-435) |
| **20** | 0 | 35 (28-43) | 70 (57-87) | 140 (113-174) | 210 (170-261) | 279 (227-348) | 349 (283-435) | 419 (340-522) | 489 (396-609) | 559 (453-696) | 629 (510-783) | 698 (566-870) |
| **25** | 0 | 44 (35-54) | 87 (71-109) | 175 (142-217) | 262 (212-326) | 349 (283-435) | 437 (354-543) | 524 (425-652) | 611 (496-761) | 698 (566-870) | 786 (637-978) | 873 (708-1087) |
| **30** | 0 | 52 (42-65) | 105 (85-130) | 210 (170-261) | 314 (255-391) | 419 (340-522) | 524 (425-652) | 629 (510-783) | 733 (595-913) | 838 (680-1043) | 943 (765-1174) | 1048 (850-1304) |
| **40** | 0 | 70 (57-87) | 140 (113-174) | 279 (227-348) | 419 (340-522) | 559 (453-696) | 698 (566-870) | 838 (680-1043) | 978 (793-1217) | 1118 (906-1391) | 1257 (1020-1565) | 1397 (1133-1739) |
| **50** | 0 | 87 (71-109) | 175 (142-217) | 349 (283-435) | 524 (425-652) | 698 (566-870) | 873 (708-1087) | 1048 (850-1304) | 1222 (991-1522) | 1397 (1133-1739) | 1572 (1274-1956) | 1746 (1416-2174) |
| **60** | 0 | 105 (85-130) | 210 (170-261) | 419 (340-522) | 629 (510-783) | 838 (680-1043) | 1048 (850-1304) | 1257 (1020-1565) | 1467 (1189-1826) | 1676 (1359-2087) | 1886 (1529-2348) | 2095 (1699-2609) |
| **70** | 0 | 122 (99-152) | 244 (198-304) | 489 (396-609) | 733 (595-913) | 978 (793-1217) | 1222 (991-1522) | 1467 (1189-1826) | 1711 (1388-2130) | 1956 (1586-2435) | 2200 (1784-2739) | 2445 (1982-3043) |
| **75** | 0 | 131 (106-163) | 262 (212-326) | 524 (425-652) | 786 (637-978) | 1048 (850-1304) | 1310 (1062-1630) | 1572 (1274-1956) | 1833 (1487-2282) | 2095 (1699-2609) | 2357 (1912-2935) | 2619 (2124-3261) |
| **80** | 0 | 140 (113-174) | 279 (227-348) | 559 (453-696) | 838 (680-1043) | 1118 (906-1391) | 1397 (1133-1739) | 1676 (1359-2087) | 1956 (1586-2435) | 2235 (1812-2782) | 2514 (2039-3130) | 2794 (2266-3478) |
| **90** | 0 | 157 (127-196) | 314 (255-391) | 629 (510-783) | 943 (765-1174) | 1257 (1020-1565) | 1572 (1274-1956) | 1886 (1529-2348) | 2200 (1784-2739) | 2514 (2039-3130) | 2829 (2294-3522) | 3143 (2549-3913) |
| **100** | 0 | 175 (142-217) | 349 (283-435) | 698 (566-870) | 1048 (850-1304) | 1397 (1133-1739) | 1746 (1416-2174) | 2095 (1699-2609) | 2445 (1982-3043) | 2794 (2266-3478) | 3143 (2549-3913) | 3492 (2832-4348) |

**Table A10.20b** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2010/11. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 25 (21-30) | 50 (42-61) | 101 (85-121) | 151 (127-182) | 201 (169-243) | 251 (211-303) | 302 (254-364) | 352 (296-425) | 402 (338-485) | 453 (381-546) | 503 (423-607) |
| **20** | 0 | 50 (42-61) | 101 (85-121) | 201 (169-243) | 302 (254-364) | 402 (338-485) | 503 (423-607) | 603 (508-728) | 704 (592-850) | 805 (677-971) | 905 (761-1092) | 1006 (846-1214) |
| **25** | 0 | 63 (53-76) | 126 (106-152) | 251 (211-303) | 377 (317-455) | 503 (423-607) | 629 (529-759) | 754 (634-910) | 880 (740-1062) | 1006 (846-1214) | 1132 (952-1365) | 1257 (1057-1517) |
| **30** | 0 | 75 (63-91) | 151 (127-182) | 302 (254-364) | 453 (381-546) | 603 (508-728) | 754 (634-910) | 905 (761-1092) | 1056 (888-1274) | 1207 (1015-1456) | 1358 (1142-1638) | 1509 (1269-1821) |
| **40** | 0 | 101 (85-121) | 201 (169-243) | 402 (338-485) | 603 (508-728) | 805 (677-971) | 1006 (846-1214) | 1207 (1015-1456) | 1408 (1184-1699) | 1609 (1354-1942) | 1810 (1523-2185) | 2012 (1692-2427) |
| **50** | 0 | 126 (106-152) | 251 (211-303) | 503 (423-607) | 754 (634-910) | 1006 (846-1214) | 1257 (1057-1517) | 1509 (1269-1821) | 1760 (1480-2124) | 2012 (1692-2427) | 2263 (1903-2731) | 2514 (2115-3034) |
| **60** | 0 | 151 (127-182) | 302 (254-364) | 603 (508-728) | 905 (761-1092) | 1207 (1015-1456) | 1509 (1269-1821) | 1810 (1523-2185) | 2112 (1777-2549) | 2414 (2030-2913) | 2716 (2284-3277) | 3017 (2538-3641) |
| **70** | 0 | 176 (148-212) | 352 (296-425) | 704 (592-850) | 1056 (888-1274) | 1408 (1184-1699) | 1760 (1480-2124) | 2112 (1777-2549) | 2464 (2073-2974) | 2816 (2369-3398) | 3168 (2665-3823) | 3520 (2961-4248) |
| **75** | 0 | 189 (159-228) | 377 (317-455) | 754 (634-910) | 1132 (952-1365) | 1509 (1269-1821) | 1886 (1586-2276) | 2263 (1903-2731) | 2640 (2221-3186) | 3017 (2538-3641) | 3395 (2855-4096) | 3772 (3172-4551) |
| **80** | 0 | 201 (169-243) | 402 (338-485) | 805 (677-971) | 1207 (1015-1456) | 1609 (1354-1942) | 2012 (1692-2427) | 2414 (2030-2913) | 2816 (2369-3398) | 3218 (2707-3884) | 3621 (3046-4369) | 4023 (3384-4855) |
| **90** | 0 | 226 (190-273) | 453 (381-546) | 905 (761-1092) | 1358 (1142-1638) | 1810 (1523-2185) | 2263 (1903-2731) | 2716 (2284-3277) | 3168 (2665-3823) | 3621 (3046-4369) | 4073 (3426-4915) | 4526 (3807-5462) |
| **100** | 0 | 251 (211-303) | 503 (423-607) | 1006 (846-1214) | 1509 (1269-1821) | 2012 (1692-2427) | 2514 (2115-3034) | 3017 (2538-3641) | 3520 (2961-4248) | 4023 (3384-4855) | 4526 (3807-5462) | 5029 (4230-6068) |

**Table A10.20c** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 7 (5-8) | 13 (11-16) | 26 (21-32) | 39 (32-47) | 52 (43-63) | 66 (53-79) | 79 (64-95) | 92 (75-111) | 105 (85-127) | 118 (96-142) | 131 (107-158) |
| **20** | 0 | 13 (11-16) | 26 (21-32) | 52 (43-63) | 79 (64-95) | 105 (85-127) | 131 (107-158) | 157 (128-190) | 183 (149-222) | 210 (171-253) | 236 (192-285) | 262 (213-317) |
| **25** | 0 | 16 (13-20) | 33 (27-40) | 66 (53-79) | 98 (80-119) | 131 (107-158) | 164 (133-198) | 197 (160-237) | 229 (187-277) | 262 (213-317) | 295 (240-356) | 328 (267-396) |
| **30** | 0 | 20 (16-24) | 39 (32-47) | 79 (64-95) | 118 (96-142) | 157 (128-190) | 197 (160-237) | 236 (192-285) | 275 (224-332) | 314 (256-380) | 354 (288-427) | 393 (320-475) |
| **40** | 0 | 26 (21-32) | 52 (43-63) | 105 (85-127) | 157 (128-190) | 210 (171-253) | 262 (213-317) | 314 (256-380) | 367 (299-443) | 419 (341-507) | 472 (384-570) | 524 (427-633) |
| **50** | 0 | 33 (27-40) | 66 (53-79) | 131 (107-158) | 197 (160-237) | 262 (213-317) | 328 (267-396) | 393 (320-475) | 459 (373-554) | 524 (427-633) | 590 (480-712) | 655 (533-792) |
| **60** | 0 | 39 (32-47) | 79 (64-95) | 157 (128-190) | 236 (192-285) | 314 (256-380) | 393 (320-475) | 472 (384-570) | 550 (448-665) | 629 (512-760) | 708 (576-855) | 786 (640-950) |
| **70** | 0 | 46 (37-55) | 92 (75-111) | 183 (149-222) | 275 (224-332) | 367 (299-443) | 459 (373-554) | 550 (448-665) | 642 (523-776) | 734 (598-887) | 825 (672-997) | 917 (747-1108) |
| **75** | 0 | 49 (40-59) | 98 (80-119) | 197 (160-237) | 295 (240-356) | 393 (320-475) | 491 (400-594) | 590 (480-712) | 688 (560-831) | 786 (640-950) | 884 (720-1069) | 983 (800-1187) |
| **80** | 0 | 52 (43-63) | 105 (85-127) | 210 (171-253) | 314 (256-380) | 419 (341-507) | 524 (427-633) | 629 (512-760) | 734 (598-887) | 839 (683-1013) | 943 (768-1140) | 1048 (854-1266) |
| **90** | 0 | 59 (48-71) | 118 (96-142) | 236 (192-285) | 354 (288-427) | 472 (384-570) | 590 (480-712) | 708 (576-855) | 825 (672-997) | 943 (768-1140) | 1061 (864-1282) | 1179 (960-1425) |
| **100** | 0 | 66 (53-79) | 131 (107-158) | 262 (213-317) | 393 (320-475) | 524 (427-633) | 655 (533-792) | 786 (640-950) | 917 (747-1108) | 1048 (854-1266) | 1179 (960-1425) | 1310 (1067-1583) |

**Table A10.20d** Predicted impacts of displacement, for Atlantic puffin for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects plus 2 km buffer, based on a range of displacement and mortality rates for the mean of 2010, 2010/11 and 2011/12. The final chosen displacement and mortality rates taken through in the assessment are highlighted in yellow. The number of birds estimated to be displaced and the die based on these rates is highlighted in green.

| D/M | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **10** | 0 | 15 (12-18) | 30 (25-36) | 59 (49-72) | 89 (74-109) | 119 (98-145) | 148 (123-181) | 178 (147-217) | 208 (172-254) | 237 (196-290) | 267 (221-326) | 297 (245-362) |
| **20** | 0 | 30 (25-36) | 59 (49-72) | 119 (98-145) | 178 (147-217) | 237 (196-290) | 297 (245-362) | 356 (294-435) | 416 (343-507) | 475 (392-580) | 534 (441-652) | 594 (490-724) |
| **25** | 0 | 37 (31-45) | 74 (61-91) | 148 (123-181) | 223 (184-272) | 297 (245-362) | 371 (306-453) | 445 (368-543) | 519 (429-634) | 594 (490-724) | 668 (552-815) | 742 (613-906) |
| **30** | 0 | 45 (37-54) | 89 (74-109) | 178 (147-217) | 267 (221-326) | 356 (294-435) | 445 (368-543) | 534 (441-652) | 623 (515-761) | 712 (588-869) | 801 (662-978) | 891 (736-1087) |
| **40** | 0 | 59 (49-72) | 119 (98-145) | 237 (196-290) | 356 (294-435) | 475 (392-580) | 594 (490-724) | 712 (588-869) | 831 (686-1014) | 950 (785-1159) | 1069 (883-1304) | 1187 (981-1449) |
| **50** | 0 | 74 (61-91) | 148 (123-181) | 297 (245-362) | 445 (368-543) | 594 (490-724) | 742 (613-906) | 891 (736-1087) | 1039 (858-1268) | 1187 (981-1449) | 1336 (1103-1630) | 1484 (1226-1811) |
| **60** | 0 | 89 (74-109) | 178 (147-217) | 356 (294-435) | 534 (441-652) | 712 (588-869) | 891 (736-1087) | 1069 (883-1304) | 1247 (1030-1521) | 1425 (1177-1739) | 1603 (1324-1956) | 1781 (1471-2173) |
| **70** | 0 | 104 (86-127) | 208 (172-254) | 416 (343-507) | 623 (515-761) | 831 (686-1014) | 1039 (858-1268) | 1247 (1030-1521) | 1455 (1201-1775) | 1662 (1373-2028) | 1870 (1545-2282) | 2078 (1716-2536) |
| **75** | 0 | 111 (92-136) | 223 (184-272) | 445 (368-543) | 668 (552-815) | 891 (736-1087) | 1113 (919-1358) | 1336 (1103-1630) | 1558 (1287-1902) | 1781 (1471-2173) | 2004 (1655-2445) | 2226 (1839-2717) |
| **80** | 0 | 119 (98-145) | 237 (196-290) | 475 (392-580) | 712 (588-869) | 950 (785-1159) | 1187 (981-1449) | 1425 (1177-1739) | 1662 (1373-2028) | 1900 (1569-2318) | 2137 (1765-2608) | 2375 (1961-2898) |
| **90** | 0 | 134 (110-163) | 267 (221-326) | 534 (441-652) | 801 (662-978) | 1069 (883-1304) | 1336 (1103-1630) | 1603 (1324-1956) | 1870 (1545-2282) | 2137 (1765-2608) | 2404 (1986-2934) | 2672 (2207-3260) |
| **100** | 0 | 148 (123-181) | 297 (245-362) | 594 (490-724) | 891 (736-1087) | 1187 (981-1449) | 1484 (1226-1811) | 1781 (1471-2173) | 2078 (1716-2536) | 2375 (1961-2898) | 2672 (2207-3260) | 2968 (2452-3622) |

## APPENDIX 11 Population estimates for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects combined

A11.1 Population estimates are presented here for the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects combined.

A11.2 Numbers presented are from habitat association modelling, methods of which are presented in chapter 2.

A11.3 Estimates are split between years 2010, 2010/11 and 2011/12 and are given for both within project areas in the Dogger Bank Zone and for the project areas together with a 2km buffer surrounding each project. These combined 'Project + Buffer' estimates are used for assessing the effects of disturbance and displacement. Buffers around individual projects frequently overlapped. Therefore, for the cumulative assessment (and for the EIA for combined Dogger Bank Teesside A and B assessment), buffer overlaps were only counted once to ensure that over-estimates of populations were not produced.

### Species accounts

#### *Northern fulmar* Fulmarus glacialis

A11.4 In 2010 the monthly baseline population estimates for northern fulmar within the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas peaked during the period of April to July (highest value in June of 3,285 birds, 90% CIs = 2,684-3,894). Monthly population estimates decreased and showed temporal differences in the 2010/11 and 2011/12 periods. In 2010/11, the species' abundance peaked during July (1,611 birds, 90% CIs = 1,283-1,968). In contrast, in 2011/12 the species' abundance peaked in April and May (highest value in May with 1,458 birds, 90% CIs = 1,144-1,758) (Table A11.1, Figure A11.1). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas (Tables 2.3 and A11.1). Mean populations across the two and a half years of survey peaked in May at 1,726 birds (90% Cls = 1,414-2,059), with a mean population peak of 2,378 birds (90% Cls = 1,946-2,837) estimated for the project areas plus buffers.

**Table A11.1** Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 306 (214-423) | 415 (291-572) | Jul | 1,611 (1,283-1,968) | 2,221 (1,768-2,712) | 537 (442-654) | 738 (608-899) | Jul | 1,074 (863-1311) | 1,480 (1,188-1,805) |
| Feb | 832 (650-1,029) | 1,128 (881-1,397) | Aug | 662 (519-820) | 913 (716-1,129) | 628 (523-757) | 864 (719-1,042) | Aug | 645 (521-788) | 889 (717-1,086) |
| Mar | 781 (619-962) | 1,072 (849-1,320) | Sep | 471 (360-610) | 650 (497-842) | 749 (603-907) | 1,031 (829-1,249) | Sep | 610 (481-758) | 840 (663-1,046) |
| Apr | 1,604 (1,307-1,959) | 2,208 (1,798-2,696) | Oct | 525 (417-650) | 714 (567-883) | 1,203 (953-1,500) | 1,637 (1,294-2,039) | Oct | 864 (685-1075) | 1,176 (931-1,461) |
| May | 3,202 (2,676-3,808) | 4,414 (3,685-5,249) | Nov | 314 (254-379) | 427 (344-516) | 480 (379-584) | 653 (515-794) | Nov | 397 (316-482) | 540 (430-655) |
| Jun | 3,285 (2,684-3,894) | 4,528 (3,702-5,372) | Dec | 371 (301-459) | 503 (408-624) | 323 (247-399) | 438 (336-543) | Dec | 347 (274-429) | 471 (372-583) |
| Jul | 1,611 (1,283-1,968) | 2,221 (1,768-2,712) | Jan | 340 (255-442) | 462 (346-601) | 228 (176-286) | 310 (239-389) | Jan | 291 (215-384) | 395 (292-521) |
| Aug | 662 (519-820) | 913 (716-1,129) | Feb | 568 (436-716) | 772 (593-974) | 799 (612-992) | 1,084 (830-1,347) | Feb | 733 (566-913) | 995 (768-1,239) |
| Sep | 471 (360-610) | 650 (497-842) | Mar | 430 (343-521) | 591 (472-717) | 677 (542-835) | 930 (744-1,147) | Mar | 630 (501-773) | 864 (688-1,061) |
| Oct | 525 (417-650) | 714 (567-883) | Apr | 543 (442-639) | 748 (607-880) | 1,252 (1,014-1,513) | 1,723 (1,395-2,083) | Apr | 1,133 (921-1,370) | 1,560 (1,267-1,886) |
| Nov | 314 (254-379) | 427 (344-516) | May | 517 (422-612) | 711 (580-842) | 1,458 (1,144-1,758) | 2,008 (1,574-2,422) | May | 1,726 (1,414-2,059) | 2,378 (1,946-2,837) |
| Dec | 371 (301-459) | 503 (408-624) | Jun | 502 (409-607) | 690 (561-835) | 686 (524-863) | 944 (721-1,188) | Jun | 1,491 (1205-1,788) | 2,054 (1,661-2,465) |

