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

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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. The organisation's current plan is to secure development consent for six projects, which have a total target installed capacity of 7.2 GW. Its focus is on the first four, which together are Dogger Bank Creyke Beck and Dogger Bank Teesside A&B

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.

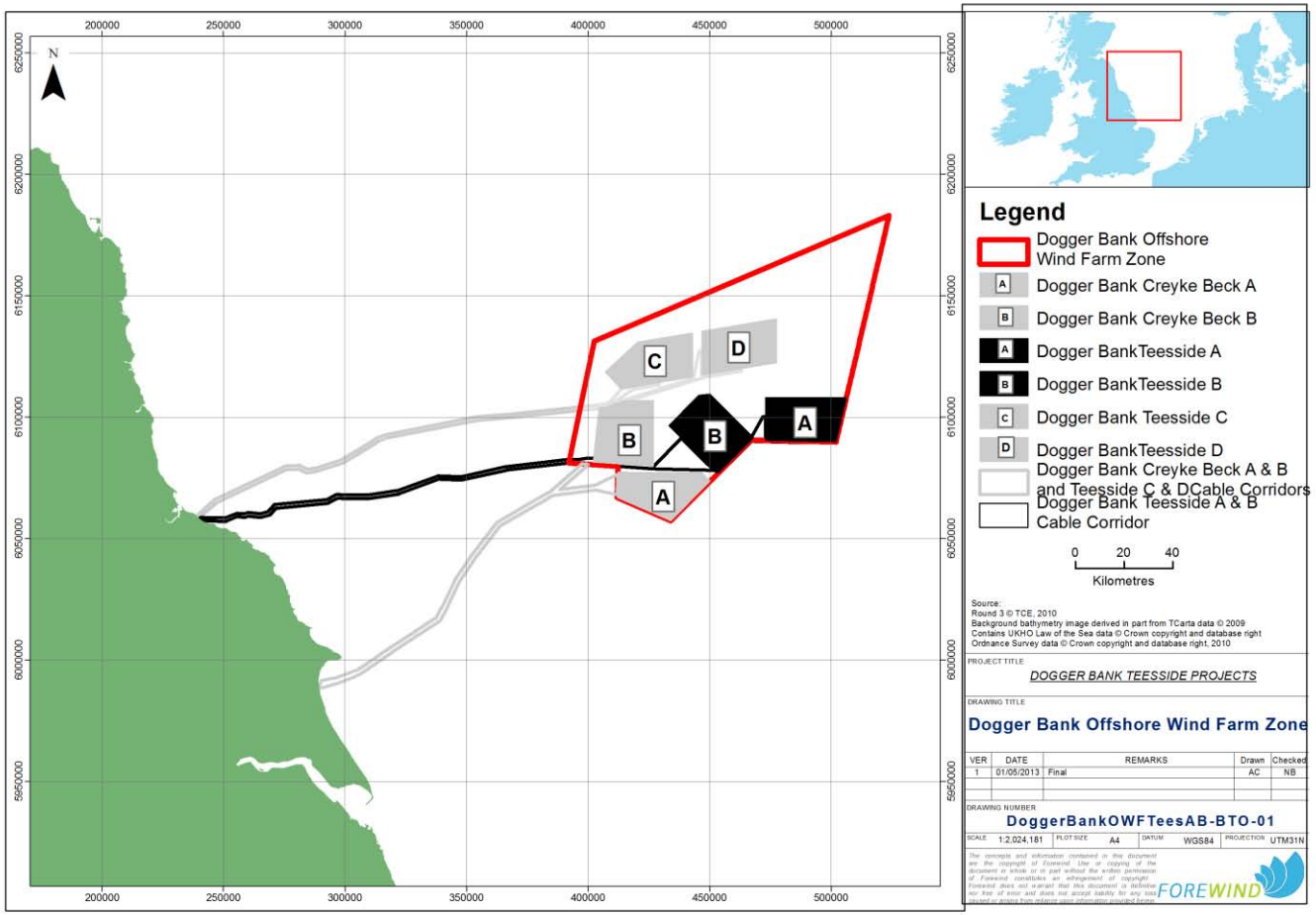

Figure 1.1 The sites of the proposed Dogger Bank Teesside A and Dogger Bank Teesside B projects within the Dogger Bank Zone, together with the proposed export cable corridor for these projects and the Dogger Bank Creyke Beck A, Dogger Bank Creyke Beck B, Dogger Bank Teesside C and Dogger Bank Teesside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

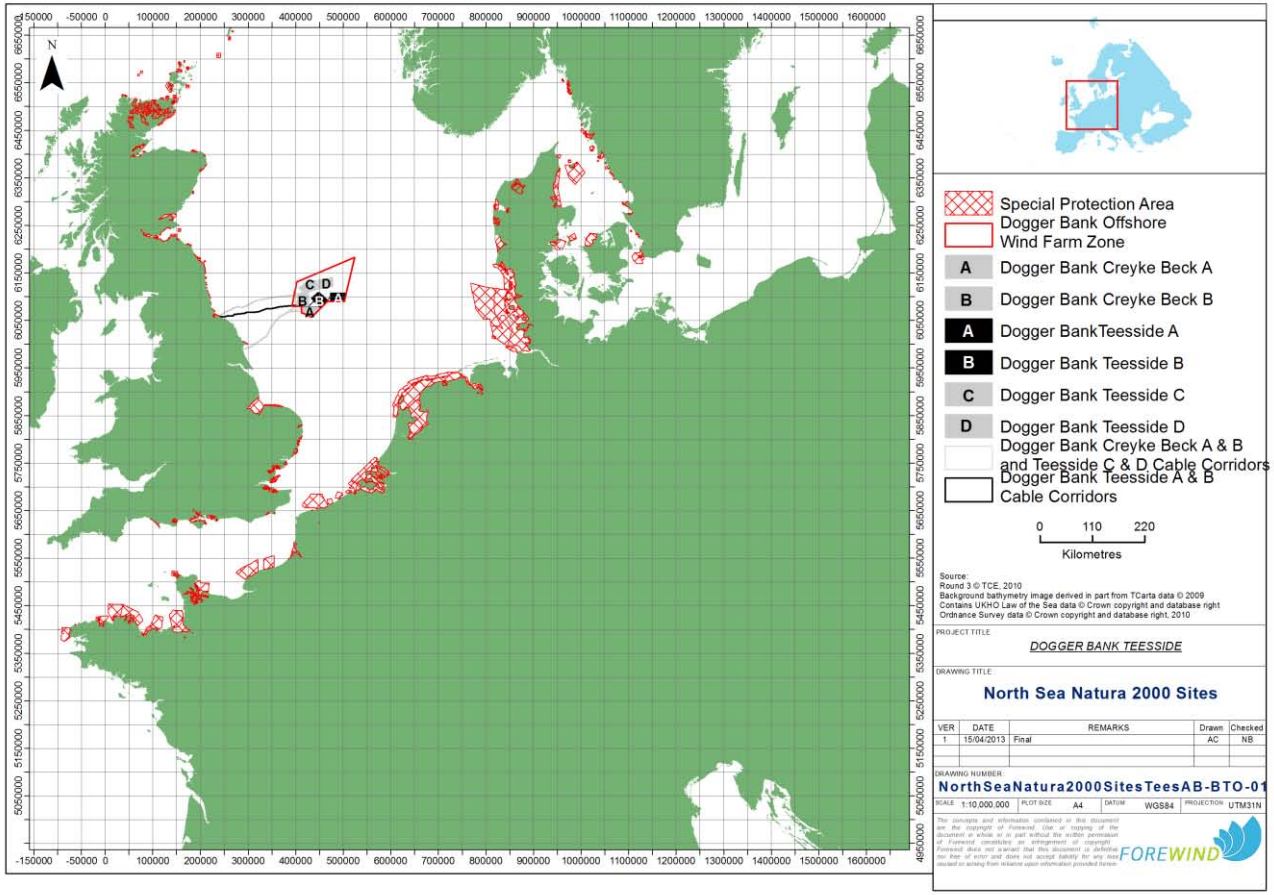

Figure 1.2 The Greater North Sea OSPAR region considered within this assessment and Special Protection Areas (SPAs) whose breeding features were considered in this region (see Appendix 1).

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.
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- 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.

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 that consultation; details of how these comments have been addressed here are again outlined in Appendix 3.

1.3.8 Further advice and comments have also been received on the Dogger Bank Creyke Beck A and B projects post-application. Responses to comments received during the consultation phase for the Dogger Bank Teesside A and B projects also reflects these.

1.3.9 Following the consultation phase for the Dogger Bank Teesside A and B projects, a meeting was held on 20 February 2014, with stakeholder representation from Natural England and RSPB. The final 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.

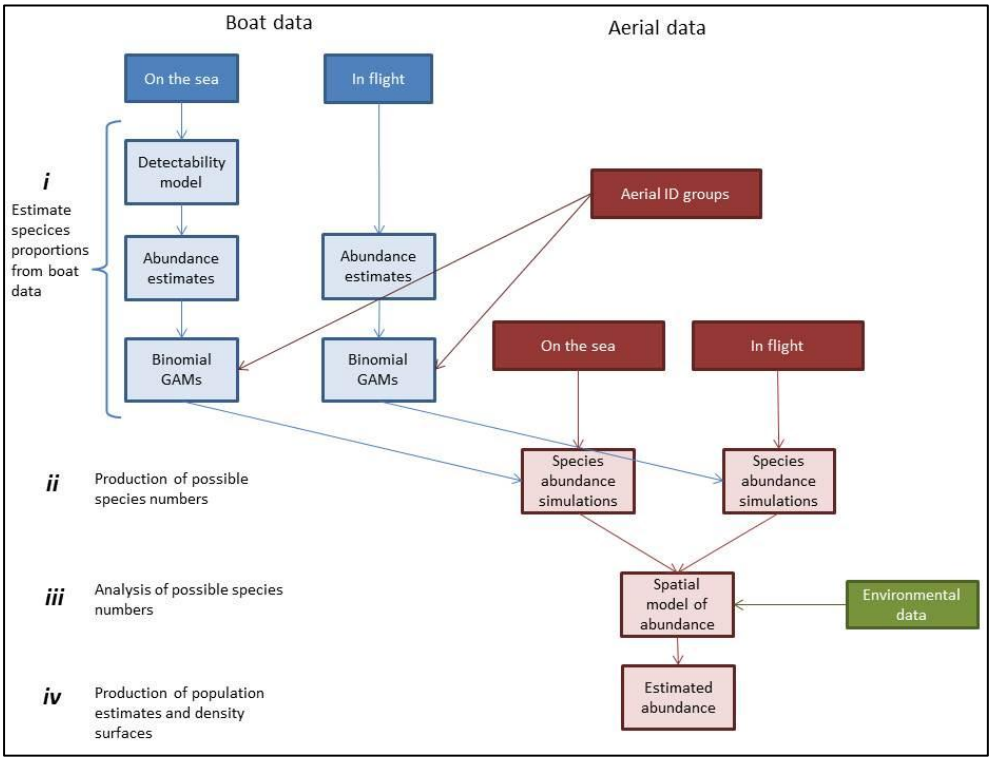

Figure 2.1 Diagrammatic representation of the modelling process

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 the statistical analysis software 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.

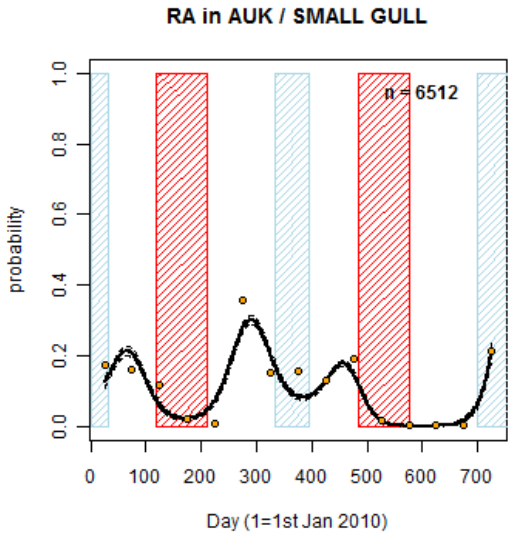

Figure 2.2 Example graph showing results from a binomial GAM for razorbill in the Auk/Small Gull grouping, showing the probability of a bird recorded in this category (n = 6512) being razorbill from days since the 1st January 2010.

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.

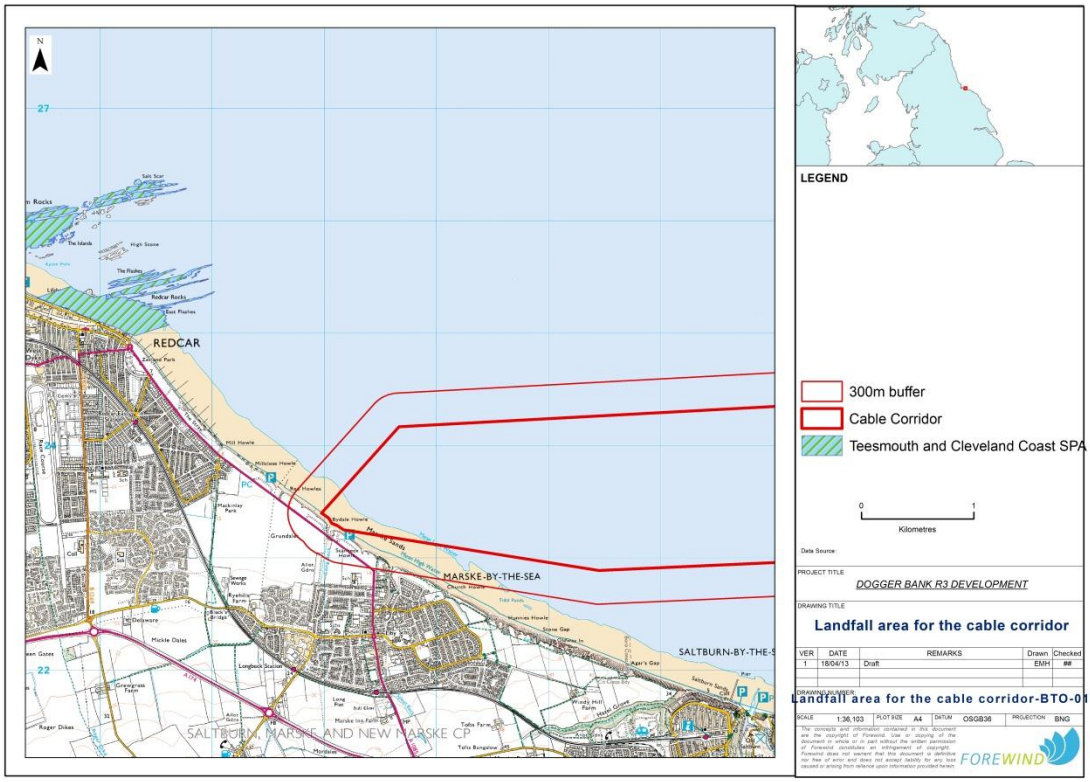

Figure 2.3 Location of the export cable corridor (thick red outline) and 300m buffer (thin red outline) in relation to the nearest SPA.

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.

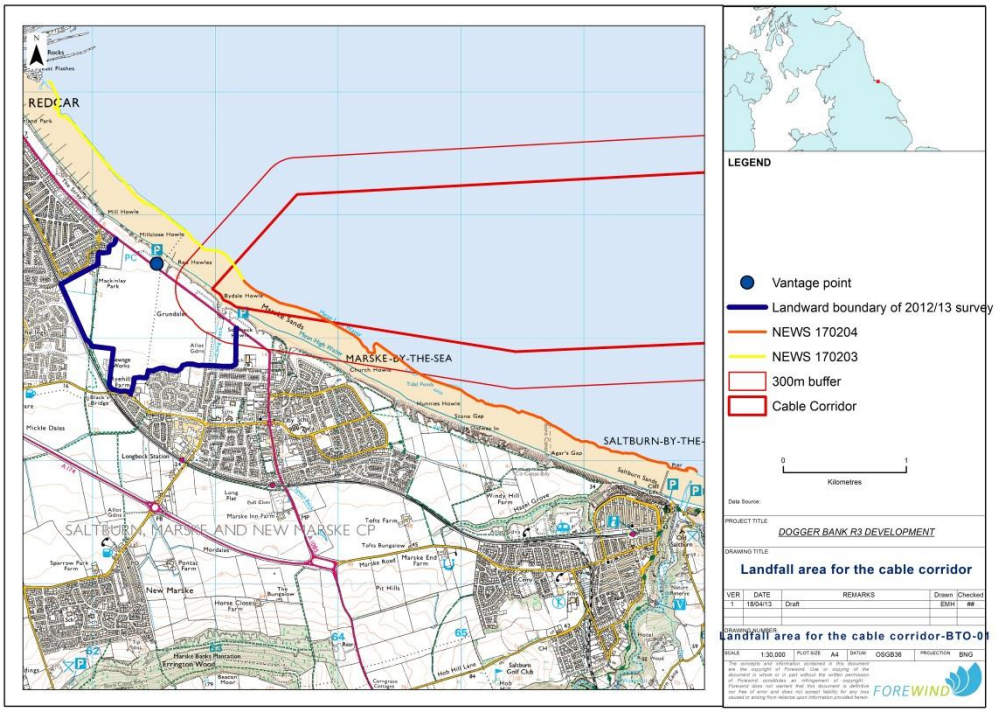

Figure 2.4 Spatial overlap between the export cable corridor (thick red outline)/buffer (thin red outline) and the relevant bird surveys: NEWS (pink and yellow line); vantage point used during the winter bird and inland sea-watch surveys in 2011/12 and the inland sea-watch survey in 2012/13 (blue circle) 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*) 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*) 990,000-1,050,000 I (*argenteus*)	10,200	Stable (*argentatus*) 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*) 800,000 I (*albionis*)	56,000 (combined) 8,000 (*albionis*)	Decreasing (*aalge*) 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 Species of international or national importance, i.e. those whose numbers surpass 1% of international or national populations 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). EU Birds Directive Annex 1 species, EU Habitats Directive priority habitat/species and Wildlife and Countryside Act Schedule 1 species (if not covered above). 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 Teesside A (section 5.2), Dogger Bank Teesside B (section 5.3), Dogger Bank Teesside A and B (section 6.2), and Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D (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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**0-2km**	**Month**	**Project**	**0-1km**	**0-2km**	**Project**	**0-1km**	**0-2km**	**Month**	**Project**	**0-1km**	**0-2km**
Jan	29 (20-38)	5 (4-7)	5 (4-7)	Jul	253 (204-307)	46 (37-55)	48 (39-58)	101 (83-124)	18 (15-22)	19 (16-24)	Jul	177 (143-215)	32 (26-39)	34 (27-41)
Feb	92 (71-113)	17 (13-20)	18 (14-21)	Aug	107 (85-131)	19 (15-24)	20 (16-25)	110 (91-135)	20 (16-24)	21 (17-26)	Aug	108 (88-133)	20 (16-24)	21 (17-25)
Mar	143 (114-177)	26 (21-32)	27 (22-34)	Sep	71 (55-87)	13 (10-16)	14 (10-17)	124 (102-152)	23 (18-28)	24 (19-29)	Sep	97 (78-120)	18 (14-22)	19 (15-23)
Apr	317 (261-384)	57 (47-69)	60 (49-73)	Oct	49 (39-59)	9 (7-11)	9 (7-11)	119 (93-149)	22 (17-27)	23 (18-28)	Oct	84 (66-104)	15 (12-19)	16 (13-20)
May	569 (476-676)	103 (86-122)	109 (91-129)	Nov	32 (26-40)	6 (5-7)	6 (5-8)	49 (38-61)	9 (7-11)	9 (7-12)	Nov	41 (32-51)	7 (6-9)	8 (6-10)
Jun	564 (457-658)	102 (82-119)	107 (87-126)	Dec	45 (36-55)	8 (7-10)	9 (7-10)	37 (28-46)	7 (5-8)	7 (5-9)	Dec	41 (32-50)	7 (6-9)	8 (6-10)
Jul	253 (204-307)	46 (37-55)	48 (39-58)	Jan	46 (35-57)	8 (6-10)	9 (7-11)	25 (20-32)	5 (4-6)	5 (4-6)	Jan	33 (25-42)	6 (4-8)	6 (5-8)
Aug	107 (85-131)	19 (15-24)	20 (16-25)	Feb	72 (56-90)	13 (10-16)	14 (11-17)	98 (73-125)	18 (13-23)	19 (14-24)	Feb	87 (67-109)	16 (12-20)	17 (13-21)
Sep	71 (55-87)	13 (10-16)	14 (10-17)	Mar	89 (71-107)	16 (13-19)	17 (13-21)	124 (98-151)	22 (18-27)	24 (19-29)	Mar	119 (94-145)	21 (17-26)	23 (18-28)
Oct	49 (39-59)	9 (7-11)	9 (7-11)	Apr	102 (83-119)	19 (15-22)	20 (16-23)	240 (195-289)	43 (35-52)	46 (37-56)	Apr	220 (179-264)	40 (32-48)	42 (34-50)
Nov	32 (26-40)	6 (5-7)	6 (5-8)	May	98 (81-116)	18 (15-21)	19 (15-22)	258 (205-309)	47 (37-56)	49 (39-59)	May	309 (254-367)	56 (46-66)	59 (48-70)
Dec	45 (36-55)	8 (7-10)	9 (7-10)	Jun	91 (74-112)	16 (13-20)	17 (14-21)	124 (94-156)	22 (17-28)	24 (18-30)	Jun	260 (208-309)	47 (38-56)	49 (40-59)

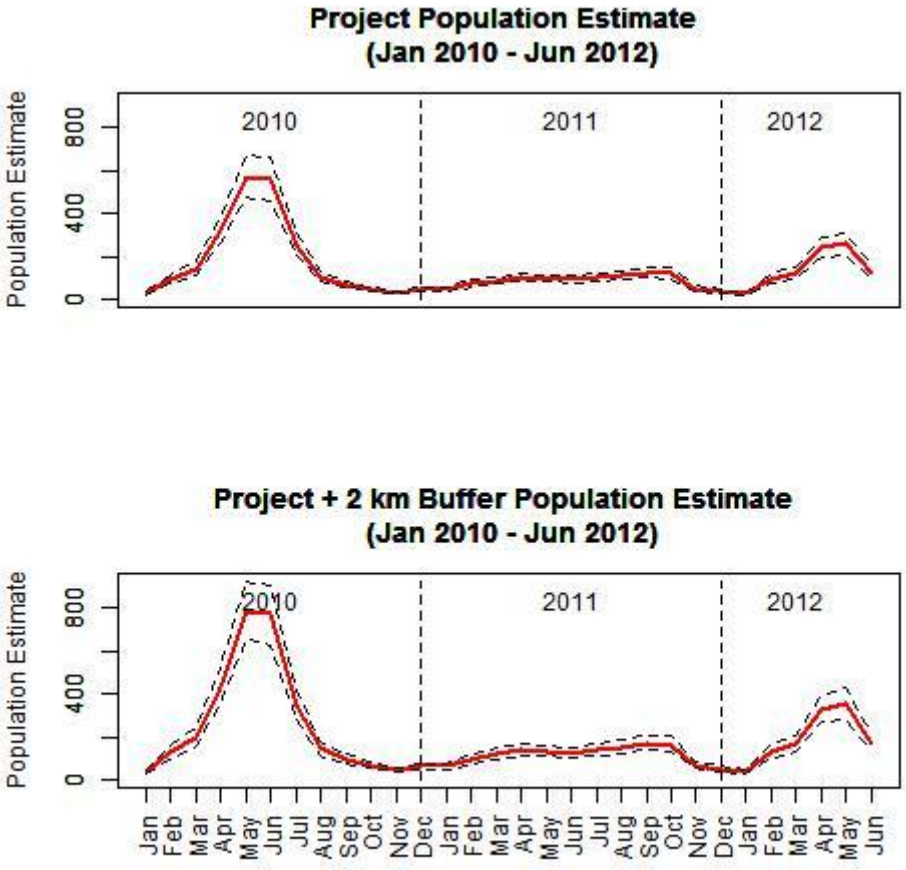

Figure 3.1 Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

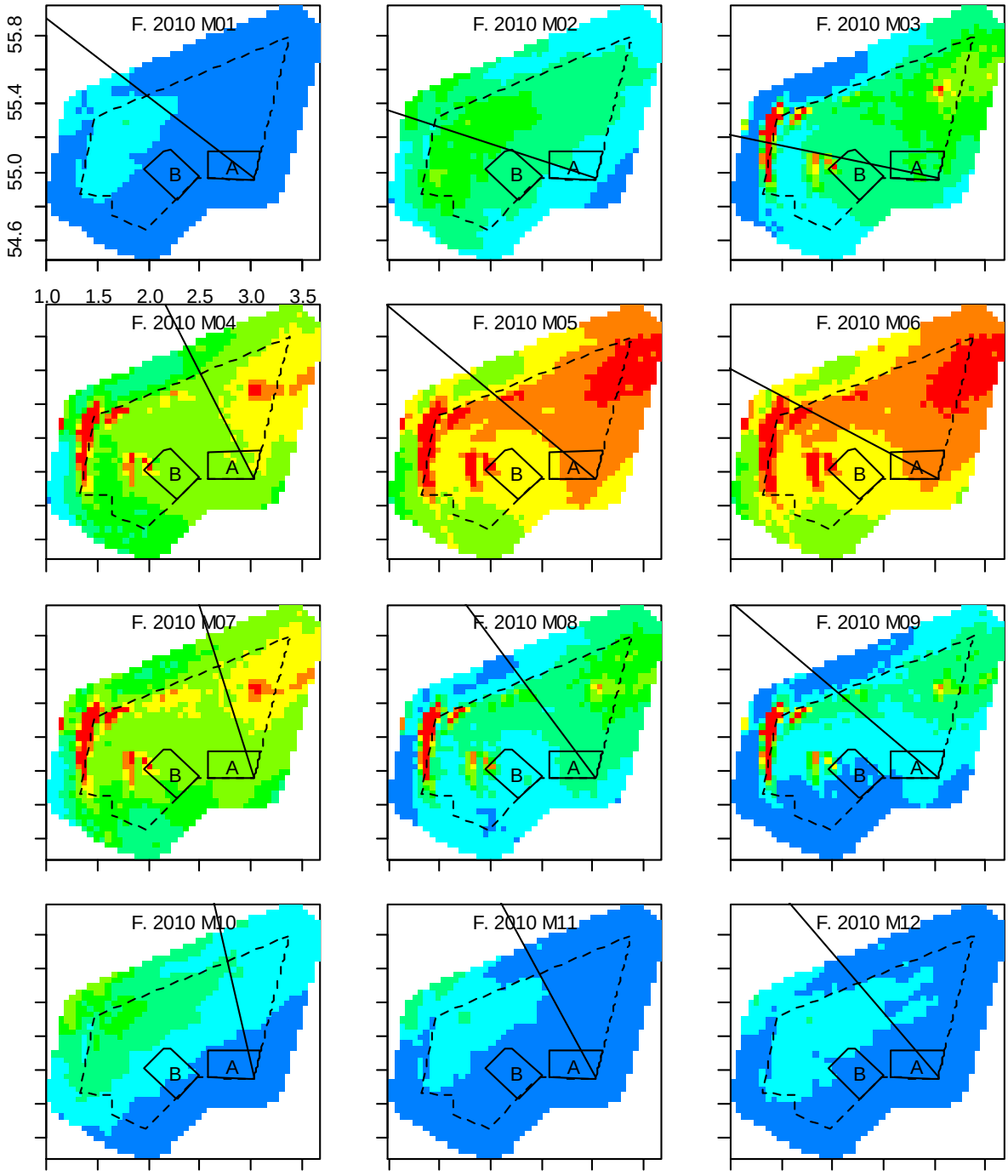

Figure 3.2 Monthly densities of northern fulmar within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

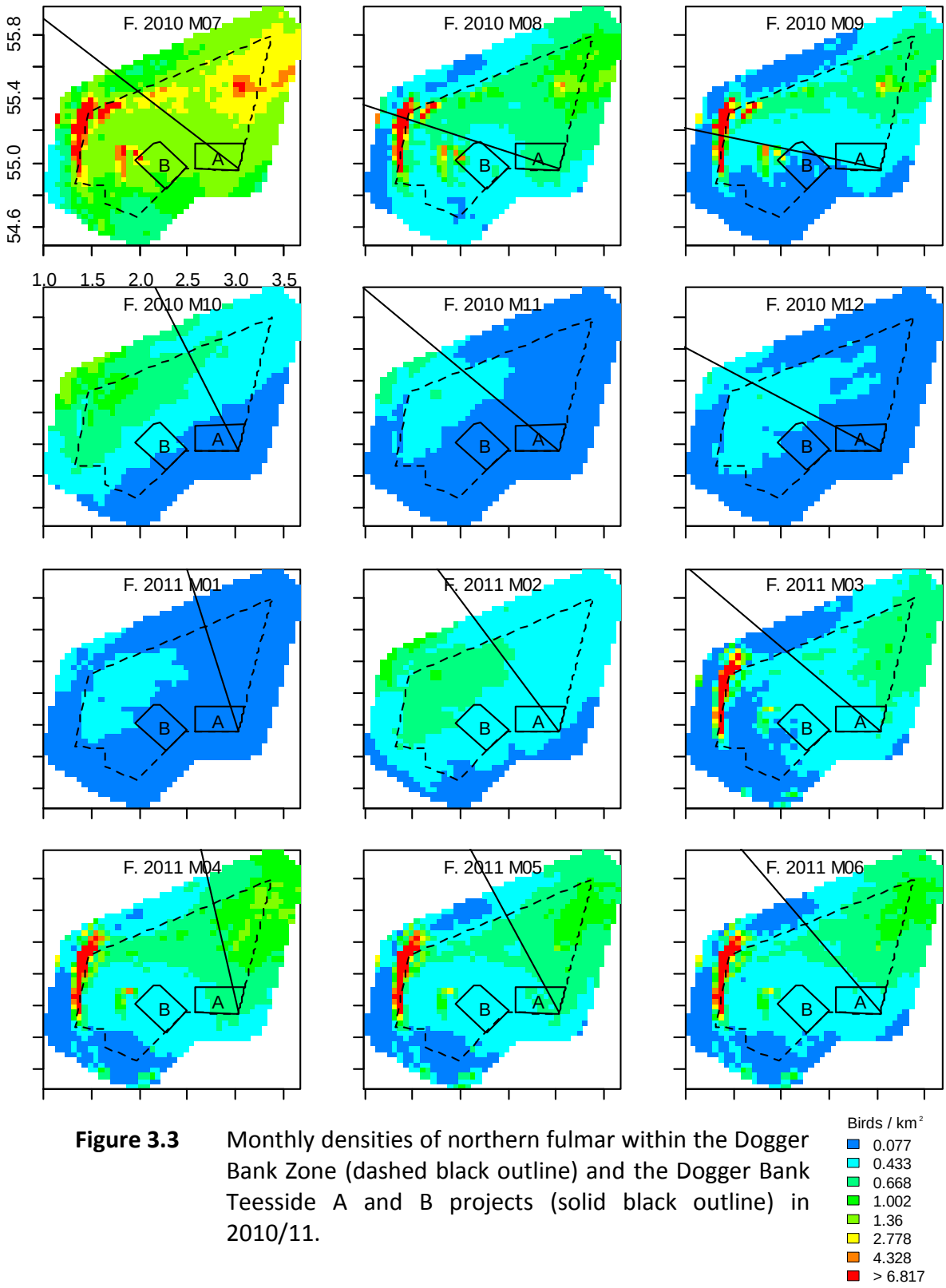

Figure 3.3 Monthly densities of northern fulmar within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