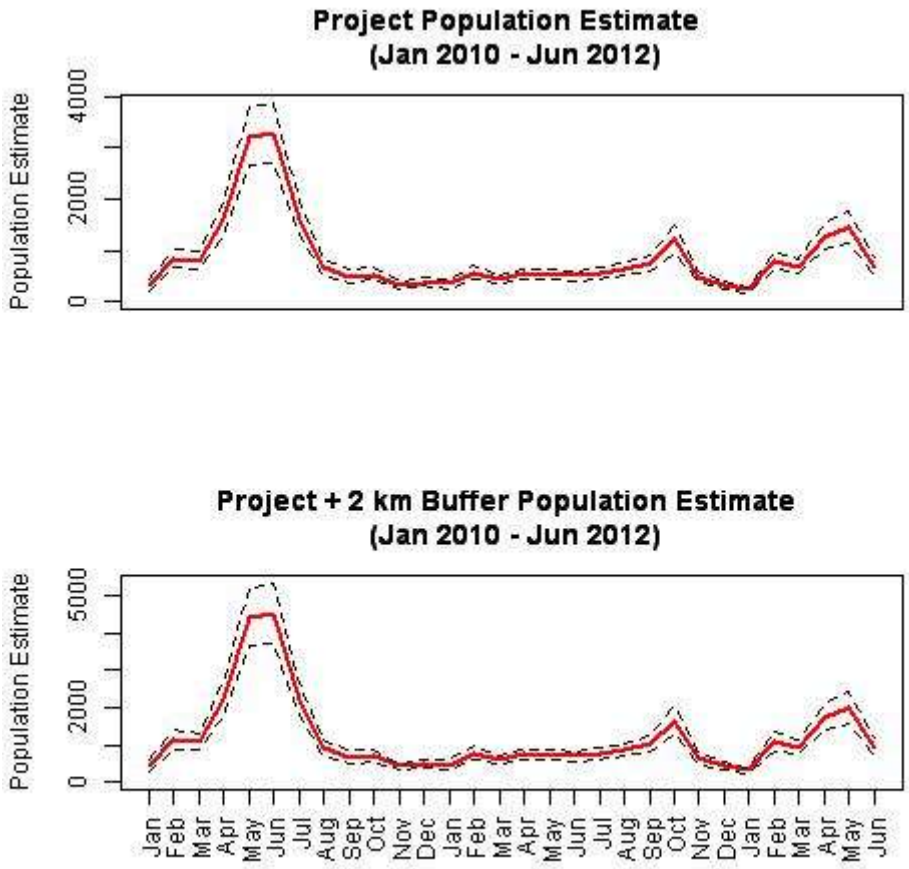



**Figure A11.1** Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Northern gannet* Morus bassanus**

A11.5 In 2010, the monthly baseline population estimates of northern gannet within the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas peaked during the months of October and December (highest value in October of 1,075 birds, 90% CIs = 916-1,269). Monthly population estimates showed some similarities between the periods of 2010/11 and 2011/12. In both years, a peak was recorded in March, with 5,047 birds (90% CIs = 4,323-5,903) in 2010/11 and 9,628 birds (90% CIs = 8,054-11,449) in 2011/12. However, population estimates increased in 2011/12 with an additional peak in October with 3,842 birds (90% CIs = 3,238-4,549) (Table A11.2, Figure A11.2). In March 2012, the 1% threshold for populations of national importance was exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas. This species is deemed to be of national importance in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas (Tables 2.3 and A11.2). Mean populations across the two and a half years of survey peaked in March at 4,996 birds (90% CIs = 4,212-

5,911), with a mean population peak of 6,791 birds (90% Cls = 5,723-8,040) estimated for the project areas plus buffers.

**Table A11.2** Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 384 (322-463) | 521 (435-628) | Jul | 470 (404-552) | 642 (552-754) | 1,080 (937-1,277) | 1,473 (1,277-1,744) | Jul | 775 (671-915) | 1,058 (915-1,249) |
| Feb | 252 (211-308) | 342 (287-418) | Aug | 297 (254-349) | 406 (347-477) | 1,376 (1,209-1,593) | 1,882 (1,652-2,181) | Aug | 837 (732-971) | 1,144 (1,000-1,329) |
| Mar | 311 (259-382) | 422 (352-519) | Sep | 461 (374-566) | 631 (512-775) | 1,864 (1,581-2,193) | 2,555 (2,165-3,007) | Sep | 1,163 (977-1,379) | 1,593 (1,338-1,891) |
| Apr | 52 (43-65) | 70 (59-88) | Oct | 1,075 (916-1,269) | 1,466 (1,248-1,732) | 3,842 (3,238-4,549) | 5,231 (4,405-6,195) | Oct | 2,459 (2,077-2,909) | 3,348 (2,827-3,964) |
| May | 226 (195-267) | 309 (267-365) | Nov | 471 (405-561) | 640 (551-764) | 639 (541-761) | 871 (736-1,037) | Nov | 555 (473-661) | 755 (643-900) |
| Jun | 558 (481-656) | 765 (658-899) | Dec | 650 (552-771) | 883 (750-1,048) | 331 (269-406) | 450 (366-552) | Dec | 490 (411-588) | 667 (558-800) |
| Jul | 470 (404-552) | 642 (552-754) | Jan | 387 (317-494) | 527 (431-674) | 152 (125-191) | 207 (170-260) | Jan | 308 (254-383) | 418 (345-520) |
| Aug | 297 (254-349) | 406 (347-477) | Feb | 858 (712-1,066) | 1,168 (969-1,452) | 1,731 (1,408-2,110) | 2,354 (1,914-2,870) | Feb | 947 (777-1,161) | 1,288 (1,057-1,580) |
| Sep | 461 (374-566) | 631 (512-775) | Mar | 5,047 (4,323-5,903) | 6,874 (5,884-8,045) | 9,628 (8,054-11,449) | 13,078 (10,935-15,558) | Mar | 4,996 (4,212-5,911) | 6,791 (5,723-8,040) |
| Oct | 1,075 (916-1,269) | 1,466 (1,248-1,732) | Apr | 906 (773-1,069) | 1,240 (1,058-1,464) | 2,784 (2,368-3,343) | 3,807 (3,237-4,575) | Apr | 1,247 (1,062-1,492) | 1,706 (1,451-2,042) |
| Nov | 471 (405-561) | 640 (551-764) | May | 920 (801-1,067) | 1,257 (1,094-1,459) | 4,321 (3,644-5,151) | 5,919 (4,989-7,061) | May | 1,822 (1,547-2,161) | 2,495 (2,117-2,962) |
| Dec | 650 (552-771) | 883 (750-1,048) | Jun | 950 (821-1,118) | 1,297 (1,121-1,528) | 1,291 (1,065-1,572) | 1,765 (1,456-2,151) | Jun | 933 (789-1,115) | 1,276 (1,078-1,526) |

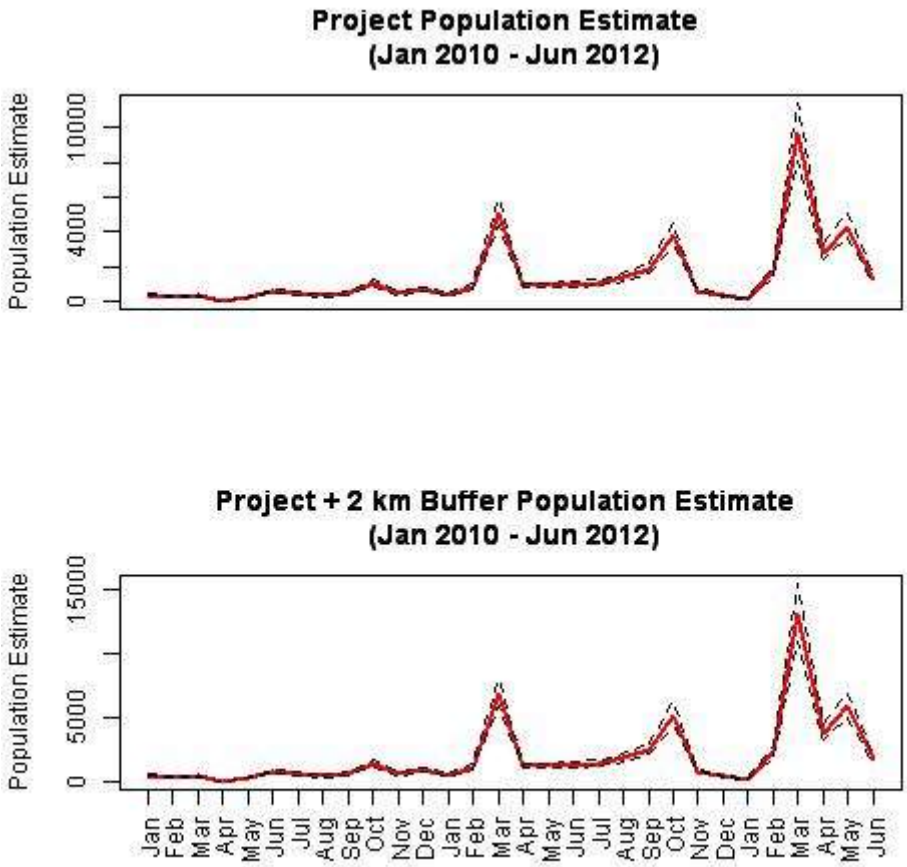



**Figure A11.2** Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Arctic skua* Stercorarius parasiticus**

A11.6 Arctic skuas were estimated to occur in all but two months (March and April) in 2010, 2010/11 and 2011/12 in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas. The highest population estimates occurred in the summer and autumn months (Figure A11.3; Table A11.3). The highest of these estimates was in September 2011 with 22 birds (90% Cls = 12-51). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in this area (Tables 2.3 and A11.3). Mean populations across the two and a half years of survey peaked in September at 15 birds (90% Cls = 7-39), with a mean population peak of 20 birds (90% Cls = 9-53) estimated for the project areas plus buffers.

**Table A11.3** Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 0 (0-997,255) | 0 (0-1,363,326) | Jul | 1 (0-10) | 2 (0-13) | 8 (1-23) | 11 (1-32) | Jul | 5 (0-17) | 6 (1-23) |
| Feb | 0 (0-13,937) | 0 (0-19,053) | Aug | 4 (0-15) | 5 (0-20) | 17 (6-37) | 24 (8-51) | Aug | 11 (3-26) | 15 (4-35) |
| Mar | 0 (0-568) | 0 (0-777) | Sep | 8 (1-26) | 10 (2-36) | 22 (12-51) | 30 (16-71) | Sep | 15 (7-39) | 20 (9-53) |
| Apr | 0 (0-63) | 0 (0-86) | Oct | 7 (1-24) | 9 (2-32) | 14 (3-35) | 19 (4-48) | Oct | 10 (2-29) | 14 (3-40) |
| May | 0 (0-10) | 0 (0-13) | Nov | 4 (0-18) | 6 (0-25) | 6 (0-18) | 8 (0-25) | Nov | 5 (0-18) | 7 (0-25) |
| Jun | 0 (0-8) | 0 (0-11) | Dec | 2 (0-12) | 3 (0-17) | 2 (0-13) | 2 (0-18) | Dec | 2 (0-13) | 3 (0-17) |
| Jul | 1 (0-10) | 2 (0-13) | Jan | 1 (0-9) | 1 (0-12) | 1 (0-7) | 1 (0-10) | Jan | 1 (0-332,424) | 1 (0-454,449) |
| Aug | 4 (0-15) | 5 (0-20) | Feb | 1 (0-6) | 1 (0-8) | 0 (0-12) | 0 (0-16) | Feb | 0 (0-4651) | 0 (0-6,359) |
| Sep | 8 (1-26) | 10 (2-36) | Mar | 0 (0-5) | 1 (0-7) | 0 (0-26) | 0 (0-36) | Mar | 0 (0-200) | 0 (0-273) |
| Oct | 7 (1-24) | 9 (2-32) | Apr | 1 (0-5) | 1 (0-7) | 0 (0-369) | 1 (0-504) | Apr | 0 (0-146) | 0 (0-199) |
| Nov | 4 (0-18) | 6 (0-25) | May | 1 (0-7) | 1 (0-10) | 1 (0-3,821) | 1 (0-5,214) | May | 1 (0-1,279) | 1 (0-1,746) |
| Dec | 2 (0-12) | 3 (0-17) | Jun | 3 (0-12) | 4 (0-17) | 1 (0-54,871) | 2 (0-74,860) | Jun | 1 (0-18,297) | 2 (0-24,963) |

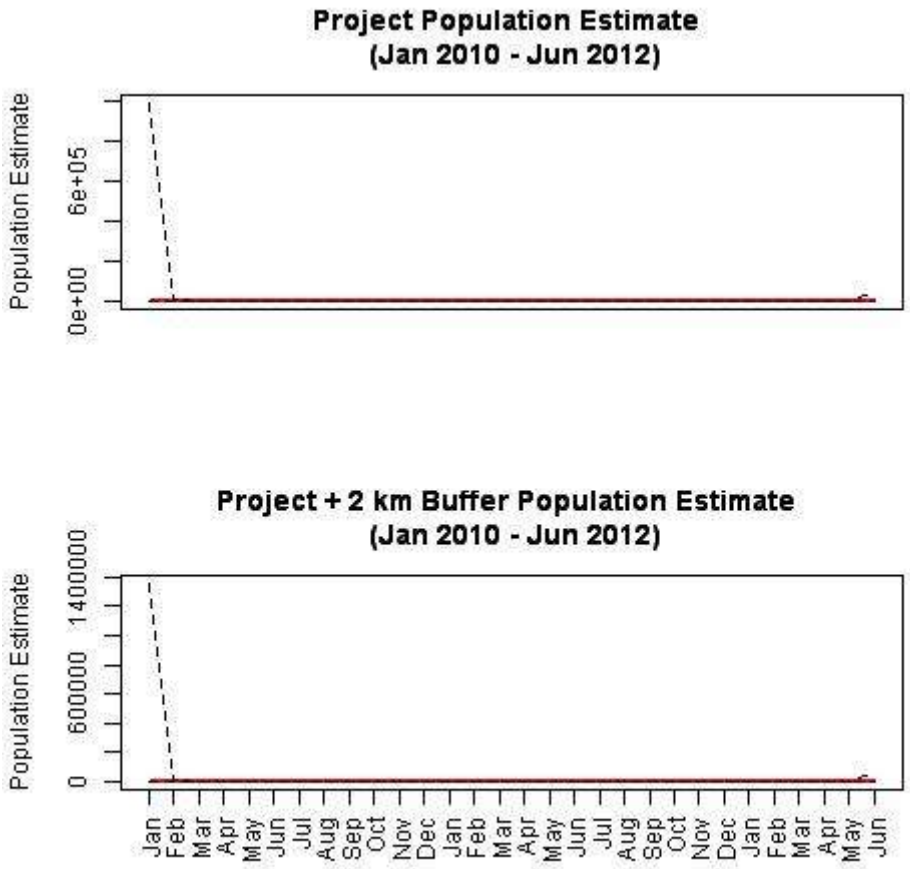



**Figure A11.3** Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Great skua* Stercorarius skua**

A11.7 Low numbers of great skua used the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in all years (Figure A11.4). The highest population estimates occurred in the summer and autumn months (Figure A11.4; Table A11.4). The highest of these estimates was in September 2011 with 39 birds (90% CIs = 28-61). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the projects (Tables 2.3 and A11.4). Mean populations across the two and a half years of survey peaked in September at 24 birds (90% CIs = 16-39), with a mean population peak of 33 birds (90% CIs = 22-53) estimated for the project areas plus buffers.

**Table A11.4** Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 0 (0-11) | 0 (0-14) | Jul | 5 (2-10) | 7 (3-14) | 21 (13-36) | 29 (18-48) | Jul | 13 (8-23) | 18 (10-31) |
| Feb | 0 (0-6) | 0 (0-9) | Aug | 8 (3-15) | 10 (5-20) | 34 (24-54) | 46 (33-74) | Aug | 21 (14-34) | 28 (19-47) |
| Mar | 1 (0-5) | 1 (0-7) | Sep | 9 (5-17) | 13 (6-23) | 39 (28-61) | 53 (39-83) | Sep | 24 (16-39) | 33 (22-53) |
| Apr | 1 (0-5) | 1 (0-7) | Oct | 10 (5-19) | 14 (7-25) | 30 (20-51) | 40 (27-70) | Oct | 20 (13-35) | 27 (17-47) |
| May | 2 (0-6) | 2 (0-8) | Nov | 10 (5-18) | 13 (7-25) | 15 (8-28) | 21 (12-38) | Nov | 12 (7-23) | 17 (9-32) |
| Jun | 3 (1-8) | 4 (1-10) | Dec | 8 (4-17) | 11 (6-23) | 6 (3-14) | 9 (4-19) | Dec | 7 (3-15) | 10 (5-21) |
| Jul | 5 (2-10) | 7 (3-14) | Jan | 6 (3-14) | 9 (4-20) | 3 (1-8) | 4 (1-11) | Jan | 3 (1-11) | 4 (2-15) |
| Aug | 8 (3-15) | 10 (5-20) | Feb | 5 (2-12) | 7 (3-16) | 2 (0-6) | 2 (0-8) | Feb | 2 (1-8) | 3 (1-11) |
| Sep | 9 (5-17) | 13 (6-23) | Mar | 4 (2-10) | 6 (3-14) | 1 (0-6) | 2 (0-8) | Mar | 2 (1-7) | 3 (1-10) |
| Oct | 10 (5-19) | 14 (7-25) | Apr | 5 (2-10) | 6 (3-14) | 2 (0-7) | 2 (0-10) | Apr | 2 (1-8) | 3 (1-10) |
| Nov | 10 (5-18) | 13 (7-25) | May | 7 (3-13) | 9 (5-18) | 2 (0-9) | 3 (0-12) | May | 3 (1-9) | 5 (2-13) |
| Dec | 8 (4-17) | 11 (6-23) | Jun | 12 (7-21) | 16 (9-29) | 2 (0-15) | 3 (0-21) | Jun | 6 (2-15) | 8 (3-20) |

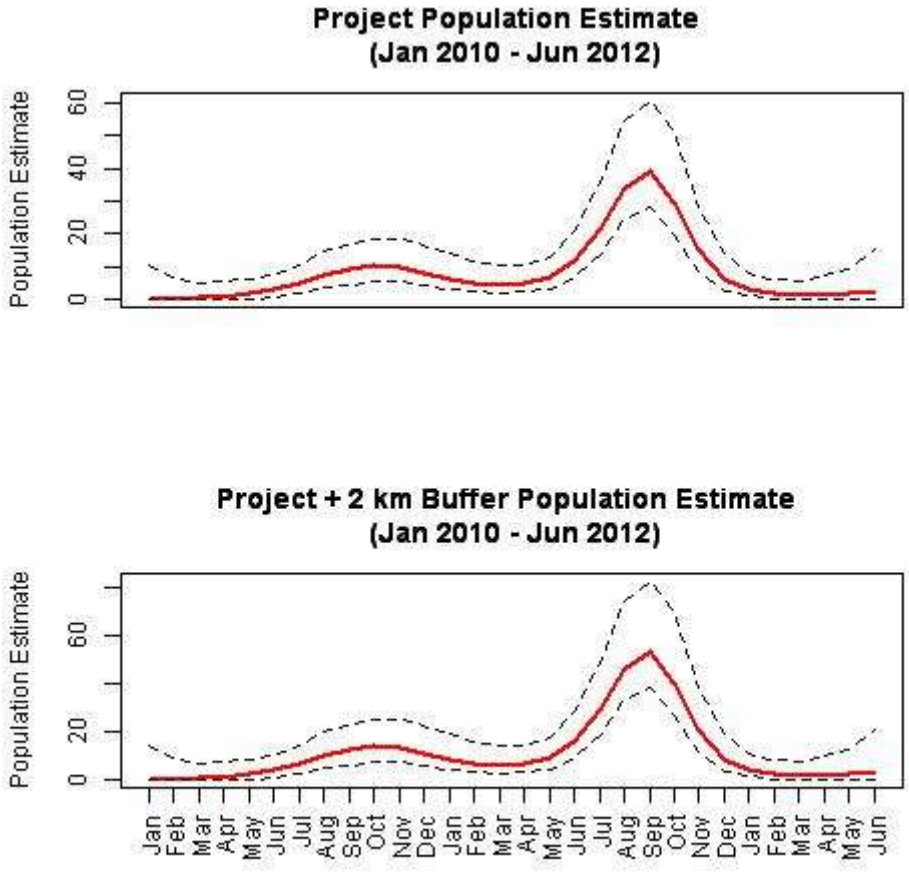



**Figure A11.4** Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Black-legged kittiwake* Rissa tridactyla**

A11.8 In 2010, the monthly baseline population estimates of black-legged kittiwake within the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas peaked between February and March (highest value in March of 18,441 birds, 90% CIs = 16,021-20,618). Population estimates increased in 2010/11 and 2011/12 and peaked during March in both years (2010/11: 10,258 birds, 90% CIs = 9,121-11,609; 2011/12: 32,286 birds, 90% CIs = 28,419-36,529) (Table A11.5; Figure A11.5). The 1% threshold for breeding populations of national importance was exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in April, May and June 2011 and in April and May 2012. This species is deemed to be of national importance in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas (Tables 2.3 and A11.5). Mean populations across the two and a half years of survey peaked in March at 29,146 birds (90% CIs = 25,860-32,727), with a mean population peak of 3,9838 birds (90% CIs = 35,327-44,763) estimated for the project areas plus buffers.

**Table A11.5** Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 8,400 (7,253-10,487) | 11,470 (9,897-14,324) | Jul | 5,878 (5,238-6,468) | 8,083 (7,205-8,902) | 6,764 (6,026-7,503) | 9,280 (8,261-10,300) | Jul | 6,321 (5,632-6,986) | 8,682 (7,733-9,601) |
| Feb | 13,032 (11,361-14,767) | 17,828 (15,528-20,196) | Aug | 3,794 (3,362-4,180) | 5,227 (4,634-5,763) | 3,055 (2,730-3,390) | 4,196 (3,749-4,662) | Aug | 3,424 (3,046-3,785) | 4,711 (4,192-5,212) |
| Mar | 18,441 (16,021-20,618) | 25,199 (21,875-28,192) | Sep | 5,304 (4,655-6,047) | 7,297 (6,403-8,330) | 1,896 (1,643-2,140) | 2,609 (2,259-2,946) | Sep | 3,600 (3,149-4,093) | 4,953 (4,331-5,638) |
| Apr | 6,380 (5,612-7,118) | 8,756 (7,700-9,775) | Oct | 8,038 (7,093-8,968) | 11,023 (9,714-12,305) | 2,115 (1,825-2,411) | 2,891 (2,493-3,298) | Oct | 5,076 (4,459-5,689) | 6,957 (6,103-7,801) |
| May | 9,926 (8,911-10,892) | 13,655 (12,241-14,996) | Nov | 5,717 (5,078-6,331) | 7,826 (6,945-8,671) | 1,345 (1,188-1,513) | 1,839 (1,623-2,071) | Nov | 3,531 (3,133-3,922) | 4,833 (4,284-5,371) |
| Jun | 10,184 (9,126-11,258) | 14,032 (12,566-15,529) | Dec | 8,029 (7,156-8,899) | 10,972 (9,772-12,167) | 2,452 (2,142-2,779) | 3,351 (2,925-3,801) | Dec | 5,241 (4,649-5,839) | 7,162 (6,348-7,984) |
| Jul | 5,878 (5,238-6,468) | 8,083 (7,205-8,902) | Jan | 5,699 (5,000-6,477) | 7,793 (6,833-8,860) | 3,053 (2,671-3,432) | 4,178 (3,654-4,699) | Jan | 5,718 (4,975-6,798) | 7,813 (6,795-9,294) |
| Aug | 3,794 (3,362-4,180) | 5,227 (4,634-5,763) | Feb | 10,258 (9,121-11,609) | 14,025 (12,464-15,885) | 15,716 (13,931-17,902) | 21,487 (19,035-24,490) | Feb | 13,002 (11,471-14,759) | 17,780 (15,676-20,190) |
| Sep | 5,304 (4,655-6,047) | 7,297 (6,403-8,330) | Mar | 36,712 (33,142-41,034) | 50,202 (45,291-56,155) | 32,286 (28,419-36,529) | 44,114 (38,814-49,940) | Mar | 29,146 (25,860-32,727) | 39,838 (35,327-44,763) |
| Oct | 8,038 (7,093-8,968) | 11,023 (9,714-12,305) | Apr | 18,846 (17,243-20,835) | 25,875 (23,656-28,638) | 12,580 (11,218-14,190) | 17,286 (15,401-19,511) | Apr | 12,602 (11,358-14,047) | 17,306 (15,586-19,308) |
| Nov | 5,717 (5,078-6,331) | 7,826 (6,945-8,671) | May | 18,068 (16,469-19,858) | 24,821 (22,610-27,306) | 14,525 (12,839-16,181) | 19,978 (17,662-22,277) | May | 14,173 (12,740-15,644) | 19,485 (17,504-21,526) |
| Dec | 8,029 (7,156-8,899) | 10,972 (9,772-12,167) | Jun | 12,906 (11,605-14,346) | 17,713 (15,917-19,708) | 8,854 (7,748-9,922) | 12,168 (10,644-13,645) | Jun | 10,648 (9,493-11,842) | 14,638 (13,042-16,294) |

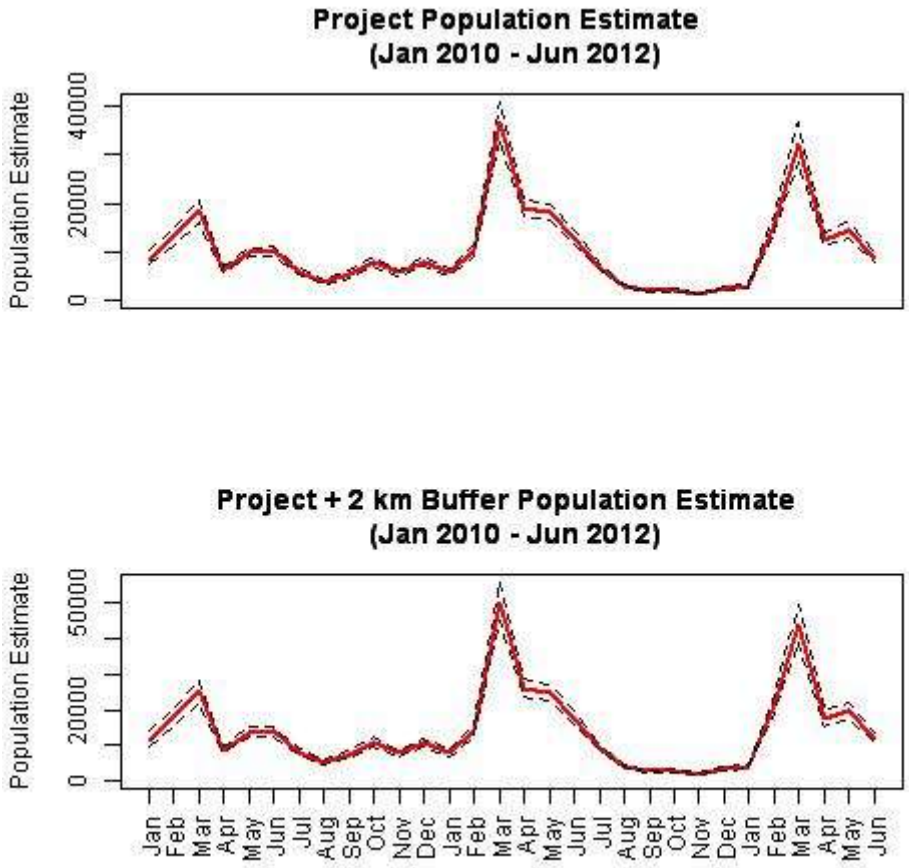



**Figure A11.5** Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Lesser black-backed gull* Larus fuscus**

A11.9 In 2010, the monthly baseline population estimates of lesser black-backed gull within the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas peaked between April and July (highest value in June with 916 birds, 90% CIs = 648-1,303). In 2010/11 and 2011/12 the populations were estimated to peak earlier, in May with 462 birds (90% CIs = 329-639) and 250 birds (90% CIs = 97-708), in 2010/11 and 2011/12 respectively. Population estimates were lower in 2011/12 than 2010/11 (Table A11.6; Figure A11.6). Between January 2010 and June 2012, the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas (Tables 2.3 and A11.6). Mean populations across the two and a half years of survey peaked in May at 490 birds (90% CIs = 328-828), with a mean population peak of 672 birds (90% CIs = 448-1,135) estimated for the project areas plus buffers.

**Table A11.6** Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 37 (21-60) | 50 (28-82) | Jul | 414 (278-636) | 567 (380-872) | 140 (85-232) | 192 (116-318) | Jul | 277 (181-434) | 379 (248-595) |
| Feb | 71 (43-116) | 97 (58-158) | Aug | 134 (71-254) | 184 (96-347) | 54 (31-120) | 74 (43-164) | Aug | 94 (51-187) | 129 (70-256) |
| Mar | 160 (98-258) | 218 (133-351) | Sep | 62 (22-149) | 84 (30-203) | 33 (17-74) | 44 (23-100) | Sep | 47 (19-111) | 64 (26-152) |
| Apr | 306 (197-501) | 418 (268-683) | Oct | 13 (3-41) | 17 (4-56) | 15 (8-34) | 21 (11-46) | Oct | 14 (5-38) | 19 (7-51) |
| May | 759 (558-1,138) | 1,040 (764-1,561) | Nov | 4 (1-20) | 6 (1-28) | 12 (7-24) | 16 (9-32) | Nov | 8 (4-22) | 11 (5-30) |
| Jun | 916 (648-1,303) | 1,254 (887-1,789) | Dec | 5 (1-22) | 6 (1-30) | 22 (12-40) | 31 (17-55) | Dec | 14 (7-31) | 18 (9-43) |
| Jul | 414 (278-636) | 567 (380-872) | Jan | 5 (1-23) | 7 (1-31) | 25 (14-46) | 34 (19-62) | Jan | 22 (12-43) | 30 (16-58) |
| Aug | 134 (71-254) | 184 (96-347) | Feb | 17 (5-53) | 23 (7-72) | 93 (53-175) | 127 (72-239) | Feb | 60 (33-115) | 82 (45-157) |
| Sep | 62 (22-149) | 84 (30-203) | Mar | 119 (63-234) | 163 (86-319) | 147 (88-302) | 201 (120-412) | Mar | 142 (83-265) | 194 (113-361) |
| Oct | 13 (3-41) | 17 (4-56) | Apr | 355 (223-490) | 484 (304-669) | 180 (97-422) | 245 (132-576) | Apr | 280 (172-471) | 382 (235-642) |
| Nov | 4 (1-20) | 6 (1-28) | May | 462 (329-639) | 633 (449-874) | 250 (97-708) | 343 (132-971) | May | 490 (328-828) | 672 (448-1,135) |
| Dec | 5 (1-22) | 6 (1-30) | Jun | 311 (201-440) | 424 (274-601) | 222 (57-590) | 304 (78-807) | Jun | 483 (302-778) | 661 (413-1,066) |

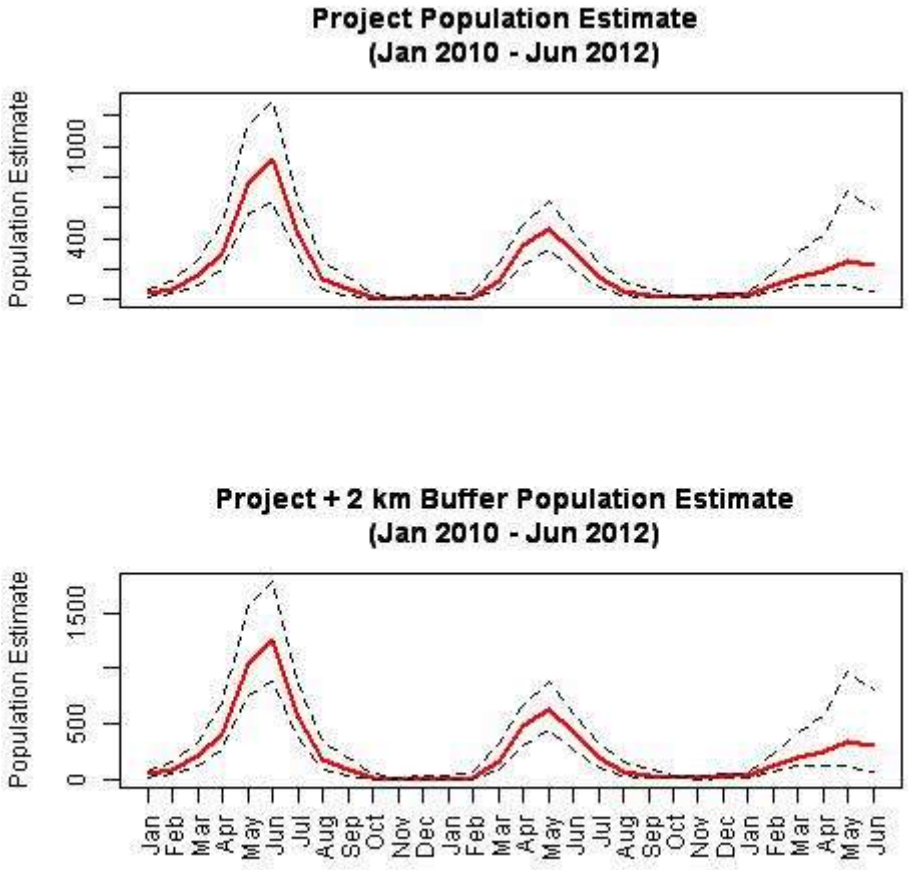



**Figure A11.6** Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Great black-backed gull*** **Larus marinus**

A11.10 Monthly baseline population estimates of great black-backed gull within the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas peaked in the winter. In 2010, a peak of 1,237 birds (90% Cls = 958-1,467) was estimated in January. Populations peaked in March (756 birds, 90% Cls = 565-959) and February (553 birds, 90% Cls = 406-725) in 2010/11 and 2011/12 respectively (Table A11.7; Figure A11.7). The winter 1% threshold for populations of international importance was exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas twice, in January 2010 and March 2011. This species is deemed to be of national importance in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas (Tables 2.3 and A11.7). Mean populations across the two and a half years of survey peaked in January at 773 birds (90% Cls = 596-943) was estimated for the project areas in January, with a mean population peak of 1,051 birds (90% Cls = 810-1,281) estimated for the project areas plus buffers.

**Table A11.7** Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 1,237 (958-1,467) | 1,680 (1,300-1,992) | Jul | 45 (22-74) | 62 (31-101) | 78 (37-122) | 107 (50-168) | Jul | 61 (29-98) | 84 (40-135) |
| Feb | 720 (503-909) | 977 (684-1,235) | Aug | 49 (25-82) | 68 (35-112) | 76 (36-120) | 104 (49-165) | Aug | 63 (31-101) | 86 (42-138) |
| Mar | 383 (254-525) | 521 (345-713) | Sep | 142 (75-247) | 192 (102-336) | 150 (79-231) | 204 (108-314) | Sep | 146 (77-239) | 198 (105-325) |
| Apr | 141 (80-199) | 193 (110-273) | Oct | 218 (131-323) | 297 (179-439) | 174 (107-250) | 237 (145-339) | Oct | 196 (119-286) | 267 (162-389) |
| May | 89 (48-144) | 123 (65-198) | Nov | 384 (255-506) | 522 (347-689) | 226 (152-293) | 307 (206-398) | Nov | 305 (203-400) | 414 (276-543) |
| Jun | 60 (31-103) | 83 (42-141) | Dec | 720 (523-906) | 978 (712-1,231) | 363 (257-466) | 494 (349-634) | Dec | 541 (390-686) | 736 (530-932) |
| Jul | 45 (22-74) | 62 (31-101) | Jan | 721 (553-907) | 980 (752-1,233) | 362 (277-454) | 492 (377-618) | Jan | 773 (596-943) | 1,051 (810-1,281) |
| Aug | 49 (25-82) | 68 (35-112) | Feb | 742 (579-924) | 1,009 (786-1,259) | 553 (406-725) | 752 (551-986) | Feb | 672 (496-853) | 913 (674-1,160) |
| Sep | 142 (75-247) | 192 (102-336) | Mar | 756 (565-959) | 1,027 (768-1,305) | 508 (342-688) | 691 (464-935) | Mar | 549 (387-724) | 746 (526-984) |
| Oct | 218 (131-323) | 297 (179-439) | Apr | 327 (212-445) | 448 (292-613) | 257 (140-365) | 354 (193-502) | Apr | 242 (144-336) | 332 (198-463) |
| Nov | 384 (255-506) | 522 (347-689) | May | 176 (99-248) | 242 (135-340) | 173 (83-262) | 238 (114-361) | May | 146 (76-218) | 201 (105-299) |
| Dec | 720 (523-906) | 978 (712-1,231) | Jun | 105 (53-156) | 144 (73-214) | 91 (38-157) | 124 (53-216) | Jun | 85 (41-139) | 117 (56-190) |