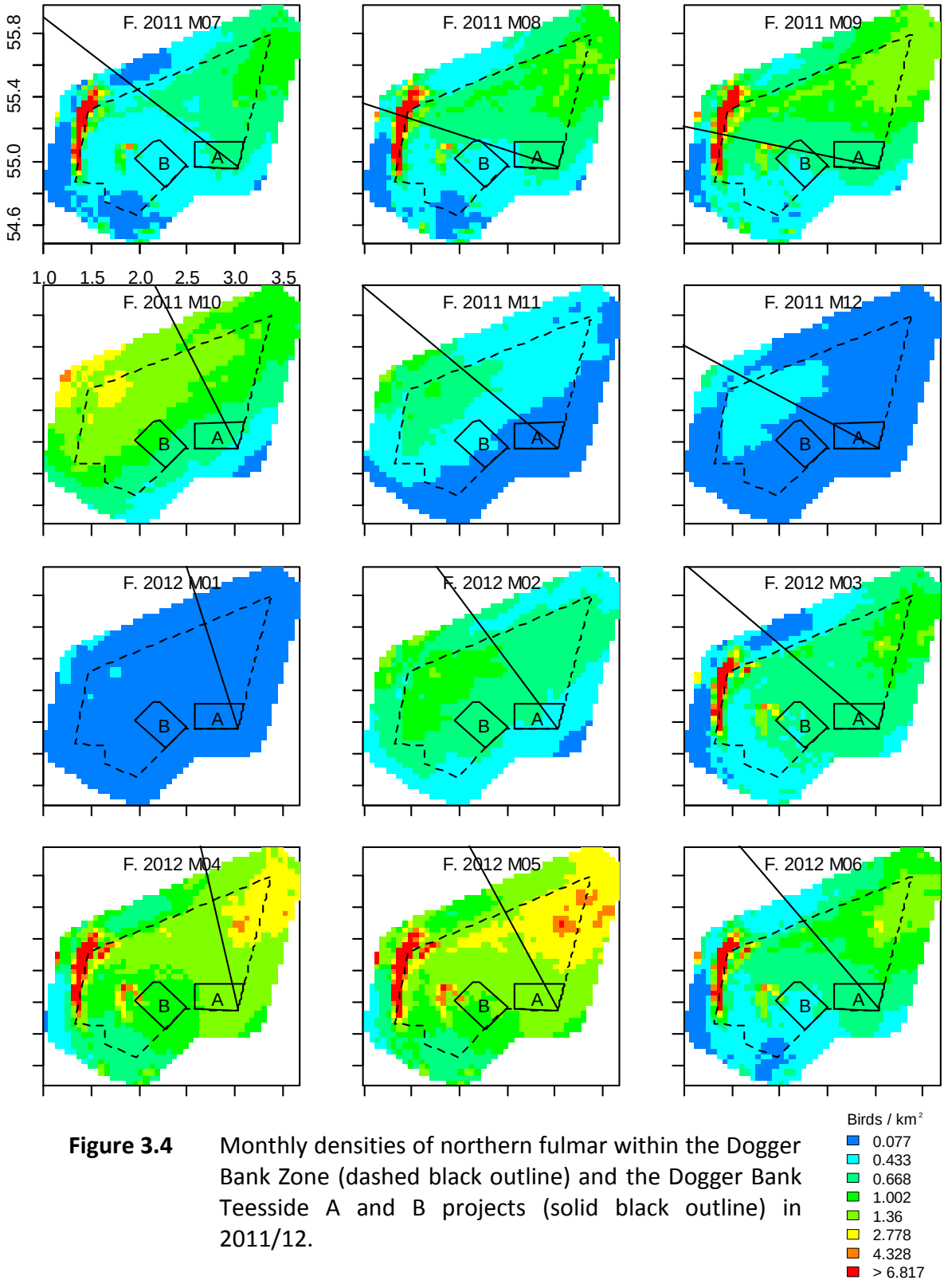

Figure 3.4 Monthly densities of northern fulmar within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	43 (30-57)	7 (5-10)	8 (6-11)	Jul	268 (213-323)	47 (38-57)	48 (39-58)	85 (71-103)	15 (12-17)	15 (13-19)	Jul	177 (142-213)	31 (25-37)	32 (26-38)
Feb	131 (102-159)	22 (17-27)	24 (18-29)	Aug	114 (89-138)	20 (16-24)	20 (16-25)	96 (80-114)	16 (14-19)	17 (14-21)	Aug	105 (85-126)	18 (15-22)	19 (15-23)
Mar	148 (118-183)	26 (21-32)	26 (21-32)	Sep	75 (57-95)	13 (10-17)	14 (10-17)	107 (89-128)	18 (15-22)	19 (16-23)	Sep	91 (73-112)	16 (13-19)	17 (13-20)
Apr	289 (237-349)	50 (41-61)	51 (43-61)	Oct	69 (56-84)	12 (10-14)	13 (10-15)	165 (134-201)	29 (23-35)	30 (25-37)	Oct	117 (95-142)	20 (16-25)	22 (17-26)
May	540 (450-640)	95 (80-112)	97 (82-114)	Nov	44 (36-52)	8 (6-9)	8 (7-10)	68 (55-81)	12 (9-14)	13 (10-15)	Nov	56 (45-67)	10 (8-12)	10 (8-12)
Jun	528 (434-626)	94 (77-110)	95 (79-111)	Dec	59 (48-70)	10 (8-12)	11 (9-13)	48 (37-58)	8 (6-10)	9 (7-11)	Dec	53 (42-64)	9 (7-11)	10 (8-12)
Jul	268 (213-323)	47 (38-57)	48 (39-58)	Jan	56 (43-68)	10 (7-12)	10 (8-12)	33 (27-41)	6 (5-7)	6 (5-8)	Jan	44 (34-55)	8 (6-10)	8 (6-10)
Aug	114 (89-138)	20 (16-24)	20 (16-25)	Feb	87 (69-106)	15 (12-18)	16 (13-19)	123 (95-153)	21 (16-26)	22 (17-28)	Feb	113 (88-139)	19 (15-24)	21 (16-25)
Sep	75 (57-95)	13 (10-17)	14 (10-17)	Mar	72 (58-86)	12 (10-15)	13 (10-15)	117 (94-144)	20 (16-25)	21 (17-26)	Mar	112 (90-138)	19 (16-24)	20 (16-24)
Oct	69 (56-84)	12 (10-14)	13 (10-15)	Apr	81 (67-93)	14 (11-16)	15 (12-17)	199 (162-237)	35 (28-41)	36 (30-43)	Apr	189 (155-227)	33 (27-39)	34 (28-41)
Nov	44 (36-52)	8 (6-9)	8 (7-10)	May	79 (66-92)	13 (11-16)	14 (12-17)	223 (179-264)	39 (31-46)	41 (33-48)	May	281 (231-332)	49 (41-58)	51 (42-59)
Dec	59 (48-70)	10 (8-12)	11 (9-13)	Jun	76 (63-91)	13 (11-16)	14 (11-17)	108 (83-133)	19 (14-23)	20 (15-24)	Jun	237 (193-283)	42 (34-49)	43 (35-51)

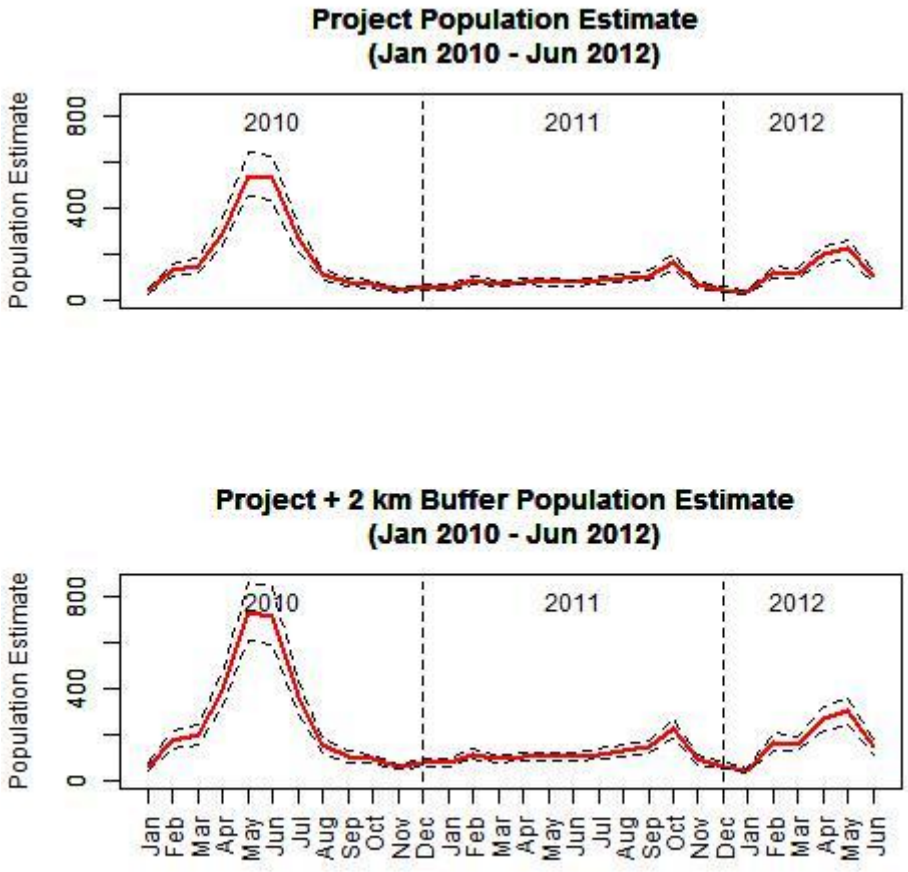

Figure 3.5 Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	71 (51-93)	13 (9-16)	13 (9-17)	Jul	522 (417-630)	93 (74-112)	96 (77-116)	186 (154-226)	33 (27-40)	34 (28-42)	Jul	354 (285-428)	63 (51-76)	65 (53-79)
Feb	223 (173-271)	39 (30-47)	41 (32-50)	Aug	220 (174-268)	39 (31-48)	41 (32-50)	206 (171-249)	36 (30-44)	38 (32-46)	Aug	213 (173-259)	38 (31-46)	39 (32-48)
Mar	292 (233-360)	51 (41-63)	53 (43-65)	Sep	146 (112-183)	26 (20-33)	27 (21-34)	232 (191-281)	41 (34-50)	43 (35-52)	Sep	189 (151-232)	34 (27-41)	35 (28-43)
Apr	606 (499-733)	107 (88-130)	111 (92-134)	Oct	118 (94-142)	21 (17-25)	22 (18-27)	284 (228-350)	50 (40-62)	53 (43-66)	Oct	201 (161-246)	36 (28-43)	38 (30-46)
May	1,112 (926-1,316)	198 (165-234)	206 (173-243)	Nov	76 (62-93)	13 (11-16)	14 (12-17)	117 (93-142)	21 (16-25)	22 (17-27)	Nov	96 (78-118)	17 (14-21)	18 (15-22)
Jun	1,094 (890-1,284)	196 (159-229)	203 (166-236)	Dec	104 (85-125)	18 (15-22)	19 (16-23)	84 (65-104)	15 (11-18)	16 (12-20)	Dec	94 (75-115)	16 (13-20)	17 (14-21)
Jul	522 (417-630)	93 (74-112)	96 (77-116)	Jan	101 (79-124)	18 (14-22)	19 (15-23)	59 (47-73)	10 (8-13)	11 (9-14)	Jan	77 (59-97)	14 (10-17)	14 (11-18)
Aug	220 (174-268)	39 (31-48)	41 (32-50)	Feb	160 (123-196)	28 (22-34)	30 (23-37)	221 (168-277)	39 (29-49)	41 (31-51)	Feb	201 (155-248)	35 (27-43)	37 (29-46)
Sep	146 (112-183)	26 (20-33)	27 (21-34)	Mar	160 (128-193)	28 (23-34)	30 (24-36)	241 (192-294)	42 (34-52)	45 (36-55)	Mar	231 (185-282)	41 (33-50)	43 (34-52)
Oct	118 (94-142)	21 (17-25)	22 (18-27)	Apr	183 (150-213)	32 (26-38)	34 (28-40)	439 (357-526)	78 (63-94)	82 (67-99)	Apr	409 (335-491)	73 (59-87)	76 (62-91)
Nov	76 (62-93)	13 (11-16)	14 (12-17)	May	178 (146-208)	31 (26-37)	33 (27-39)	480 (384-574)	86 (68-102)	90 (72-108)	May	590 (486-699)	105 (87-124)	110 (91-130)
Dec	104 (85-125)	18 (15-22)	19 (16-23)	Jun	167 (138-203)	29 (24-36)	31 (26-38)	231 (176-289)	41 (31-51)	43 (33-54)	Jun	497 (402-592)	89 (72-105)	92 (75-109)

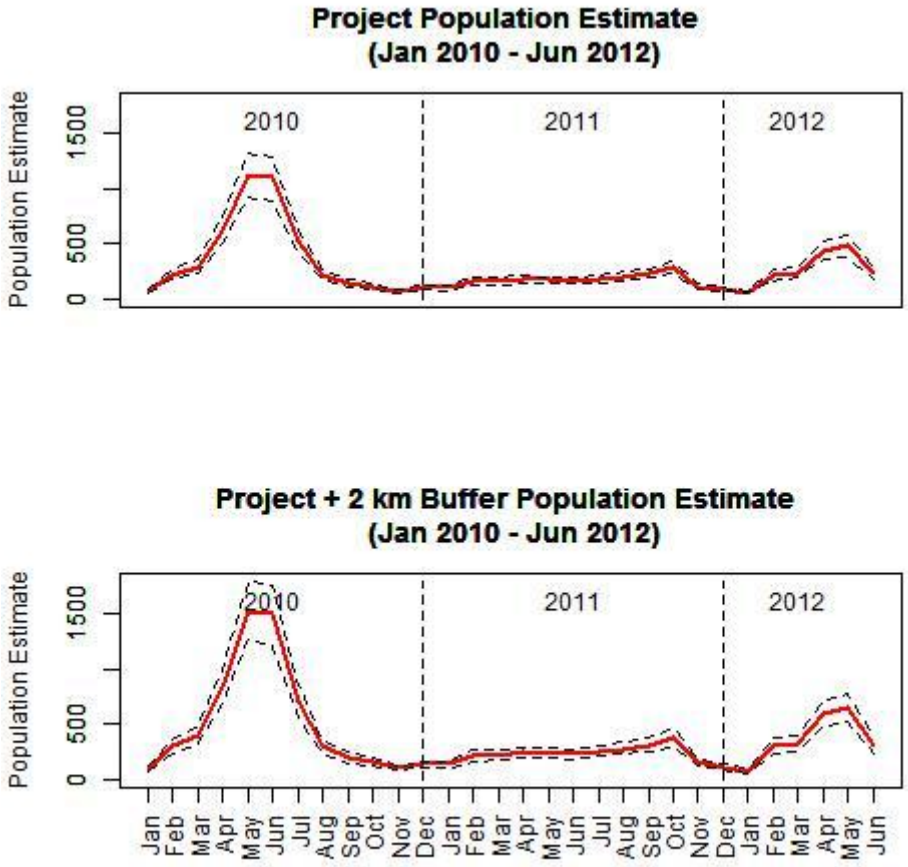

Figure 3.6 Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

<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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	36 (31-44)	6 (5-8)	7 (6-8)	Jul	44 (37-53)	8 (7-10)	9 (7-10)	127 (108-152)	24 (20-28)	25 (21-30)	Jul	86 (73-102)	16 (14-19)	17 (14-20)
Feb	32 (27-39)	6 (5-7)	6 (5-8)	Aug	29 (25-35)	5 (5-7)	6 (5-7)	140 (121-165)	26 (23-31)	28 (24-32)	Aug	85 (73-100)	16 (14-19)	17 (14-20)
Mar	46 (38-56)	8 (7-10)	9 (7-11)	Sep	38 (32-46)	7 (6-9)	8 (6-9)	163 (140-193)	31 (27-37)	33 (28-38)	Sep	101 (86-120)	19 (16-23)	20 (17-24)
Apr	8 (7-10)	1 (1-2)	2 (1-2)	Oct	109 (93-131)	20 (17-24)	21 (18-25)	442 (371-533)	80 (67-96)	84 (71-101)	Oct	276 (232-332)	50 (42-60)	53 (44-63)
May	28 (24-34)	5 (5-6)	6 (5-7)	Nov	59 (50-71)	11 (9-13)	11 (10-14)	81 (68-97)	15 (12-18)	15 (13-19)	Nov	70 (59-84)	13 (11-15)	13 (11-16)
Jun	63 (54-75)	12 (10-14)	12 (11-15)	Dec	108 (91-128)	19 (16-23)	20 (17-24)	52 (42-64)	9 (8-12)	10 (8-12)	Dec	80 (66-96)	14 (12-17)	15 (13-18)
Jul	44 (37-53)	8 (7-10)	9 (7-10)	Jan	80 (67-98)	14 (12-18)	15 (13-19)	22 (18-28)	4 (3-5)	4 (4-5)	Jan	46 (39-57)	8 (7-10)	9 (7-11)
Aug	29 (25-35)	5 (5-7)	6 (5-7)	Feb	163 (138-198)	29 (25-36)	31 (27-38)	300 (238-375)	54 (43-67)	57 (45-71)	Feb	165 (135-204)	30 (24-37)	32 (26-39)
Sep	38 (32-46)	7 (6-9)	8 (6-9)	Mar	820 (691-980)	149 (126-178)	159 (134-190)	1,244 (1,036-1,490)	225 (188-269)	242 (202-290)	Mar	703 (588-842)	128 (107-153)	137 (114-164)
Oct	109 (93-131)	20 (17-24)	21 (18-25)	Apr	106 (91-127)	20 (17-24)	21 (18-25)	379 (319-460)	71 (60-86)	76 (64-91)	Apr	165 (139-199)	31 (26-37)	33 (28-40)
Nov	59 (50-71)	11 (9-13)	11 (10-14)	May	110 (95-131)	21 (18-25)	22 (19-26)	488 (412-585)	92 (78-111)	98 (83-117)	May	209 (177-250)	39 (34-47)	42 (36-50)
Dec	108 (91-128)	19 (16-23)	20 (17-24)	Jun	104 (89-125)	20 (17-23)	21 (18-25)	152 (125-188)	29 (24-35)	30 (25-37)	Jun	107 (90-130)	20 (17-24)	21 (18-26)

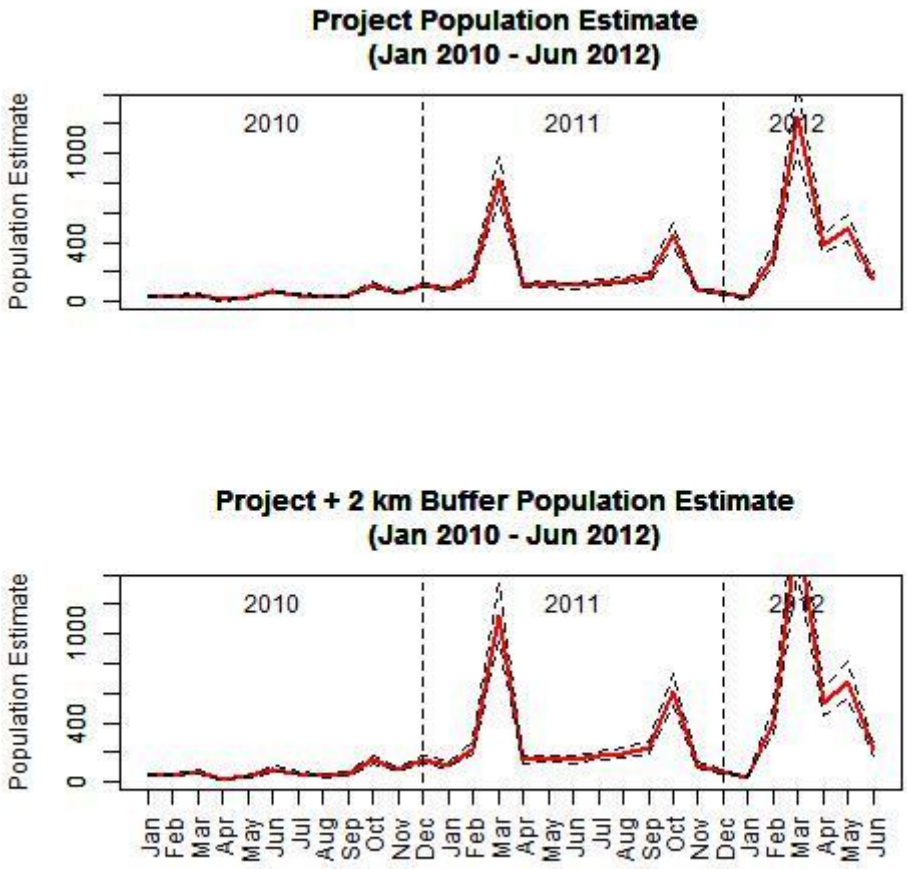

Figure 3.7 Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

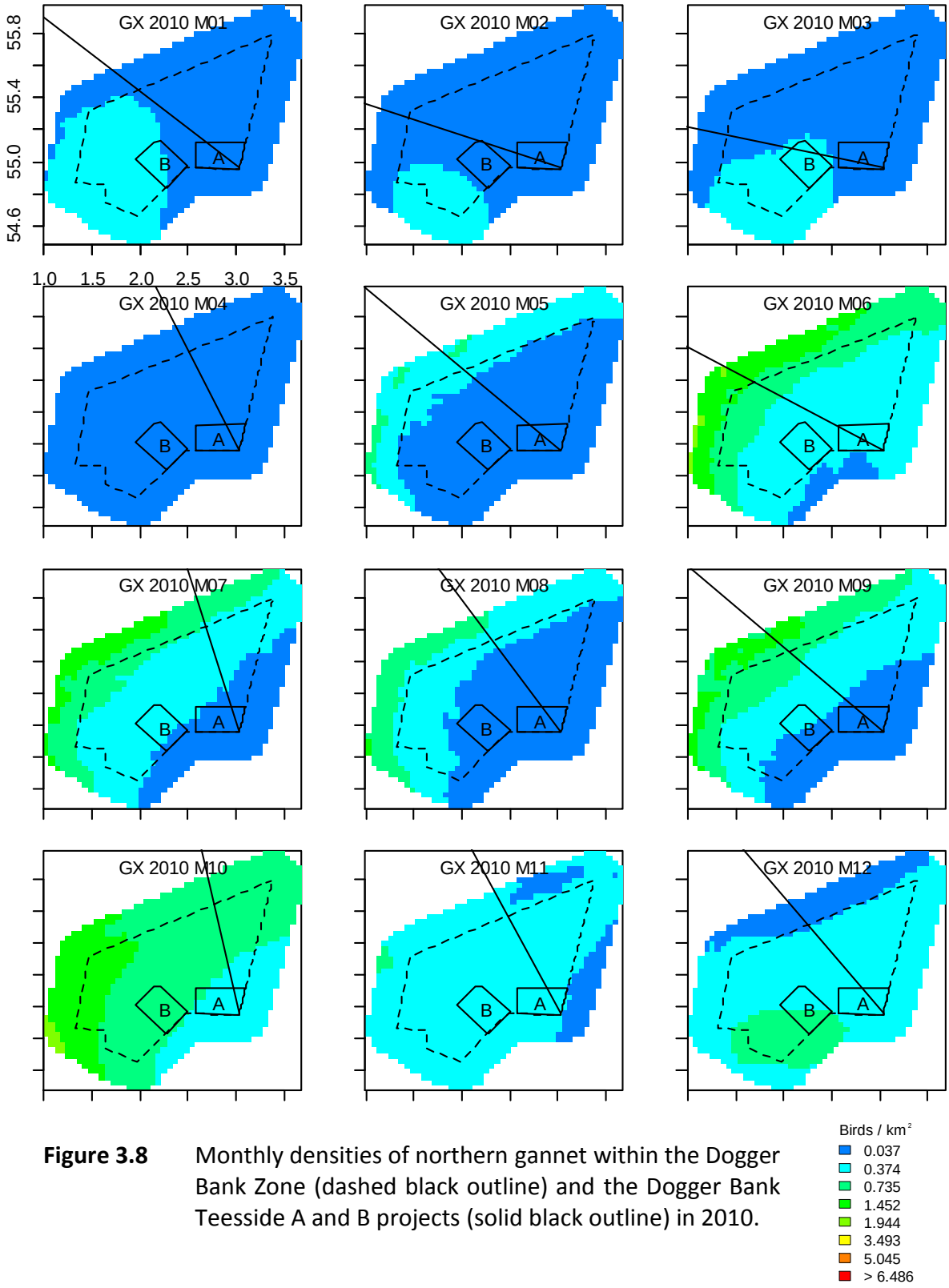

Figure 3.8 Monthly densities of northern gannet within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

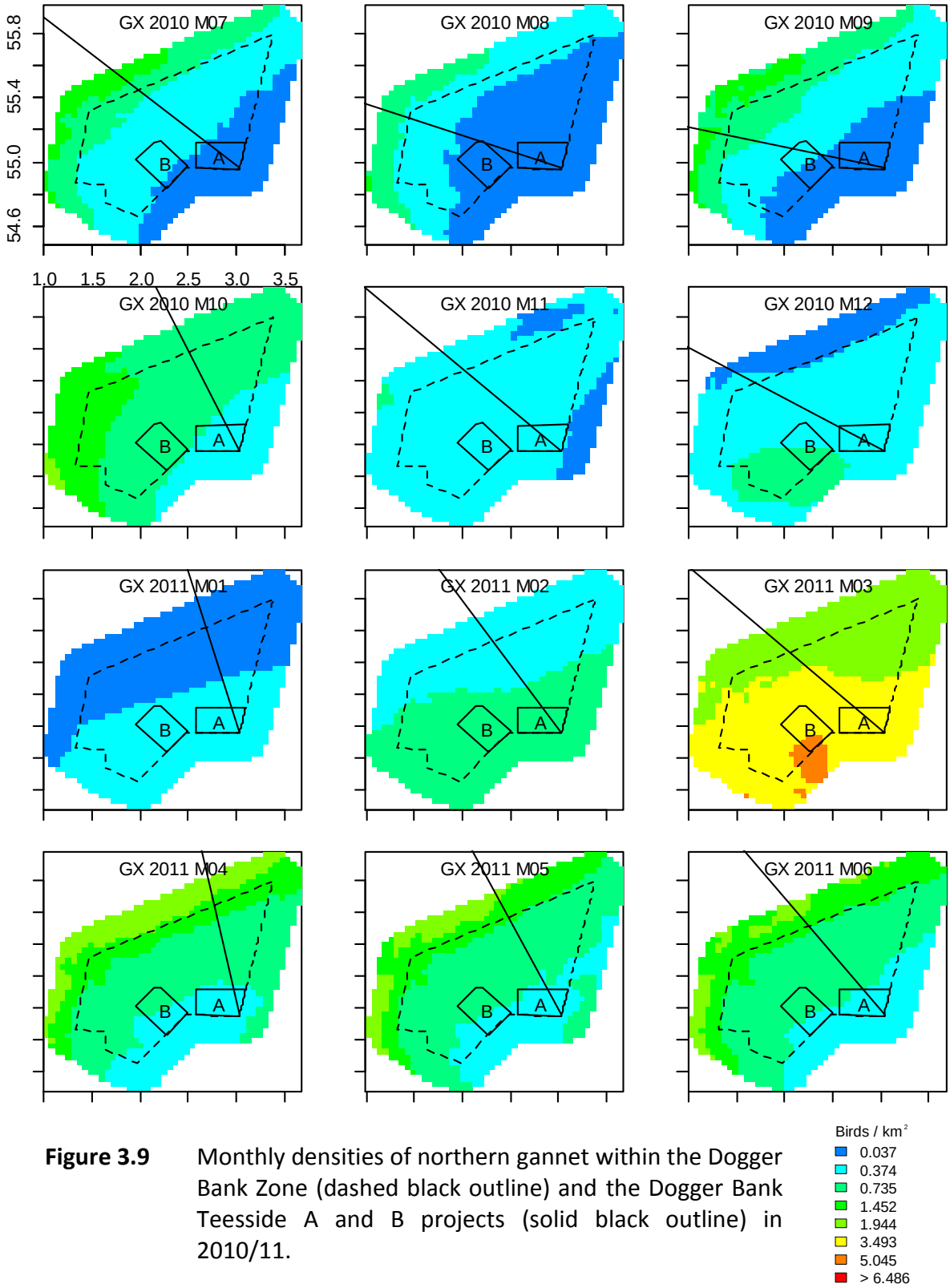

Figure 3.9 Monthly densities of northern gannet within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

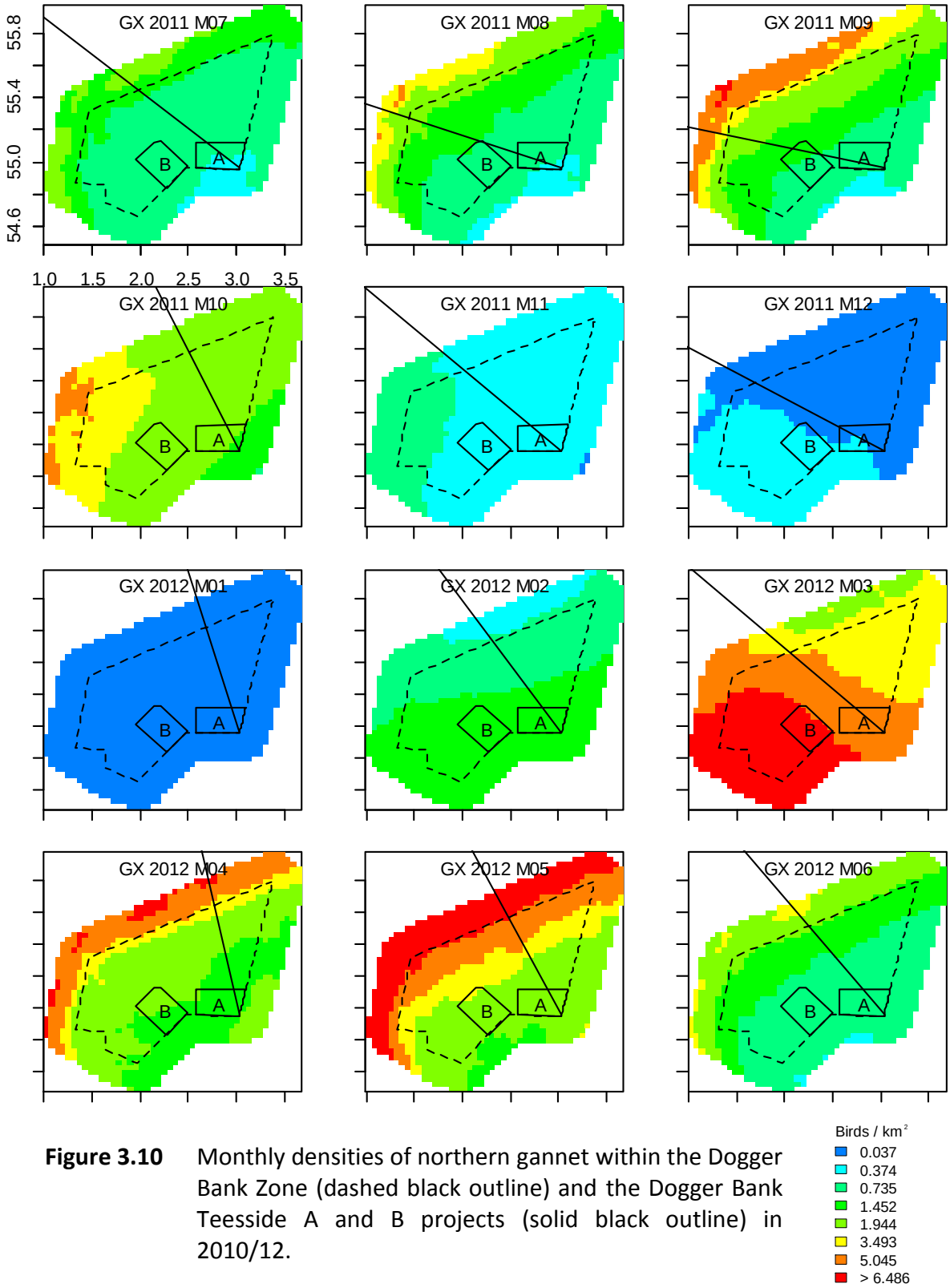

Figure 3.10 Monthly densities of northern gannet within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	59 (50-70)	10 (9-12)	11 (9-13)	Jul	67 (58-78)	11 (10-13)	12 (10-14)	179 (156-209)	29 (25-34)	31 (27-36)	Jul	123 (107-144)	20 (18-24)	21 (19-25)
Feb	46 (39-56)	8 (7-9)	8 (7-10)	Aug	44 (38-52)	7 (6-9)	8 (7-9)	205 (180-236)	34 (30-39)	36 (32-42)	Aug	125 (109-144)	21 (18-24)	22 (19-25)
Mar	64 (53-78)	11 (9-13)	11 (9-14)	Sep	58 (49-69)	10 (8-12)	11 (9-13)	241 (208-280)	40 (35-47)	43 (37-50)	Sep	150 (128-175)	25 (22-30)	27 (23-31)
Apr	9 (8-11)	1 (1-2)	2 (1-2)	Oct	155 (133-181)	26 (23-31)	28 (24-33)	597 (505-704)	101 (85-120)	108 (91-127)	Oct	376 (319-442)	64 (54-75)	68 (57-80)
May	34 (30-40)	6 (5-7)	6 (5-7)	Nov	76 (65-90)	13 (11-15)	14 (12-16)	105 (90-125)	18 (15-21)	19 (16-23)	Nov	91 (78-107)	15 (13-18)	16 (14-19)
Jun	75 (65-87)	13 (11-15)	13 (12-16)	Dec	128 (109-150)	22 (18-25)	23 (19-27)	59 (48-72)	10 (8-12)	11 (9-13)	Dec	93 (79-111)	16 (13-19)	17 (14-20)
Jul	67 (58-78)	11 (10-13)	12 (10-14)	Jan	79 (66-98)	13 (11-17)	14 (12-18)	26 (22-33)	4 (4-6)	5 (4-6)	Jan	55 (46-67)	9 (8-11)	10 (8-12)
Aug	44 (38-52)	7 (6-9)	8 (7-9)	Feb	159 (134-194)	27 (22-33)	28 (24-35)	325 (264-399)	55 (44-67)	58 (47-72)	Feb	177 (146-216)	30 (25-37)	32 (26-39)
Sep	58 (49-69)	10 (8-12)	11 (9-13)	Mar	984 (840-1,151)	164 (140-192)	174 (148-204)	1,811 (1,506-2,160)	304 (252-363)	322 (268-385)	Mar	953 (800-1,130)	160 (134-189)	169 (142-201)
Oct	155 (133-181)	26 (23-31)	28 (24-33)	Apr	129 (112-152)	22 (19-26)	23 (20-27)	434 (371-517)	72 (62-86)	77 (65-92)	Apr	191 (163-227)	32 (27-38)	34 (29-40)
Nov	76 (65-90)	13 (11-15)	14 (12-16)	May	141 (124-164)	23 (20-27)	25 (21-29)	611 (523-720)	102 (87-121)	108 (92-128)	May	262 (225-308)	44 (37-51)	46 (40-55)
Dec	128 (109-150)	22 (18-25)	23 (19-27)	Jun	142 (124-167)	24 (21-28)	25 (22-30)	191 (159-232)	32 (26-39)	34 (28-41)	Jun	136 (116-162)	23 (19-27)	24 (20-29)