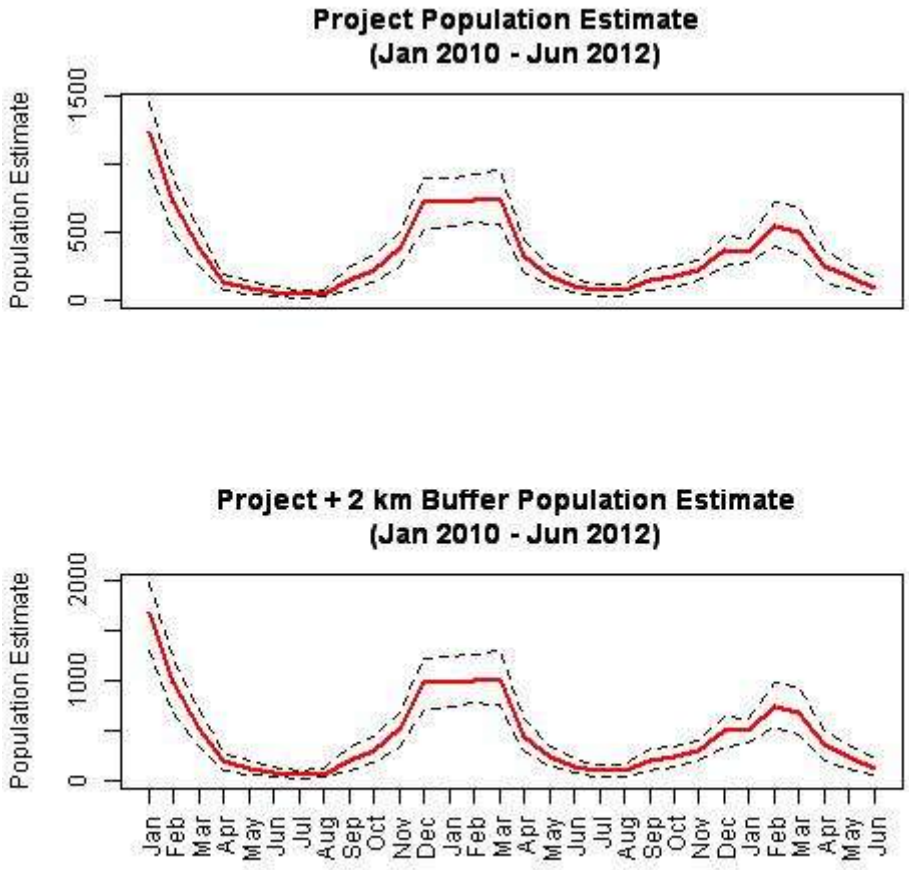



**Figure A11.7** Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Common guillemot* Uria aalge**

A11.11 In 2010, the monthly baseline population estimates of common guillemot within the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas peaked from January to April and September to December (highest value in January with 43,806 birds, 90% CIs = 40,080-47,811). Population estimates also increased during the winter months in 2010/11 and 2011/12. However, higher population estimates were calculated for these years, peaking at 72,665 birds (90% CIs = 67,442-77,975) in April 2010/11 and 67,841 birds (90% CIs = 62,995-73,587) in April 2011/12 (Table A11.8; Figure A11.8). The breeding 1% threshold for populations of national importance was exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in May and June in both 2011 and 2012. This species is deemed to be of national importance in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas (Tables 2.3 and A11.8). Mean populations across the two and a half years of survey peaked in April at 54,675 birds (90% CIs = 50,752-58,995), with a mean population peak of 74,642 birds (90% CIs = 69,268-80,556) estimated for the project areas plus buffers.

**Table A11.8** Modelled population estimates (and 90% confidence limits) for common guillemot for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 43,806 (40,080-47,811) | 59,605 (54,544-65,071) | Jul | 4,986 (4,614-5,454) | 6,874 (6,356-7,524) | 7,580 (6,965-8,319) | 10,431 (9,577-11,459) | Jul | 6,283 (5,790-6,886) | 8,652 (7,966-9,491) |
| Feb | 40,942 (37,676-44,400) | 55,789 (51,321-60,516) | Aug | 13,645 (12,224-15,219) | 19,119 (17,104-21,354) | 10,579 (9,635-11,835) | 14,771 (13,427-16,559) | Aug | 12,112 (10,929-13,527) | 16,945 (15,266-18,957) |
| Mar | 34,639 (32,220-37,365) | 47,164 (43,862-50,885) | Sep | 31,851 (28,048-35,522) | 44,489 (39,146-49,754) | 7,046 (6,350-7,868) | 9,854 (8,871-11,029) | Sep | 19,448 (17,199-21,695) | 27,172 (24,009-30,391) |
| Apr | 23,519 (21,820-25,425) | 32,102 (29,778-34,713) | Oct | 31,102 (28,673-33,607) | 42,508 (39,178-45,939) | 3,678 (3,344-4,012) | 5,016 (4,560-5,474) | Oct | 17,390 (16,009-18,810) | 23762 (2,869-25,707) |
| May | 7,350 (6,815-8,055) | 10,125 (9,381-11,112) | Nov | 29,425 (27,331-31,686) | 40,148 (37,278-43,237) | 2,856 (2,607-3,083) | 3,896 (3,556-4,208) | Nov | 16,141 (14,969-17,385) | 22,022 (20,417-23,722) |
| Jun | 7,077 (6,534-7,695) | 9,776 (9,020-10,640) | Dec | 39,592 (36,841-42,612) | 53,914 (50,157-58,033) | 5,895 (5,404-6,432) | 8,034 (7,364-8,766) | Dec | 22,744 (21,122-24,522) | 30,974 (28,760-33,400) |
| Jul | 4,986 (4,614-5,454) | 6,874 (6,356-7,524) | Jan | 23,001 (21,075-25,236) | 31,345 (28,715-34,398) | 8,134 (7,432-8,796) | 11,096 (10,136-11,999) | Jan | 24,980 (22,862-27,281) | 34,015 (31,132-37,156) |
| Aug | 13,645 (12,224-15,219) | 19,119 (17,104-21,354) | Feb | 27,561 (25,495-30,053) | 37,572 (34,745-40,975) | 35,859 (32,693-38,865) | 48,869 (44,550-52,980) | Feb | 34,787 (31,955-37,773) | 47,410 (43,539-51,490) |
| Sep | 31,851 (28,048-35,522) | 44,489 (39,146-49,754) | Mar | 61,271 (57,309-65,435) | 83,548 (78,129-89,244) | 63,699 (58,766-68,589) | 86,781 (80,050-93,452) | Mar | 53,203 (49,431-57,130) | 72,498 (67,347-77,861) |
| Oct | 31,102 (28,673-33,607) | 42,508 (39,178-45,939) | Apr | 72,665 (67,442-77,975) | 99,178 (92,027-106,443) | 67,841 (62,995-73,587) | 92,645 (85,999-100,513) | Apr | 54,675 (50,752-58,995) | 74,642 (69,268-80,556) |
| Nov | 29,425 (27,331-31,686) | 40,148 (37,278-43,237) | May | 18,065 (16,695-19,519) | 24,874 (22,970-26,901) | 21,183 (19,229-23,429) | 29,204 (26,489-32,322) | May | 15,533 (14,246-17,001) | 21,401 (19,614-23,445) |
| Dec | 39,592 (36,841-42,612) | 53,914 (50,157-58,033) | Jun | 13,378 (12,334-14,584) | 18,412 (16,962-20,098) | 13,545 (12,318-14,995) | 18,661 (16,955-20,667) | Jun | 11,333 (10,395-12,425) | 15,616 (14,312-17,135) |

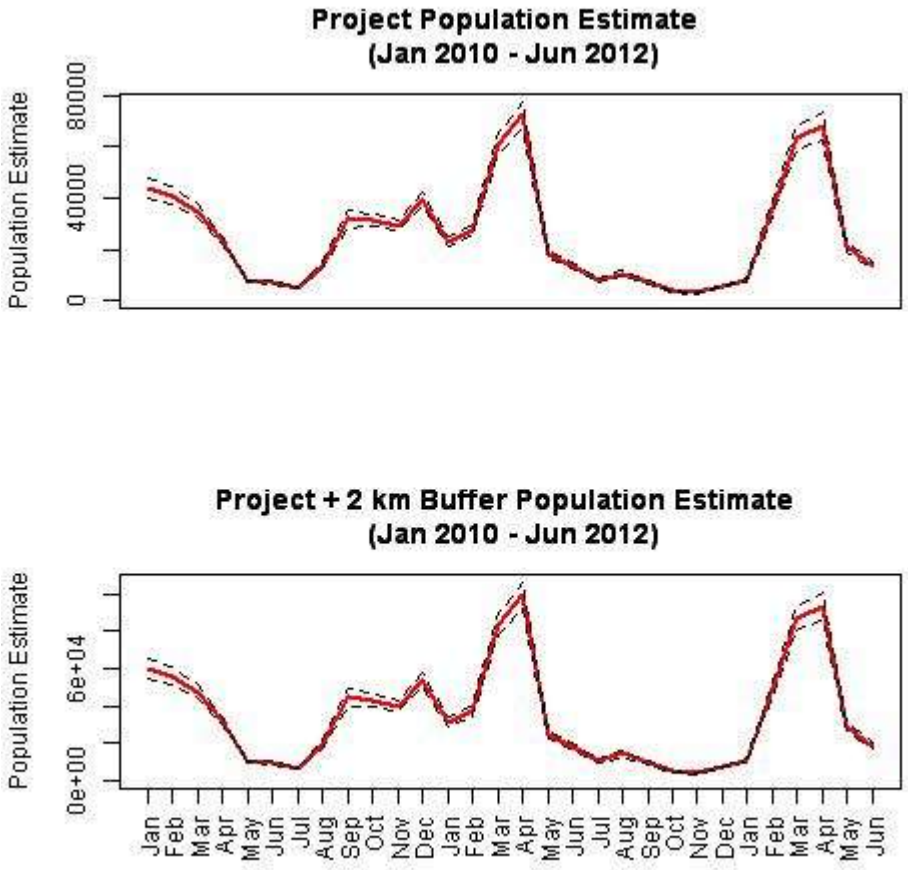



**Figure A11.8** Modelled monthly population estimates (and 90% confidence limits) for common guillemot for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Razorbill* Alca torda**

A11.12 In 2010, there were two main peaks in razorbill population estimates in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas from January to March (highest value in January of 16,113 birds with 90% CIs = 13,809-18,637) and from October to December (highest value in October of 14,630 birds with 90% CIs = 12,930-16,591). In 2010/11 abundance peaked between October and December, then again between March and April (highest in April with 29,932 birds, 90% CLs = 26,685-33,522). In contrast, population estimates produced for 2011/12 peaked between February and April only (highest in March with 23,879 birds, 90% CLs = 21,320-26,916) (Table A11.9; Figure A11.9). The 1% threshold for populations of international importance was exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas in March and April of 2011 and 2012, while the breeding 1% threshold for populations of national importance was exceeded in May 2011 and May and June 2012. This species is deemed to be of national and international importance in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas (Tables 2.3 and A11.9).

Mean populations across the two and a half years of survey peaked in April at 19,648 birds (90% Cls = 17,350-22,136), with a mean population peak of 26,883 birds (90% Cls = 23,725-30,300) estimated for the project areas plus buffers.

**Table A11.9** Modelled population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 16,113 (13,809-18,637) | 21,976 (18,829-25,430) | Jul | 352 (284-436) | 482 (389-598) | 243 (185-305) | 332 (252-417) | Jul | 298 (235-370) | 407 (321-507) |
| Feb | 15,813 (13,880-17,793) | 21,632 (18,963-24,351) | Aug | 1,830 (1,475-2,243) | 2,582 (2,074-3,185) | 216 (155-286) | 304 (217-403) | Aug | 1,023 (815-1,265) | 1,443 (1,146-1,794) |
| Mar | 12,304 (10,825-13,717) | 16,805 (14,775-18,755) | Sep | 5,546 (4,450-6,619) | 7,808 (6,241-9,364) | 83 (55-120) | 116 (77-169) | Sep | 2,814 (2,252-3,370) | 3,962 (3,159-4,767) |
| Apr | 6,942 (6,070-7,872) | 9,502 (8304-10,776) | Oct | 14,630 (12,930-16,591) | 20,041 (17,703-22,736) | 120 (82-172) | 164 (112-235) | Oct | 7,375 (6,506-8,381) | 10,102 (8,907-11,485) |
| May | 471 (385-566) | 645 (527-776) | Nov | 11,366 (10,185-12,658) | 15,539 (13,909-17,312) | 176 (129-241) | 240 (176-329) | Nov | 5,771 (5,157-6,449) | 7,889 (7,042-8,821) |
| Jun | 469 (384-573) | 643 (527-787) | Dec | 13,282 (11,699-14,806) | 18,128 (15,957-20,214) | 1,071 (847-1,369) | 1,463 (1,156-1,870) | Dec | 7,176 (6,273-8,088) | 9,795 (8,557-11,042) |
| Jul | 352 (284-436) | 482 (389-598) | Jan | 5,379 (4,576-6,295) | 7,354 (6,253-8,606) | 2,647 (2,277-3,158) | 3,621 (3,113-4,320) | Jan | 8,046 (6,888-9,363) | 10,984 (9,398-12,785) |
| Aug | 1,830 (1,475-2,243) | 2,582 (2,074-3,185) | Feb | 6,426 (5,513-7,522) | 8,783 (7,529-10,282) | 16,590 (14,445-19,293) | 22,673 (19,733-26,373) | Feb | 12,943 (11,280-14,869) | 17,696 (15,408-20,335) |
| Sep | 5,546 (4,450-6,619) | 7,808 (6,241-9,364) | Mar | 20,352 (18,223-22,806) | 27,824 (24,896-31,199) | 23,879 (21,320-26,916) | 32,605 (29,096-36,763) | Mar | 18,845 (16,789-21,146) | 25,745 (22,922-28,906) |
| Oct | 14,630 (12,930-16,591) | 20,041 (17,703-22,736) | Apr | 29,932 (26,685-33,522) | 40,934 (36,476-45,861) | 22,070 (19,294-25,014) | 30,213 (26,396-34,264) | Apr | 19,648 (17,350-22,136) | 26,883 (23,725-30,300) |
| Nov | 11,366 (10,185-12,658) | 15,539 (13,909-17,312) | May | 1,602 (1,348-1,897) | 2,193 (1,843-2,600) | 2,324 (1,879-2878) | 3,183 (2,572-3,945) | May | 1,466 (1,204-1,780) | 2,007 (1,647-2,440) |
| Dec | 13,282 (11,699-14,806) | 18,128 (15,957-20,214) | Jun | 862 (707-1,031) | 1,177 (966-1,412) | 3,619 (2,962-4,467) | 4,951 (4,049-6,122) | Jun | 1,650 (1,351-2,023) | 2,257 (1847-2,774) |

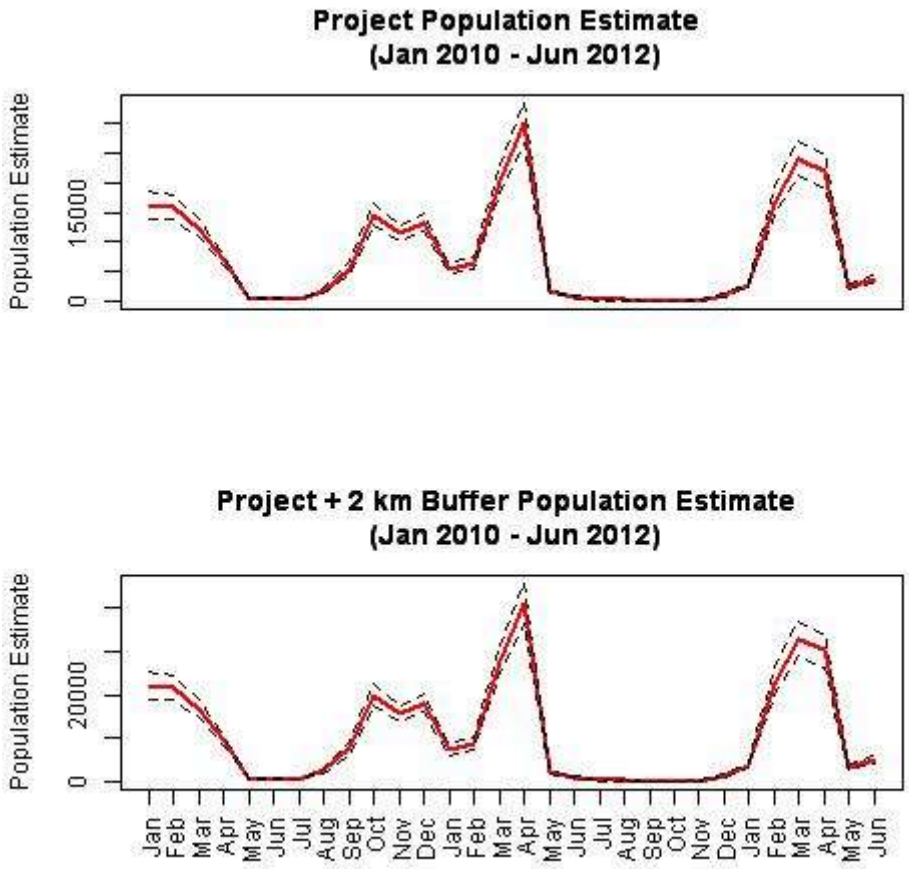



**Figure A11.9** Modelled monthly population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Little auk* Alle alle**

A11.13 In 2010, little auk population estimates for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D began with 7,962 birds (90% CIs = 7,998-12,775) in January before decreasing through the spring and into summer. The population climbed again in September and peaked in December with 9,781 birds (90% CIs = 7,998-12,775). Similar population trends were predicted for the 2010/11 and 2011/12 periods, with population estimates peaking in December for all years (December 2011 = 3,442 birds, 90% CIs = 2,871-4,531) (Table A11.10; Figure A11.10). There is no British population estimate for little auk. However, given the numbers estimated, this species is deemed to be of national importance in this area. This species has been assessed to have a receptor value of high in the project areas (Tables 2.6 and A11.10). Mean populations across the two and a half years of survey peaked in December at 6,612 birds (90% CIs = 5,435-8,653), with a mean population peak of 9,037 birds (90% CIs = 7,425-11,830) estimated for the project areas plus buffers.