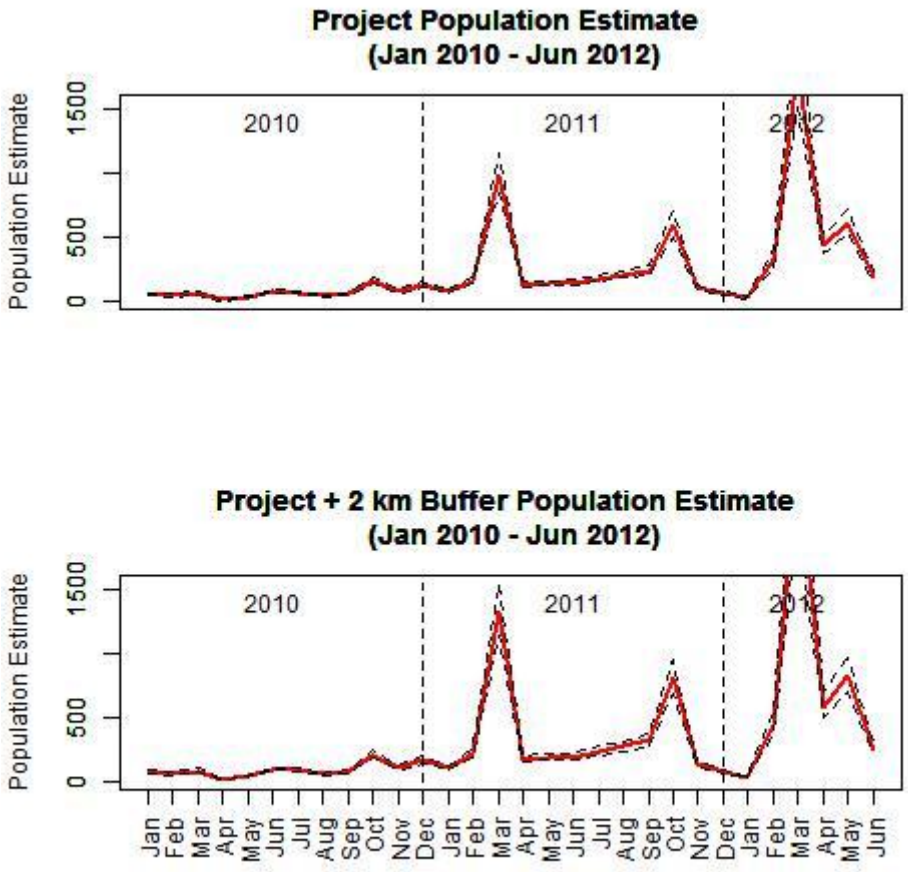

Figure 3.11 Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11, 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	95 (81-115)	17 (14-20)	18 (15-21)	Jul	111 (95-131)	19 (17-23)	21 (18-24)	306 (264-361)	53 (46-63)	56 (48-66)	Jul	209 (180-246)	36 (31-43)	38 (33-45)
Feb	79 (66-96)	14 (11-17)	14 (12-18)	Aug	74 (63-87)	13 (11-15)	14 (12-16)	345 (300-401)	60 (52-70)	64 (55-74)	Aug	209 (182-244)	37 (32-43)	39 (34-45)
Mar	109 (91-134)	19 (16-23)	20 (17-25)	Sep	96 (80-115)	17 (14-21)	18 (15-22)	404 (348-474)	71 (61-84)	76 (65-89)	Sep	250 (214-294)	44 (38-52)	47 (40-55)
Apr	17 (14-21)	3 (3-4)	3 (3-4)	Oct	264 (226-312)	46 (40-55)	49 (42-58)	1,039 (875-1,237)	181 (153-216)	192 (162-229)	Oct	651 (551-774)	114 (96-135)	121 (102-144)
May	62 (54-74)	11 (9-13)	12 (10-14)	Nov	134 (115-160)	24 (20-28)	25 (21-30)	186 (158-222)	32 (28-39)	34 (29-41)	Nov	160 (137-191)	28 (24-33)	30 (25-36)
Jun	138 (120-162)	24 (21-29)	26 (22-31)	Dec	235 (200-278)	41 (35-48)	43 (37-51)	111 (90-137)	19 (16-24)	21 (17-25)	Dec	173 (145-207)	30 (25-36)	32 (27-38)
Jul	111 (95-131)	19 (17-23)	21 (18-24)	Jan	159 (133-196)	28 (23-34)	29 (25-37)	49 (40-60)	8 (7-11)	9 (7-11)	Jan	101 (84-124)	18 (15-22)	19 (16-23)
Aug	74 (63-87)	13 (11-15)	14 (12-16)	Feb	322 (272-392)	56 (48-69)	60 (51-73)	624 (502-774)	108 (87-134)	115 (93-143)	Feb	341 (280-421)	59 (49-73)	63 (52-78)
Sep	96 (80-115)	17 (14-21)	18 (15-22)	Mar	1,805 (1,529-2,131)	314 (265-370)	333 (282-394)	3,056 (2,538-3,650)	529 (439-632)	565 (469-676)	Mar	1,657 (1,386-1,972)	287 (240-342)	306 (256-365)
Oct	264 (226-312)	46 (40-55)	49 (42-58)	Apr	236 (203-280)	42 (36-50)	44 (38-53)	815 (690-975)	143 (121-172)	153 (129-183)	Apr	356 (302-425)	63 (53-75)	67 (57-80)
Nov	134 (115-160)	24 (20-28)	25 (21-30)	May	252 (219-295)	44 (38-52)	47 (40-55)	1,099 (935-1,305)	194 (165-231)	206 (175-245)	May	471 (403-558)	83 (71-99)	88 (75-105)
Dec	235 (200-278)	41 (35-48)	43 (37-51)	Jun	247 (213-293)	43 (37-51)	46 (39-54)	343 (284-420)	61 (50-74)	64 (53-78)	Jun	243 (205-292)	43 (36-51)	45 (38-54)

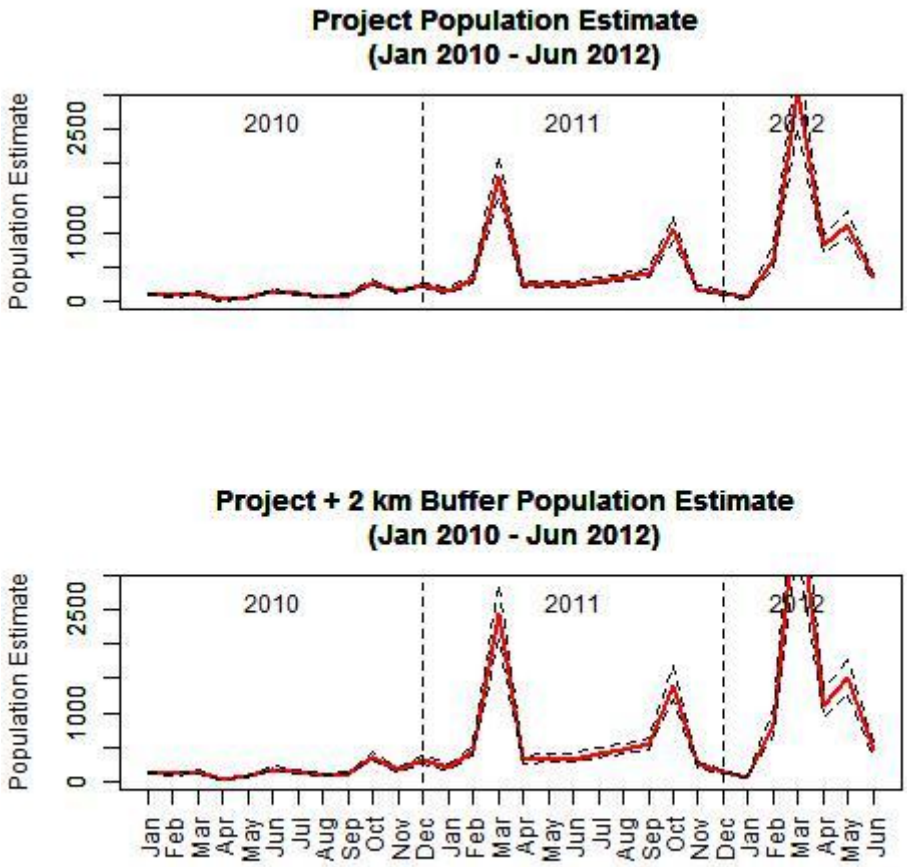

Figure 3.12 Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010 and 2010/11, 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	0 (0-200,837)	0 (0-34,421)	0 (0-37,198)	Jul	0 (0-2)	0 (0-0)	0 (0-0)	1 (0-4)	0 (0-1)	0 (0-1)	Jul	1 (0-3)	0 (0-0)	0 (0-1)
Feb	0 (0-2,806)	0 (0-481)	0 (0-520)	Aug	1 (0-3)	0 (0-0)	0 (0-0)	3 (1-7)	1 (0-1)	1 (0-1)	Aug	2 (0-5)	0 (0-1)	0 (0-1)
Mar	0 (0-114)	0 (0-20)	0 (0-21)	Sep	1 (0-5)	0 (0-1)	0 (0-1)	4 (2-10)	1 (0-2)	1 (0-2)	Sep	3 (1-7)	0 (0-1)	1 (0-1)
Apr	0 (0-12)	0 (0-2)	0 (0-2)	Oct	1 (0-4)	0 (0-1)	0 (0-1)	3 (0-7)	0 (0-1)	0 (0-1)	Oct	2 (0-5)	0 (0-1)	0 (0-1)
May	0 (0-2)	0 (0-0)	0 (0-0)	Nov	1 (0-3)	0 (0-1)	0 (0-1)	1 (0-3)	0 (0-1)	0 (0-1)	Nov	1 (0-3)	0 (0-1)	0 (0-1)
Jun	0 (0-2)	0 (0-0)	0 (0-0)	Dec	0 (0-2)	0 (0-0)	0 (0-0)	0 (0-2)	0 (0-0)	0 (0-0)	Dec	0 (0-2)	0 (0-0)	0 (0-0)
Jul	0 (0-2)	0 (0-0)	0 (0-0)	Jan	0 (0-1)	0 (0-0)	0 (0-0)	0 (0-1)	0 (0-0)	0 (0-0)	Jan	0 (0-66,947)	0 (0-11,474)	0 (0-12,399)
Aug	1 (0-3)	0 (0-0)	0 (0-0)	Feb	0 (0-1)	0 (0-0)	0 (0-0)	0 (0-2)	0 (0-0)	0 (0-0)	Feb	0 (0-937)	0 (0-161)	0 (0-173)
Sep	1 (0-5)	0 (0-1)	0 (0-1)	Mar	0 (0-1)	0 (0-0)	0 (0-0)	0 (0-4)	0 (0-1)	0 (0-1)	Mar	0 (0-40)	0 (0-7)	0 (0-7)
Oct	1 (0-4)	0 (0-1)	0 (0-1)	Apr	0 (0-1)	0 (0-0)	0 (0-0)	0 (0-72)	0 (0-13)	0 (0-13)	Apr	0 (0-28)	0 (0-5)	0 (0-5)
Nov	1 (0-3)	0 (0-1)	0 (0-1)	May	0 (0-1)	0 (0-0)	0 (0-0)	0 (0-750)	0 (0-130)	0 (0-140)	May	0 (0-251)	0 (0-43)	0 (0-47)
Dec	0 (0-2)	0 (0-0)	0 (0-0)	Jun	1 (0-2)	0 (0-0)	0 (0-0)	0 (0-10,769)	0 (0-1,864)	0 (0-2,004)	Jun	0 (0-3,591)	0 (0-621)	0 (0-668)

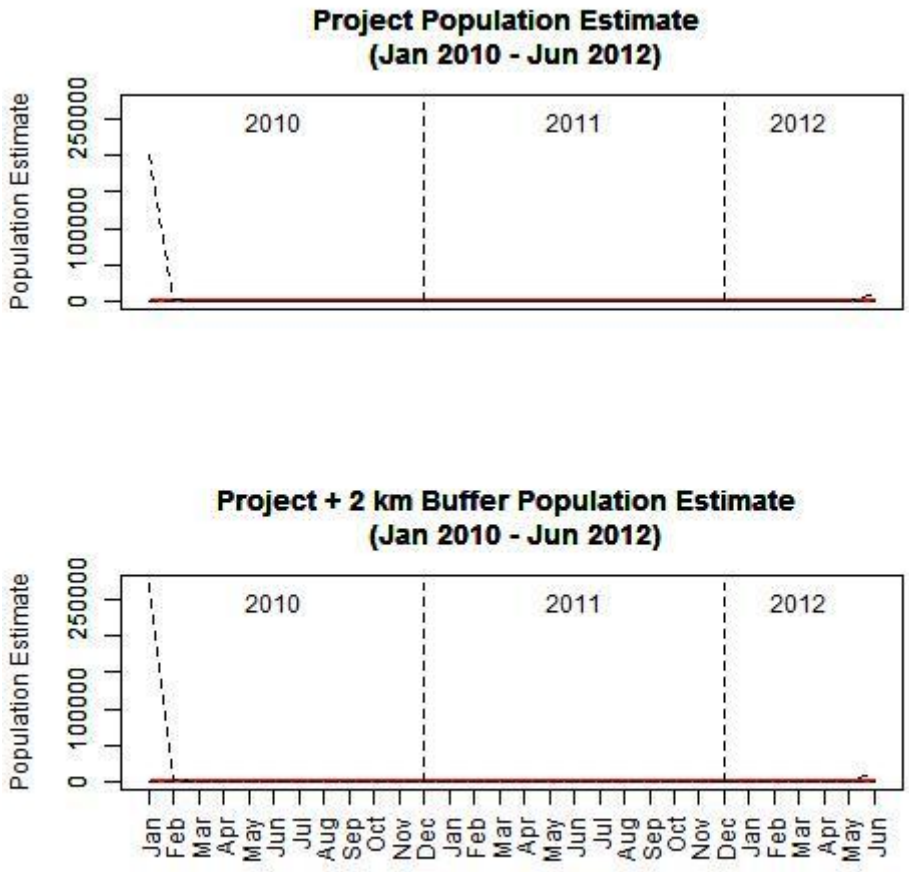

Figure 3.13 Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

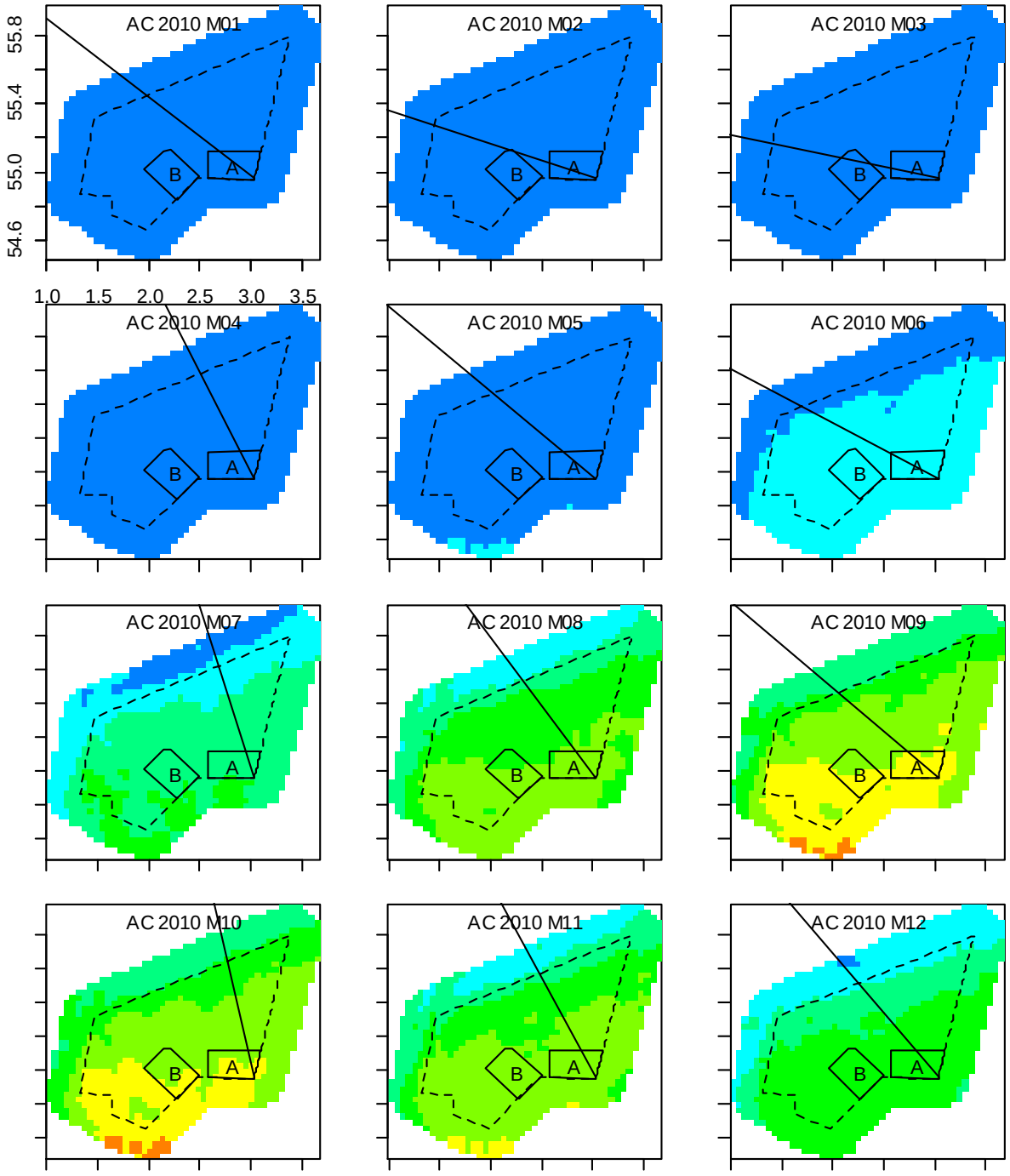

Figure 3.14 Monthly densities of Arctic Skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

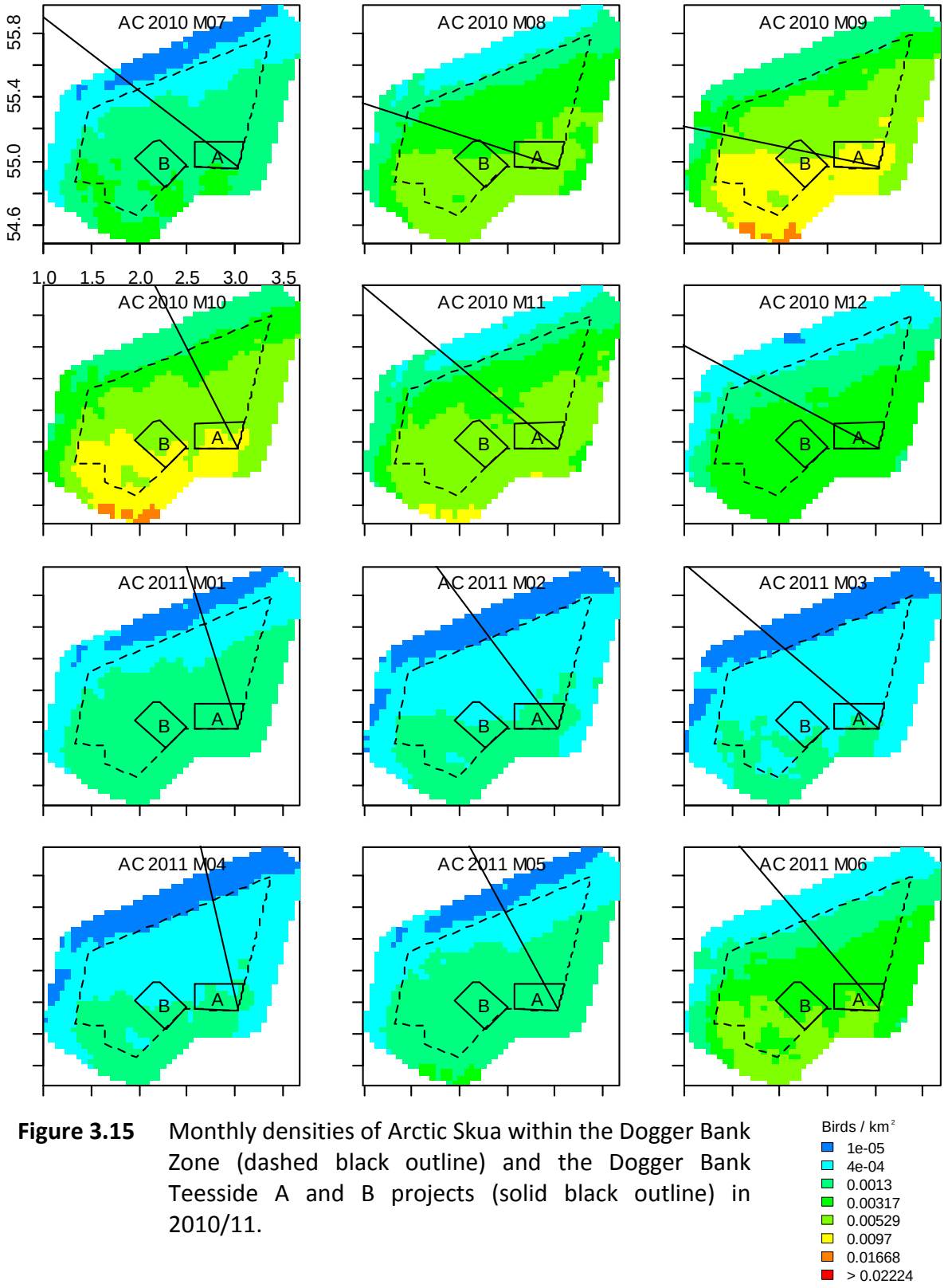

Figure 3.15 Monthly densities of Arctic Skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

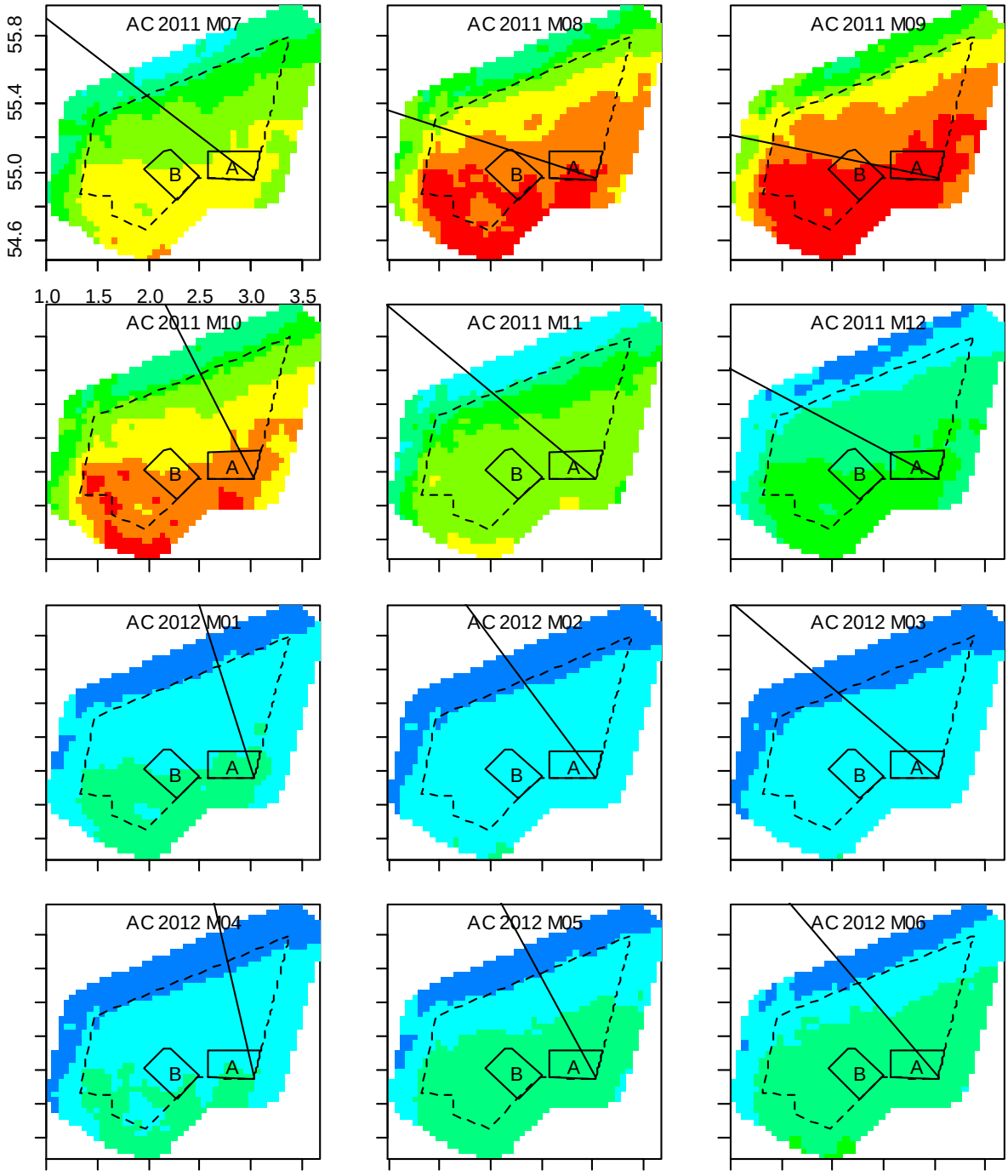

Figure 3.16 Monthly densities of Arctic Skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2011 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	0 (0-184,190)	0 (0-33,785)	0 (0-36,240)	Jul	0 (0-2)	0 (0-0)	0 (0-0)	1 (0-4)	0 (0-1)	0 (0-1)	Jul	1 (0-3)	0 (0-0)	0 (0-1)
Feb	0 (0-2,573)	0 (0-472)	0 (0-506)	Aug	1 (0-3)	0 (0-0)	0 (0-0)	3 (1-7)	1 (0-1)	1 (0-1)	Aug	2 (1-5)	0 (0-1)	0 (0-1)
Mar	0 (0-105)	0 (0-19)	0 (0-21)	Sep	1 (0-5)	0 (0-1)	0 (0-1)	4 (2-9)	1 (0-2)	1 (0-2)	Sep	3 (1-7)	0 (0-1)	1 (0-1)
Apr	0 (0-12)	0 (0-2)	0 (0-2)	Oct	1 (0-4)	0 (0-1)	0 (0-1)	3 (0-6)	0 (0-1)	0 (0-1)	Oct	2 (0-5)	0 (0-1)	0 (0-1)
May	0 (0-2)	0 (0-0)	0 (0-0)	Nov	1 (0-3)	0 (0-1)	0 (0-1)	1 (0-3)	0 (0-1)	0 (0-1)	Nov	1 (0-3)	0 (0-1)	0 (0-1)
Jun	0 (0-2)	0 (0-0)	0 (0-0)	Dec	0 (0-2)	0 (0-0)	0 (0-0)	0 (0-2)	0 (0-0)	0 (0-0)	Dec	0 (0-2)	0 (0-0)	0 (0-0)
Jul	0 (0-2)	0 (0-0)	0 (0-0)	Jan	0 (0-2)	0 (0-0)	0 (0-0)	0 (0-1)	0 (0-0)	0 (0-0)	Jan	0 (0-61,398)	0 (0-11,262)	0 (0-12,080)
Aug	1 (0-3)	0 (0-0)	0 (0-0)	Feb	0 (0-1)	0 (0-0)	0 (0-0)	0 (0-2)	0 (0-0)	0 (0-0)	Feb	0 (0-859)	0 (0-158)	0 (0-169)
Sep	1 (0-5)	0 (0-1)	0 (0-1)	Mar	0 (0-1)	0 (0-0)	0 (0-0)	0 (0-6)	0 (0-1)	0 (0-1)	Mar	0 (0-37)	0 (0-7)	0 (0-7)
Oct	1 (0-4)	0 (0-1)	0 (0-1)	Apr	0 (0-1)	0 (0-0)	0 (0-0)	0 (0-68)	0 (0-12)	0 (0-13)	Apr	0 (0-27)	0 (0-5)	0 (0-5)
Nov	1 (0-3)	0 (0-1)	0 (0-1)	May	0 (0-1)	0 (0-0)	0 (0-0)	0 (0-706)	0 (0-127)	0 (0-136)	May	0 (0-236)	0 (0-42)	0 (0-45)
Dec	0 (0-2)	0 (0-0)	0 (0-0)	Jun	1 (0-2)	0 (0-0)	0 (0-0)	0 (0-10,139)	0 (0-1,823)	0 (0-1,952)	Jun	0 (0-3,381)	0 (0-608)	0 (0-651)