**Table A11.10** Baseline monthly population estimates (and 90% confidence limits) for little auk for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 7,962 (5,245-12,088) | 10,850 (7,147-16,483) | Jul | 1 (1-3) | 2 (1-4) | 2 (1-6) | 3 (2-8) | Jul | 2 (1-4) | 3 (1-6) |
| Feb | 1,678 (1,226-2,571) | 2,285 (1,667-3,500) | Aug | 3 (2-6) | 4 (2-8) | 5 (2-10) | 7 (3-13) | Aug | 4 (2-8) | 5 (3-11) |
| Mar | 253 (182-384) | 345 (248-523) | Sep | 87 (55-142) | 119 (75-195) | 35 (22-61) | 49 (31-84) | Sep | 61 (38-101) | 84 (53-140) |
| Apr | 22 (15-36) | 30 (20-49) | Oct | 417 (308-595) | 577 (424-822) | 121 (89-174) | 167 (122-238) | Oct | 269 (198-384) | 372 (273-530) |
| May | 6 (4-11) | 8 (5-16) | Nov | 2,109 (1,674-2,808) | 2,901 (2,299-3,864) | 562 (459-724) | 772 (631-996) | Nov | 1,336 (1,067-1,766) | 1,836 (1,465-2,430) |
| Jun | 2 (1-5) | 3 (2-6) | Dec | 9,781 (7,998-12,775) | 13,359 (10,923-17,456) | 3,442 (2,871-4,531) | 4,714 (3,927-6,203) | Dec | 6,612 (5,435-8,653) | 9,037 (7,425-11,830) |
| Jul | 1 (1-3) | 2 (1-4) | Jan | 3,407 (2,510-4,664) | 4,655 (3,430-6,377) | 1,338 (1,133-1,734) | 1,831 (1,550-2,375) | Jan | 4,235 (2,962-6,162) | 5,778 (4,042-8,411) |
| Aug | 3 (2-6) | 4 (2-8) | Feb | 1,399 (1,094-1,904) | 1,917 (1,499-2,609) | 1,271 (887-2,015) | 1,735 (1,212-2,753) | Feb | 1,449 (1,069-2,163) | 1,979 (1,459-2,954) |
| Sep | 87 (55-142) | 119 (75-195) | Mar | 842 (637-1,165) | 1,154 (872-1,596) | 175 (98-316) | 240 (134-432) | Mar | 424 (306-622) | 580 (418-850) |
| Oct | 417 (308-595) | 577 (424-822) | Apr | 120 (84-175) | 164 (116-242) | 25 (12-56) | 34 (16-77) | Apr | 55 (37-89) | 76 (51-123) |
| Nov | 2,109 (1,674-2,808) | 2,901 (2,299-3,864) | May | 16 (9-28) | 22 (12-39) | 15 (6-35) | 20 (8-49) | May | 12 (6-25) | 17 (8-34) |
| Dec | 9,781 (7,998-12,775) | 13,359 (10,923-17,456) | Jun | 4 (2-9) | 6 (3-13) | 11 (3-34) | 15 (4-47) | Jun | 6 (2-16) | 8 (3-22) |

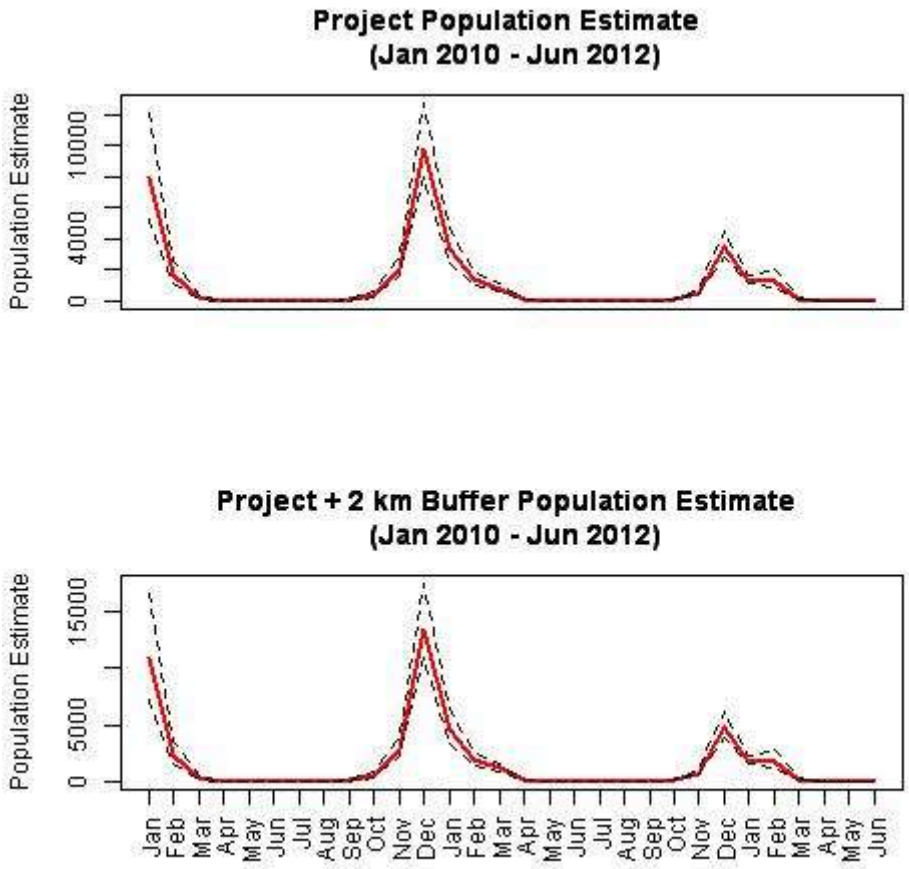



**Figure A11.10** Baseline monthly population estimates (and 90% confidence limits) for little auk for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D , and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***Atlantic puffin*** **Fratercula arctica**

A11.14 In 2010, there were two main peaks in Atlantic puffin population estimates in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas from January to March (highest value in March of 1,606 birds with 90% CIs = 1,337-1,974) and from September to December (highest value in October of 3,635 birds, 90% CIs = 3,018-4,502). In 2010/11 abundance peaked between September and April (highest in March with 4,119 birds, 90% CLs = 3,699-4,734). In contrast, population estimates showed a general decrease in 2011/12, with a peak in abundance between February and March (highest value was in March with 1,157 birds, 90% CLs = 996-1,380) (Table A11.11; Figure A11.11). Between January 2010 and June 2012 the 1% thresholds for populations of national and international importance were not exceeded in the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project areas (Tables 2.3 and A11.11). Mean populations across the two and a half years of survey peaked in March at 2,294 birds (90% CIs = 2,011-2,696), with a mean population

peak of 3,131 birds (90% CIs = 2,743-3,679) estimated for the project areas plus buffers.

**Table A11.11** Baseline monthly population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

| Month | 2010 | | Month | 2010/11 | | 2011/12 | | Month | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Project | Project + Buffer | | Project | Project + Buffer | Project | Project + Buffer | | Project | Project + Buffer |
| Jan | 1,107 (759-1,570) | 1,508 (1,034-2,142) | Jul | 154 (113-202) | 211 (154-278) | 198 (155-250) | 271 (212-343) | Jul | 176 (134-226) | 241 (183-310) |
| Feb | 1,554 (1,206-1,990) | 2,120 (1,644-2,713) | Aug | 145 (105-191) | 199 (144-262) | 109 (85-140) | 149 (116-193) | Aug | 127 (95-166) | 174 (130-228) |
| Mar | 1,606 (1,337-1,974) | 2,189 (1,823-2,692) | Sep | 2,747 (2,227-3,450) | 3,790 (3,072-4,767) | 748 (604-913) | 1,035 (835-1,263) | Sep | 1,748 (1,416-2,182) | 2,412 (1,954-3,015) |
| Apr | 485 (392-611) | 665 (537-834) | Oct | 3,635 (3,018-4,502) | 5,021 (4,170-6,236) | 529 (415-642) | 729 (574-886) | Oct | 2,082 (1,717-2,572) | 2,875 (2,372-3,561) |
| May | 382 (316-477) | 524 (432-652) | Nov | 1,577 (1,300-1,872) | 2,157 (1,779-2,561) | 170 (124-207) | 232 (169-283) | Nov | 873 (712-1,039) | 1,195 (974-1,422) |
| Jun | 254 (197-328) | 347 (270-451) | Dec | 2,961 (2,509-3,479) | 4,038 (3,424-4,743) | 361 (277-428) | 492 (377-584) | Dec | 1,661 (1,393-1,953) | 2,265 (1,901-2,664) |
| Jul | 154 (113-202) | 211 (154-278) | Jan | 2,619 (2,125-3,270) | 3,573 (2,895-4,465) | 457 (364-537) | 624 (497-734) | Jan | 1,394 (1,083-1,792) | 1,902 (1,475-2,447) |
| Aug | 145 (105-191) | 199 (144-262) | Feb | 2,987 (2,480-3,660) | 4,074 (3,382-5,001) | 1,053 (878-1,239) | 1,436 (1,199-1,690) | Feb | 1,864 (1,521-2,296) | 2,543 (2,075-3,135) |
| Sep | 2,747 (2,227-3,450) | 3,790 (3,072-4,767) | Mar | 4,119 (3,699-4,734) | 5,623 (5,047-6,462) | 1,157 (996-1,380) | 1,580 (1,359-1,883) | Mar | 2,294 (2,011-2,696) | 3,131 (2,743-3,679) |
| Oct | 3,635 (3,018-4,502) | 5,021 (4,170-6,236) | Apr | 1,431 (1,230-1,661) | 1,964 (1,687-2,280) | 433 (350-525) | 594 (479-720) | Apr | 783 (657-932) | 1,074 (901-1,278) |
| Nov | 1,577 (1,300-1,872) | 2,157 (1,779-2,561) | May | 793 (685-929) | 1,087 (939-1,274) | 395 (321-476) | 542 (440-654) | May | 523 (441-627) | 717 (604-860) |
| Dec | 2,961 (2,509-3,479) | 4,038 (3,424-4,743) | Jun | 405 (337-499) | 555 (462-685) | 275 (227-352) | 376 (311-483) | Jun | 311 (254-393) | 426 (348-540) |

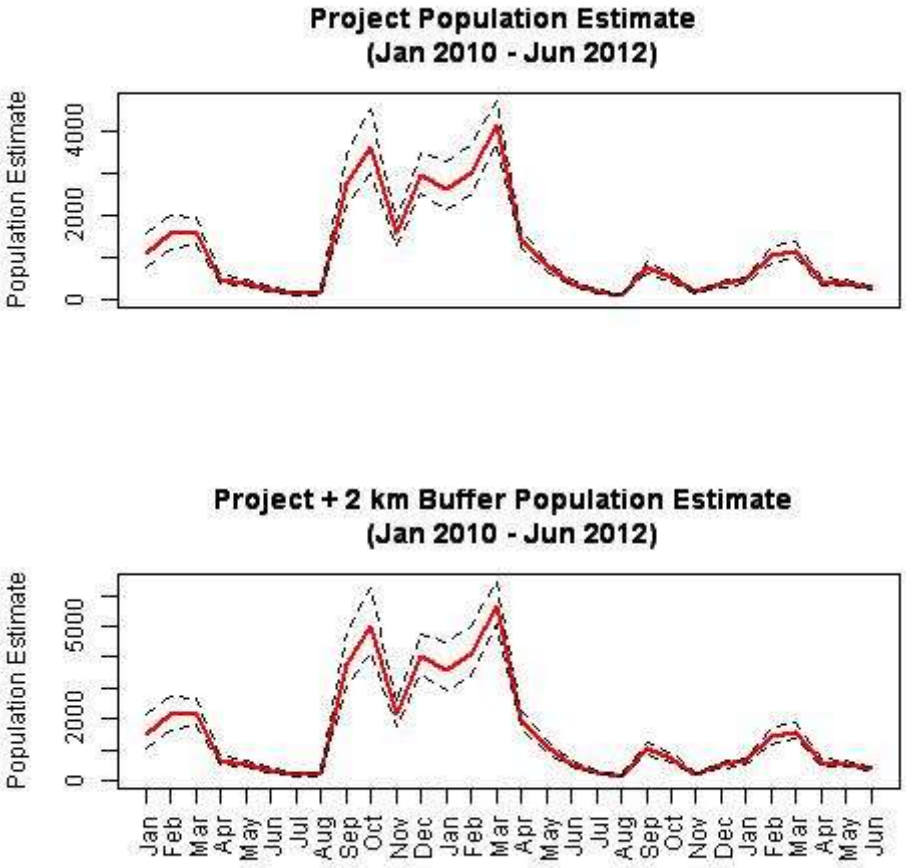



**Figure A11.11** Baseline monthly population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

## APPENDIX 12 ASSESSING THE IMPACT OF RAISING THE LOWER TIP HEIGHT FROM 26M TO 100M ON ESTIMATED COLLISION RATES

A12.1. This appendix contains species-specific collision estimates for Dogger Bank Teesside A and Dogger Bank Teesside B based on a worst case scenario of 6MW turbines with minimum heights of 26 to 100m above highest astronomic tide.

### Dogger Bank Teesside A

A12.2. As the minimum lower tip height increased from 26 to 100m above highest astronomic tide, significant reductions in the estimated number of collisions were observed in all species in both 2010 and 2011 (Tables A12.1, A12.2 & A12.3). Plots of the annual number of collisions against lower type height were suggestive of an asymptotic relationship (Figures A12.1, A12.2 & A12.3). However, whilst the number of collisions involving each species were negligible at a height of 100m above highest astronomic tide, only two species – Arctic skua and black-legged kittiwake – reached an asymptote, at 79m and 65m respectively (Table A12.4).

**Table A12.1** Impact of increasing lower type height from 26 to 100m above highest astronomic tide (h. a. t.) on the annual collision estimates (and 90% Confidence Limits) for sensitive species in Dogger Bank Teesside A based on 2010 populations, assuming 6MW turbines and an avoidance rate of 99% for northern gannet and 98% for other species.

| Turbine Height (m above h. a. t) | Northern Fulmar | Northern Gannet | Arctic Skua | Great Skua | Black legged Kittiwake | Lesser Black Backed Gull | Great Black backed Gull | Common Guillemot | Razorbill | Little Auk | Atlantic Puffin |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 0 (0 - 0) | 1 (1 - 1) | 0 (0 - 6) | 0 (0 - 0) | 1 (1 - 1) | 3 (2 - 5) | 2 (2 - 3) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 95 | 0 (0 - 0) | 2 (1 - 2) | 0 (0 - 10) | 0 (0 - 0) | 1 (1 - 2) | 4 (3 - 6) | 2 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 90 | 0 (0 - 0) | 2 (2 - 2) | 0 (0 - 14) | 0 (0 - 0) | 1 (1 - 2) | 5 (3 - 8) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 85 | 0 (0 - 0) | 2 (2 - 3) | 0 (0 - 18) | 0 (0 - 0) | 2 (1 - 2) | 6 (4 - 9) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 80 | 0 (0 - 0) | 3 (2 - 3) | 0 (0 - 23) | 0 (0 - 0) | 2 (1 - 2) | 7 (4 - 10) | 3 (2 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 75 | 0 (0 - 0) | 3 (3 - 4) | 0 (0 - 28) | 0 (0 - 0) | 2 (1 - 2) | 8 (5 - 12) | 4 (3 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 70 | 0 (0 - 0) | 4 (3 - 4) | 0 (0 - 32) | 0 (0 - 0) | 1 (1 - 2) | 9 (6 - 14) | 4 (3 - 6) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 65 | 0 (0 - 0) | 4 (3 - 5) | 0 (0 - 37) | 0 (0 - 0) | 2 (1 - 2) | 10 (7 - 16) | 5 (3 - 7) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 60 | 0 (0 - 0) | 5 (4 - 5) | 0 (0 - 44) | 0 (0 - 0) | 2 (2 - 2) | 12 (7 - 18) | 5 (4 - 8) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 55 | 0 (0 - 0) | 5 (4 - 6) | 0 (0 - 52) | 0 (0 - 0) | 2 (2 - 2) | 13 (8 - 21) | 7 (5 - 10) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 50 | 0 (0 - 0) | 6 (5 - 7) | 0 (0 - 61) | 0 (0 - 0) | 3 (2 - 3) | 15 (10 - 23) | 8 (6 - 12) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 45 | 0 (0 - 0) | 7 (5 - 8) | 0 (0 - 71) | 0 (0 - 0) | 4 (3 - 4) | 17 (11 - 26) | 10 (7 - 15) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 40 | 0 (0 - 0) | 8 (6 - 9) | 0 (0 - 85) | 0 (0 - 0) | 6 (5 - 7) | 18 (12 - 29) | 13 (9 - 19) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 39 | 0 (0 - 0) | 8 (6 - 9) | 0 (0 - 91) | 0 (0 - 0) | 7 (6 - 7) | 19 (12 - 29) | 14 (10 - 20) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 38 | 0 (0 - 0) | 8 (6 - 9) | 0 (0 - 96) | 0 (0 - 0) | 7 (6 - 8) | 19 (12 - 30) | 14 (10 - 21) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 37 | 0 (0 - 0) | 8 (7 - 10) | 0 (0 - 101) | 0 (0 - 0) | 8 (7 - 9) | 19 (13 - 30) | 15 (11 - 22) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 36 | 0 (0 - 0) | 9 (7 - 10) | 0 (0 - 105) | 0 (0 - 0) | 9 (8 - 10) | 20 (13 - 31) | 16 (11 - 24) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 35 | 0 (0 - 1) | 9 (7 - 10) | 0 (0 - 113) | 0 (0 - 0) | 10 (9 - 11) | 20 (13 - 32) | 17 (12 - 25) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 34 | 0 (0 - 1) | 9 (7 - 11) | 0 (0 - 122) | 0 (0 - 0) | 11 (10 - 13) | 21 (13 - 32) | 18 (13 - 26) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 33 | 0 (0 - 1) | 9 (8 - 11) | 0 (0 - 131) | 0 (0 - 0) | 13 (12 - 15) | 21 (14 - 33) | 19 (13 - 28) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 32 | 0 (0 - 1) | 10 (8 - 12) | 0 (0 - 140) | 0 (0 - 0) | 15 (13 - 17) | 21 (14 - 33) | 20 (14 - 29) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 31 | 1 (0 - 1) | 10 (8 - 12) | 0 (0 - 153) | 0 (0 - 0) | 17 (15 - 20) | 22 (14 - 34) | 21 (15 - 31) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 30 | 1 (0 - 1) | 10 (8 - 12) | 0 (0 - 171) | 0 (0 - 0) | 20 (18 - 23) | 22 (14 - 35) | 22 (16 - 33) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 29 | 1 (0 - 1) | 11 (9 - 13) | 0 (0 - 190) | 0 (0 - 0) | 23 (20 - 26) | 23 (15 - 36) | 24 (17 - 35) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 28 | 1 (1 - 1) | 11 (9 - 13) | 0 (0 - 210) | 0 (0 - 0) | 26 (23 - 30) | 23 (15 - 36) | 25 (18 - 37) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 27 | 1 (1 - 1) | 11 (9 - 14) | 0 (0 - 235) | 0 (0 - 0) | 30 (27 - 34) | 24 (15 - 37) | 26 (19 - 39) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 26 | 1 (1 - 1) | 11 (9 - 14) | 0 (0 - 269) | 0 (0 - 0) | 35 (31 - 39) | 24 (16 - 38) | 28 (20 - 41) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |

**Table A12.2** Impact of increasing lower type height from 26 to 100m above highest astronomic tide (h. a. t.) on the annual collision estimates (and 90% Confidence Limits) for sensitive species in Dogger Bank Teesside A based on population estimates from summer 2010-2011, assuming 6MW turbines and an avoidance rate of 99% for northern gannet and 98% for other species.

| Turbine Height (m above h. a. t) | Northern Fulmar | Northern Gannet | Arctic Skua | Great Skua | Black legged Kittiwake | Lesser Black Backed Gull | Great Black backed Gull | Common Guillemot | Razorbill | Little Auk | Atlantic Puffin |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 0 (0 - 0) | 2 (2 - 2) | 0 (0 - 0) | 0 (0 - 0) | 2 (2 - 3) | 2 (1 - 3) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 95 | 0 (0 - 0) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 3 (2 - 3) | 3 (2 - 4) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 90 | 0 (0 - 0) | 4 (3 - 4) | 0 (0 - 0) | 0 (0 - 0) | 3 (2 - 3) | 3 (2 - 5) | 3 (2 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 85 | 0 (0 - 0) | 4 (3 - 5) | 0 (0 - 0) | 0 (0 - 0) | 3 (2 - 3) | 4 (2 - 6) | 3 (2 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 80 | 0 (0 - 0) | 5 (4 - 6) | 0 (0 - 0) | 0 (0 - 0) | 3 (2 - 3) | 4 (3 - 7) | 4 (3 - 6) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 75 | 0 (0 - 0) | 6 (5 - 7) | 0 (0 - 0) | 0 (0 - 0) | 3 (2 - 3) | 5 (3 - 8) | 4 (3 - 6) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 70 | 0 (0 - 0) | 6 (5 - 8) | 0 (0 - 0) | 0 (0 - 0) | 3 (2 - 3) | 5 (3 - 9) | 5 (3 - 7) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 65 | 0 (0 - 0) | 7 (6 - 8) | 0 (0 - 0) | 0 (0 - 0) | 3 (2 - 3) | 6 (4 - 10) | 5 (4 - 8) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 60 | 0 (0 - 0) | 8 (6 - 9) | 0 (0 - 0) | 0 (0 - 0) | 3 (3 - 3) | 7 (4 - 12) | 6 (5 - 9) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 55 | 0 (0 - 0) | 9 (7 - 10) | 0 (0 - 0) | 0 (0 - 0) | 4 (3 - 4) | 8 (5 - 13) | 8 (5 - 11) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 50 | 0 (0 - 0) | 10 (8 - 12) | 0 (0 - 0) | 0 (0 - 0) | 5 (4 - 6) | 9 (6 - 15) | 9 (7 - 14) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 45 | 0 (0 - 0) | 12 (9 - 14) | 0 (0 - 0) | 0 (0 - 0) | 7 (6 - 8) | 10 (6 - 17) | 12 (8 - 17) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 40 | 0 (0 - 0) | 13 (11 - 16) | 0 (0 - 0) | 0 (0 - 0) | 11 (10 - 12) | 11 (7 - 19) | 15 (11 - 22) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 39 | 0 (0 - 0) | 13 (11 - 16) | 0 (0 - 0) | 0 (0 - 0) | 12 (11 - 14) | 12 (7 - 19) | 16 (12 - 23) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 38 | 0 (0 - 0) | 14 (11 - 16) | 0 (0 - 0) | 0 (0 - 0) | 13 (12 - 15) | 12 (7 - 20) | 17 (12 - 25) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 37 | 0 (0 - 0) | 14 (12 - 17) | 0 (0 - 0) | 0 (0 - 0) | 15 (13 - 17) | 12 (7 - 20) | 18 (13 - 26) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 36 | 0 (0 - 0) | 15 (12 - 18) | 0 (0 - 0) | 0 (0 - 0) | 16 (14 - 18) | 12 (7 - 20) | 19 (13 - 27) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 35 | 0 (0 - 0) | 15 (12 - 18) | 0 (0 - 0) | 0 (0 - 0) | 18 (16 - 21) | 12 (8 - 21) | 20 (14 - 29) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 34 | 0 (0 - 0) | 15 (13 - 18) | 0 (0 - 0) | 0 (0 - 0) | 21 (18 - 24) | 13 (8 - 21) | 21 (15 - 31) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 33 | 0 (0 - 0) | 16 (13 - 19) | 0 (0 - 0) | 0 (0 - 0) | 24 (21 - 27) | 13 (8 - 22) | 22 (16 - 32) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 32 | 0 (0 - 0) | 17 (14 - 20) | 0 (0 - 0) | 0 (0 - 0) | 27 (24 - 31) | 13 (8 - 22) | 23 (17 - 34) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 31 | 0 (0 - 0) | 17 (14 - 21) | 0 (0 - 0) | 0 (0 - 0) | 31 (28 - 36) | 13 (8 - 22) | 25 (18 - 36) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 30 | 0 (0 - 0) | 18 (14 - 21) | 0 (0 - 0) | 0 (0 - 0) | 36 (32 - 41) | 14 (8 - 23) | 26 (19 - 38) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 29 | 0 (0 - 1) | 18 (15 - 22) | 0 (0 - 0) | 0 (0 - 0) | 41 (37 - 47) | 14 (9 - 23) | 27 (20 - 40) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 28 | 0 (0 - 1) | 19 (16 - 23) | 0 (0 - 0) | 0 (0 - 0) | 48 (42 - 54) | 14 (9 - 24) | 29 (21 - 43) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 27 | 0 (0 - 1) | 20 (16 - 23) | 0 (0 - 0) | 0 (0 - 0) | 55 (49 - 62) | 15 (9 - 24) | 31 (22 - 45) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 26 | 0 (0 - 1) | 20 (16 - 24) | 0 (0 - 0) | 0 (0 - 0) | 63 (56 - 72) | 15 (9 - 25) | 33 (23 - 48) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |

**Table A12.3** Impact of increasing lower type height from 26 to 100m above highest astronomic tide (h. a. t.) on the annual collision estimates (and 90% Confidence Limits) for sensitive species in Dogger Bank Teesside A based on population estimates from summer 2011-2012, assuming 6MW turbines and an avoidance rate of 99% for northern gannet and 98% for other species.

| Turbine Height (m above h. a. t) | Northern Fulmar | Northern Gannet | Arctic Skua | Great Skua | Black legged Kittiwake | Lesser Black Backed Gull | Great Black backed Gull | Common Guillemot | Razorbill | Little Auk | Atlantic Puffin |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 0 (0 - 0) | 6 (5 - 7) | 0 (0 - 1) | 0 (0 - 0) | 2 (2 - 3) | 1 (1 - 3) | 2 (1 - 3) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 95 | 0 (0 - 0) | 8 (7 - 10) | 0 (0 - 1) | 0 (0 - 0) | 3 (2 - 3) | 2 (1 - 3) | 2 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 90 | 0 (0 - 0) | 10 (8 - 12) | 0 (0 - 2) | 0 (0 - 0) | 3 (2 - 3) | 2 (1 - 4) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 85 | 0 (0 - 0) | 11 (9 - 14) | 0 (0 - 2) | 0 (0 - 0) | 3 (2 - 3) | 2 (1 - 4) | 3 (2 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 80 | 0 (0 - 0) | 13 (11 - 16) | 0 (0 - 3) | 0 (0 - 0) | 3 (2 - 3) | 3 (2 - 5) | 3 (2 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 75 | 0 (0 - 0) | 15 (12 - 18) | 0 (0 - 3) | 0 (0 - 0) | 3 (2 - 3) | 3 (2 - 6) | 4 (2 - 6) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 70 | 0 (0 - 0) | 17 (14 - 21) | 0 (0 - 4) | 0 (0 - 0) | 3 (2 - 3) | 4 (2 - 7) | 4 (3 - 6) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 65 | 0 (0 - 0) | 19 (16 - 23) | 0 (0 - 4) | 0 (0 - 0) | 3 (2 - 3) | 4 (2 - 8) | 5 (3 - 7) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 60 | 0 (0 - 0) | 21 (17 - 26) | 0 (0 - 5) | 0 (0 - 0) | 3 (3 - 4) | 5 (3 - 9) | 5 (3 - 8) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 55 | 0 (0 - 0) | 24 (19 - 29) | 0 (0 - 6) | 0 (0 - 0) | 4 (3 - 4) | 6 (3 - 10) | 6 (4 - 10) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 50 | 0 (0 - 0) | 27 (22 - 32) | 0 (0 - 7) | 0 (0 - 0) | 5 (4 - 6) | 6 (3 - 11) | 8 (5 - 12) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 45 | 0 (0 - 0) | 32 (26 - 38) | 0 (0 - 8) | 0 (0 - 0) | 7 (6 - 8) | 7 (4 - 13) | 10 (6 - 16) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 40 | 0 (0 - 0) | 36 (29 - 43) | 0 (0 - 10) | 0 (0 - 0) | 11 (10 - 13) | 8 (4 - 14) | 13 (8 - 20) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 39 | 0 (0 - 0) | 36 (30 - 44) | 0 (0 - 10) | 0 (0 - 0) | 12 (11 - 14) | 8 (4 - 14) | 13 (8 - 21) | 0 (0 - 0) | 1 (1 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 38 | 0 (0 - 0) | 37 (30 - 45) | 0 (0 - 11) | 0 (0 - 0) | 13 (12 - 15) | 8 (4 - 15) | 14 (9 - 22) | 0 (0 - 0) | 1 (1 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 37 | 0 (0 - 0) | 39 (32 - 47) | 0 (0 - 12) | 0 (0 - 0) | 15 (13 - 17) | 8 (4 - 15) | 15 (9 - 23) | 0 (0 - 0) | 1 (1 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 36 | 0 (0 - 1) | 40 (33 - 48) | 0 (0 - 12) | 0 (0 - 0) | 16 (14 - 19) | 8 (5 - 15) | 16 (10 - 25) | 0 (0 - 0) | 1 (1 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 35 | 0 (0 - 1) | 41 (33 - 49) | 0 (0 - 13) | 0 (0 - 1) | 18 (16 - 21) | 9 (5 - 15) | 17 (10 - 26) | 0 (0 - 0) | 1 (1 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 34 | 0 (0 - 1) | 42 (34 - 51) | 0 (0 - 14) | 0 (0 - 1) | 21 (18 - 24) | 9 (5 - 16) | 17 (11 - 28) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 33 | 1 (0 - 1) | 44 (36 - 53) | 0 (0 - 15) | 0 (0 - 1) | 24 (21 - 27) | 9 (5 - 16) | 18 (12 - 29) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 32 | 1 (0 - 1) | 46 (37 - 55) | 0 (0 - 16) | 0 (0 - 1) | 27 (24 - 31) | 9 (5 - 16) | 19 (12 - 31) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 31 | 1 (0 - 1) | 47 (38 - 56) | 0 (0 - 18) | 0 (0 - 1) | 32 (28 - 36) | 9 (5 - 17) | 21 (13 - 32) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 30 | 1 (1 - 1) | 48 (39 - 58) | 0 (0 - 20) | 0 (0 - 1) | 36 (32 - 42) | 9 (5 - 17) | 22 (14 - 34) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 29 | 1 (1 - 1) | 50 (41 - 60) | 0 (0 - 22) | 0 (0 - 1) | 42 (36 - 48) | 10 (5 - 17) | 23 (14 - 36) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 28 | 1 (1 - 1) | 52 (43 - 63) | 0 (0 - 24) | 0 (0 - 1) | 48 (42 - 55) | 10 (5 - 18) | 24 (15 - 38) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 27 | 1 (1 - 1) | 53 (43 - 64) | 0 (0 - 27) | 0 (0 - 1) | 55 (48 - 63) | 10 (5 - 18) | 26 (16 - 41) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 26 | 1 (1 - 1) | 54 (44 - 65) | 0 (0 - 31) | 0 (0 - 1) | 63 (56 - 73) | 10 (6 - 19) | 27 (17 - 43) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |

**Table A12.4** Minimum lower type height above highest astronomic tide at which the annual collision estimate reaches its asymptotic value. Asymptotic value given in ()'s

| | 2010 | 2010-2011 | 2011-2012 |
|---|---|---|---|
| Northern Fulmar | 100 (-0.03) | 100 (-0.02) | 100 (-0.03) |
| Northern Gannet | 100 (0.45) | 100 (0.77) | 100 (2.1) |
| Arctic Skua | 79 (0) | 79 (0) | 79 (0) |
| Great Skua | 100 (0) | 100 (0) | 100 (0) |
| Black legged Kittiwake | 65 (1.52) | 65 (2.77) | 65 (2.78) |
| Lesser Black Backed Gull | 100 (-6.12) | 100 (-3.76) | 100 (-2.58) |
| Great Black backed Gull | 100 (2.23) | 100 (2.6) | 100 (2.17) |
| Common Guillemot | 100 (0) | 100 (0) | 100 (0) |
| Razorbill | 100 (-0.13) | 100 (-0.31) | 100 (-0.27) |
| Little Auk | 100 (0) | 100 (0) | 100 (0) |
| Atlantic Puffin | 100 (0) | 100 (0) | 100 (0) |