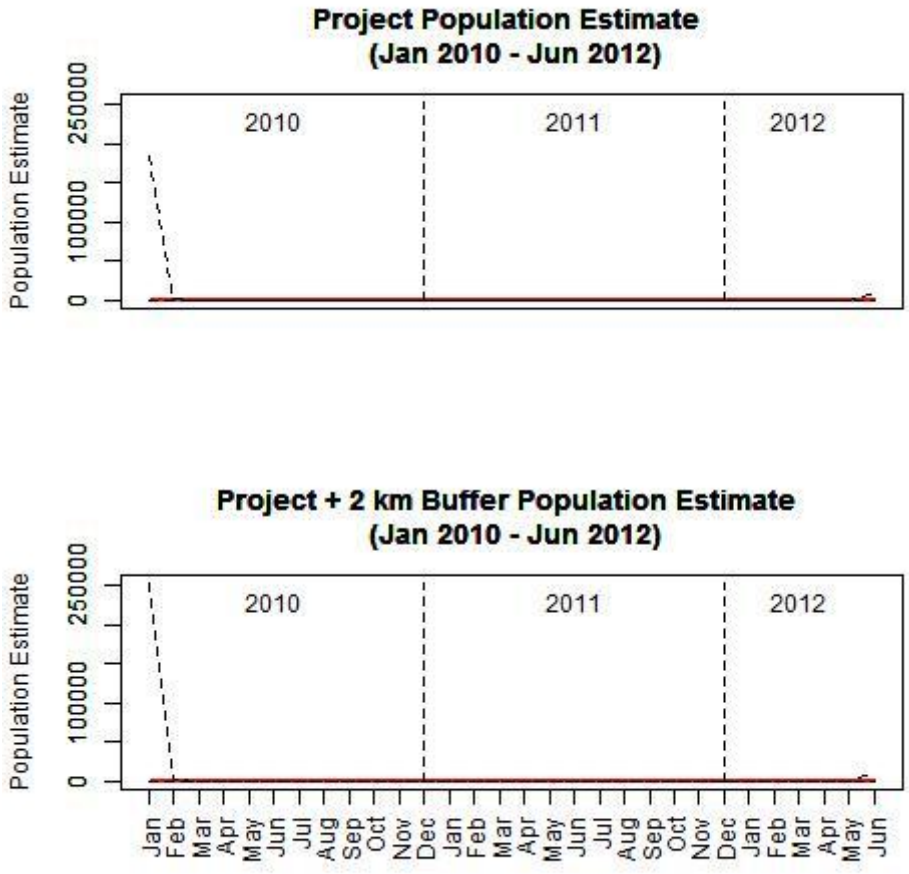

Figure 3.17 Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	0 (0-38,5027)	0 (0-68,207)	0 (0-73,440)	Jul	0 (0-3)	0 (0-1)	0 (0-1)	3 (0-8)	1 (0-1)	1 (0-1)	Jul	2 (0-6)	0 (0-1)	0 (0-1)
Feb	0 (0-5,380)	0 (0-953)	0 (0-1,026)	Aug	1 (0-5)	0 (0-1)	0 (0-1)	6 (2-13)	1 (0-2)	1 (0-3)	Aug	4 (1-9)	1 (0-2)	1 (0-2)
Mar	0 (0-219)	0 (0-39)	0 (0-42)	Sep	3 (0-10)	1 (0-2)	1 (0-2)	8 (4-19)	1 (1-3)	1 (1-4)	Sep	5 (2-14)	1 (0-3)	1 (0-3)
Apr	0 (0-24)	0 (0-4)	0 (0-5)	Oct	2 (0-9)	0 (0-2)	0 (0-2)	5 (1-13)	1 (0-2)	1 (0-2)	Oct	4 (1-11)	1 (0-2)	1 (0-2)
May	0 (0-3)	0 (0-1)	0 (0-1)	Nov	2 (0-7)	0 (0-1)	0 (0-1)	2 (0-6)	0 (0-1)	0 (0-1)	Nov	2 (0-6)	0 (0-1)	0 (0-1)
Jun	0 (0-3)	0 (0-1)	0 (0-1)	Dec	1 (0-5)	0 (0-1)	0 (0-1)	1 (0-5)	0 (0-1)	0 (0-1)	Dec	1 (0-5)	0 (0-1)	0 (0-1)
Jul	0 (0-3)	0 (0-1)	0 (0-1)	Jan	0 (0-3)	0 (0-1)	0 (0-1)	0 (0-3)	0 (0-0)	0 (0-1)	Jan	0 (0-128,344)	0 (0-22,736)	0 (0-24,481)
Aug	1 (0-5)	0 (0-1)	0 (0-1)	Feb	0 (0-2)	0 (0-0)	0 (0-0)	0 (0-5)	0 (0-1)	0 (0-1)	Feb	0 (0-1795)	0 (0-318)	0 (0-343)
Sep	3 (0-10)	1 (0-2)	1 (0-2)	Mar	0 (0-2)	0 (0-0)	0 (0-0)	0 (0-11)	0 (0-2)	0 (0-2)	Mar	0 (0-77)	0 (0-14)	0 (0-15)
Oct	2 (0-9)	0 (0-2)	0 (0-2)	Apr	0 (0-2)	0 (0-0)	0 (0-0)	0 (0-141)	0 (0-25)	0 (0-27)	Apr	0 (0-56)	0 (0-10)	0 (0-11)
Nov	2 (0-7)	0 (0-1)	0 (0-1)	May	0 (0-2)	0 (0-0)	0 (0-0)	0 (0-1,456)	0 (0-257)	0 (0-275)	May	0 (0-487)	0 (0-86)	0 (0-92)
Dec	1 (0-5)	0 (0-1)	0 (0-1)	Jun	1 (0-4)	0 (0-1)	0 (0-1)	0 (0-20,908)	0 (0-3,687)	0 (0-3,956)	Jun	1 (0-6,972)	0 (0-1,229)	0 (0-1,319)

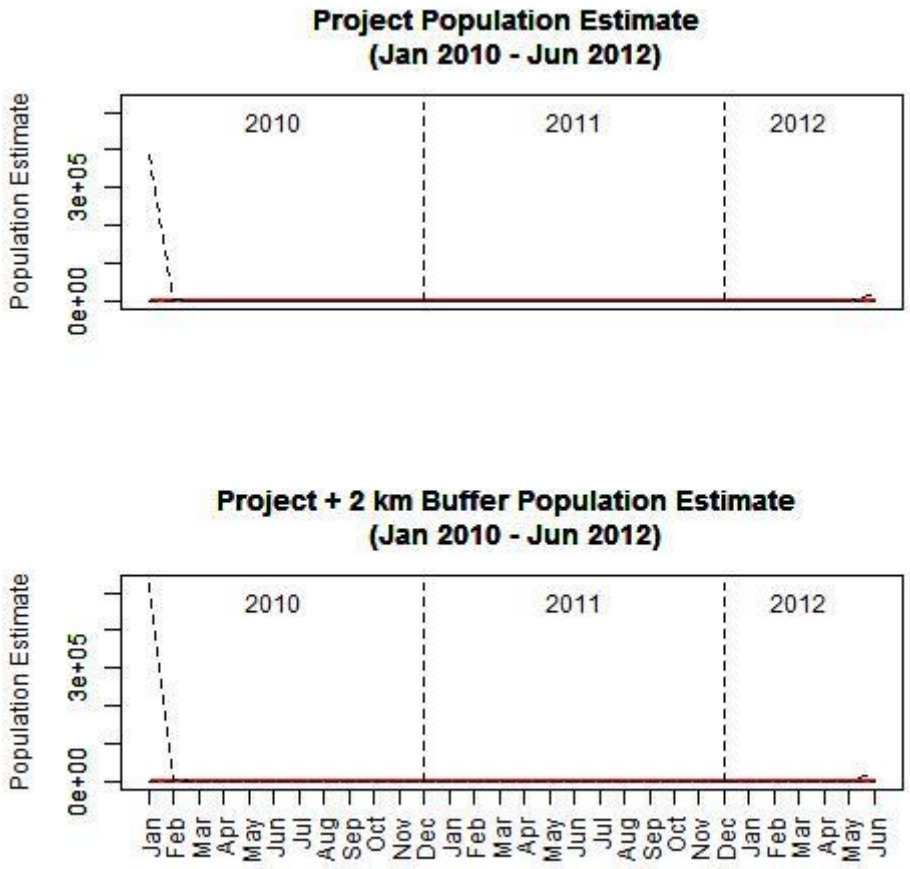

Figure 3.18 Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11, 2011/12.

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

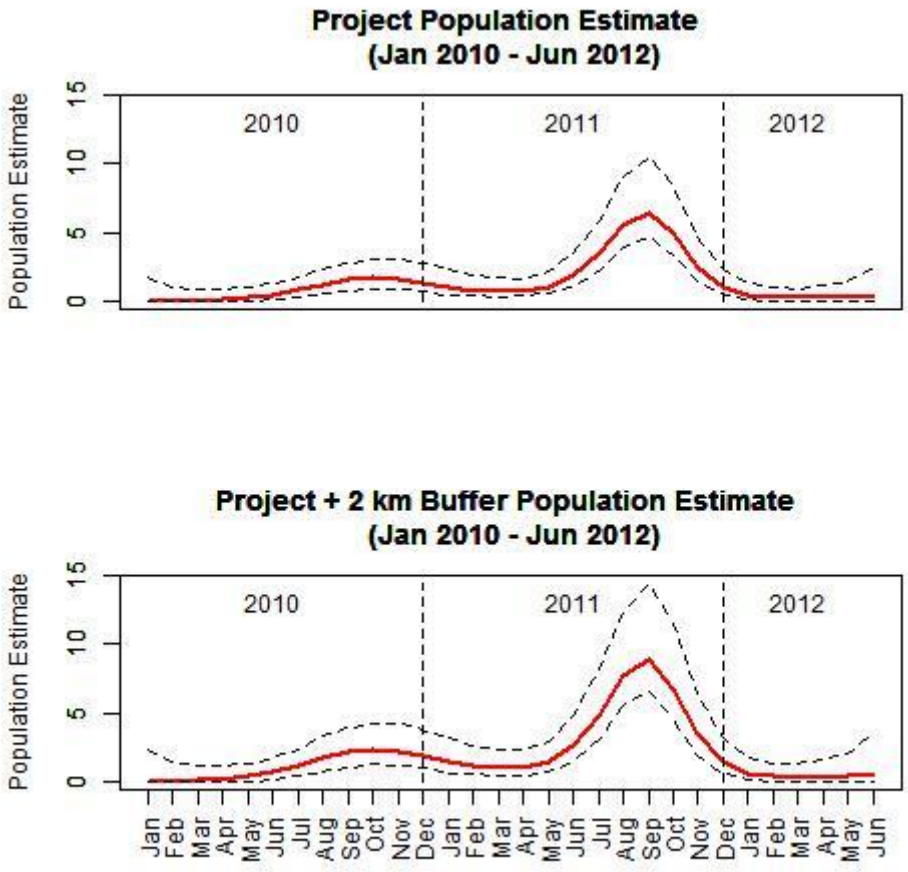

Figure 3.19 Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11, 2011/12.

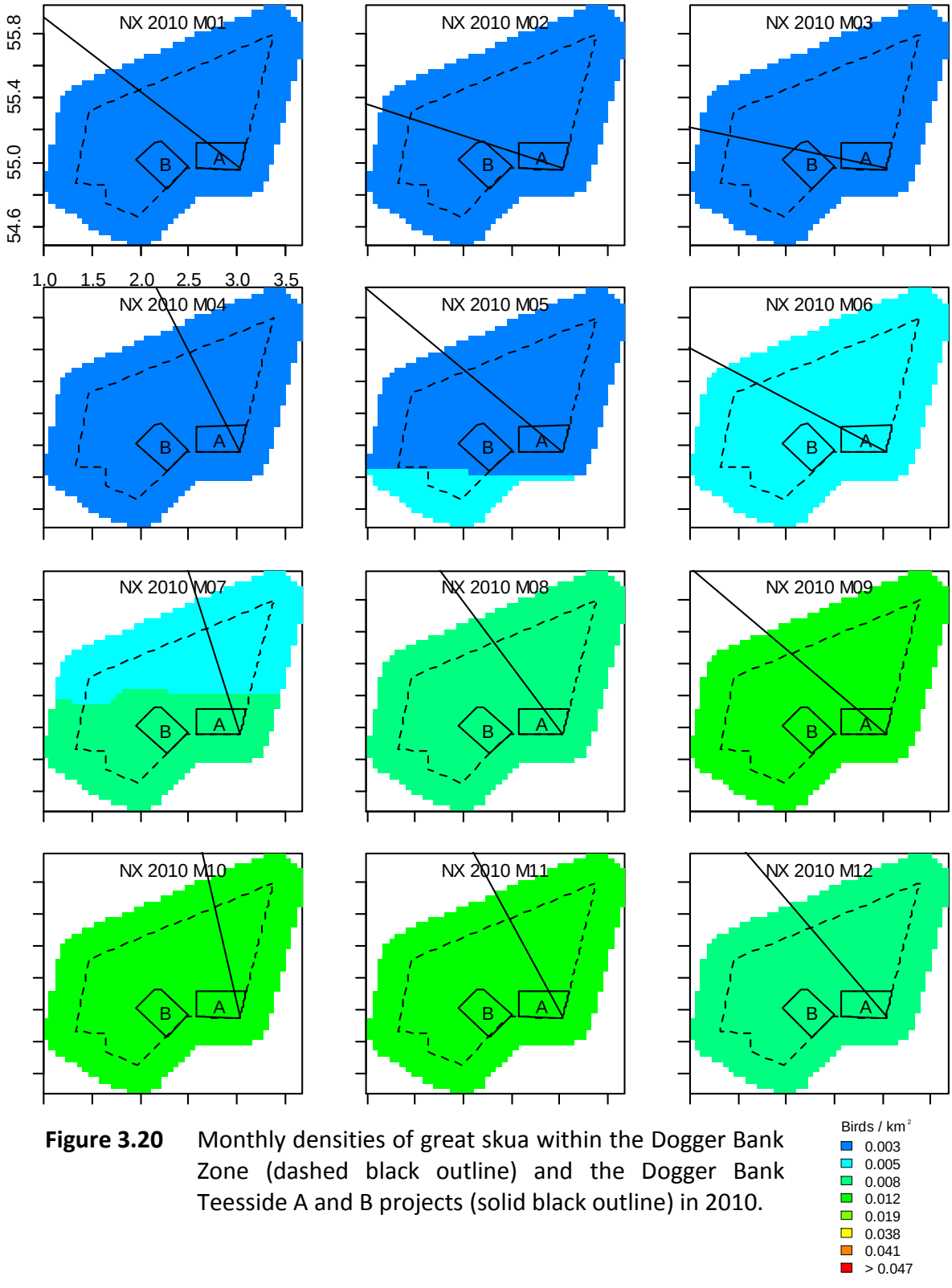

Figure 3.20 Monthly densities of great skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

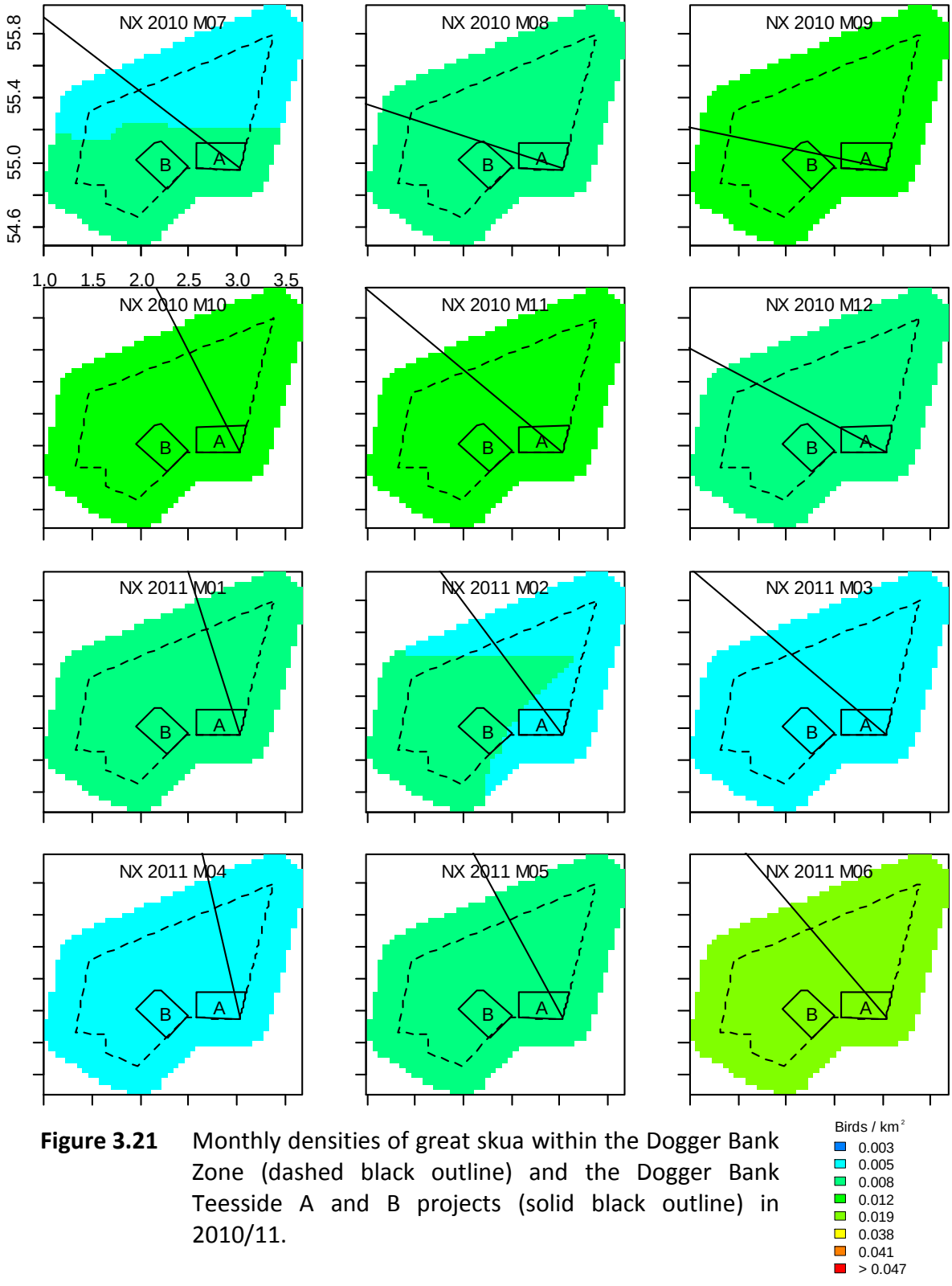

Figure 3.21 Monthly densities of great skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

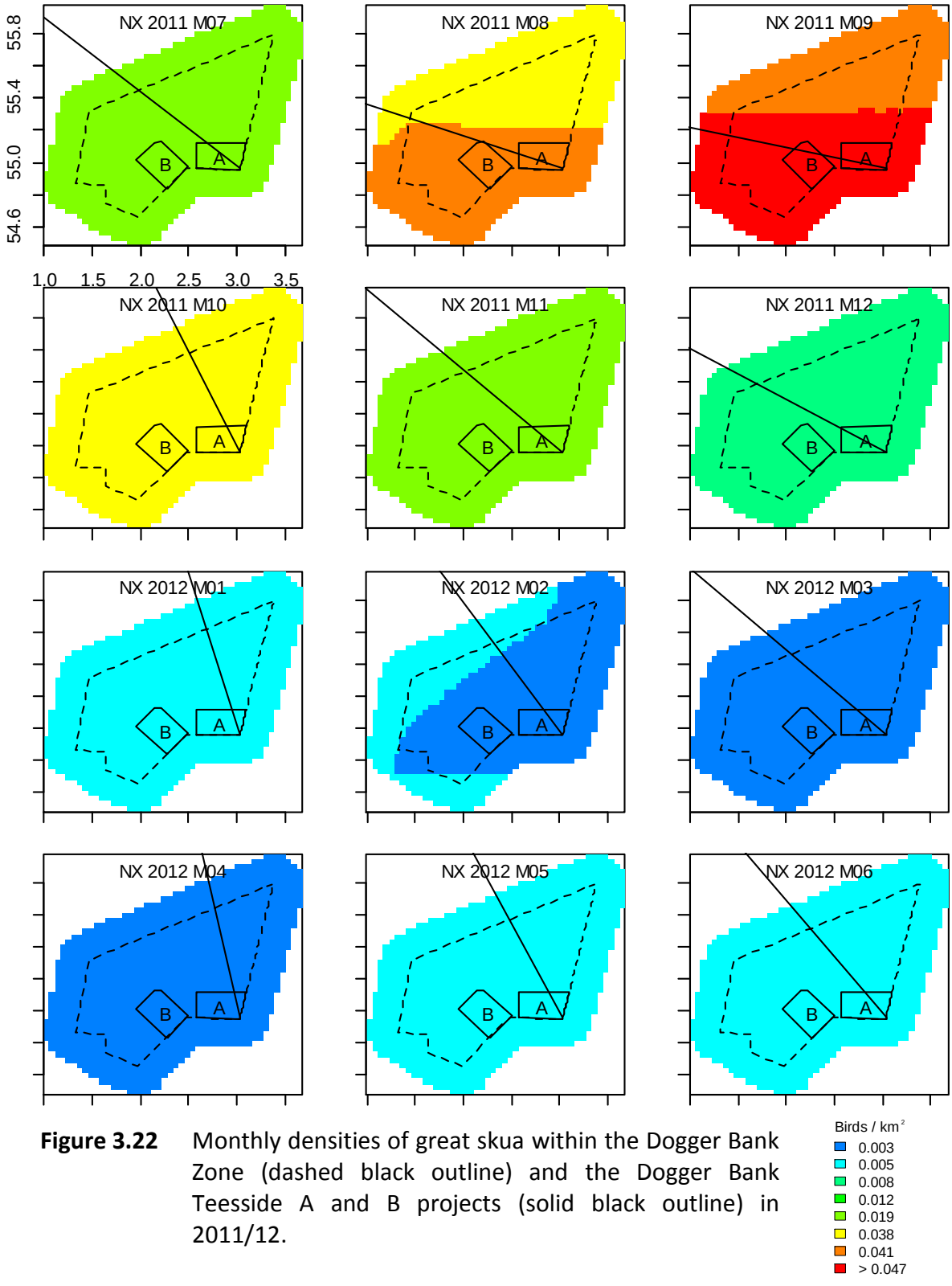

Figure 3.22 Monthly densities of great skua within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	0 (0-2)	0 (0-0)	0 (0-0)	Jul	1 (0-2)	0 (0-0)	0 (0-0)	4 (2-6)	1 (0-1)	1 (0-1)	Jul	2 (1-4)	0 (0-1)	0 (0-1)
Feb	0 (0-1)	0 (0-0)	0 (0-0)	Aug	1 (1-3)	0 (0-0)	0 (0-0)	6 (4-10)	1 (1-2)	1 (1-2)	Aug	4 (2-6)	1 (0-1)	1 (0-1)
Mar	0 (0-1)	0 (0-0)	0 (0-0)	Sep	2 (1-3)	0 (0-0)	0 (0-1)	7 (5-11)	1 (1-2)	1 (1-2)	Sep	4 (3-7)	1 (0-1)	1 (1-1)
Apr	0 (0-1)	0 (0-0)	0 (0-0)	Oct	2 (1-3)	0 (0-1)	0 (0-1)	5 (3-9)	1 (1-2)	1 (1-2)	Oct	4 (2-6)	1 (0-1)	1 (0-1)
May	0 (0-1)	0 (0-0)	0 (0-0)	Nov	2 (1-3)	0 (0-1)	0 (0-1)	3 (1-5)	0 (0-1)	0 (0-1)	Nov	2 (1-4)	0 (0-1)	0 (0-1)
Jun	1 (0-1)	0 (0-0)	0 (0-0)	Dec	1 (1-3)	0 (0-0)	0 (0-1)	1 (0-2)	0 (0-0)	0 (0-0)	Dec	1 (1-3)	0 (0-0)	0 (0-0)
Jul	1 (0-2)	0 (0-0)	0 (0-0)	Jan	1 (1-3)	0 (0-0)	0 (0-0)	1 (0-1)	0 (0-0)	0 (0-0)	Jan	1 (0-2)	0 (0-0)	0 (0-0)
Aug	1 (1-3)	0 (0-0)	0 (0-0)	Feb	1 (0-2)	0 (0-0)	0 (0-0)	0 (0-1)	0 (0-0)	0 (0-0)	Feb	0 (0-1)	0 (0-0)	0 (0-0)
Sep	2 (1-3)	0 (0-0)	0 (0-1)	Mar	1 (0-2)	0 (0-0)	0 (0-0)	0 (0-1)	0 (0-0)	0 (0-0)	Mar	0 (0-1)	0 (0-0)	0 (0-0)
Oct	2 (1-3)	0 (0-1)	0 (0-1)	Apr	1 (0-2)	0 (0-0)	0 (0-0)	0 (0-1)	0 (0-0)	0 (0-0)	Apr	0 (0-1)	0 (0-0)	0 (0-0)
Nov	2 (1-3)	0 (0-1)	0 (0-1)	May	1 (1-2)	0 (0-0)	0 (0-0)	0 (0-2)	0 (0-0)	0 (0-0)	May	1 (0-2)	0 (0-0)	0 (0-0)
Dec	1 (1-3)	0 (0-0)	0 (0-1)	Jun	2 (1-4)	0 (0-1)	0 (0-1)	0 (0-3)	0 (0-0)	0 (0-0)	Jun	1 (0-3)	0 (0-0)	0 (0-0)

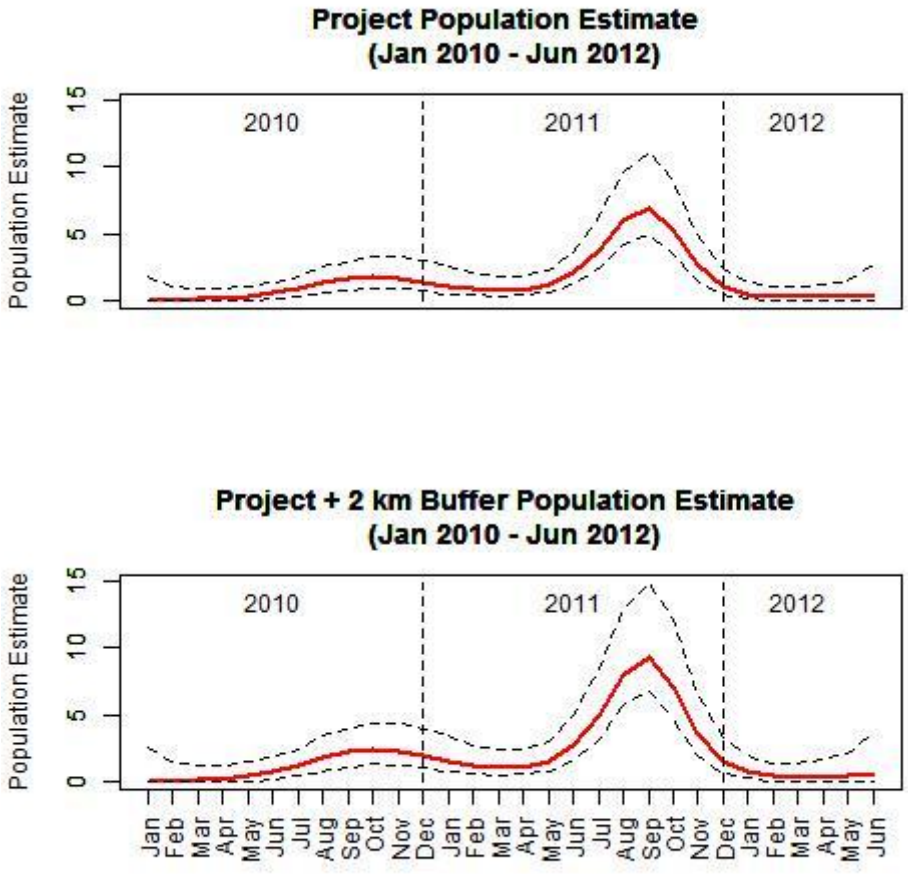

Figure 3.23 Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	0 (0-4)	0 (0-1)	0 (0-1)	Jul	2 (1-4)	0 (0-1)	0 (0-1)	7 (5-12)	1 (1-2)	1 (1-2)	Jul	4 (3-8)	1 (0-1)	1 (0-1)
Feb	0 (0-2)	0 (0-0)	0 (0-0)	Aug	3 (1-5)	0 (0-1)	0 (0-1)	12 (8-19)	2 (1-3)	2 (2-3)	Aug	7 (5-12)	1 (1-2)	1 (1-2)
Mar	0 (0-2)	0 (0-0)	0 (0-0)	Sep	3 (2-6)	1 (0-1)	1 (0-1)	13 (10-22)	2 (2-4)	2 (2-4)	Sep	8 (6-14)	1 (1-2)	2 (1-3)
Apr	0 (0-2)	0 (0-0)	0 (0-0)	Oct	4 (2-6)	1 (0-1)	1 (0-1)	10 (7-17)	2 (1-3)	2 (1-3)	Oct	7 (4-12)	1 (1-2)	1 (1-2)
May	1 (0-2)	0 (0-0)	0 (0-0)	Nov	3 (2-6)	1 (0-1)	1 (0-1)	5 (3-10)	1 (1-2)	1 (1-2)	Nov	4 (2-8)	1 (0-1)	1 (0-1)
Jun	1 (0-3)	0 (0-0)	0 (0-0)	Dec	3 (1-6)	0 (0-1)	1 (0-1)	2 (1-5)	0 (0-1)	0 (0-1)	Dec	2 (1-5)	0 (0-1)	0 (0-1)
Jul	2 (1-4)	0 (0-1)	0 (0-1)	Jan	2 (1-5)	0 (0-1)	0 (0-1)	1 (0-3)	0 (0-0)	0 (0-1)	Jan	1 (0-4)	0 (0-1)	0 (0-1)
Aug	3 (1-5)	0 (0-1)	0 (0-1)	Feb	2 (1-4)	0 (0-1)	0 (0-1)	1 (0-2)	0 (0-0)	0 (0-0)	Feb	1 (0-3)	0 (0-0)	0 (0-1)
Sep	3 (2-6)	1 (0-1)	1 (0-1)	Mar	1 (1-3)	0 (0-1)	0 (0-1)	1 (0-2)	0 (0-0)	0 (0-0)	Mar	1 (0-2)	0 (0-0)	0 (0-0)
Oct	4 (2-6)	1 (0-1)	1 (0-1)	Apr	2 (1-3)	0 (0-1)	0 (0-1)	1 (0-2)	0 (0-0)	0 (0-0)	Apr	1 (0-3)	0 (0-0)	0 (0-0)
Nov	3 (2-6)	1 (0-1)	1 (0-1)	May	2 (1-4)	0 (0-1)	0 (0-1)	1 (0-3)	0 (0-1)	0 (0-1)	May	1 (0-3)	0 (0-1)	0 (0-1)
Dec	3 (1-6)	0 (0-1)	1 (0-1)	Jun	4 (2-7)	1 (0-1)	1 (0-1)	1 (0-5)	0 (0-1)	0 (0-1)	Jun	2 (1-5)	0 (0-1)	0 (0-1)

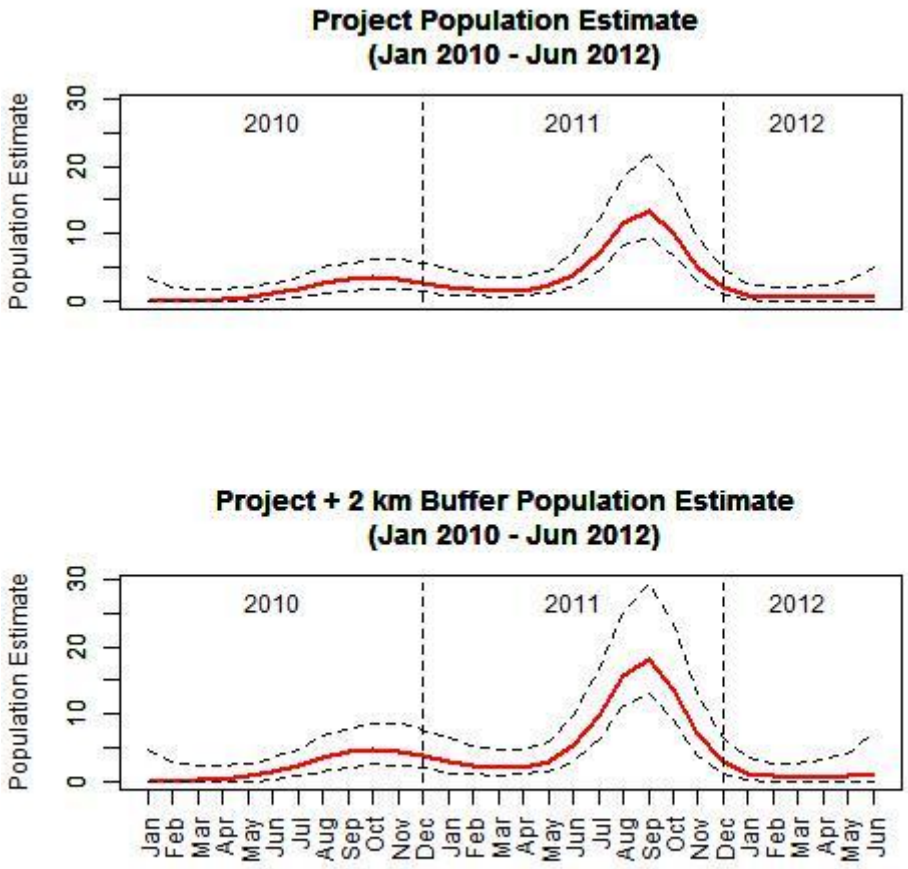

Figure 3.24 Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	731 (629-915)	128 (110-160)	136 (117-170)	Jul	421 (369-468)	77 (68-85)	82 (72-91)	575 (504-644)	105 (92-117)	111 (98-125)	Jul	498 (437-556)	91 (80-101)	96 (85-108)
Feb	1,386 (1,203-1,572)	247 (215-280)	263 (229-299)	Aug	273 (236-303)	50 (43-55)	53 (46-59)	240 (207-268)	44 (38-49)	47 (40-52)	Aug	257 (222-286)	47 (41-52)	50 (43-55)
Mar	2,196 (1,914-2,467)	392 (342-440)	418 (364-469)	Sep	364 (315-410)	67 (58-76)	72 (62-81)	136 (115-155)	25 (21-29)	27 (22-30)	Sep	250 (215-283)	46 (40-52)	49 (42-55)
Apr	652 (563-734)	118 (102-133)	125 (108-141)	Oct	762 (668-845)	136 (120-151)	145 (127-160)	223 (191-256)	40 (34-46)	42 (36-48)	Oct	493 (429-550)	88 (77-98)	93 (82-104)
May	874 (773-967)	160 (141-176)	171 (151-189)	Nov	618 (542-689)	110 (97-122)	118 (103-131)	150 (131-170)	27 (23-30)	28 (25-32)	Nov	384 (336-429)	68 (60-76)	73 (64-82)
Jun	832 (737-923)	152 (135-168)	161 (143-178)	Dec	1,044 (926-1,159)	185 (164-204)	196 (174-217)	315 (274-358)	56 (49-64)	60 (52-68)	Dec	679 (600-759)	120 (106-134)	128 (113-143)
Jul	421 (369-468)	77 (68-85)	82 (72-91)	Jan	885 (783-988)	157 (139-175)	168 (149-188)	362 (315-409)	65 (56-73)	69 (60-78)	Jan	659 (575-771)	117 (102-136)	125 (109-145)
Aug	273 (236-303)	50 (43-55)	53 (46-59)	Feb	1,499 (1,340-1,681)	268 (240-300)	286 (256-321)	2,123 (1,853-2,447)	376 (328-433)	401 (351-462)	Feb	1,670 (1,465-1,900)	297 (261-338)	317 (278-360)
Sep	364 (315-410)	67 (58-76)	72 (62-81)	Mar	4,889 (4,332-5,464)	875 (777-978)	937 (831-1,047)	3,540 (3,117-3,981)	632 (557-710)	681 (599-766)	Mar	3,542 (3,121-3,971)	633 (558-709)	679 (598-761)
Oct	762 (668-845)	136 (120-151)	145 (127-160)	Apr	1,648 (1,476-1,851)	302 (271-339)	322 (288-361)	1,193 (1,041-1,345)	218 (190-245)	233 (204-263)	Apr	1,165 (1,027-1,310)	213 (188-239)	227 (200-255)
Nov	618 (542-689)	110 (97-122)	118 (103-131)	May	1,592 (1,441-1,770)	292 (264-323)	310 (281-344)	1,235 (1,080-1,387)	227 (199-255)	242 (212-272)	May	1,233 (1,098-1,374)	226 (202-252)	241 (215-268)
Dec	1,044 (926-1,159)	185 (164-204)	196 (174-217)	Jun	1,058 (933-1,181)	193 (171-215)	204 (180-227)	760 (659-864)	139 (121-158)	148 (128-168)	Jun	883 (776-989)	161 (142-180)	171 (150-191)

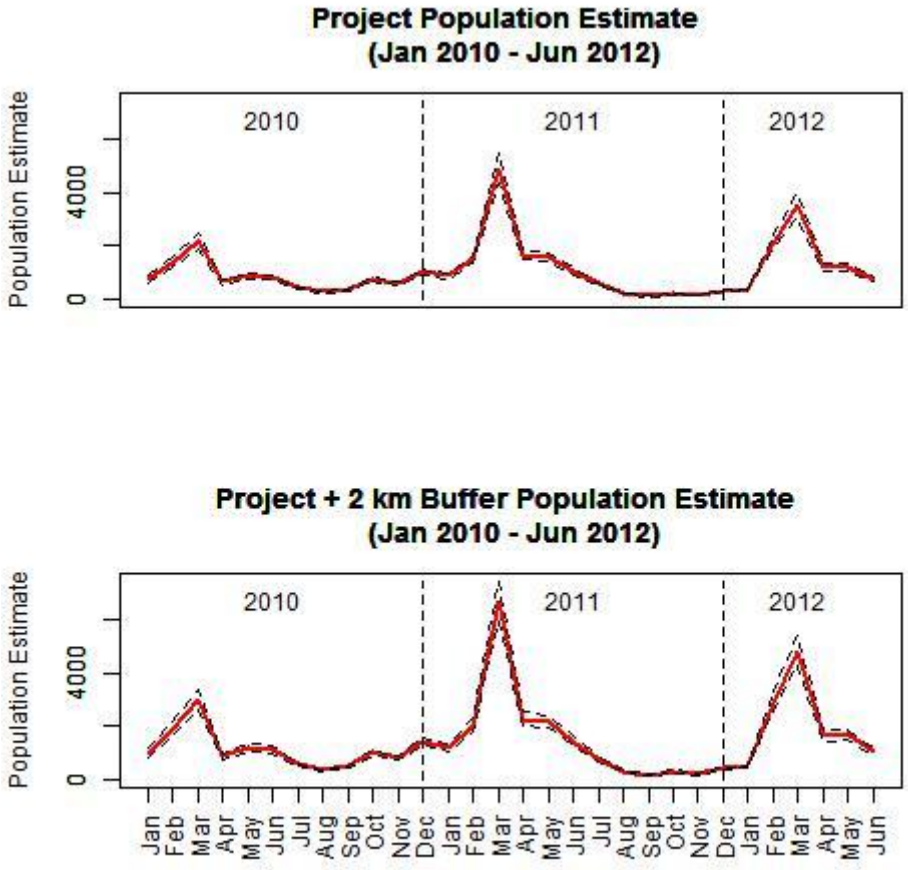

Figure 3.25 Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

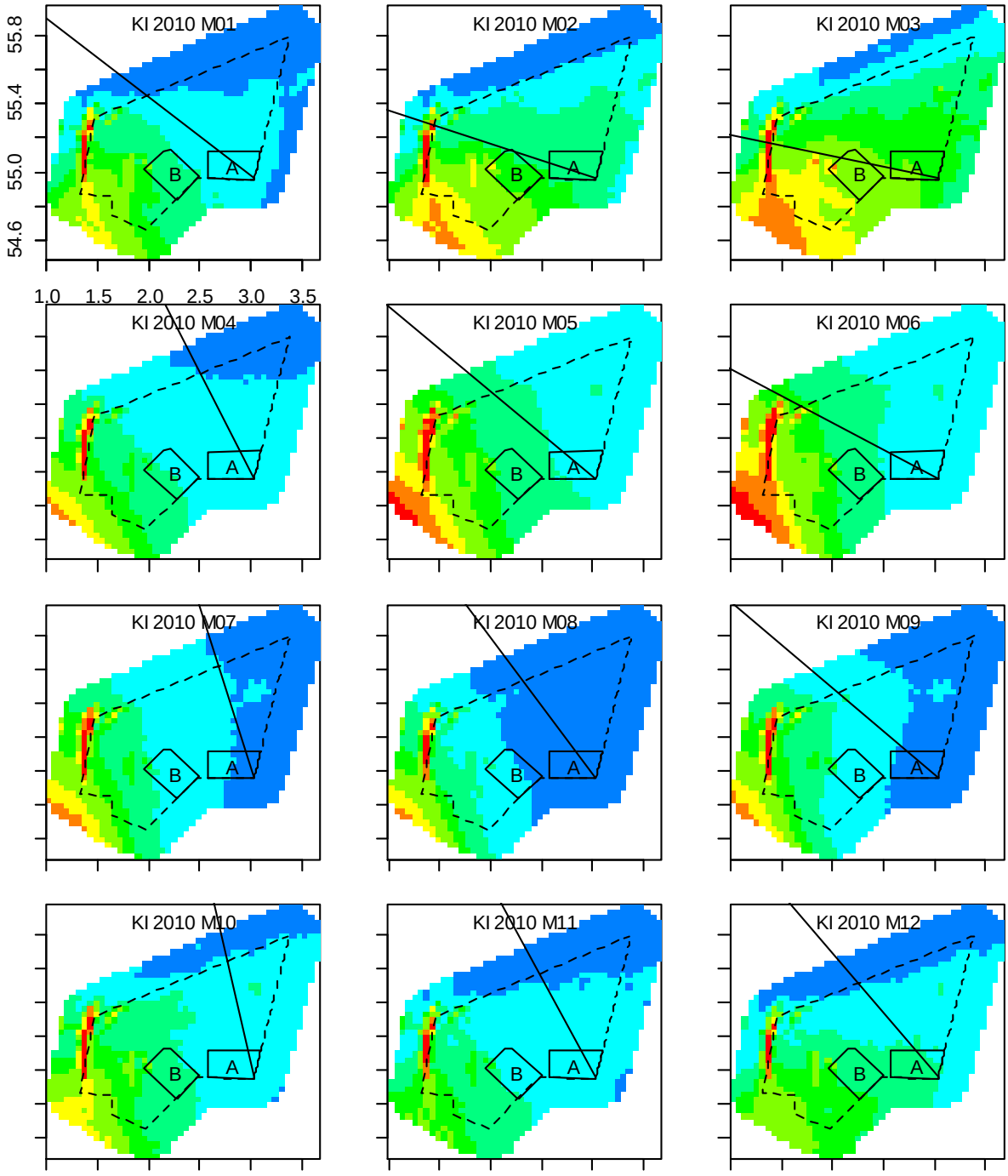

Figure 3.26 Monthly densities of black-legged kittiwake within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

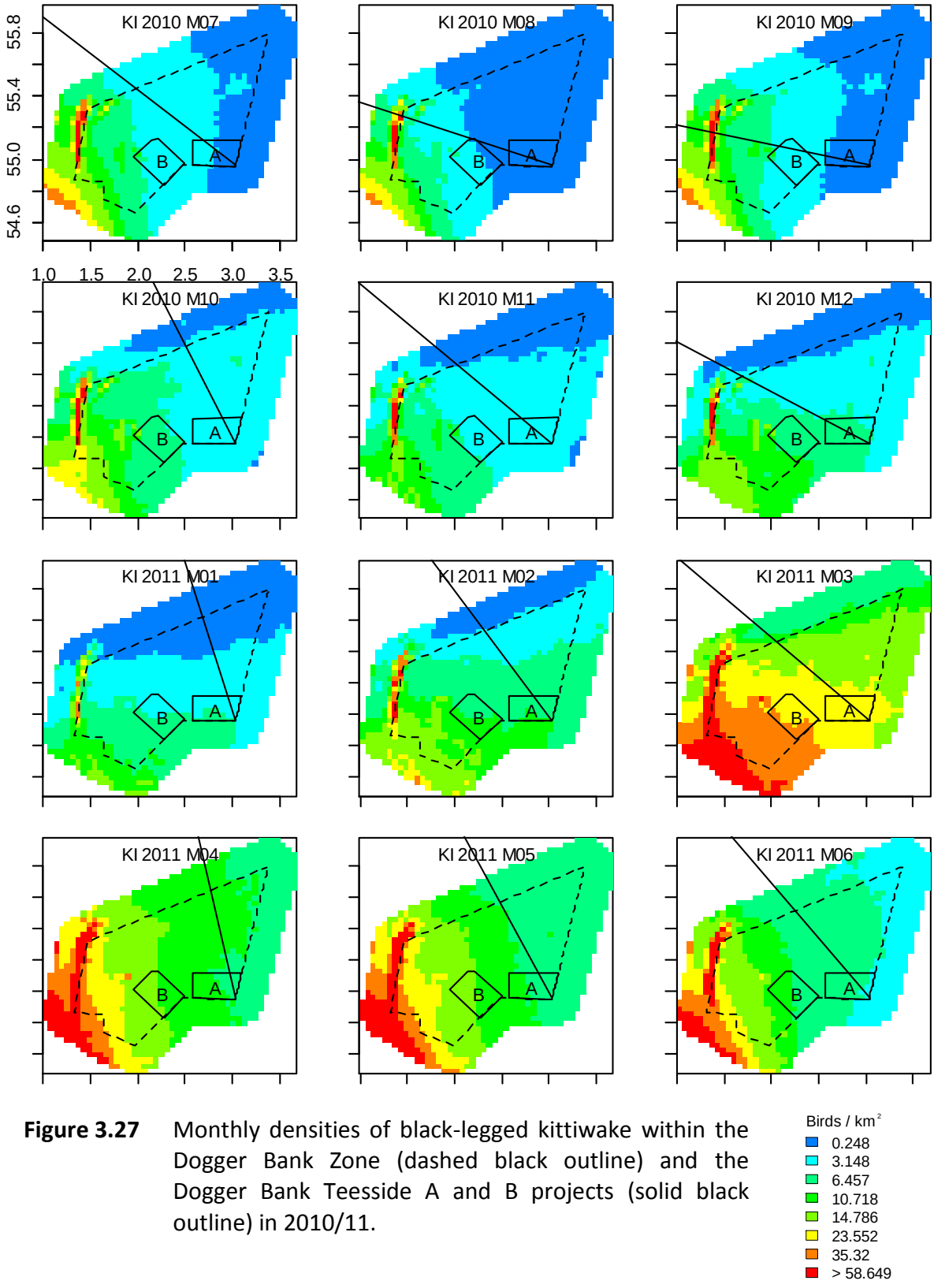

Figure 3.27 Monthly densities of black-legged kittiwake within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

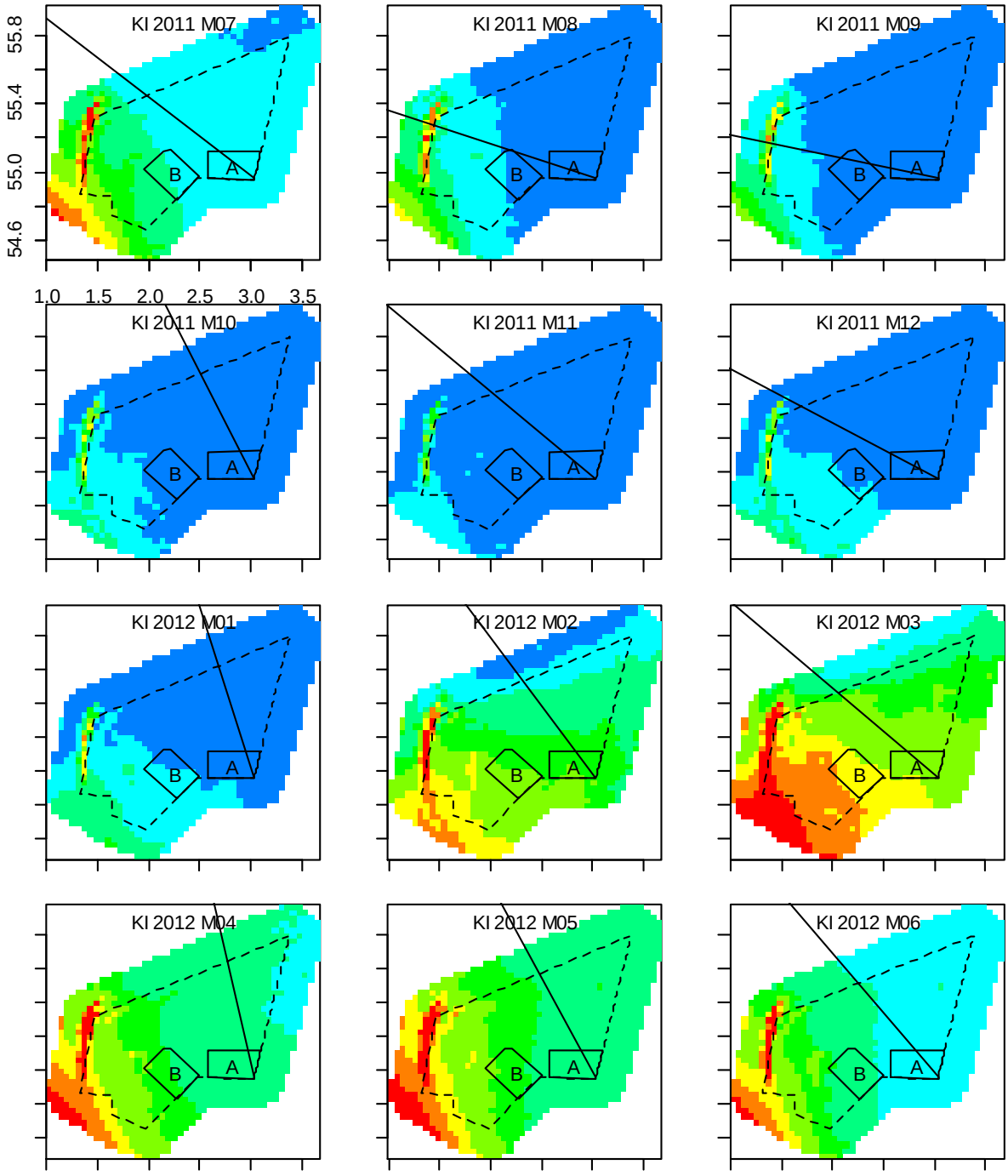

Figure 3.28 Monthly densities of black-legged kittiwake within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	1,253 (1,088-1,545)	222 (193-275)	236 (205-292)	Jul	799 (711-874)	140 (124-153)	148 (131-161)	988 (886-1090)	167 (150-185)	178 (159-197)	Jul	894 (799-982)	153 (137-169)	163 (145-179)
Feb	2,189 (1,923-2,486)	383 (336-435)	406 (356-461)	Aug	518 (459-570)	91 (80-100)	96 (85-105)	422 (374-464)	72 (64-79)	76 (68-84)	Aug	470 (417-517)	81 (72-89)	86 (76-95)
Mar	3,398 (2,985-3,779)	587 (515-654)	620 (544-688)	Sep	690 (602-774)	122 (106-137)	129 (113-145)	240 (211-270)	41 (36-46)	44 (38-49)	Sep	465 (406-522)	81 (71-91)	86 (76-97)
Apr	1,006 (893-1,121)	173 (153-193)	183 (162-203)	Oct	1,186 (1,054-1,308)	209 (185-231)	222 (197-245)	321 (278-363)	55 (48-63)	59 (51-67)	Oct	753 (666-835)	132 (117-147)	140 (124-156)
May	1,422 (1,290-1,551)	247 (224-271)	262 (238-286)	Nov	902 (801-993)	159 (141-176)	169 (150-186)	212 (187-236)	37 (32-41)	39 (34-43)	Nov	557 (494-615)	98 (87-108)	104 (92-115)
Jun	1,331 (1,203-1,451)	234 (211-256)	248 (224-271)	Dec	1,439 (1,288-1,588)	252 (225-279)	267 (239-295)	406 (357-456)	70 (62-79)	75 (66-84)	Dec	922 (823-1022)	161 (144-179)	171 (152-190)
Jul	799 (711-874)	140 (124-153)	148 (131-161)	Jan	1,037 (923-1,155)	179 (159-199)	190 (169-213)	492 (431-548)	86 (75-96)	91 (80-102)	Jan	927 (814-1083)	162 (142-190)	173 (151-202)
Aug	518 (459-570)	91 (80-100)	96 (85-105)	Feb	1,742 (1,565-1,948)	300 (269-336)	319 (286-358)	2,703 (2,403-3,068)	470 (416-533)	499 (443-567)	Feb	2,212 (1,963-2,501)	384 (340-435)	408 (362-462)
Sep	690 (602-774)	122 (106-137)	129 (113-145)	Mar	6,487 (5,864-7,207)	1,108 (1,000-1,232)	1,178 (1,063-1,310)	5,507 (4,859-6,188)	955 (841-1,074)	1,014 (894-1,140)	Mar	5,131 (4,570-5,725)	883 (785-987)	937 (833-1,046)
Oct	1,186 (1,054-1,308)	209 (185-231)	222 (197-245)	Apr	2,564 (2,363-2,816)	439 (404-483)	468 (431-515)	1,819 (1,619-2,020)	313 (278-349)	332 (296-370)	Apr	1,796 (1,625-1,986)	308 (279-342)	328 (296-363)
Nov	902 (801-993)	159 (141-176)	169 (150-186)	May	2,555 (2,348-2,791)	432 (396-472)	459 (420-502)	1,999 (1,783-2,207)	344 (306-380)	365 (325-403)	May	1,992 (1,807-2,183)	341 (309-374)	362 (328-397)
Dec	1,439 (1,288-1,588)	252 (225-279)	267 (239-295)	Jun	1,776 (1,606-1,950)	302 (273-332)	322 (291-354)	1,236 (1,088-1,379)	213 (187-238)	226 (199-253)	Jun	1,448 (1,299-1,593)	250 (224-275)	265 (238-292)

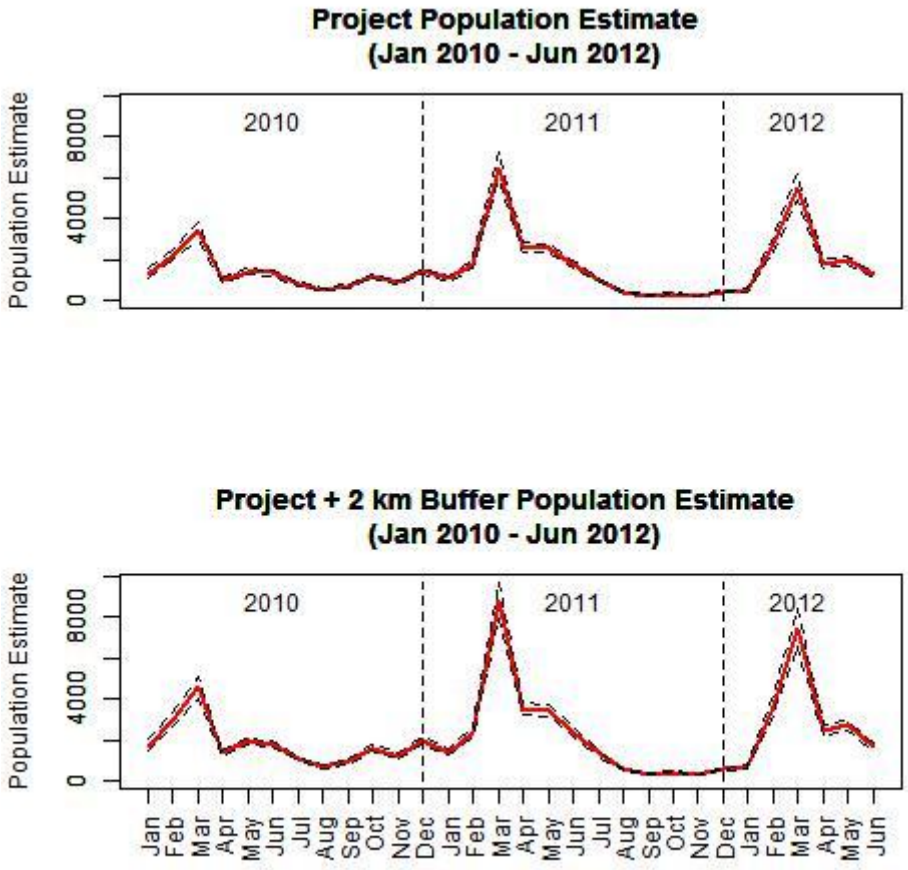

Figure 3.29 Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	1,985 (1,716-2,461)	351 (303-435)	372 (322-462)	Jul	1,214 (1,081-1,342)	215 (192-238)	228 (203-252)	1,564 (1,389-1,734)	272 (242-302)	289 (257-321)	Jul	1,389 (1,235-1,538)	244 (217-270)	259 (230-287)
Feb	3,577 (3,125-4,059)	630 (550-715)	669 (585-760)	Aug	791 (697-873)	140 (124-155)	149 (131-164)	663 (579-732)	116 (101-128)	123 (107-136)	Aug	727 (638-803)	128 (112-142)	136 (119-150)
Mar	5,596 (4,899-6,246)	980 (857-1,093)	1,038 (909-1,157)	Sep	1,053 (916-1,184)	189 (164-212)	200 (174-225)	377 (325-426)	66 (57-75)	70 (61-79)	Sep	715 (620-805)	127 (110-144)	135 (117-152)
Apr	1,658 (1,453-1,855)	291 (255-326)	308 (270-344)	Oct	1,950 (1,723-2,151)	346 (305-382)	367 (324-405)	544 (468-619)	95 (82-108)	101 (87-115)	Oct	1,247 (1,096-1,385)	221 (194-245)	234 (206-260)
May	2,292 (2,061-2,517)	406 (365-446)	432 (389-474)	Nov	1,520 (1,344-1,682)	269 (238-298)	286 (253-317)	362 (318-406)	63 (56-71)	67 (59-76)	Nov	941 (831-1,044)	166 (147-185)	177 (156-196)
Jun	2,156 (1,945-2,373)	384 (346-423)	407 (368-448)	Dec	2,480 (2,214-2,747)	436 (389-483)	463 (413-512)	719 (631-815)	126 (110-143)	134 (118-152)	Dec	1,600 (1,422-1,781)	281 (250-313)	298 (265-332)
Jul	1,214 (1,081-1,342)	215 (192-238)	228 (203-252)	Jan	1,924 (1,708-2,139)	336 (298-374)	359 (319-400)	854 (746-957)	151 (132-169)	161 (140-180)	Jan	1,588 (1,390-1,853)	279 (244-326)	297 (260-347)
Aug	791 (697-873)	140 (124-155)	149 (131-164)	Feb	3,240 (2,905-3,638)	567 (508-638)	605 (542-680)	4,825 (4,257-5,515)	845 (745-966)	901 (794-1029)	Feb	3,880 (3,429-4,404)	681 (601-773)	725 (640-823)
Sep	1,053 (916-1,184)	189 (164-212)	200 (174-225)	Mar	11,369 (10,196-12,664)	1,982 (1,777-2,209)	2,113 (1,893-2,356)	9,056 (7,967-10,189)	1,588 (1,397-1,787)	1,697 (1,492-1,910)	Mar	8,674 (7,687-9,700)	1,517 (1,343-1,697)	1,616 (1,431-1,808)
Oct	1,950 (1,723-2,151)	346 (305-382)	367 (324-405)	Apr	4,219 (3,834-4,666)	742 (674-822)	791 (718-876)	3,013 (2,649-3,359)	531 (467-592)	566 (497-631)	Apr	2,963 (2,645-3,293)	521 (465-580)	555 (495-617)
Nov	1,520 (1,344-1,682)	269 (238-298)	286 (253-317)	May	4,147 (3,796-4,569)	723 (661-797)	769 (703-848)	3,234 (2,866-3,591)	571 (506-635)	608 (538-675)	May	3,224 (2,908-3,559)	567 (511-626)	603 (543-666)
Dec	2,480 (2,214-2,747)	436 (389-483)	463 (413-512)	Jun	2,831 (2,550-3,127)	495 (445-547)	525 (472-580)	1,994 (1,747-2,242)	352 (308-396)	374 (327-420)	Jun	2,327 (2,081-2,581)	410 (367-455)	435 (389-483)

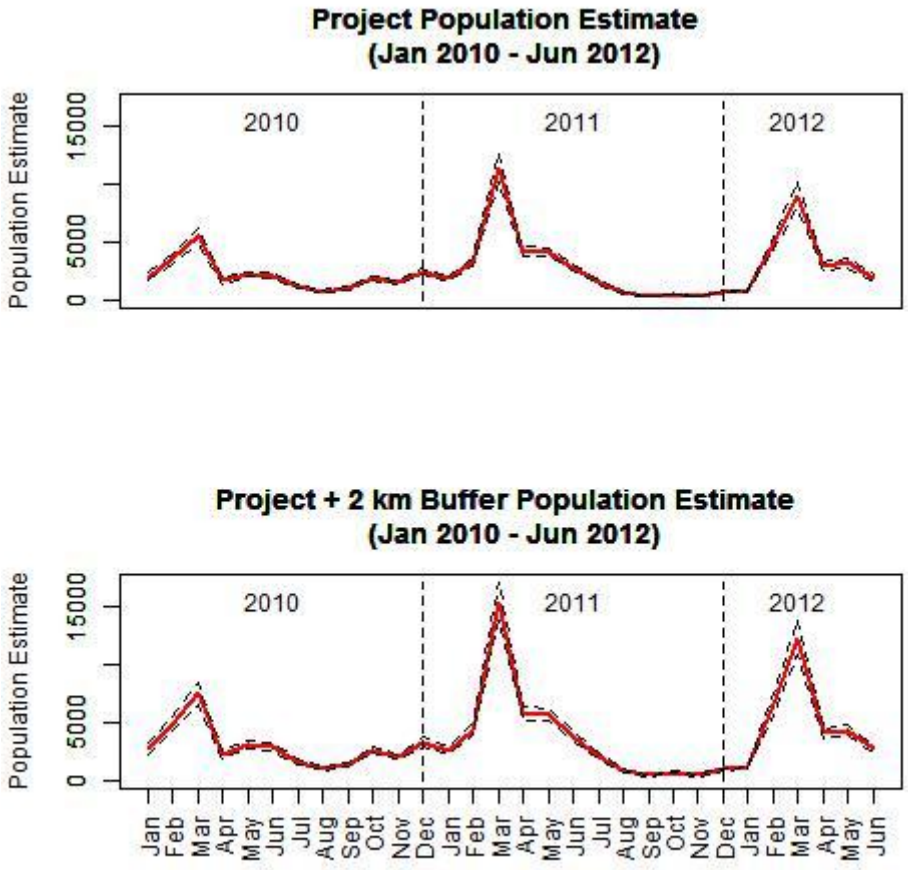

Figure 3.30 Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	8 (4-13)	1 (1-2)	1 (1-2)	Jul	82 (51-123)	15 (9-22)	16 (10-23)	32 (20-55)	6 (4-10)	6 (4-10)	Jul	57 (35-89)	10 (6-16)	11 (7-17)
Feb	18 (11-27)	3 (2-5)	3 (2-5)	Aug	27 (14-51)	5 (3-9)	5 (3-10)	12 (7-26)	2 (1-5)	2 (1-5)	Aug	20 (10-38)	3 (2-7)	4 (2-7)
Mar	41 (25-65)	7 (4-12)	8 (5-12)	Sep	13 (5-29)	2 (1-5)	3 (1-6)	7 (4-16)	1 (1-3)	1 (1-3)	Sep	10 (4-23)	2 (1-4)	2 (1-4)
Apr	87 (58-134)	15 (10-24)	16 (11-25)	Oct	3 (1-9)	0 (0-2)	1 (0-2)	4 (2-8)	1 (0-1)	1 (0-1)	Oct	3 (1-8)	1 (0-1)	1 (0-2)
May	174 (124-263)	31 (22-47)	33 (24-50)	Nov	1 (0-5)	0 (0-1)	0 (0-1)	3 (2-5)	1 (0-1)	1 (0-1)	Nov	2 (1-5)	0 (0-1)	0 (0-1)
Jun	201 (140-286)	36 (25-51)	38 (27-54)	Dec	1 (0-6)	0 (0-1)	0 (0-1)	6 (3-11)	1 (1-2)	1 (1-2)	Dec	4 (2-8)	1 (0-1)	1 (0-2)
Jul	82 (51-123)	15 (9-22)	16 (10-23)	Jan	2 (0-6)	0 (0-1)	0 (0-1)	6 (4-11)	1 (1-2)	1 (1-2)	Jan	5 (3-10)	1 (0-2)	1 (1-2)
Aug	27 (14-51)	5 (3-9)	5 (3-10)	Feb	5 (1-15)	1 (0-3)	1 (0-3)	27 (14-48)	5 (2-8)	5 (3-9)	Feb	16 (9-30)	3 (2-5)	3 (2-6)
Sep	13 (5-29)	2 (1-5)	3 (1-6)	Mar	33 (17-59)	6 (3-10)	6 (3-11)	36 (23-69)	6 (4-12)	7 (4-13)	Mar	36 (22-64)	6 (4-11)	7 (4-12)
Oct	3 (1-9)	0 (0-2)	1 (0-2)	Apr	88 (58-121)	16 (10-22)	17 (11-23)	47 (25-114)	8 (4-20)	9 (5-22)	Apr	74 (47-123)	13 (8-22)	14 (9-23)
Nov	1 (0-5)	0 (0-1)	0 (0-1)	May	108 (76-154)	19 (14-28)	21 (15-29)	55 (22-148)	10 (4-27)	11 (4-28)	May	112 (74-188)	20 (13-34)	21 (14-36)
Dec	1 (0-6)	0 (0-1)	0 (0-1)	Jun	69 (45-102)	12 (8-18)	13 (8-19)	52 (13-139)	9 (2-25)	10 (3-26)	Jun	107 (66-176)	19 (12-31)	20 (13-33)