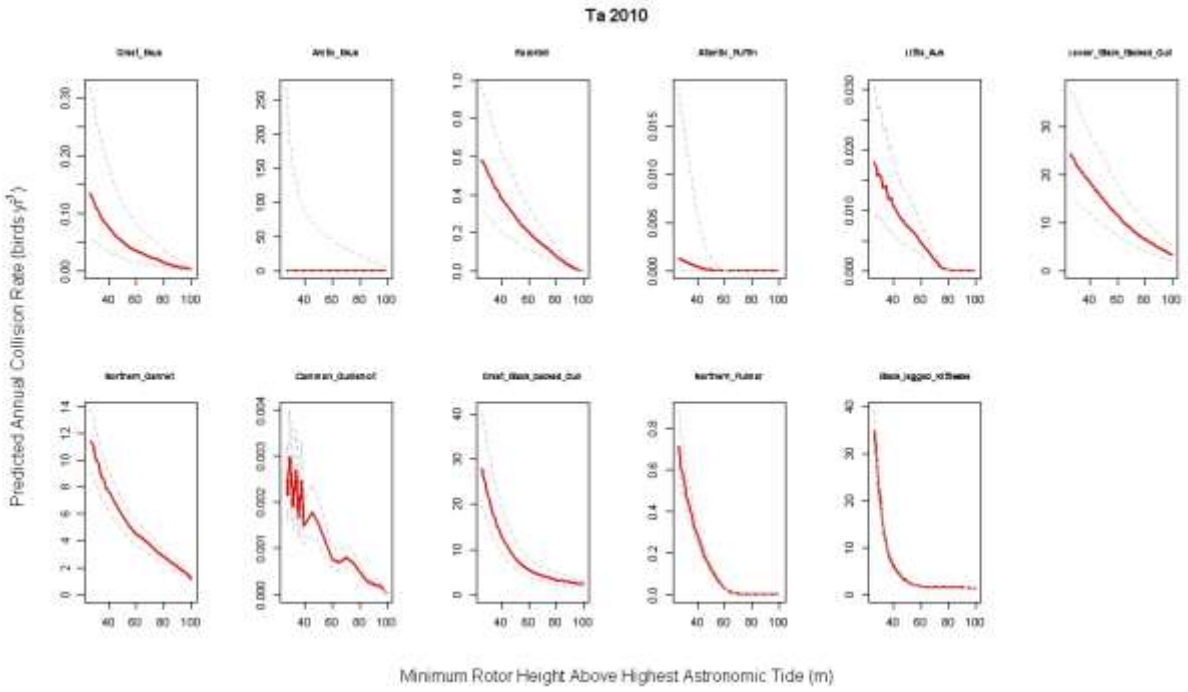



**Figure A12.1** Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside A in 2010.

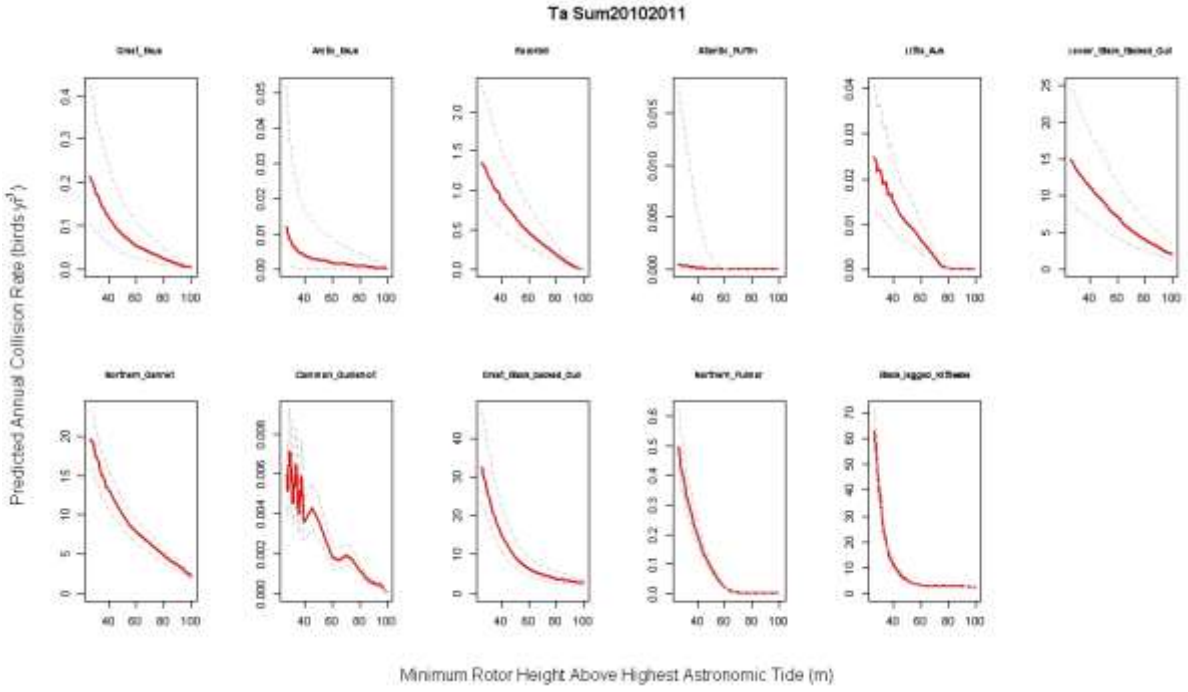



**Figure A12.2** Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside A between July 2010 and June 2011.

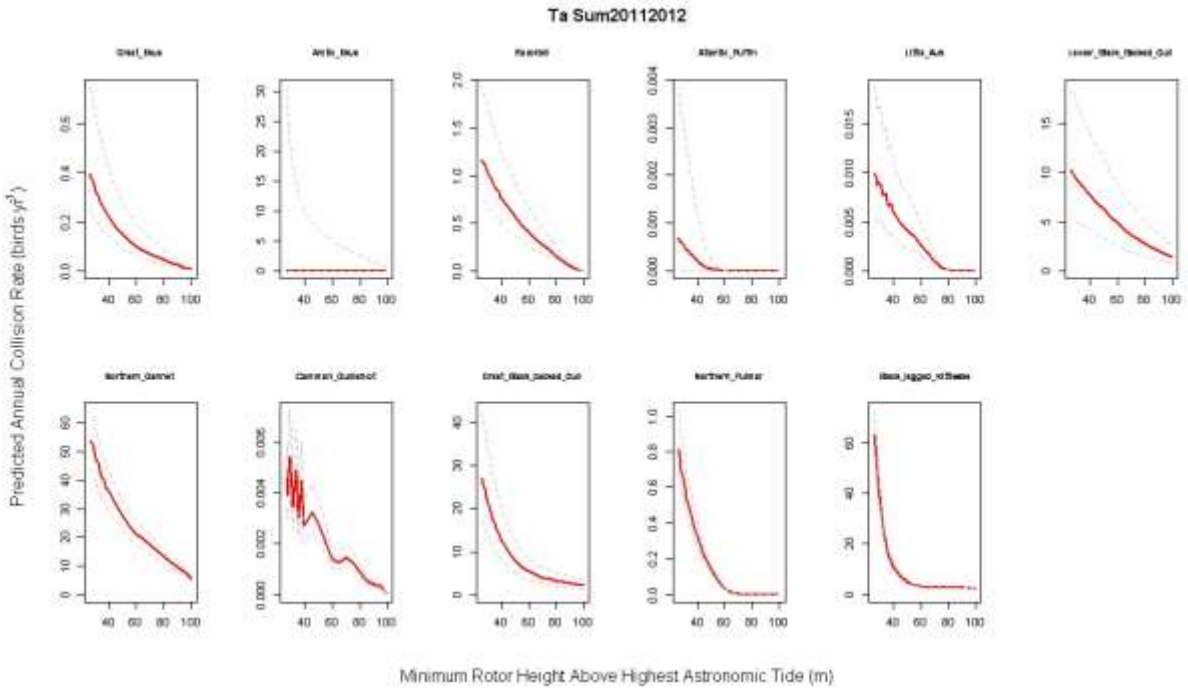



**Figure A12.3** Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside A between July 2011 and June 2012.

**Dogger Bank Teesside B**

A12.3. As the minimum lower tip height increased from 26 to 100m above highest astronomic tide, significant reductions in the estimated number of collisions were observed in all species in both 2010 and 2011 (Tables A12.5, A12.6 & A12.7). Plots of the annual number of collisions against lower type height were suggestive of an asymptotic relationship (Figures A12.4, A12.5 & A12.6). However, whilst the number of collisions involving each species were negligible at a height of 100m above highest astronomic tide, only two species – Arctic skua and black-legged kittiwake – reached an asymptote, at 79m and 65m respectively (Table A12.8).

**Table A12.5** Impact of increasing lower type height from 26 to 100m above highest astronomic tide (h. a. t.) on the annual collision estimates (and 90% Confidence Limits) for sensitive species in Dogger Bank Teesside B based on 2010 populations, assuming 6MW turbines and an avoidance rate of 99% for northern gannet and 98% for other species.

| Turbine Height (m above h. a. t) | Northern Fulmar | Northern Gannet | Arctic Skua | Great Skua | Black legged Kittiwake | Lesser Black Backed Gull | Great Black backed Gull | Common Guillemot | Razorbill | Little Auk | Atlantic Puffin |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 0 (0 - 0) | 2 (1 - 2) | 0 (0 - 5) | 0 (0 - 0) | 2 (2 - 2) | 3 (2 - 5) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 95 | 0 (0 - 0) | 2 (2 - 3) | 0 (0 - 8) | 0 (0 - 0) | 2 (2 - 3) | 4 (3 - 6) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 90 | 0 (0 - 0) | 3 (2 - 3) | 0 (0 - 12) | 0 (0 - 0) | 2 (2 - 3) | 5 (4 - 8) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 85 | 0 (0 - 0) | 3 (3 - 4) | 0 (0 - 16) | 0 (0 - 0) | 2 (2 - 3) | 6 (4 - 9) | 3 (2 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 80 | 0 (0 - 0) | 4 (3 - 4) | 0 (0 - 20) | 0 (0 - 0) | 2 (2 - 3) | 7 (5 - 10) | 4 (3 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 75 | 0 (0 - 0) | 4 (3 - 5) | 0 (0 - 24) | 0 (0 - 0) | 2 (2 - 3) | 8 (6 - 12) | 4 (3 - 6) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 70 | 0 (0 - 0) | 5 (4 - 5) | 0 (0 - 28) | 0 (0 - 0) | 2 (2 - 3) | 9 (6 - 13) | 5 (3 - 7) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 65 | 0 (0 - 0) | 5 (4 - 6) | 0 (0 - 32) | 0 (0 - 0) | 2 (2 - 3) | 10 (7 - 15) | 5 (4 - 8) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 60 | 0 (0 - 0) | 6 (5 - 7) | 0 (0 - 38) | 0 (0 - 0) | 3 (2 - 3) | 12 (8 - 18) | 6 (5 - 9) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 55 | 0 (0 - 0) | 6 (5 - 8) | 0 (0 - 45) | 0 (0 - 0) | 3 (3 - 4) | 13 (10 - 20) | 8 (5 - 11) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 50 | 0 (0 - 0) | 7 (6 - 9) | 0 (0 - 53) | 0 (0 - 0) | 4 (4 - 5) | 15 (11 - 23) | 9 (7 - 13) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 45 | 0 (0 - 0) | 9 (7 - 10) | 0 (0 - 62) | 0 (0 - 0) | 6 (6 - 7) | 17 (12 - 25) | 12 (8 - 16) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 40 | 0 (0 - 0) | 10 (8 - 11) | 0 (0 - 74) | 0 (0 - 0) | 10 (9 - 11) | 19 (13 - 28) | 15 (11 - 21) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 39 | 0 (0 - 0) | 10 (8 - 12) | 0 (0 - 78) | 0 (0 - 0) | 11 (9 - 12) | 19 (14 - 29) | 16 (11 - 22) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 38 | 0 (0 - 0) | 10 (8 - 12) | 0 (0 - 83) | 0 (0 - 0) | 12 (10 - 13) | 20 (14 - 29) | 17 (12 - 23) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 37 | 0 (0 - 0) | 10 (9 - 12) | 0 (0 - 87) | 0 (0 - 0) | 13 (12 - 14) | 20 (14 - 30) | 18 (13 - 25) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 36 | 0 (0 - 0) | 11 (9 - 13) | 0 (0 - 91) | 0 (0 - 0) | 14 (13 - 16) | 20 (14 - 30) | 19 (13 - 26) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 35 | 0 (0 - 1) | 11 (9 - 13) | 0 (0 - 98) | 0 (0 - 0) | 16 (15 - 18) | 21 (15 - 31) | 20 (14 - 28) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 34 | 0 (0 - 1) | 11 (9 - 13) | 0 (0 - 106) | 0 (0 - 0) | 18 (16 - 21) | 21 (15 - 32) | 21 (15 - 29) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 33 | 0 (0 - 1) | 12 (10 - 14) | 0 (0 - 114) | 0 (0 - 0) | 21 (19 - 23) | 22 (15 - 32) | 22 (16 - 31) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 32 | 1 (0 - 1) | 12 (10 - 15) | 0 (0 - 121) | 0 (0 - 0) | 24 (21 - 27) | 22 (15 - 33) | 23 (17 - 32) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 31 | 1 (0 - 1) | 13 (10 - 15) | 0 (0 - 133) | 0 (0 - 0) | 28 (25 - 31) | 22 (16 - 34) | 24 (18 - 34) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 30 | 1 (0 - 1) | 13 (11 - 15) | 0 (0 - 148) | 0 (0 - 0) | 32 (29 - 36) | 23 (16 - 34) | 26 (19 - 36) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 29 | 1 (1 - 1) | 13 (11 - 16) | 0 (0 - 164) | 0 (0 - 0) | 36 (33 - 41) | 23 (16 - 35) | 27 (20 - 38) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 28 | 1 (1 - 1) | 14 (12 - 17) | 0 (0 - 182) | 0 (0 - 0) | 42 (38 - 47) | 24 (17 - 36) | 29 (21 - 40) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 27 | 1 (1 - 1) | 14 (12 - 17) | 0 (0 - 203) | 0 (0 - 0) | 48 (43 - 54) | 24 (17 - 37) | 31 (22 - 43) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 26 | 1 (1 - 1) | 15 (12 - 17) | 0 (0 - 233) | 0 (0 - 0) | 56 (50 - 62) | 25 (18 - 38) | 32 (23 - 45) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |

**Table A12.6** Impact of increasing lower type height from 26 to 100m above highest astronomic tide (h. a. t.) on the annual collision estimates (and 90% Confidence Limits) for sensitive species in Dogger Bank Teesside B based population estimates for summer 2010 - 2011, assuming 6MW turbines and an avoidance rate of 99% for northern gannet and 98% for other species.

| Turbine Height (m above h. a. t) | Northern Fulmar | Northern Gannet | Arctic Skua | Great Skua | Black legged Kittiwake | Lesser Black Backed Gull | Great Black backed Gull | Common Guillemot | Razorbill | Little Auk | Atlantic Puffin |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 0 (0 - 0) | 3 (2 - 3) | 0 (0 - 0) | 0 (0 - 0) | 4 (3 - 4) | 2 (1 - 3) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 95 | 0 (0 - 0) | 4 (3 - 4) | 0 (0 - 0) | 0 (0 - 0) | 4 (3 - 4) | 3 (2 - 4) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 90 | 0 (0 - 0) | 4 (4 - 5) | 0 (0 - 0) | 0 (0 - 0) | 4 (4 - 4) | 3 (2 - 5) | 3 (2 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 85 | 0 (0 - 0) | 5 (4 - 6) | 0 (0 - 0) | 0 (0 - 0) | 4 (4 - 5) | 4 (2 - 6) | 4 (3 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 80 | 0 (0 - 0) | 6 (5 - 7) | 0 (0 - 0) | 0 (0 - 0) | 4 (4 - 5) | 4 (3 - 6) | 4 (3 - 6) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 75 | 0 (0 - 0) | 7 (6 - 8) | 0 (0 - 0) | 0 (0 - 0) | 4 (4 - 5) | 5 (3 - 7) | 4 (3 - 6) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 70 | 0 (0 - 0) | 8 (6 - 9) | 0 (0 - 0) | 0 (0 - 0) | 4 (4 - 5) | 5 (4 - 9) | 5 (4 - 7) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 65 | 0 (0 - 0) | 9 (7 - 10) | 0 (0 - 0) | 0 (0 - 0) | 4 (4 - 5) | 6 (4 - 10) | 6 (4 - 8) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 60 | 0 (0 - 0) | 10 (8 - 11) | 0 (0 - 0) | 0 (0 - 0) | 5 (4 - 5) | 7 (5 - 11) | 7 (5 - 9) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 55 | 0 (0 - 0) | 11 (9 - 13) | 0 (0 - 0) | 0 (0 - 0) | 5 (5 - 6) | 8 (5 - 13) | 8 (6 - 11) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 50 | 0 (0 - 0) | 12 (10 - 14) | 0 (0 - 0) | 0 (0 - 0) | 7 (7 - 8) | 9 (6 - 14) | 10 (7 - 14) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 45 | 0 (0 - 0) | 14 (12 - 17) | 0 (0 - 0) | 0 (0 - 0) | 11 (9 - 12) | 10 (7 - 16) | 12 (9 - 17) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 40 | 0 (0 - 0) | 16 (13 - 19) | 0 (0 - 0) | 0 (0 - 0) | 16 (15 - 18) | 11 (7 - 18) | 16 (11 - 22) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 39 | 0 (0 - 0) | 16 (14 - 19) | 0 (0 - 0) | 0 (0 - 0) | 18 (16 - 20) | 12 (7 - 18) | 17 (12 - 23) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 38 | 0 (0 - 0) | 17 (14 - 20) | 0 (0 - 0) | 0 (0 - 0) | 20 (18 - 22) | 12 (8 - 19) | 17 (13 - 25) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 37 | 0 (0 - 0) | 17 (15 - 20) | 0 (0 - 0) | 0 (0 - 0) | 22 (20 - 24) | 12 (8 - 19) | 18 (13 - 26) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 36 | 0 (0 - 0) | 18 (15 - 21) | 0 (0 - 0) | 0 (0 - 0) | 24 (22 - 27) | 12 (8 - 19) | 19 (14 - 27) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 35 | 0 (0 - 0) | 18 (15 - 22) | 0 (0 - 0) | 0 (0 - 0) | 28 (25 - 31) | 12 (8 - 20) | 21 (15 - 29) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 34 | 0 (0 - 0) | 19 (16 - 22) | 0 (0 - 0) | 0 (0 - 0) | 31 (28 - 35) | 13 (8 - 20) | 22 (16 - 30) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 33 | 0 (0 - 0) | 20 (16 - 23) | 0 (0 - 0) | 0 (0 - 0) | 35 (32 - 40) | 13 (8 - 20) | 23 (17 - 32) | 0 (0 - 0) | 1 (1 - 3) | 0 (0 - 0) | 0 (0 - 0) |
| 32 | 0 (0 - 0) | 21 (17 - 24) | 0 (0 - 0) | 0 (0 - 0) | 41 (37 - 45) | 13 (9 - 21) | 24 (18 - 34) | 0 (0 - 0) | 1 (1 - 3) | 0 (0 - 0) | 0 (0 - 0) |
| 31 | 0 (0 - 0) | 21 (18 - 25) | 0 (0 - 0) | 0 (0 - 0) | 47 (42 - 53) | 13 (9 - 21) | 25 (19 - 36) | 0 (0 - 0) | 2 (1 - 3) | 0 (0 - 0) | 0 (0 - 0) |
| 30 | 0 (0 - 0) | 22 (18 - 25) | 0 (0 - 0) | 0 (0 - 0) | 54 (49 - 61) | 14 (9 - 22) | 27 (20 - 38) | 0 (0 - 0) | 2 (1 - 3) | 0 (0 - 0) | 0 (0 - 0) |
| 29 | 0 (0 - 1) | 22 (19 - 26) | 0 (0 - 0) | 0 (0 - 0) | 62 (56 - 69) | 14 (9 - 22) | 28 (21 - 40) | 0 (0 - 0) | 2 (1 - 3) | 0 (0 - 0) | 0 (0 - 0) |
| 28 | 0 (0 - 1) | 24 (20 - 28) | 0 (0 - 0) | 0 (0 - 0) | 71 (64 - 80) | 14 (9 - 23) | 30 (22 - 42) | 0 (0 - 0) | 2 (1 - 3) | 0 (0 - 0) | 0 (0 - 0) |
| 27 | 0 (0 - 1) | 24 (20 - 28) | 0 (0 - 0) | 0 (0 - 0) | 82 (74 - 92) | 15 (10 - 23) | 32 (23 - 45) | 0 (0 - 0) | 2 (1 - 3) | 0 (0 - 0) | 0 (0 - 0) |
| 26 | 1 (0 - 1) | 24 (20 - 28) | 0 (0 - 0) | 0 (0 - 0) | 95 (85 - 106) | 15 (10 - 24) | 34 (25 - 47) | 0 (0 - 0) | 2 (1 - 3) | 0 (0 - 0) | 0 (0 - 0) |

**Table A12.7** Impact of increasing lower type height from 26 to 100m above highest astronomic tide (h. a. t.) on the annual collision estimates (and 90% Confidence Limits) for sensitive species in Dogger Bank Teesside B based population estimates for summer 2011 - 2012, assuming 6MW turbines and an avoidance rate of 99% for northern gannet and 98% for other species.