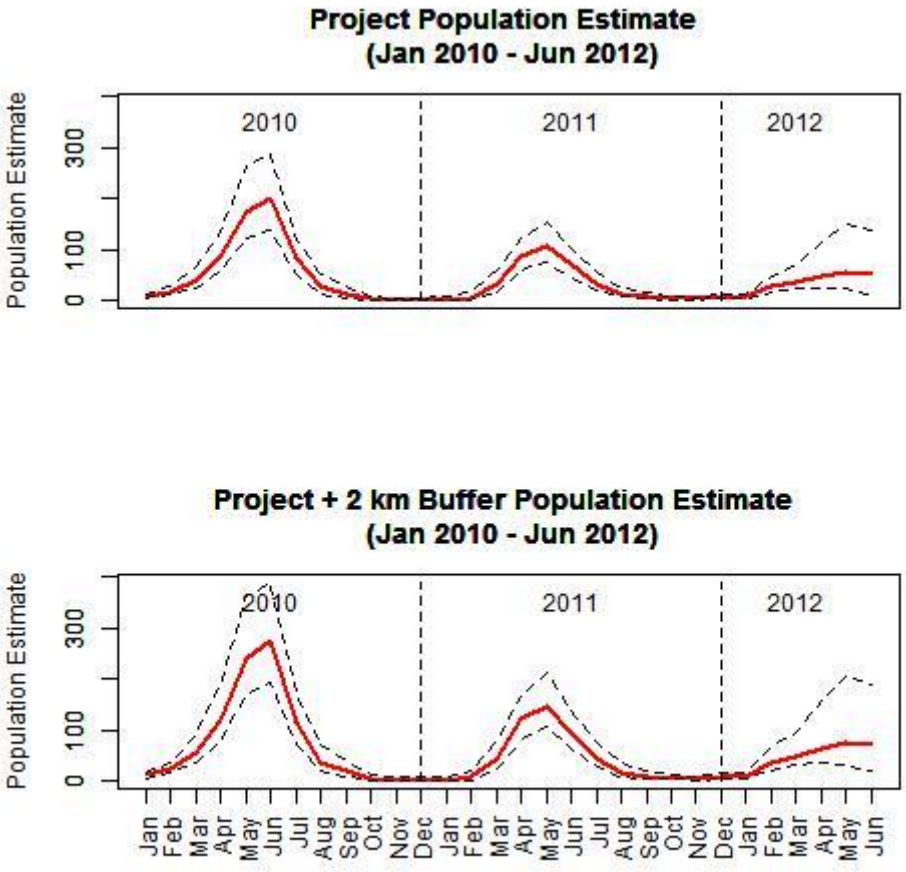

Figure 3.31 Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

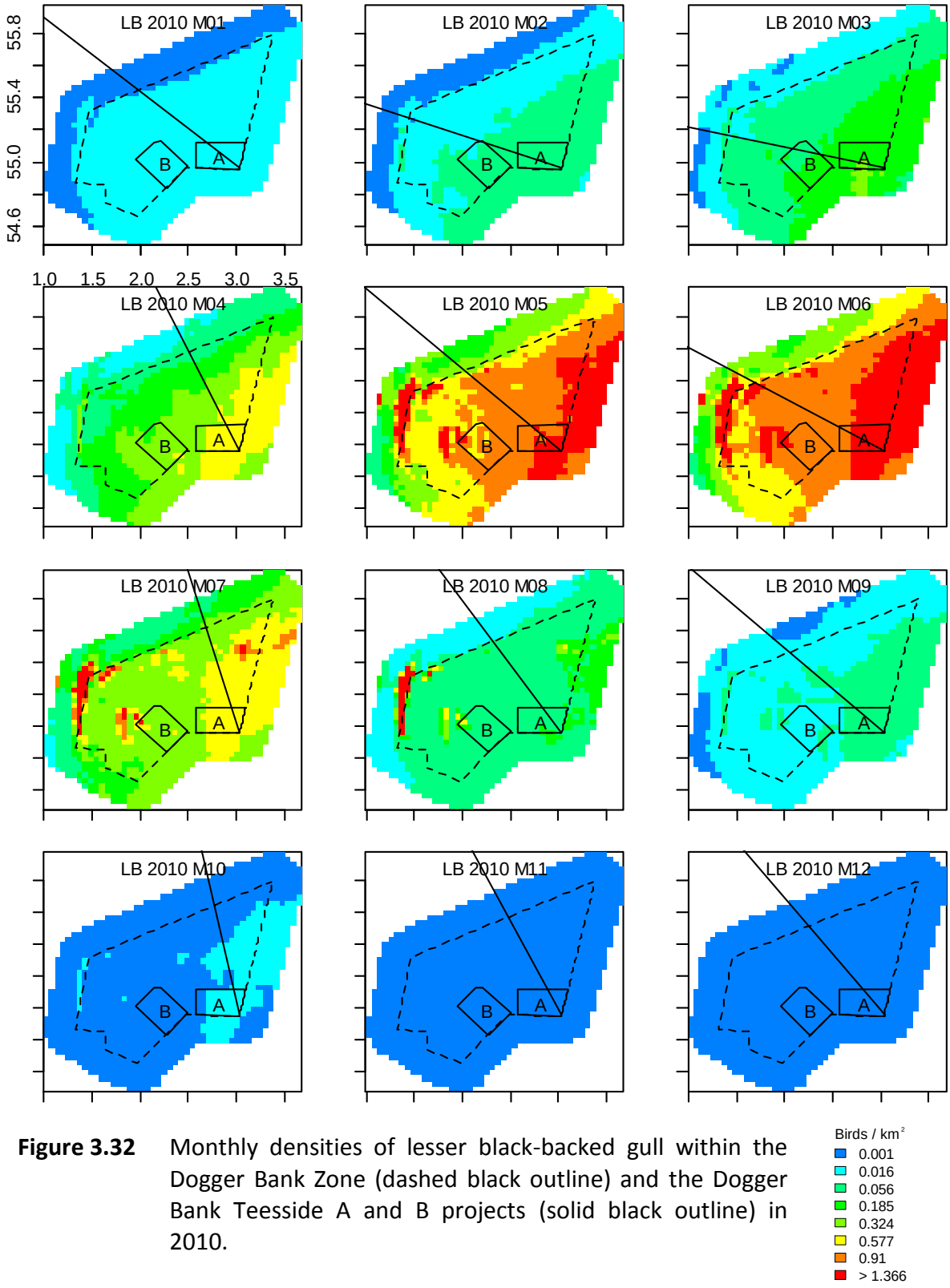

Figure 3.32 Monthly densities of lesser black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

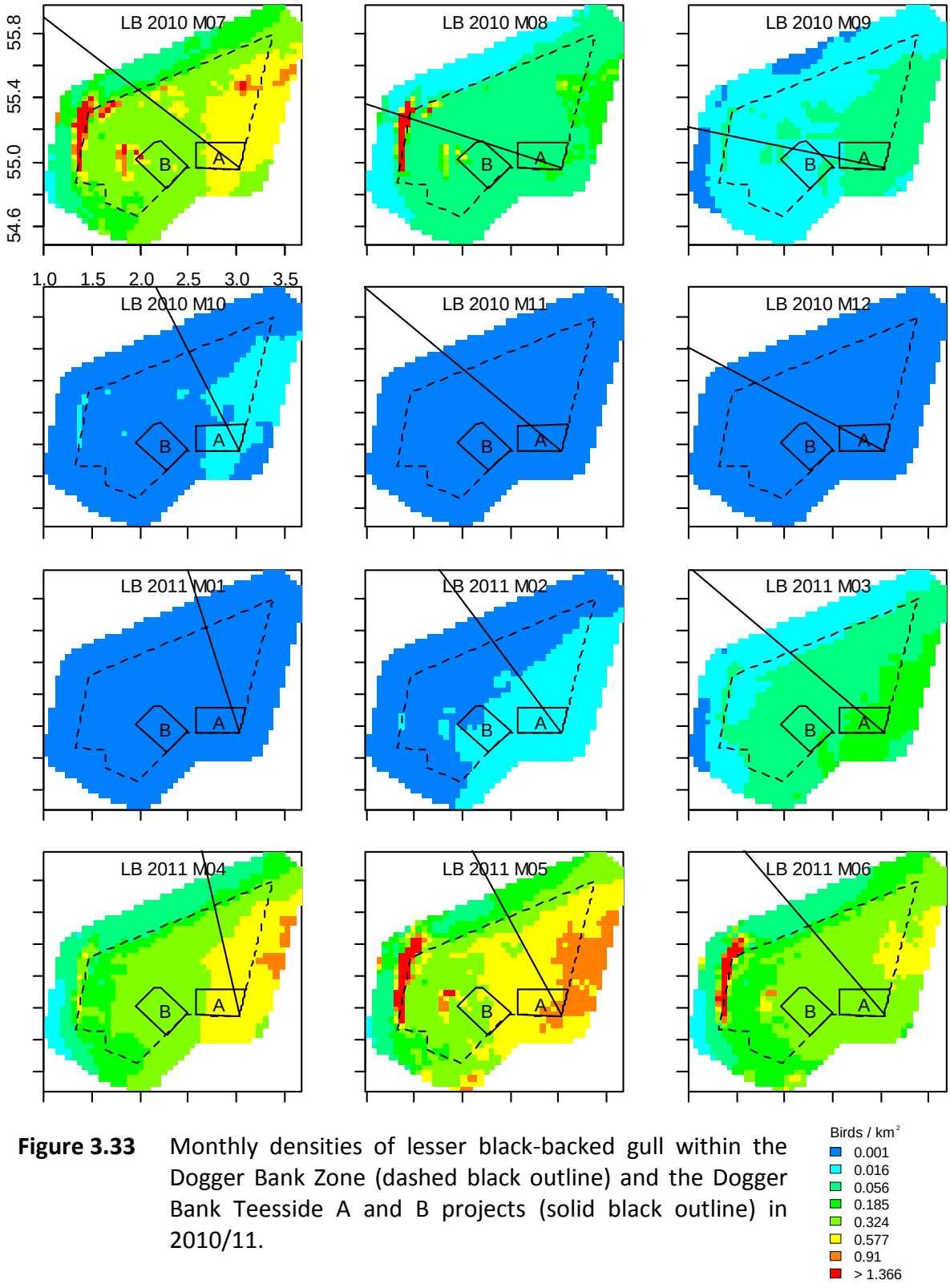

Figure 3.33 Monthly densities of lesser black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

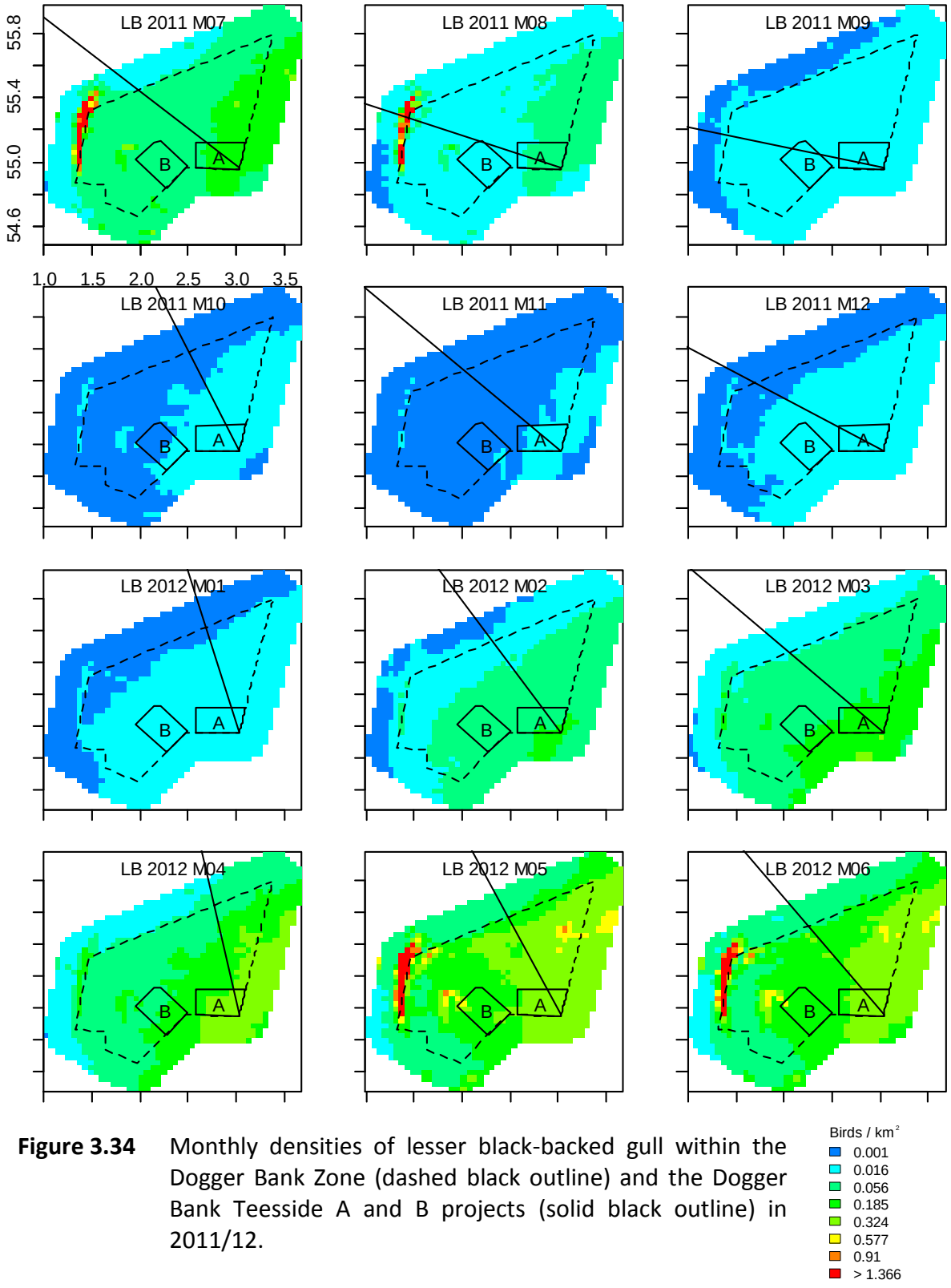

Figure 3.34 Monthly densities of lesser black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	7 (4-12)	1 (1-2)	1 (1-2)	Jul	77 (50-117)	13 (9-20)	14 (9-21)	26 (16-43)	4 (3-7)	5 (3-8)	Jul	52 (33-80)	9 (6-14)	9 (6-15)
Feb	15 (9-23)	3 (2-4)	3 (2-4)	Aug	25 (13-48)	4 (2-8)	5 (2-9)	10 (6-21)	2 (1-4)	2 (1-4)	Aug	17 (9-35)	3 (2-6)	3 (2-6)
Mar	34 (21-55)	6 (4-9)	6 (4-10)	Sep	11 (4-25)	2 (1-4)	2 (1-5)	6 (3-13)	1 (1-2)	1 (1-2)	Sep	8 (3-19)	1 (1-3)	2 (1-3)
Apr	61 (39-98)	10 (7-17)	11 (7-18)	Oct	2 (1-7)	0 (0-1)	0 (0-1)	3 (1-6)	0 (0-1)	1 (0-1)	Oct	3 (1-7)	0 (0-1)	0 (0-1)
May	141 (102-217)	25 (18-38)	26 (19-39)	Nov	1 (0-4)	0 (0-1)	0 (0-1)	2 (1-4)	0 (0-1)	0 (0-1)	Nov	2 (1-4)	0 (0-1)	0 (0-1)
Jun	160 (115-228)	28 (20-40)	29 (21-41)	Dec	1 (0-4)	0 (0-1)	0 (0-1)	4 (2-8)	1 (0-1)	1 (0-1)	Dec	3 (1-6)	0 (0-1)	0 (0-1)
Jul	77 (50-117)	13 (9-20)	14 (9-21)	Jan	1 (0-5)	0 (0-1)	0 (0-1)	5 (3-9)	1 (0-2)	1 (1-2)	Jan	4 (2-8)	1 (0-1)	1 (0-2)
Aug	25 (13-48)	4 (2-8)	5 (2-9)	Feb	3 (1-10)	1 (0-2)	1 (0-2)	19 (11-35)	3 (2-6)	3 (2-6)	Feb	12 (7-23)	2 (1-4)	2 (1-4)
Sep	11 (4-25)	2 (1-4)	2 (1-5)	Mar	24 (13-46)	4 (2-8)	4 (2-8)	30 (18-61)	5 (3-10)	6 (3-11)	Mar	29 (17-54)	5 (3-9)	5 (3-10)
Oct	2 (1-7)	0 (0-1)	0 (0-1)	Apr	64 (42-86)	11 (7-15)	12 (8-16)	33 (18-77)	6 (3-13)	6 (3-14)	Apr	53 (33-87)	9 (6-15)	10 (6-16)
Nov	1 (0-4)	0 (0-1)	0 (0-1)	May	81 (59-113)	14 (10-19)	15 (11-20)	44 (18-121)	8 (3-21)	8 (3-22)	May	89 (60-150)	15 (10-26)	16 (11-27)
Dec	1 (0-4)	0 (0-1)	0 (0-1)	Jun	55 (37-79)	9 (6-13)	10 (7-14)	40 (11-107)	7 (2-18)	7 (2-19)	Jun	85 (54-138)	15 (9-24)	16 (10-25)

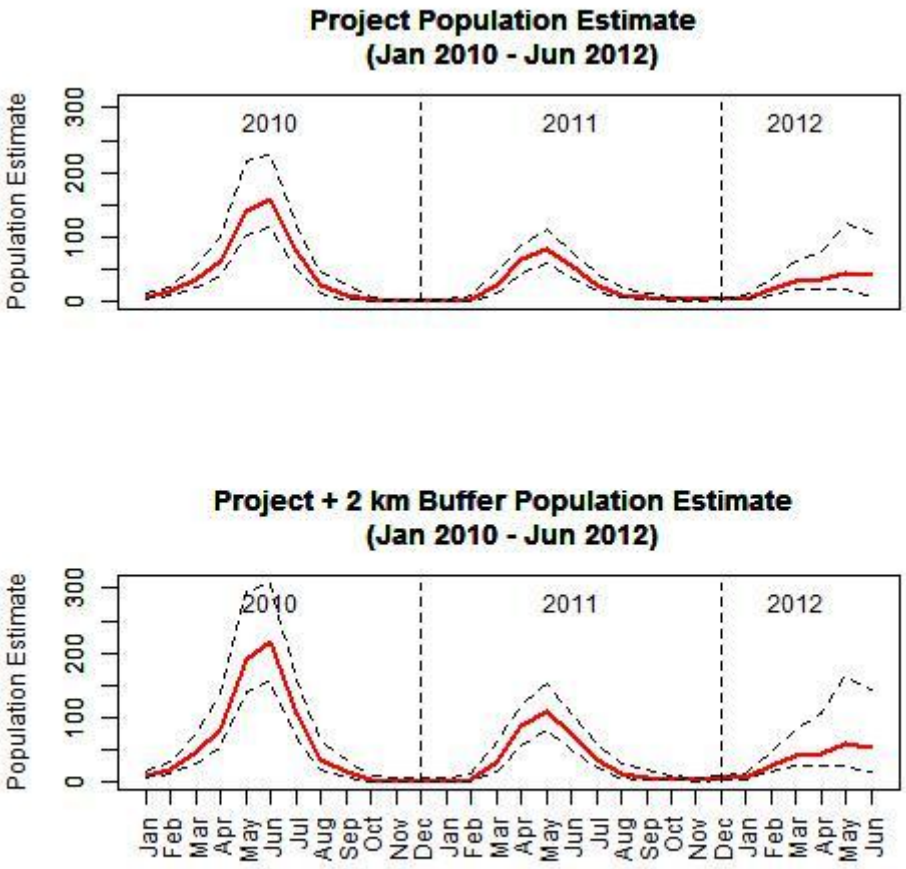

Figure 3.35 Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	15 (8-23)	3 (1-4)	3 (2-4)	Jul	159 (101-240)	28 (18-42)	29 (19-45)	58 (36-98)	10 (6-17)	11 (7-18)	Jul	108 (69-169)	19 (12-30)	20 (13-31)
Feb	32 (20-51)	6 (3-9)	6 (4-9)	Aug	53 (27-99)	9 (5-18)	10 (5-18)	22 (13-47)	4 (2-8)	4 (2-9)	Aug	37 (20-73)	7 (4-13)	7 (4-14)
Mar	74 (47-119)	13 (8-21)	14 (9-22)	Sep	24 (9-53)	4 (2-9)	5 (2-10)	13 (7-29)	2 (1-5)	2 (1-5)	Sep	18 (8-41)	3 (1-7)	3 (1-8)
Apr	147 (97-236)	26 (17-41)	27 (18-44)	Oct	5 (1-16)	1 (0-3)	1 (0-3)	6 (3-14)	1 (1-2)	1 (1-3)	Oct	6 (2-15)	1 (0-3)	1 (0-3)
May	316 (226-480)	56 (40-85)	59 (42-90)	Nov	2 (0-8)	0 (0-1)	0 (0-2)	5 (3-10)	1 (1-2)	1 (1-2)	Nov	3 (2-9)	1 (0-2)	1 (0-2)
Jun	365 (254-514)	65 (45-91)	68 (47-95)	Dec	2 (0-10)	0 (0-2)	0 (0-2)	10 (6-19)	2 (1-3)	2 (1-3)	Dec	6 (3-14)	1 (1-3)	1 (1-3)
Jul	159 (101-240)	28 (18-42)	29 (19-45)	Jan	3 (0-11)	0 (0-2)	0 (0-2)	11 (6-20)	2 (1-4)	2 (1-4)	Jan	10 (5-18)	2 (1-3)	2 (1-3)
Aug	53 (27-99)	9 (5-18)	10 (5-18)	Feb	8 (2-26)	1 (0-5)	2 (0-5)	45 (25-82)	8 (4-14)	8 (5-15)	Feb	29 (16-53)	5 (3-9)	5 (3-10)
Sep	24 (9-53)	4 (2-9)	5 (2-10)	Mar	58 (30-105)	10 (5-18)	11 (6-19)	66 (41-130)	12 (7-23)	12 (8-24)	Mar	66 (39-118)	12 (7-21)	12 (7-22)
Oct	5 (1-16)	1 (0-3)	1 (0-3)	Apr	154 (101-208)	27 (18-37)	29 (19-39)	81 (43-191)	14 (8-34)	15 (8-36)	Apr	127 (80-212)	22 (14-37)	24 (15-40)
Nov	2 (0-8)	0 (0-1)	0 (0-2)	May	188 (136-265)	33 (24-47)	35 (25-49)	99 (39-269)	17 (7-47)	18 (7-50)	May	201 (134-338)	35 (24-60)	37 (25-63)
Dec	2 (0-10)	0 (0-2)	0 (0-2)	Jun	125 (80-182)	22 (14-32)	23 (15-33)	91 (24-244)	16 (4-43)	17 (4-46)	Jun	194 (119-313)	34 (21-55)	36 (22-58)

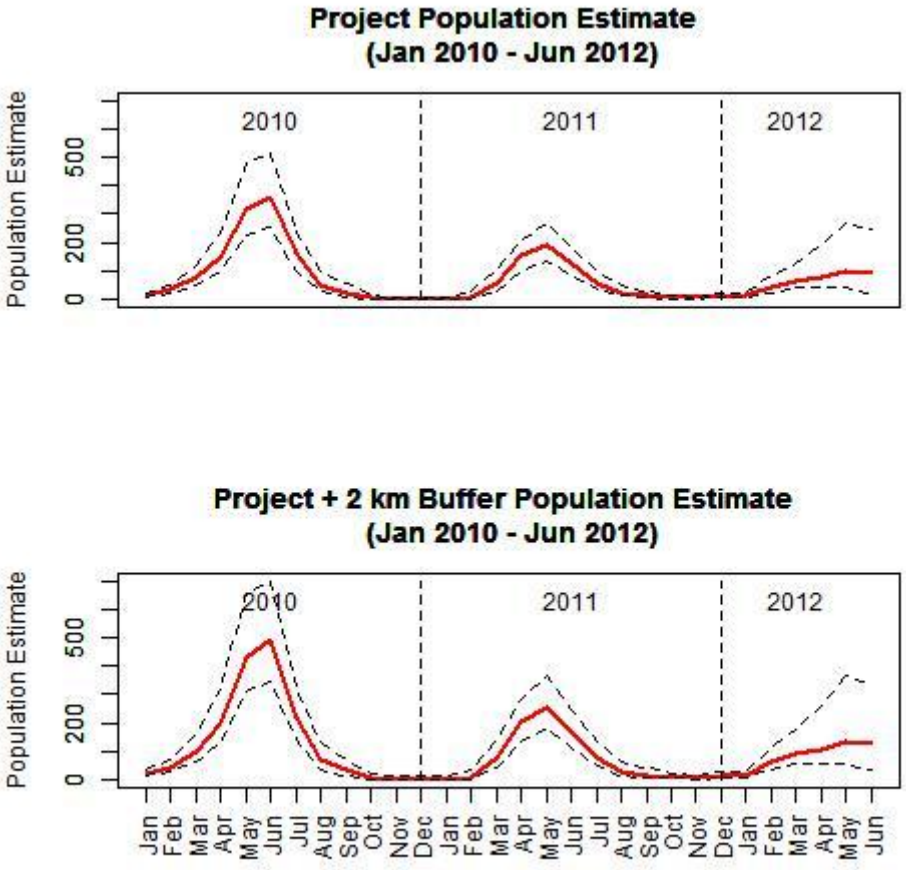

Figure 3.36 Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	155 (118-188)	28 (21-33)	29 (22-36)	Jul	9 (5-14)	2 (1-3)	2 (1-3)	18 (9-26)	3 (2-5)	3 (2-5)	Jul	13 (7-20)	2 (1-4)	3 (1-4)
Feb	97 (69-127)	17 (12-23)	19 (13-24)	Aug	10 (5-16)	2 (1-3)	2 (1-3)	17 (9-25)	3 (2-5)	3 (2-5)	Aug	13 (7-21)	2 (1-4)	3 (1-4)
Mar	54 (36-75)	10 (6-13)	10 (7-14)	Sep	17 (9-29)	3 (2-5)	3 (2-6)	19 (10-28)	3 (2-5)	4 (2-5)	Sep	18 (9-29)	3 (2-5)	4 (2-6)
Apr	33 (20-48)	6 (4-9)	6 (4-9)	Oct	27 (16-40)	5 (3-7)	5 (3-8)	23 (14-33)	4 (3-6)	4 (3-6)	Oct	25 (15-37)	5 (3-7)	5 (3-7)
May	20 (11-29)	4 (2-5)	4 (2-6)	Nov	50 (34-68)	9 (6-12)	10 (7-13)	30 (20-41)	5 (4-7)	6 (4-8)	Nov	40 (27-55)	7 (5-10)	8 (5-10)
Jun	13 (7-21)	2 (1-4)	3 (1-4)	Dec	104 (76-137)	19 (14-25)	20 (14-26)	52 (36-67)	9 (6-12)	10 (7-13)	Dec	78 (56-102)	14 (10-18)	15 (11-19)
Jul	9 (5-14)	2 (1-3)	2 (1-3)	Jan	113 (87-146)	20 (16-26)	22 (17-28)	51 (39-65)	9 (7-12)	10 (7-13)	Jan	107 (81-133)	19 (15-24)	20 (15-25)
Aug	10 (5-16)	2 (1-3)	2 (1-3)	Feb	111 (89-143)	20 (16-26)	21 (17-27)	81 (56-110)	15 (10-20)	16 (11-21)	Feb	97 (72-127)	17 (13-23)	18 (14-24)
Sep	17 (9-29)	3 (2-5)	3 (2-6)	Mar	109 (82-145)	20 (15-26)	21 (16-28)	69 (47-96)	12 (8-17)	13 (9-18)	Mar	77 (55-105)	14 (10-19)	15 (10-20)
Oct	27 (16-40)	5 (3-7)	5 (3-8)	Apr	74 (50-101)	14 (9-19)	14 (10-20)	60 (36-85)	11 (7-16)	12 (7-17)	Apr	56 (35-78)	10 (6-14)	11 (7-15)
Nov	50 (34-68)	9 (6-12)	10 (7-13)	May	41 (25-55)	8 (5-10)	8 (5-11)	38 (21-56)	7 (4-10)	7 (4-11)	May	33 (19-47)	6 (3-9)	6 (4-9)
Dec	104 (76-137)	19 (14-25)	20 (14-26)	Jun	24 (12-34)	4 (2-6)	5 (2-7)	20 (9-34)	4 (2-6)	4 (2-7)	Jun	19 (10-29)	3 (2-5)	4 (2-6)

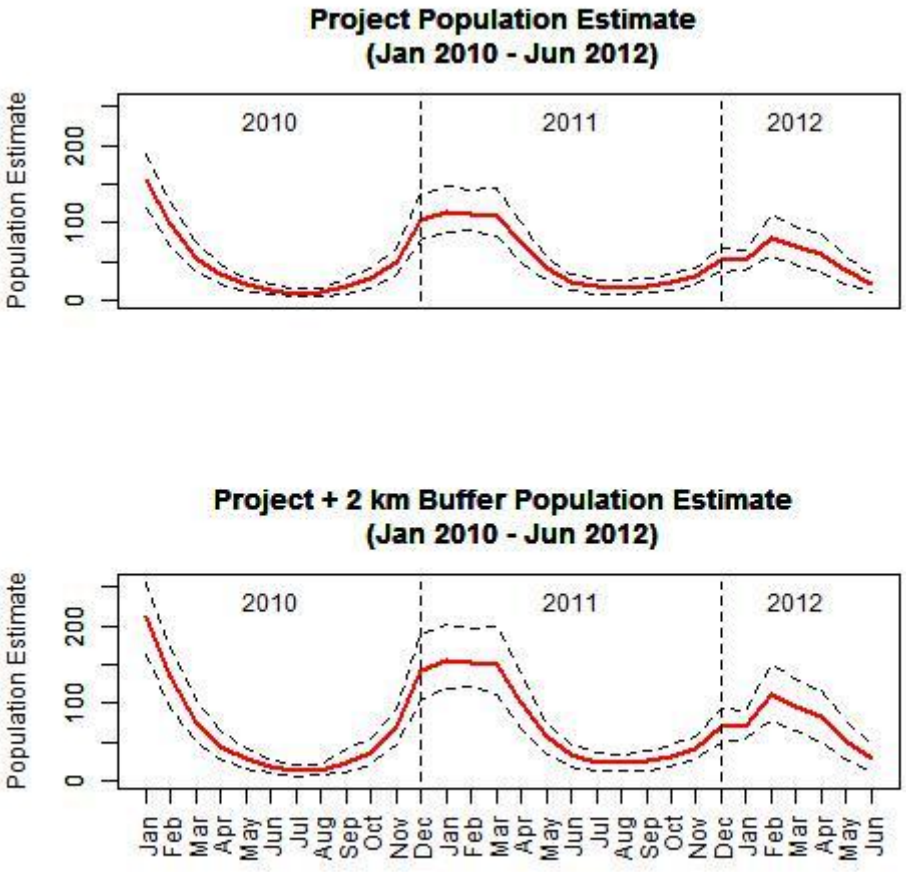

Figure 3.37 Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11, 2011/12.

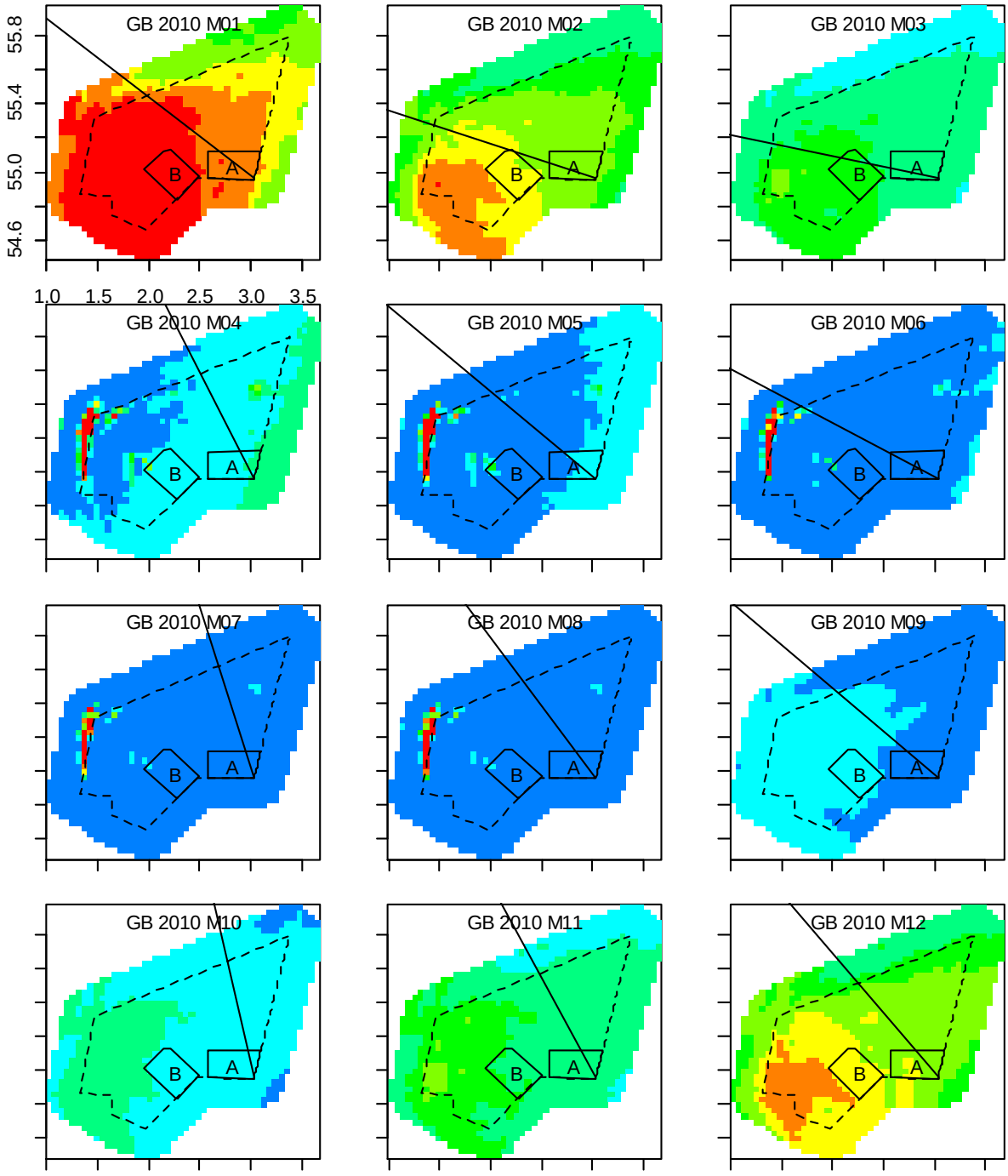

Figure 3.38 Monthly densities of great black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

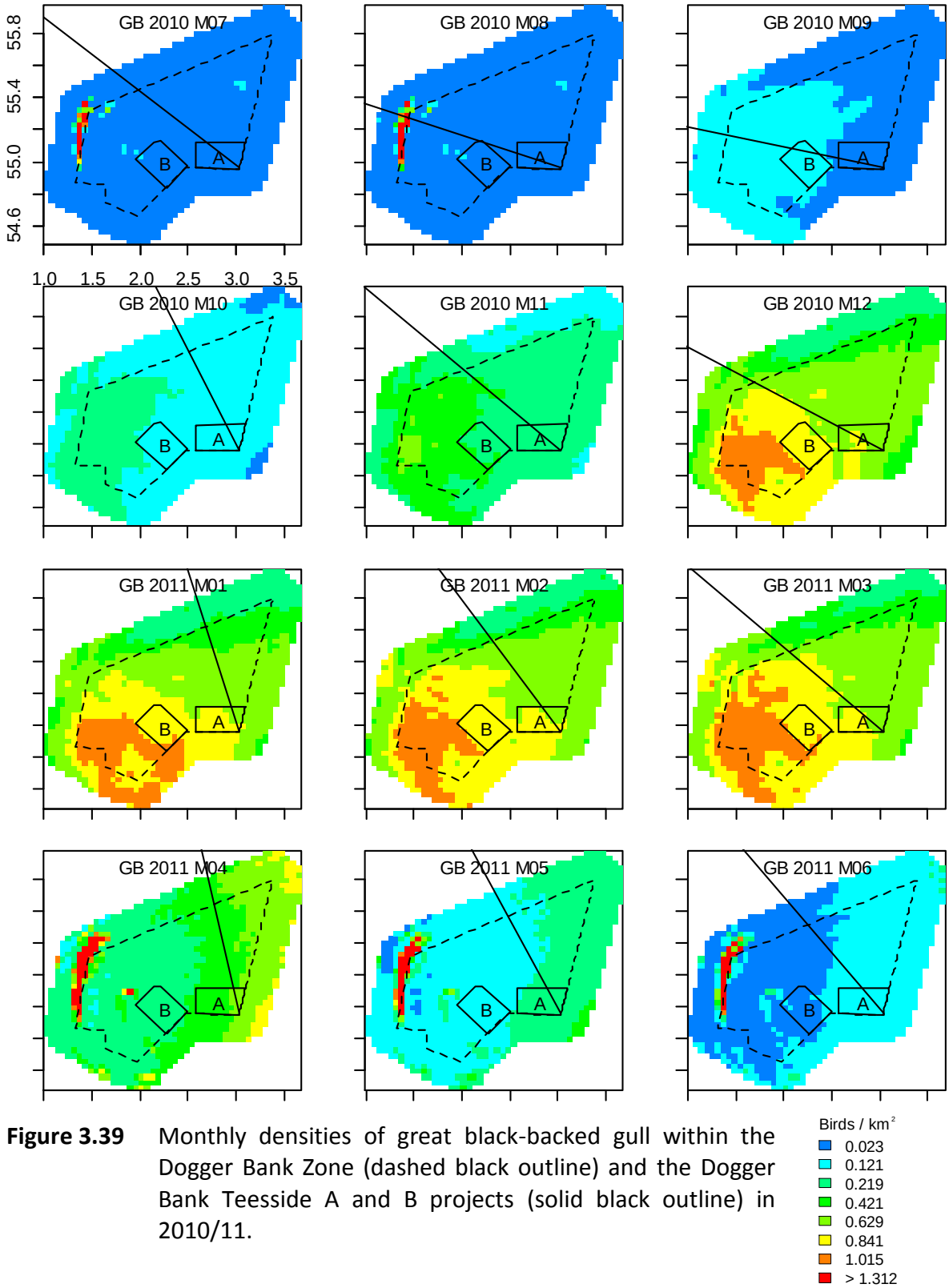

Figure 3.39 Monthly densities of great black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

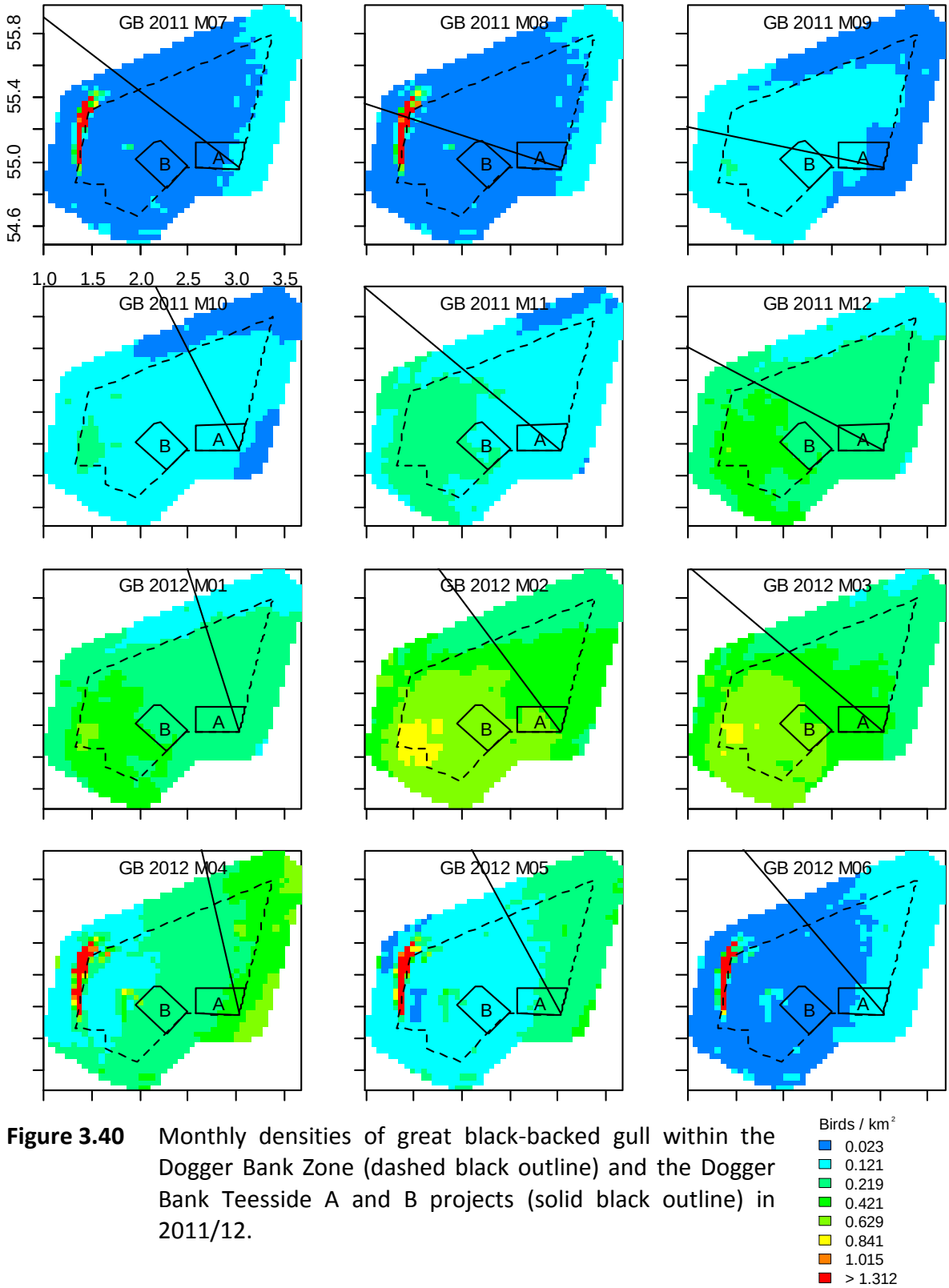

Figure 3.40 Monthly densities of great black-backed gull within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	204 (161-239)	35 (27-41)	37 (29-44)	Jul	8 (4-14)	1 (1-2)	1 (1-2)	14 (7-22)	2 (1-4)	3 (1-4)	Jul	11 (6-18)	2 (1-3)	2 (1-3)
Feb	124 (87-157)	21 (15-27)	22 (16-29)	Aug	9 (5-15)	2 (1-3)	2 (1-3)	14 (7-21)	2 (1-4)	2 (1-4)	Aug	12 (6-18)	2 (1-3)	2 (1-3)
Mar	69 (46-92)	12 (8-16)	12 (8-17)	Sep	22 (12-37)	4 (2-6)	4 (2-7)	24 (13-36)	4 (2-6)	4 (2-7)	Sep	23 (12-37)	4 (2-6)	4 (2-7)
Apr	27 (16-39)	5 (3-7)	5 (3-7)	Oct	35 (21-51)	6 (4-9)	6 (4-9)	29 (17-41)	5 (3-7)	5 (3-7)	Oct	32 (19-46)	5 (3-8)	6 (3-8)
May	17 (9-27)	3 (2-5)	3 (2-5)	Nov	63 (43-83)	11 (7-14)	11 (8-15)	38 (25-49)	6 (4-8)	7 (5-9)	Nov	50 (34-66)	9 (6-11)	9 (6-12)
Jun	11 (6-19)	2 (1-3)	2 (1-3)	Dec	126 (92-164)	21 (16-28)	23 (17-30)	62 (44-79)	11 (7-14)	11 (8-15)	Dec	94 (68-122)	16 (12-21)	17 (12-22)
Jul	8 (4-14)	1 (1-2)	1 (1-2)	Jan	130 (103-159)	22 (17-27)	24 (18-29)	62 (47-77)	11 (8-13)	11 (9-14)	Jan	132 (104-158)	23 (18-27)	24 (19-29)
Aug	9 (5-15)	2 (1-3)	2 (1-3)	Feb	128 (101-157)	22 (17-27)	23 (18-29)	95 (70-127)	16 (12-22)	17 (13-23)	Feb	116 (86-147)	20 (15-25)	21 (16-27)
Sep	22 (12-37)	4 (2-6)	4 (2-7)	Mar	132 (100-172)	22 (17-29)	24 (18-31)	88 (59-118)	15 (10-20)	16 (11-22)	Mar	96 (68-127)	16 (12-22)	17 (12-23)
Oct	35 (21-51)	6 (4-9)	6 (4-9)	Apr	57 (39-75)	10 (6-13)	10 (7-13)	48 (26-66)	8 (4-11)	8 (5-12)	Apr	44 (27-60)	7 (5-10)	8 (5-11)
Nov	63 (43-83)	11 (7-14)	11 (8-15)	May	32 (18-44)	5 (3-7)	6 (3-8)	32 (15-47)	5 (3-8)	6 (3-8)	May	27 (14-39)	5 (2-7)	5 (3-7)
Dec	126 (92-164)	21 (16-28)	23 (17-30)	Jun	19 (10-28)	3 (2-5)	3 (2-5)	17 (7-28)	3 (1-5)	3 (1-5)	Jun	16 (8-25)	3 (1-4)	3 (1-4)

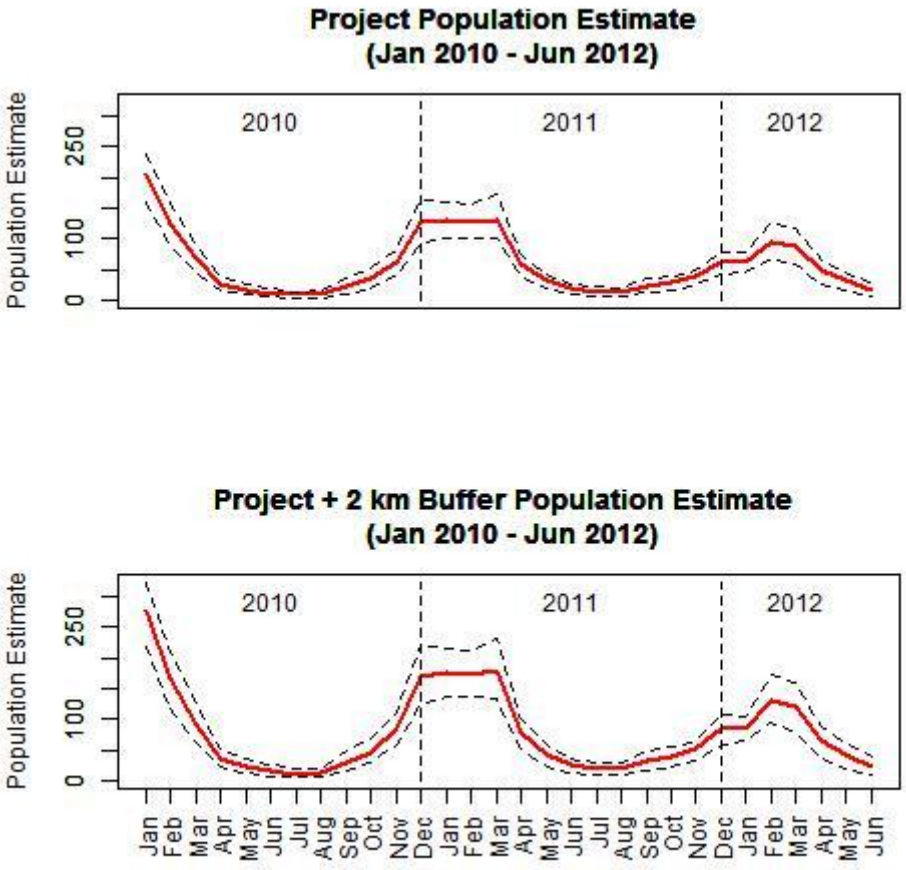

Figure 3.41 Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	359 (276-420)	63 (48-73)	66 (51-78)	Jul	17 (9-28)	3 (2-5)	3 (2-5)	32 (16-48)	6 (3-8)	6 (3-9)	Jul	25 (13-38)	4 (2-7)	5 (2-7)
Feb	221 (157-281)	39 (27-49)	41 (29-52)	Aug	20 (11-31)	4 (2-6)	4 (2-6)	31 (15-45)	5 (3-8)	6 (3-9)	Aug	25 (13-38)	4 (2-7)	5 (2-7)
Mar	123 (82-169)	22 (14-29)	23 (15-31)	Sep	39 (20-66)	7 (3-12)	7 (4-12)	43 (22-64)	8 (4-11)	8 (4-12)	Sep	41 (21-65)	7 (4-11)	8 (4-12)
Apr	61 (36-84)	11 (6-15)	11 (7-16)	Oct	62 (37-92)	11 (6-16)	11 (7-17)	52 (31-73)	9 (5-13)	10 (6-14)	Oct	57 (34-82)	10 (6-14)	11 (6-15)
May	37 (21-56)	6 (4-10)	7 (4-10)	Nov	113 (77-151)	20 (13-26)	21 (14-28)	68 (46-90)	12 (8-16)	13 (9-17)	Nov	90 (61-120)	16 (11-21)	17 (11-22)
Jun	25 (13-39)	4 (2-7)	5 (2-7)	Dec	228 (167-301)	40 (29-52)	42 (31-56)	113 (80-147)	20 (14-26)	21 (15-27)	Dec	171 (124-224)	30 (22-39)	32 (23-41)
Jul	17 (9-28)	3 (2-5)	3 (2-5)	Jan	242 (189-305)	42 (33-53)	45 (35-57)	113 (86-142)	20 (15-25)	21 (16-26)	Jan	238 (184-289)	42 (32-51)	44 (34-54)
Aug	20 (11-31)	4 (2-6)	4 (2-6)	Feb	240 (193-300)	42 (34-53)	45 (36-56)	176 (127-237)	31 (22-41)	33 (23-44)	Feb	213 (159-273)	37 (28-48)	39 (29-51)
Sep	39 (20-66)	7 (3-12)	7 (4-12)	Mar	240 (182-317)	42 (32-55)	45 (34-59)	156 (106-216)	27 (19-38)	29 (20-40)	Mar	173 (124-234)	30 (22-41)	32 (23-43)
Oct	62 (37-92)	11 (6-16)	11 (7-17)	Apr	131 (92-175)	23 (16-31)	25 (17-33)	105 (62-150)	19 (11-27)	20 (12-28)	Apr	99 (64-137)	18 (11-24)	19 (12-26)
Nov	113 (77-151)	20 (13-26)	21 (14-28)	May	73 (42-98)	13 (7-17)	14 (8-18)	69 (37-103)	12 (7-18)	13 (7-19)	May	60 (33-86)	11 (6-15)	11 (6-16)
Dec	228 (167-301)	40 (29-52)	42 (31-56)	Jun	43 (21-60)	8 (4-11)	8 (4-11)	37 (16-62)	6 (3-11)	7 (3-12)	Jun	35 (17-54)	6 (3-9)	6 (3-10)

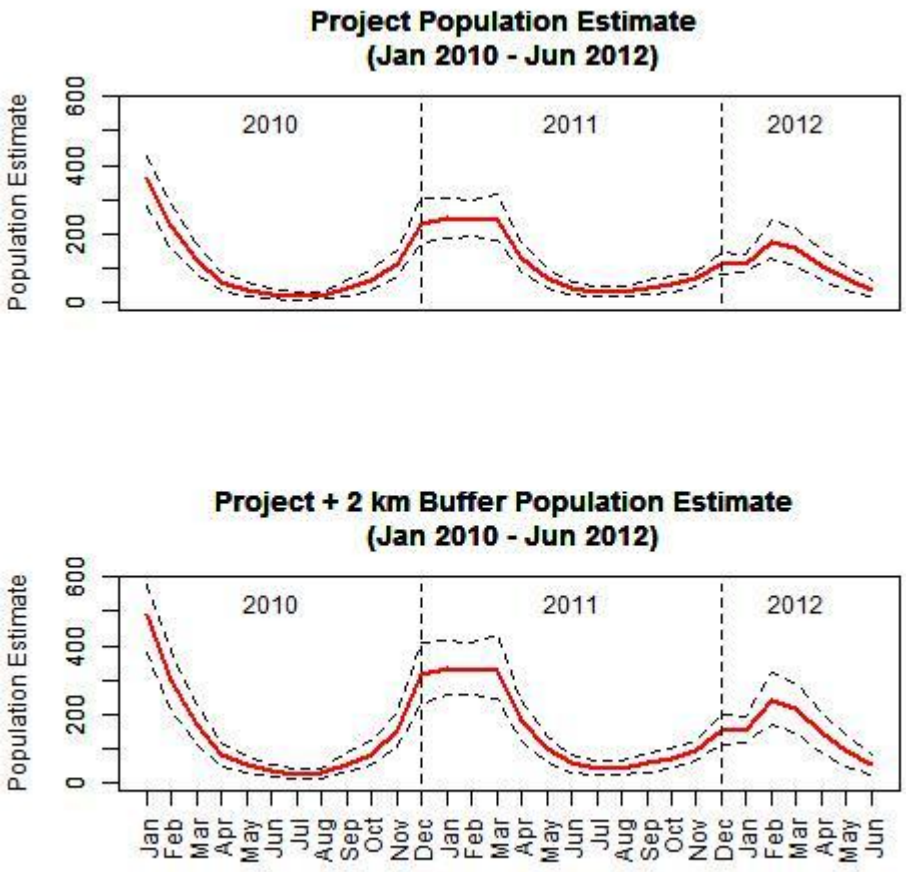

Figure 3.42 Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/112.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	3,122 (2,874-3,418)	549 (506-601)	580 (535-636)	Jul	201 (184-223)	37 (34-41)	39 (35-43)	362 (331-399)	66 (60-72)	69 (63-76)	Jul	281 (258-311)	51 (47-56)	54 (49-60)
Feb	3,619 (3,354-3,940)	645 (598-703)	685 (635-746)	Aug	284 (250-320)	52 (46-59)	56 (49-63)	237 (210-268)	44 (39-49)	46 (41-52)	Aug	260 (230-294)	48 (43-54)	51 (45-57)
Mar	3,410 (3,152-3,682)	610 (563-658)	647 (598-699)	Sep	613 (532-682)	114 (99-127)	121 (105-135)	143 (126-160)	27 (23-30)	28 (25-31)	Sep	378 (329-421)	70 (61-78)	75 (65-83)
Apr	2,535 (2,331-2,727)	451 (415-485)	478 (439-514)	Oct	2,359 (2,160-2,563)	423 (388-460)	448 (409-486)	307 (274-335)	55 (49-60)	58 (52-63)	Oct	1,333 (1,217-1,449)	239 (218-260)	253 (231-275)
May	366 (335-403)	66 (61-73)	70 (65-78)	Nov	2,558 (2,365-2,764)	456 (422-493)	485 (448-524)	252 (228-273)	45 (41-49)	48 (43-52)	Nov	1,405 (1,297-1,519)	251 (231-271)	266 (246-288)
Jun	319 (292-352)	58 (53-64)	61 (56-67)	Dec	4,196 (3,915-4,553)	743 (693-806)	787 (733-853)	603 (548-664)	107 (97-118)	114 (104-126)	Dec	2,400 (2,231-2,608)	425 (395-462)	451 (418-489)
Jul	201 (184-223)	37 (34-41)	39 (35-43)	Jan	2,852 (2,648-3,111)	506 (469-552)	540 (501-589)	782 (708-851)	140 (126-152)	149 (135-162)	Jan	2,252 (2,076-2,460)	398 (367-435)	423 (390-462)
Aug	284 (250-320)	52 (46-59)	56 (49-63)	Feb	3,207 (2,985-3,482)	572 (532-621)	608 (565-660)	3,922 (3,537-4,281)	695 (626-758)	739 (665-806)	Feb	3,583 (3,292-3,901)	637 (586-694)	677 (622-737)
Sep	613 (532-682)	114 (99-127)	121 (105-135)	Mar	6,469 (6,051-6,975)	1,159 (1,084-1,249)	1,234 (1,154-1,331)	5,649 (5,236-6,053)	1,009 (934-1,080)	1,081 (1,000-1,158)	Mar	5,176 (4,813-5,570)	926 (860-996)	987 (917-1,062)
Oct	2,359 (2,160-2,563)	423 (388-460)	448 (409-486)	Apr	6,546 (6,074-7,052)	1,178 (1,093-1,269)	1,250 (1,160-1,348)	6,681 (6,146-7,176)	1,197 (1,101-1,285)	1,278 (1,175-1,373)	Apr	5,254 (4,850-5,652)	942 (869-1013)	1,002 (925-1,078)
Nov	2,558 (2,365-2,764)	456 (422-493)	485 (448-524)	May	875 (803-960)	159 (146-174)	168 (154-185)	991 (895-1,114)	181 (163-203)	192 (173-215)	May	744 (678-826)	136 (123-150)	143 (131-159)
Dec	4,196 (3,915-4,553)	743 (693-806)	787 (733-853)	Jun	610 (559-673)	111 (102-122)	116 (107-128)	645 (582-728)	118 (106-133)	124 (112-140)	Jun	525 (478-585)	95 (87-106)	101 (92-112)

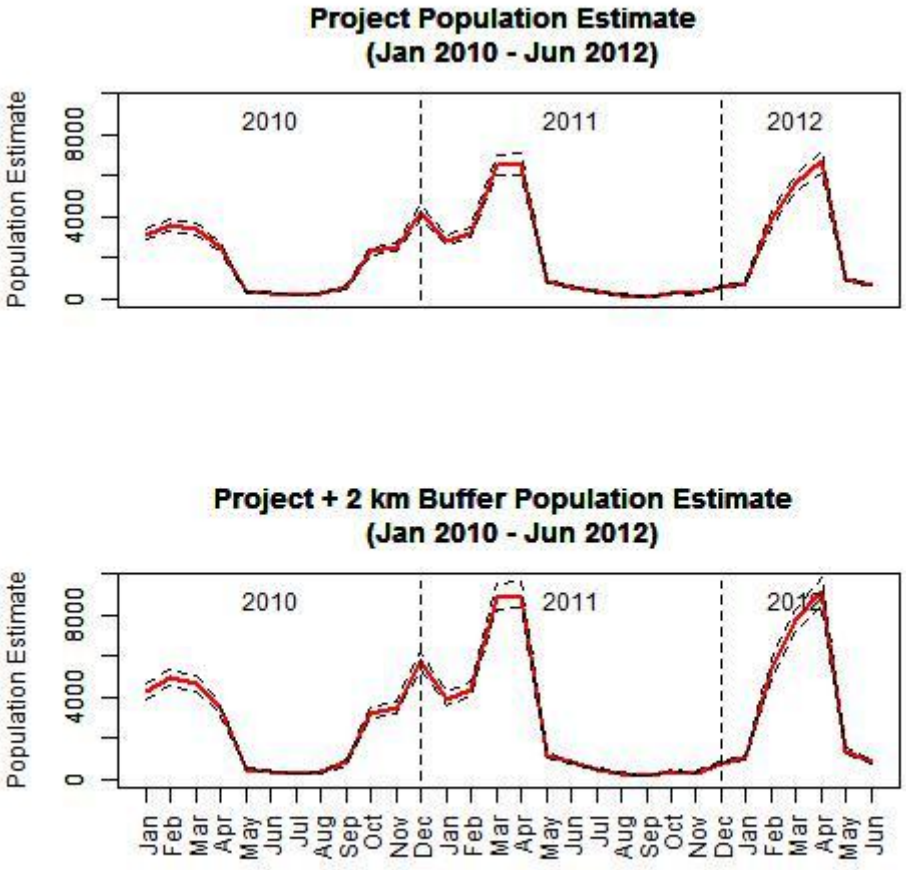

Figure 3.43 Modelled monthly population estimates (and 90% confidence limits) for common guillemot for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

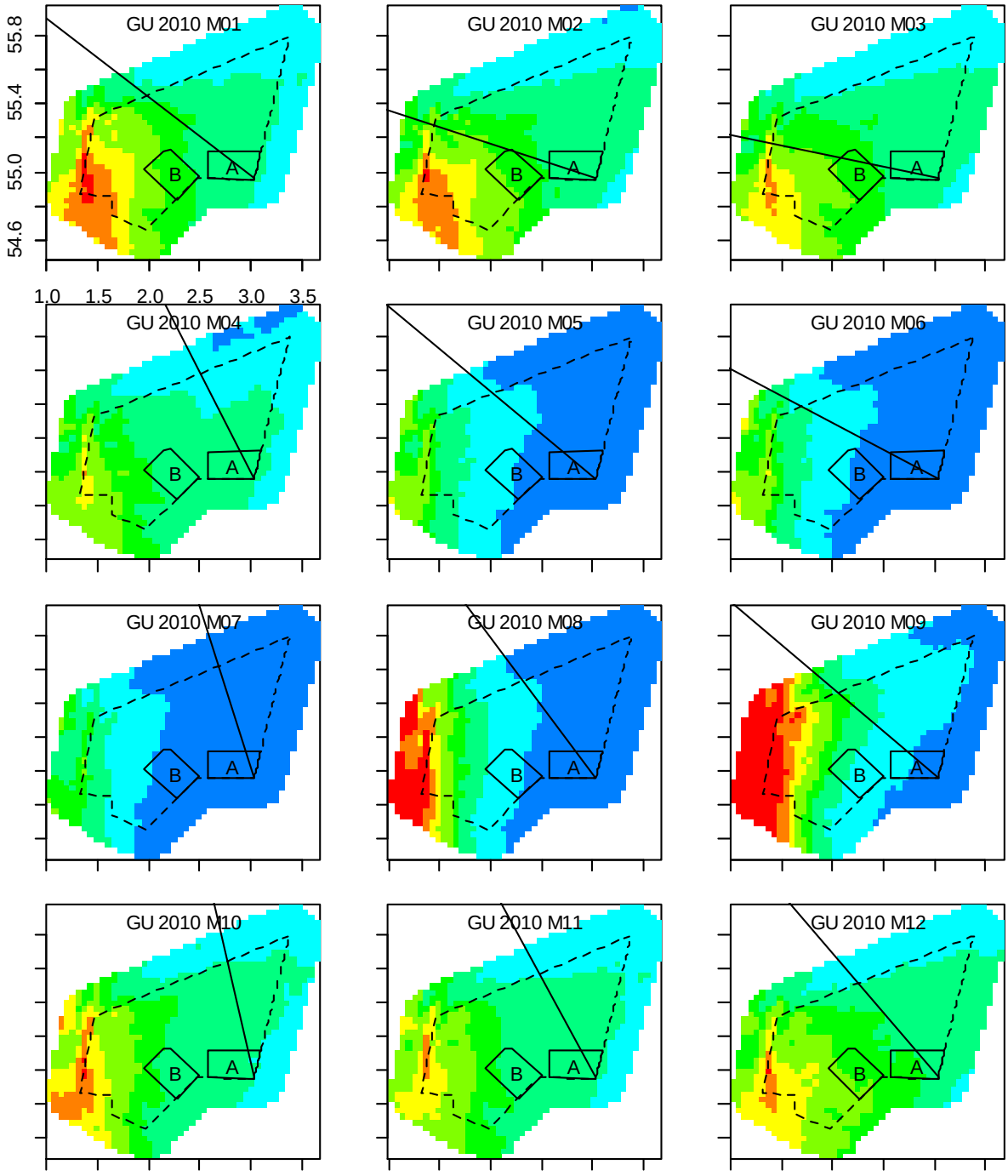

Figure 3.44 Monthly densities of common guillemot within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