| Turbine Height (m above h. a. t) | Northern Fulmar | Northern Gannet | Arctic Skua | Great Skua | Black legged Kittiwake | Lesser Black Backed Gull | Great Black backed Gull | Common Guillemot | Razorbill | Little Auk | Atlantic Puffin |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 0 (0 - 0) | 7 (6 - 8) | 0 (0 - 1) | 0 (0 - 0) | 4 (3 - 4) | 1 (1 - 2) | 2 (1 - 3) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 95 | 0 (0 - 0) | 10 (8 - 12) | 0 (0 - 1) | 0 (0 - 0) | 4 (3 - 4) | 2 (1 - 3) | 2 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 90 | 0 (0 - 0) | 12 (10 - 14) | 0 (0 - 1) | 0 (0 - 0) | 4 (4 - 5) | 2 (1 - 4) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 85 | 0 (0 - 0) | 14 (12 - 17) | 0 (0 - 2) | 0 (0 - 0) | 4 (4 - 5) | 2 (1 - 4) | 3 (2 - 4) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 80 | 0 (0 - 0) | 16 (13 - 19) | 0 (0 - 2) | 0 (0 - 0) | 4 (4 - 5) | 3 (1 - 5) | 3 (2 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 75 | 0 (0 - 0) | 19 (15 - 22) | 0 (0 - 3) | 0 (0 - 0) | 4 (4 - 5) | 3 (2 - 6) | 4 (2 - 5) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) | 0 (0 - 0) |
| 70 | 0 (0 - 0) | 21 (18 - 25) | 0 (0 - 3) | 0 (0 - 0) | 4 (4 - 5) | 4 (2 - 6) | 4 (3 - 6) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 65 | 0 (0 - 0) | 24 (19 - 28) | 0 (0 - 4) | 0 (0 - 0) | 4 (4 - 5) | 4 (2 - 7) | 4 (3 - 7) | 0 (0 - 0) | 0 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 60 | 0 (0 - 0) | 26 (22 - 31) | 0 (0 - 4) | 0 (0 - 0) | 5 (4 - 5) | 5 (3 - 8) | 5 (3 - 8) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 55 | 0 (0 - 0) | 29 (24 - 34) | 0 (0 - 5) | 0 (0 - 0) | 6 (5 - 6) | 5 (3 - 10) | 6 (4 - 9) | 0 (0 - 0) | 1 (0 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 50 | 0 (0 - 0) | 33 (27 - 39) | 0 (0 - 6) | 0 (0 - 0) | 7 (7 - 9) | 6 (3 - 11) | 8 (5 - 12) | 0 (0 - 0) | 1 (1 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 45 | 0 (0 - 0) | 39 (32 - 46) | 0 (0 - 7) | 0 (0 - 0) | 11 (10 - 12) | 7 (4 - 12) | 10 (6 - 15) | 0 (0 - 0) | 1 (1 - 1) | 0 (0 - 0) | 0 (0 - 0) |
| 40 | 0 (0 - 0) | 44 (36 - 52) | 0 (0 - 9) | 0 (0 - 0) | 17 (15 - 19) | 8 (4 - 13) | 13 (8 - 19) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 39 | 0 (0 - 0) | 45 (37 - 53) | 0 (0 - 9) | 0 (0 - 0) | 18 (16 - 21) | 8 (4 - 14) | 13 (8 - 20) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 38 | 0 (0 - 0) | 46 (38 - 54) | 0 (0 - 10) | 0 (0 - 0) | 20 (18 - 23) | 8 (4 - 14) | 14 (9 - 21) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 37 | 0 (0 - 0) | 48 (39 - 56) | 0 (0 - 10) | 0 (0 - 0) | 22 (20 - 26) | 8 (4 - 14) | 15 (9 - 22) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 36 | 0 (0 - 1) | 49 (41 - 58) | 0 (0 - 11) | 0 (0 - 0) | 25 (22 - 29) | 8 (4 - 14) | 15 (10 - 23) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 35 | 0 (0 - 1) | 51 (42 - 59) | 0 (0 - 11) | 0 (0 - 1) | 28 (25 - 32) | 8 (5 - 15) | 16 (10 - 24) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 34 | 0 (0 - 1) | 52 (43 - 61) | 0 (0 - 12) | 0 (0 - 1) | 32 (29 - 37) | 9 (5 - 15) | 17 (11 - 26) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 33 | 1 (0 - 1) | 54 (45 - 63) | 0 (0 - 13) | 0 (0 - 1) | 36 (32 - 41) | 9 (5 - 15) | 18 (12 - 27) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 32 | 1 (0 - 1) | 57 (47 - 66) | 0 (0 - 14) | 0 (0 - 1) | 42 (37 - 48) | 9 (5 - 15) | 19 (12 - 29) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 31 | 1 (0 - 1) | 58 (48 - 68) | 0 (0 - 16) | 0 (0 - 1) | 49 (43 - 55) | 9 (5 - 16) | 20 (13 - 30) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 30 | 1 (1 - 1) | 59 (49 - 70) | 0 (0 - 17) | 0 (0 - 1) | 56 (50 - 64) | 9 (5 - 16) | 21 (14 - 32) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 29 | 1 (1 - 1) | 62 (51 - 72) | 0 (0 - 19) | 0 (0 - 1) | 64 (57 - 73) | 9 (5 - 16) | 23 (14 - 34) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 28 | 1 (1 - 1) | 65 (53 - 76) | 0 (0 - 21) | 0 (0 - 1) | 73 (65 - 83) | 10 (5 - 17) | 24 (15 - 36) | 0 (0 - 0) | 1 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 27 | 1 (1 - 1) | 66 (54 - 77) | 0 (0 - 24) | 0 (0 - 1) | 85 (75 - 96) | 10 (5 - 17) | 25 (16 - 38) | 0 (0 - 0) | 2 (1 - 2) | 0 (0 - 0) | 0 (0 - 0) |
| 26 | 1 (1 - 1) | 66 (55 - 78) | 0 (0 - 27) | 0 (0 - 1) | 98 (87 - 111) | 10 (5 - 18) | 27 (17 - 40) | 0 (0 - 0) | 2 (1 - 3) | 0 (0 - 0) | 0 (0 - 0) |

**Table A12.8** Minimum lower type height above highest astronomic tide at which the annual collision estimate reaches its asymptotic value. Asymptotic value given in ()'s

| | 2010 | 2010-2011 | 2011-2012 |
|---|---|---|---|
| Northern Fulmar | 100 (-0.03) | 100 (-0.02) | 100 (-0.03) |
| Northern Gannet | 100 (0.57) | 100 (0.94) | 100 (2.58) |
| Arctic Skua | 79 (0) | 79 (0) | 79 (0) |
| Great Skua | 100 (0) | 100 (0) | 100 (0) |
| Black legged Kittiwake | 65 (2.43) | 65 (4.15) | 65 (4.27) |
| Lesser Black Backed Gull | 100 (-6.29) | 100 (-3.76) | 100 (-2.54) |
| Great Black backed Gull | 100 (2.58) | 100 (2.7) | 100 (2.14) |
| Common Guillemot | 100 (0) | 100 (0) | 100 (0) |
| Razorbill | 100 (-0.18) | 100 (-0.41) | 100 (-0.36) |
| Little Auk | 100 (0) | 100 (0) | 100 (0) |
| Atlantic Puffin | 100 (0) | 100 (0) | 100 (0) |

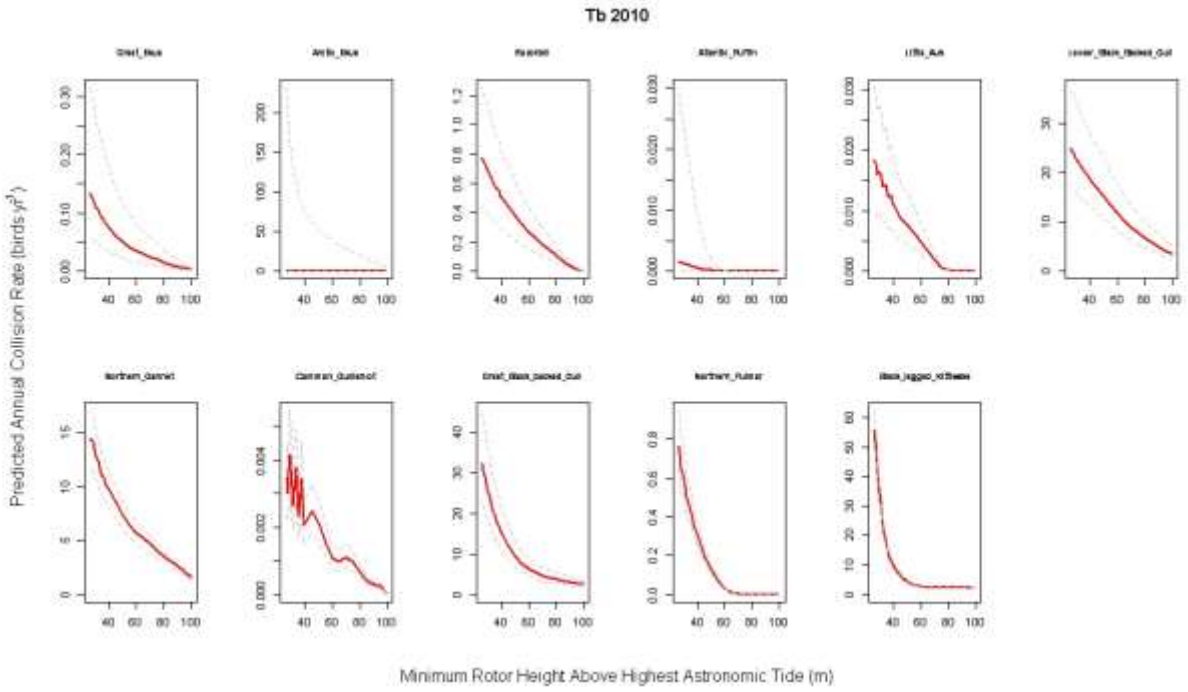



**Figure A12.4** Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside B in 2010.

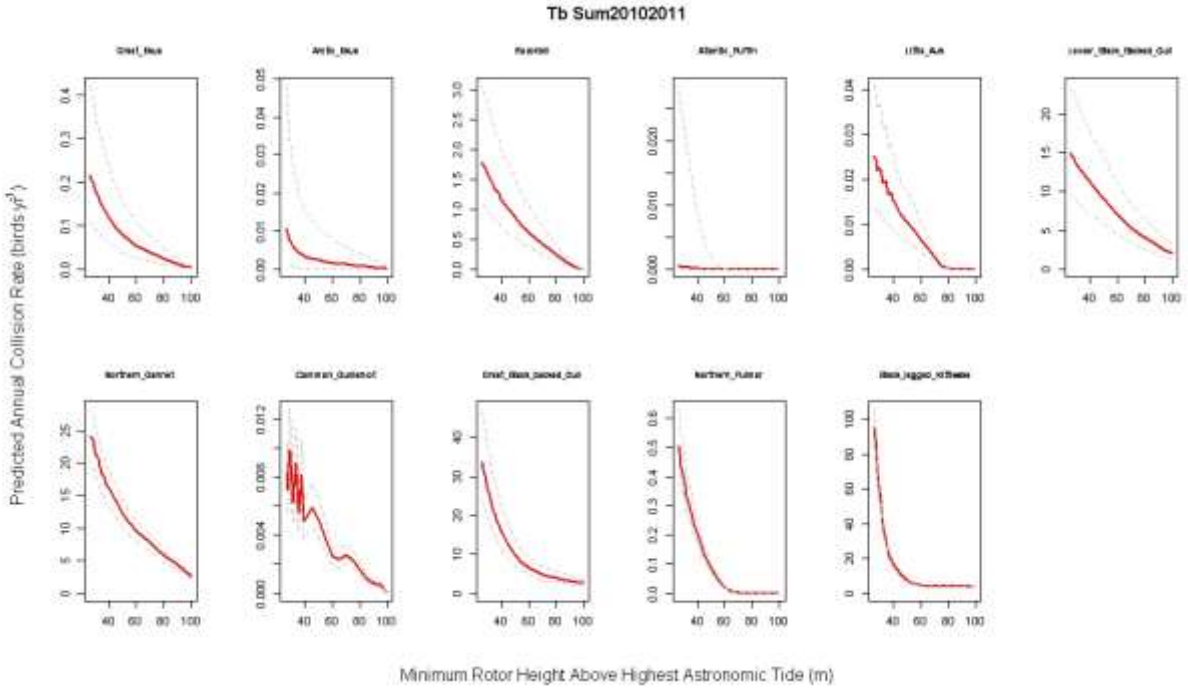



**Figure A12.5** Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside B between July 2010 and June 2011.

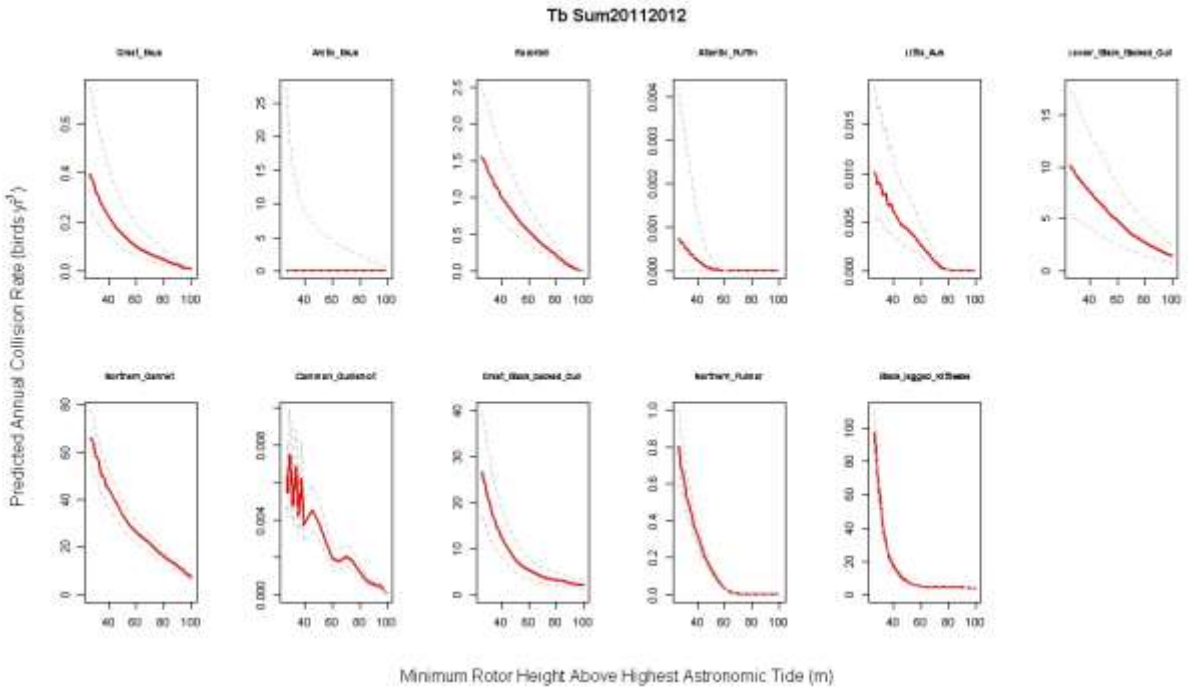



**Figure A12.6** Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside B between July 2011 and June 2012.

## APPENDIX 13 NUMBERS OF BIRDS LOST THROUGH COLLISION AND DISTURBANCE/DISPLACEMENT, APPORTIONED TO PROTECTED SITES FOR THE CUMULATIVE ASSESSMENT AT THE NORTH SEA SCALE

A13.1. This appendix presents the numbers of displaced birds (and those displaced birds that may die), apportioned to protected sites from other projects, that was used within the cumulative assessment of disturbance/displacement at the North Sea scale.

A13.2. Information was available from one extra project for displacement: the European Offshore Wind Development Centre (EOWDC) and Hornsea Project One where impacts had been apportioned for displacement (and/or mortality), were available for five SPAs: Flamborough Head and Bempton Cliffs, Coquet Island, Farne Islands, Buchan Ness to Collieston Coast and Fowlsheugh SPAs.

A13.3. For completion, the number of birds potentially displaced (and killed) for those particular sites are also shown for the Dogger Bank Teesside A and B and Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D assessment, together with those sites also reaching significance for the Dogger Bank Teesside A and B and Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D assessment, but that had no additional information from other projects (Table A13.1), see section 6.3 for more details.

**Table A13.1** Numbers of displaced birds (and those displaced birds that may die, brackets) apportioned to protected sites from other EIAs used within the cumulative assessment of displacement at the North Sea scale. Proportion of birds of protected sites lost are, and for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B, and Dogger Bank Teesside C and D the median value is presented. Absence of information is represented by a dash "-".

| Project | Protected site | Northern gannet | | Common guillemot | | Razorbill | | Atlantic Puffin | |
|---|---|---|---|---|---|---|---|---|---|
| | | No. | Prop lost | No. | Prop lost | No. | Prop lost | No. | Prop lost |
| Hornsea Project One | Flamborough Head & Bempton Cliffs | 0 | 0 | (127) | 0.15 | (79) | 0.4 | (3) | 0.3 |
| | Coquet Island | | | | | | | (9) | 0.05 |
| | Farne Islands | | | | | | | (18) | 0.04 |
| EOWDC | Fowlsheugh | | | 88 (88) | 0.2 | 30 (30) | 0.6 | | |
| | Buchan Ness to Collieston | | | 298 (298) | 1.5 | 99 (99) | 2.3 | | |
| Teesside A and B, Creyke Beck A and B and Teesside C and D | Flamborough Head & Bempton Cliffs | 341 (17) | 0.09 | 4,880 (244) | 0.25 | 1,260 (63) | 0.23 | 2 (<1) | 0.01 |
| | Coquet | | | | | | | 60 (3) | 0.01 |
| | Farne Islands | | | | | | | 140 (7) | 0.01 |
| | Fowlsheugh | | | 1,960 (98) | 0.12 | 316 (16) | 0.15 | | |
| | Buchan Ness to Collieston | | | 780 (39) | 0.11 | - | - | | |

| Project | Protected site | Northern gannet | | Common guillemot | | Razorbill | | Atlantic Puffin | |
|---|---|---|---|---|---|---|---|---|---|
| | | No. | Prop lost | No. | Prop lost | No. | Prop lost | No. | Prop lost |
| **Totals lost** | **Total Flamborough Head & Bempton Cliffs** | **17** | **0.09** | **371** | **0.4** | **142** | **0.63** | **3** | **0.31** |
| | **Total Coquet** | | | | | | | **12** | **0.06** |
| | **Total Farne Islands** | | | | | | | **25** | **0.05** |
| | **Total Fowlsheugh** | | | **186** | **0.32** | **46** | **0.75** | | |
| | **Total Buchan Ness** | | | **337** | **1.61** | **-** | **-** | | |

A13.4. Similar to disturbance/displacement, here we also present the numbers of birds apportioned to protected sites that are predicted to be killed due to collision (Table A13.2). These numbers were fed through for the North Sea cumulative assessment of collision at the protected site level in combination with information from Dogger Bank Teesside A and B and Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D assessment (also given in Table A13.2).

A13.5. For collision risk, information of numbers of birds apportioned to protected sites was available from five additional projects: Beatrice, East Anglia ONE, Dudgeon, Hornsea Project One and Triton Knoll. Protected sites where impacts had been apportioned for collision were available for three SPAs: Alde-Orde Estuary, East Caithness Cliffs and Flamborough Head and Bempton Cliffs SPAs.

**Table A13.2** Numbers of birds predicted to be lost from protected sites due to collision, using information from other EIAs, to assess the cumulative impact at the North Sea scale. Absence of information is represented by a dash "-".

| Project | Protected site | Northern fulmar | Northern gannet | Black-legged kittiwake | Lesser black-backed gull | Great black-backed gull | Common guillemot | Razorbill | Atlantic puffin |
|---|---|---|---|---|---|---|---|---|---|
| Beatrice | East Caithness Cliffs | 5 | - | 21 | - | 18 | 27 | 1 | - |
| East Anglia ONE | Flamborough Head & Bempton Cliffs | | 91 | 108 | | | | | |
| Dudgeon | Flamborough Head & Bempton Cliffs | - | 597 | - | - | - | - | - | - |
| Hornsea Project One | Flamborough Head & Bempton Cliffs | | 6 | **15** | | | | | |
| Triton Knoll | Flamborough Head & Bempton Cliffs | - | 129 | 158 | - | - | - | - | - |
| East Anglia ONE | Alde-Ore Estuary | - | - | - | 16 | - | - | - | - |
| Teesside A and B and Creyke Beck A and B and Teesside C and D | Flamborough Head & Bempton Cliffs | <1 | 35 | 285 | - | - | <1 | <1 | <1 |
| | East Caithness Cliffs | <1 | - | 42 | - | 1 | <1 | <1 | <1 |
| | Alde-Ore Estuary | - | - | - | 3 | - | - | - | - |
| **Total Flamborough Head & Bempton Cliffs** | | **-** | **858** | **566** | **-** | **-** | **-** | **-** | **-** |
| **Total East Caithness Cliffs** | | **6** | **-** | **63** | **-** | **19** | **27** | **1** | **<1** |
| **Total Alde-Ore Estuary** | | **-** | **-** | **-** | **19** | **-** | **-** | **-** | **-** |