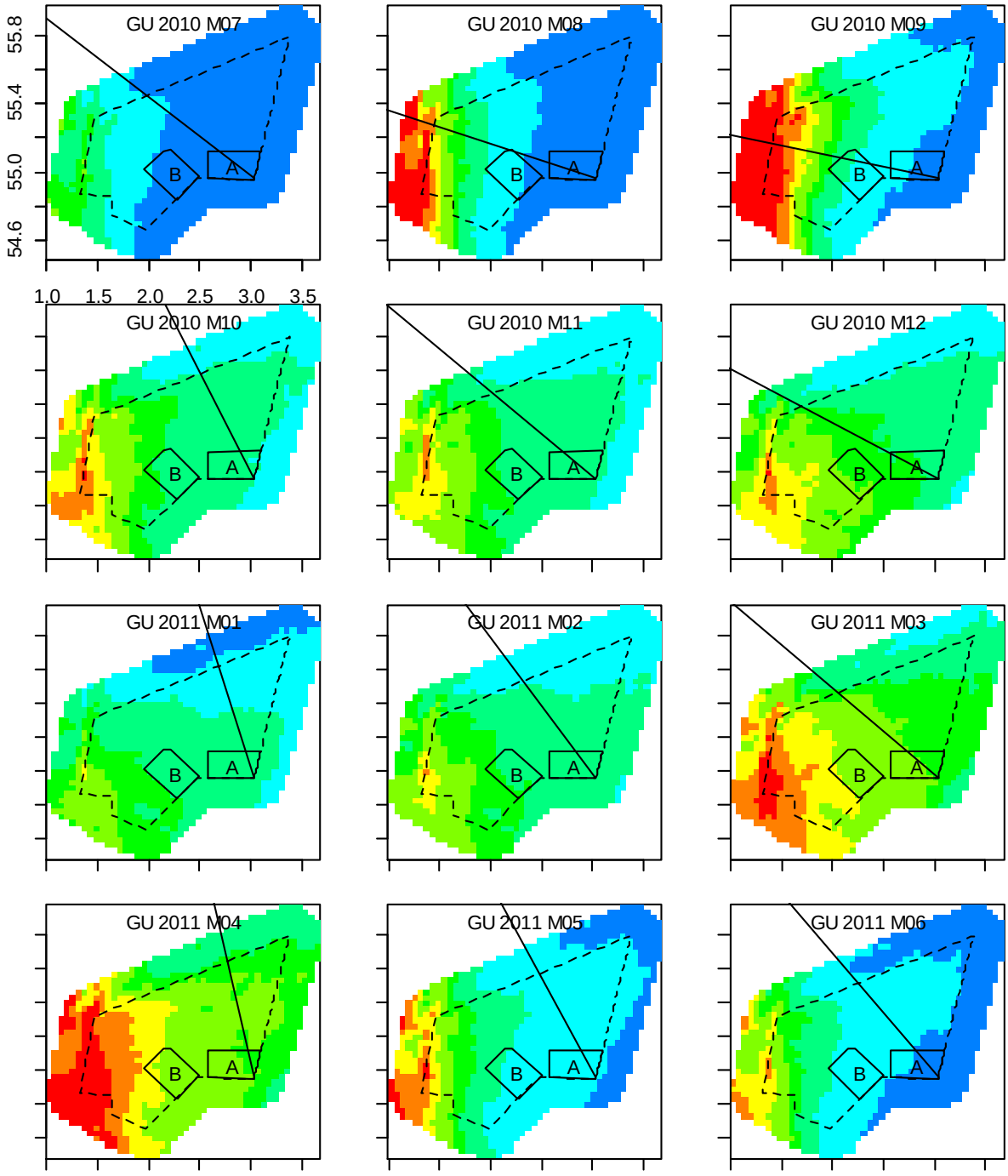

Figure 3.45 Monthly densities of common guillemot within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

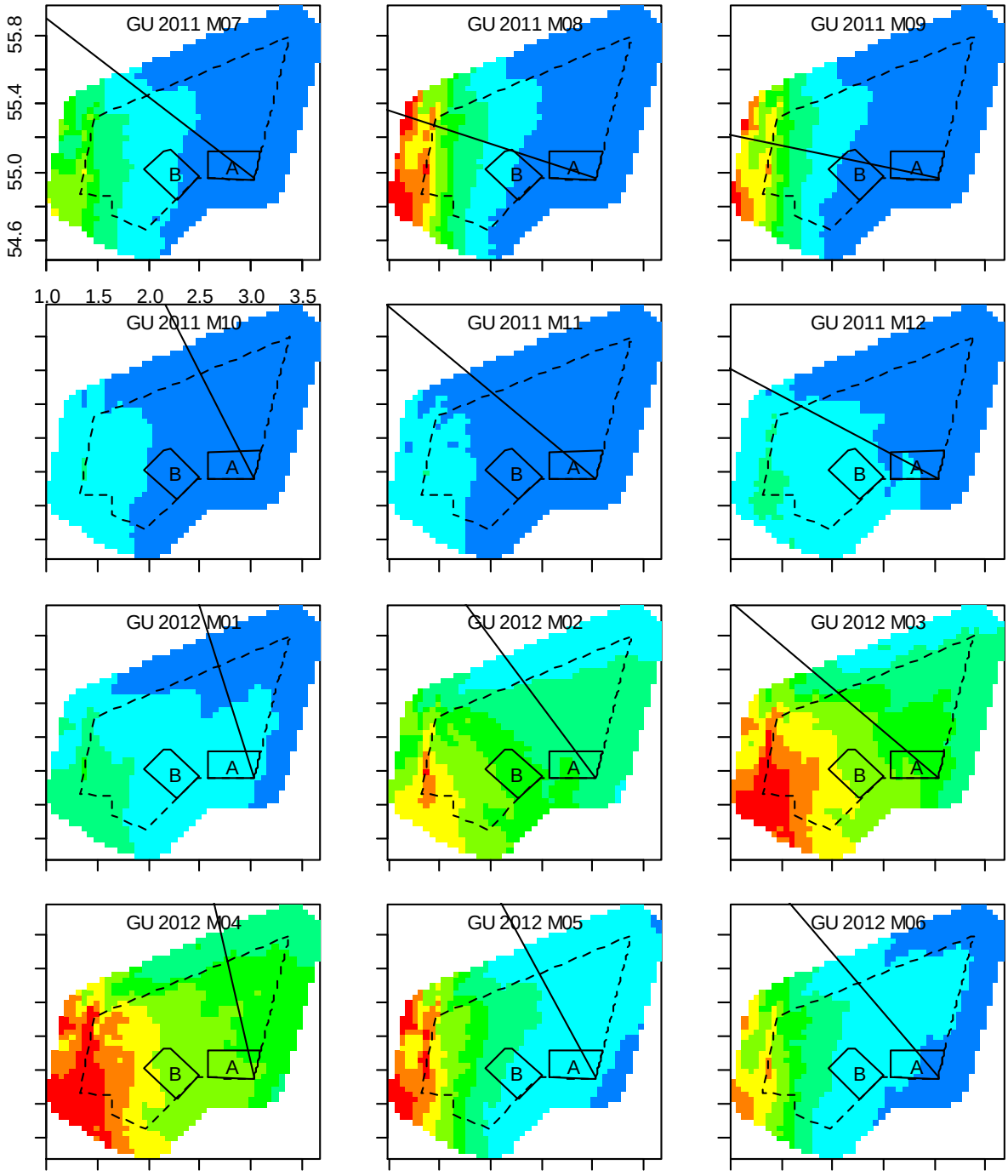

Figure 3.46 Monthly densities of common guillemot within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	Project	0-1km	1-2km	Month	Project	0-1km	1-2km	Project	0-1km	1-2km	Month	Project	0-1km	1-2km
Jan	5,707 (5,259-6,216)	1,013 (932-1,103)	1,085 (999-1,181)	Jul	460 (427-505)	84 (77-92)	90 (84-99)	786 (727-852)	140 (129-152)	150 (139-163)	Jul	623 (577-679)	112 (103-122)	120 (111-131)
Feb	6,150 (5,706-6,674)	1,074 (996-1,165)	1,146 (1,064-1,243)	Aug	920 (823-1,019)	172 (154-190)	186 (167-206)	733 (667-817)	136 (124-151)	147 (134-164)	Aug	826 (745-918)	154 (139-170)	167 (151-185)
Mar	5,700 (5,259-6,125)	984 (908-1,057)	1,047 (967-1,125)	Sep	1,980 (1,739-2,185)	377 (331-415)	410 (361-452)	448 (401-494)	84 (75-92)	91 (82-100)	Sep	1,214 (1,070-1,339)	230 (203-254)	250 (221-276)
Apr	3,569 (3,310-3,853)	621 (576-670)	662 (615-714)	Oct	3,969 (3,647-4,279)	700 (644-755)	749 (689-807)	494 (447-537)	86 (78-94)	92 (84-100)	Oct	2,231 (2,047-2,408)	393 (361-424)	421 (387-454)
May	732 (679-799)	132 (123-144)	142 (132-155)	Nov	4,048 (3,755-4,364)	713 (662-769)	763 (708-822)	399 (363-428)	70 (63-75)	75 (68-80)	Nov	2,223 (2,059-2,396)	392 (363-422)	419 (388-451)
Jun	626 (582-683)	114 (106-125)	123 (115-134)	Dec	6,317 (5,877-6,806)	1,103 (1,027-1,189)	1,177 (1,097-1,267)	877 (800-956)	153 (140-167)	163 (149-178)	Dec	3,597 (3,339-3,881)	628 (584-678)	670 (623-723)
Jul	460 (427-505)	84 (77-92)	90 (84-99)	Jan	3,815 (3,517-4,154)	661 (609-720)	705 (649-768)	1,172 (1,064-1,267)	206 (187-222)	220 (200-238)	Jan	3,565 (3,280-3,879)	626 (576-682)	670 (616-729)
Aug	920 (823-1,019)	172 (154-190)	186 (167-206)	Feb	4,238 (3,932-4,602)	736 (682-800)	786 (729-854)	5,568 (5,037-6,016)	969 (878-1,048)	1,034 (938-1,118)	Feb	5,319 (4,892-5,764)	926 (852-1,004)	989 (910-1,072)
Sep	1,980 (1,739-2,185)	377 (331-415)	410 (361-452)	Mar	9,719 (9,108-10,385)	1,676 (1,571-1,790)	1,786 (1,674-1,907)	9,645 (8,879-10,389)	1,679 (1,547-1,809)	1,792 (1,652-1,930)	Mar	8,355 (7,748-8,966)	1,446 (1,342-1,552)	1,542 (1,431-1,654)
Oct	3,969 (3,647-4,279)	700 (644-755)	749 (689-807)	Apr	9,638 (8,944-10,325)	1,694 (1,573-1,813)	1,814 (1,685-1,940)	9,489 (8,801-10,201)	1,664 (1,545-1,789)	1,779 (1,652-1,913)	Apr	7,565 (7,018-8,126)	1,326 (1,231-1,424)	1,418 (1,317-1,523)
Nov	4,048 (3,755-4,364)	713 (662-769)	763 (708-822)	May	1,787 (1,661-1,931)	318 (296-344)	342 (319-370)	2,004 (1,840-2,228)	361 (331-401)	388 (357-431)	May	1,508 (1,393-1,652)	270 (250-296)	291 (269-319)
Dec	6,317 (5,877-6,806)	1,103 (1,027-1,189)	1,177 (1,097-1,267)	Jun	1298 (1204-1410)	233 (216-253)	251 (232-272)	1,310 (1,193-1,460)	236 (215-262)	254 (232-282)	Jun	1,078 (993-1,184)	194 (179-213)	209 (193-229)

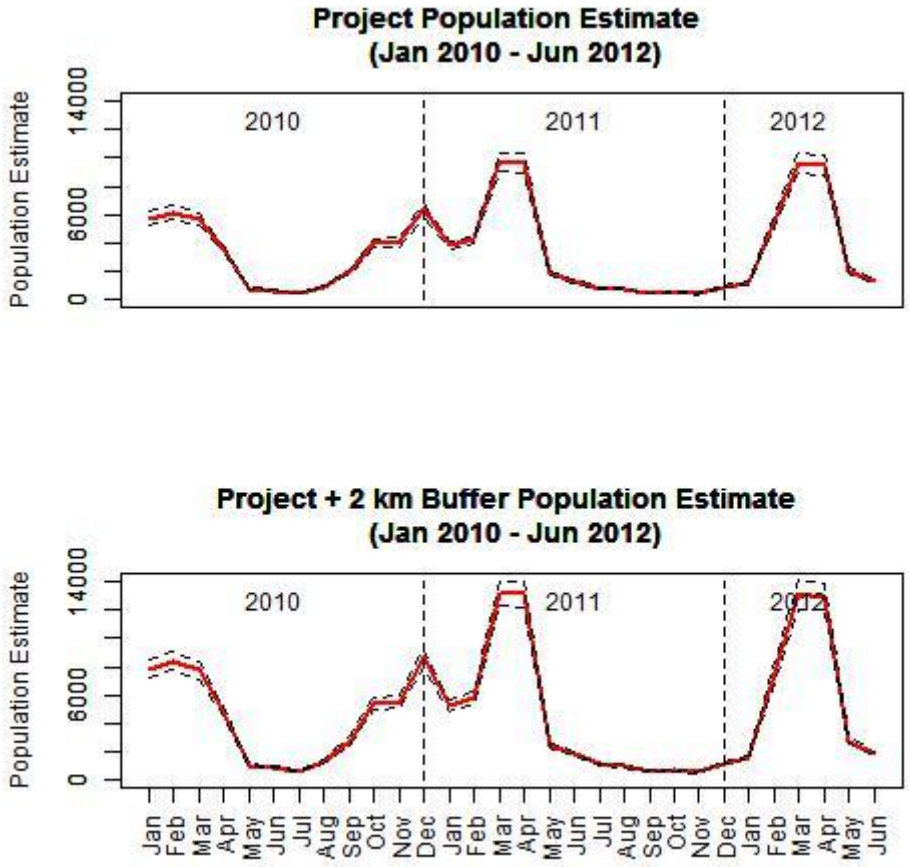

Figure 3.47 Modelled monthly population estimates (and 90% confidence limits) for common guillemot for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12

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% CIs = 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% CIs = 15,159-17,360) in March 2010/11 and 16,170 birds (90% CIs = 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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	8,818 (8,133-9,634)	1,560 (1,438-1,704)	1,664 (1,534-1,817)	Jul	661 (611-730)	120 (111-132)	129 (119-142)	1,148 (1,060-1,251)	206 (190-224)	220 (203-240)	Jul	905 (836-990)	163 (150-178)	174 (161-191)
Feb	9,766 (9,060-10,597)	1,719 (1,594-1,865)	1,832 (1,699-1,987)	Aug	1,204 (1,074-1,339)	224 (200-249)	242 (216-269)	971 (878-1086)	180 (163-201)	194 (176-216)	Aug	1,087 (976-1,212)	202 (182-225)	218 (196-242)
Mar	9,109 (8,398-9,815)	1,593 (1,470-1,717)	1,694 (1,563-1,825)	Sep	2,594 (2,274-2,864)	491 (430-542)	532 (466-586)	591 (527-653)	110 (99-122)	119 (106-131)	Sep	1,593 (1,401-1,759)	301 (264-332)	325 (286-359)
Apr	6,108 (5,641-6,580)	1,072 (991-1,155)	1,140 (1,054-1,229)	Oct	6,330 (5,806-6,841)	1,124 (1,032-1,215)	1,197 (1,099-1,294)	802 (722-871)	141 (127-154)	150 (136-164)	Oct	3,566 (3,264-3,856)	633 (579-684)	674 (617-729)
May	1,097 (1,015-1,202)	198 (184-217)	212 (197-232)	Nov	6,603 (6,120-7,127)	1,169 (1,084-1,262)	1,247 (1,156-1,346)	650 (591-701)	115 (104-123)	122 (111-132)	Nov	3,627 (3,355-3,914)	642 (594-693)	685 (634-739)
Jun	946 (876-1,037)	172 (160-189)	184 (171-202)	Dec	10,513 (9,792-11,361)	1,847 (1,720-1,995)	1,963 (1,830-2,121)	1,480 (1,348-1,620)	260 (237-285)	278 (253-304)	Dec	5,996 (5,570-6,491)	1,053 (979-1,140)	1,121 (1,041-1,213)
Jul	661 (611-730)	120 (111-132)	129 (119-142)	Jan	6,664 (6,165-7,265)	1,166 (1,078-1,272)	1,244 (1,150-1,357)	1,955 (1,772-2,120)	346 (313-375)	369 (335-400)	Jan	5,812 (5,356-6,340)	1,024 (943-1,117)	1,092 (1,006-1,192)
Aug	1,204 (1,074-1,339)	224 (200-249)	242 (216-269)	Feb	7,453 (6,913-8,077)	1,309 (1,214-1,419)	1,395 (1,293-1,513)	9,492 (8,574-10,297)	1,665 (1,505-1,806)	1,774 (1,603-1,924)	Feb	8,904 (8,182-9,657)	1,564 (1,438-1,697)	1,667 (1,532-1,808)
Sep	2,594 (2,274-2,864)	491 (430-542)	532 (466-586)	Mar	16,194 (15,159-17,347)	2,835 (2,654-3,037)	3,021 (2,828-3,237)	15,280 (14,115-16,457)	2,686 (2,481-2,893)	2,871 (2,652-3,093)	Mar	13,528 (12,557-14,540)	2,372 (2,202-2,549)	2,529 (2,348-2,718)
Oct	6,330 (5,806-6,841)	1,124 (1,032-1,215)	1,197 (1,099-1,294)	Apr	16,179 (15,015-17,361)	2,870 (2,665-3,081)	3,063 (2,843-3,288)	16,170 (14,946-17,368)	2,861 (2,645-3,073)	3,057 (2,827-3,285)	Apr	12,819 (11,867-13,769)	2,268 (2,100-2,437)	2,420 (2,241-2,601)
Nov	6,603 (6,120-7,127)	1,169 (1,084-1,262)	1,247 (1,156-1,346)	May	2,662 (2,466-2,890)	477 (443-518)	511 (473-555)	2,995 (2,738-3,341)	542 (496-604)	580 (531-646)	May	2,251 (2,073-2,478)	406 (374-446)	434 (400-478)
Dec	10,513 (9,792-11,361)	1847 (1,720-1,995)	1,963 (1,830-2,121)	Jun	1,914 (1,764-2,083)	345 (318-375)	368 (340-401)	1,955 (1,776-2,188)	353 (321-395)	378 (344-422)	Jun	1,605 (1,472-1,769)	290 (266-320)	310 (285-342)

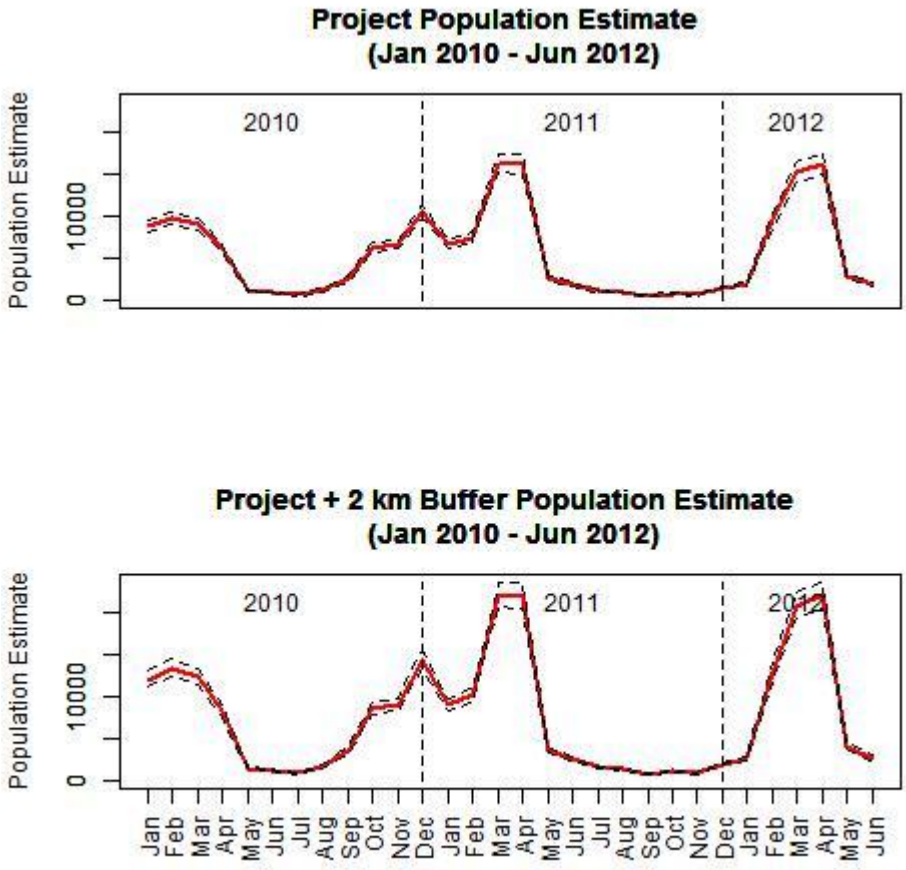

Figure 3.48 Modelled monthly population estimates (and 90% confidence limits) for common guillemot for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	1,164 (1,005-1,359)	204 (176-237)	216 (186-252)	Jul	28 (21-35)	5 (4-6)	5 (4-7)	23 (17-29)	4 (3-5)	4 (3-5)	Jul	26 (19-32)	5 (4-6)	5 (4-6)
Feb	1,464 (1,302-1,640)	261 (232-292)	279 (247-312)	Aug	42 (30-52)	8 (6-10)	9 (6-11)	6 (4-8)	1 (1-1)	1 (1-2)	Aug	24 (17-30)	5 (3-6)	5 (3-6)
Mar	1,311 (1,171-1,456)	234 (209-260)	250 (223-277)	Sep	119 (87-151)	23 (17-29)	25 (19-31)	2 (1-3)	0 (0-1)	0 (0-1)	Sep	60 (44-77)	12 (9-15)	13 (9-16)
Apr	844 (748-956)	150 (133-170)	159 (141-180)	Oct	1,176 (1,039-1,345)	211 (187-241)	224 (198-255)	11 (7-16)	2 (1-3)	2 (1-3)	Oct	593 (523-680)	107 (94-122)	113 (100-129)
May	48 (37-58)	9 (7-11)	9 (7-11)	Nov	1,083 (956-1,205)	193 (171-214)	206 (182-229)	17 (12-24)	3 (2-4)	3 (2-4)	Nov	550 (484-614)	98 (86-109)	104 (92-117)
Jun	44 (34-54)	8 (6-10)	8 (7-10)	Dec	1,585 (1,401-1,765)	280 (247-311)	297 (263-331)	124 (96-156)	22 (17-28)	23 (18-30)	Dec	854 (749-960)	151 (132-170)	160 (141-180)
Jul	28 (21-35)	5 (4-6)	5 (4-7)	Jan	770 (669-891)	136 (119-158)	147 (127-169)	280 (238-333)	50 (43-59)	54 (46-64)	Jan	738 (637-861)	130 (112-152)	139 (120-162)
Aug	42 (30-52)	8 (6-10)	9 (6-11)	Feb	867 (757-992)	154 (135-177)	165 (144-189)	2,036 (1,745-2,400)	360 (308-424)	384 (329-453)	Feb	1,456 (1,268-1,677)	258 (225-297)	276 (240-318)
Sep	119 (87-151)	23 (17-29)	25 (19-31)	Mar	2,447 (2,179-2,753)	438 (390-493)	470 (418-529)	2,284 (2,040-2,549)	407 (364-454)	440 (393-491)	Mar	2,014 (1,797-2,253)	360 (321-402)	386 (345-432)
Oct	1,176 (1,039-1,345)	211 (187-241)	224 (198-255)	Apr	3,009 (2,660-3,364)	542 (479-604)	578 (511-645)	2,464 (2,150-2,787)	441 (386-500)	474 (415-537)	Apr	2,106 (1,852-2,369)	377 (332-424)	404 (356-454)
Nov	1,083 (956-1,205)	193 (171-214)	206 (182-229)	May	159 (129-195)	29 (24-35)	31 (25-38)	223 (172-274)	41 (32-50)	43 (34-53)	May	143 (113-176)	26 (21-32)	28 (22-34)
Dec	1,585 (1,401-1,765)	280 (247-311)	297 (263-331)	Jun	78 (62-97)	14 (11-18)	15 (12-18)	350 (272-436)	64 (49-79)	68 (52-84)	Jun	157 (123-196)	29 (22-36)	30 (24-38)

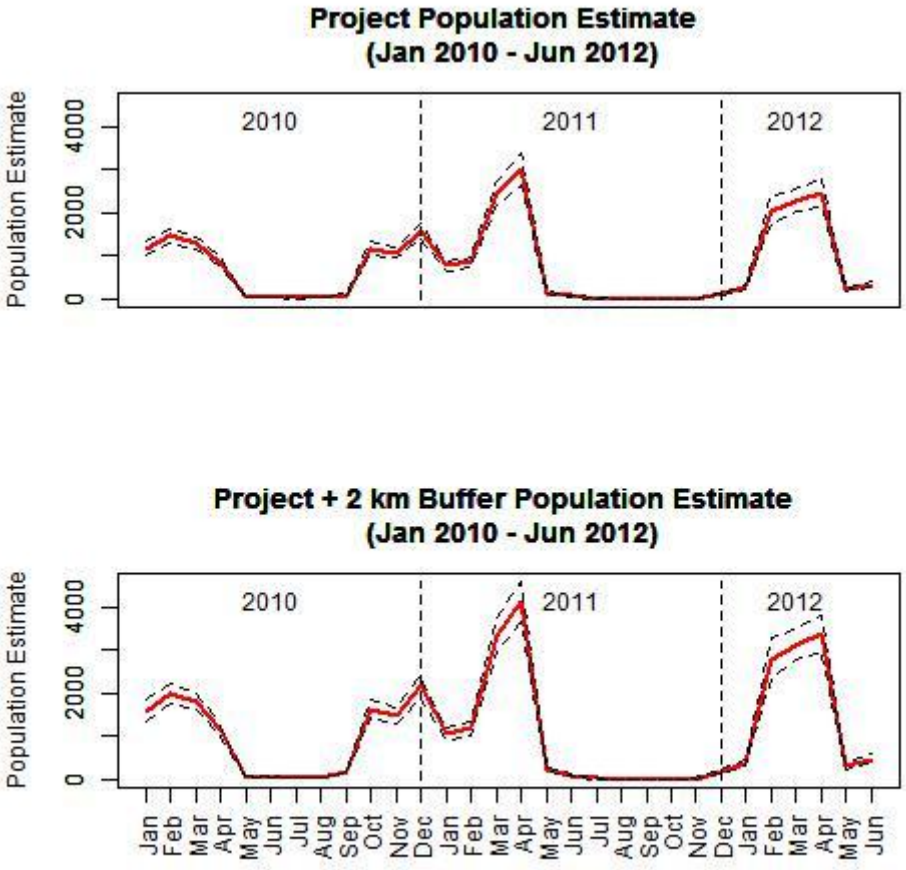

Figure 3.49 Modelled monthly population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

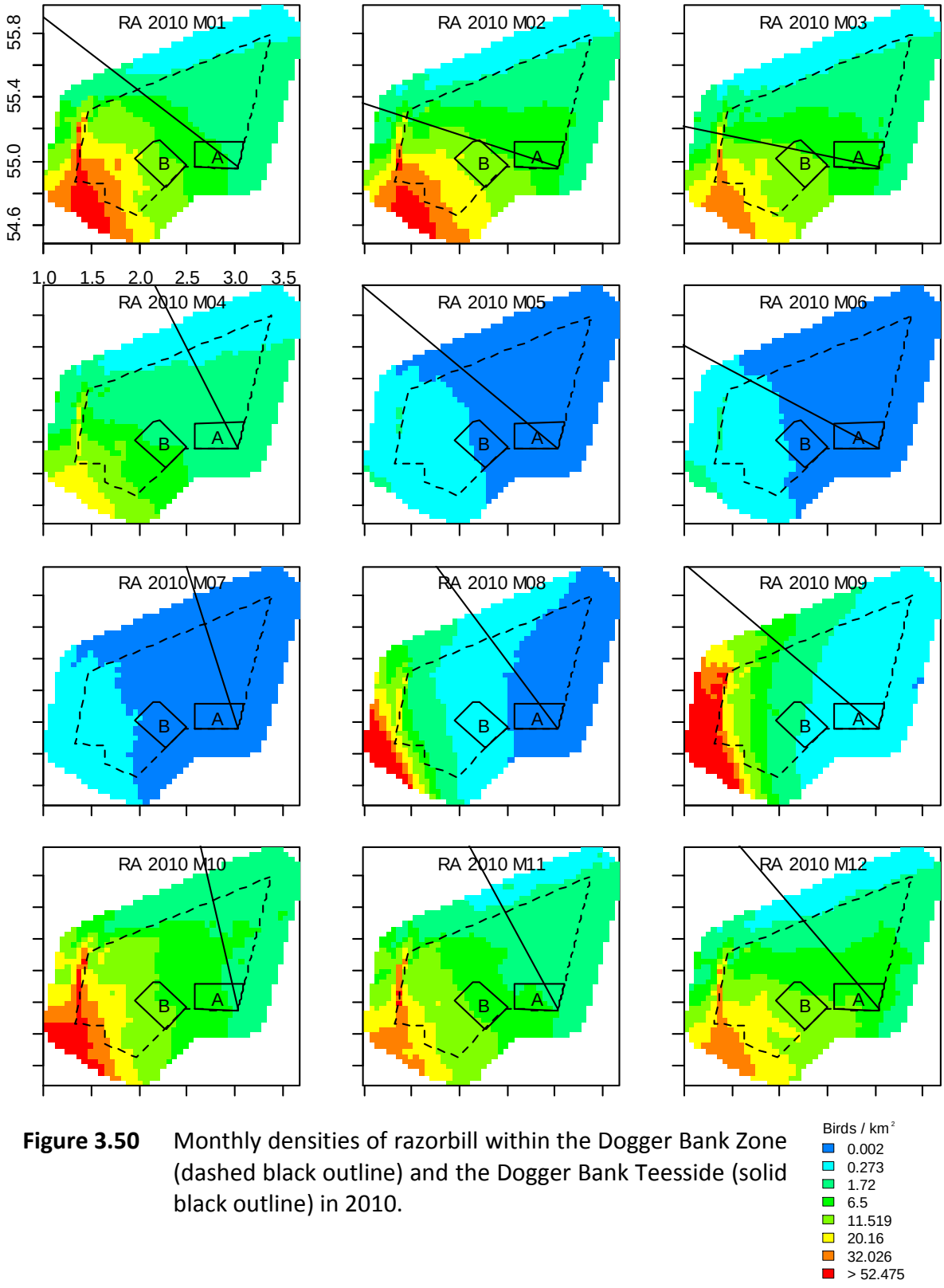

Figure 3.50 Monthly densities of razorbill within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside (solid black outline) in 2010.

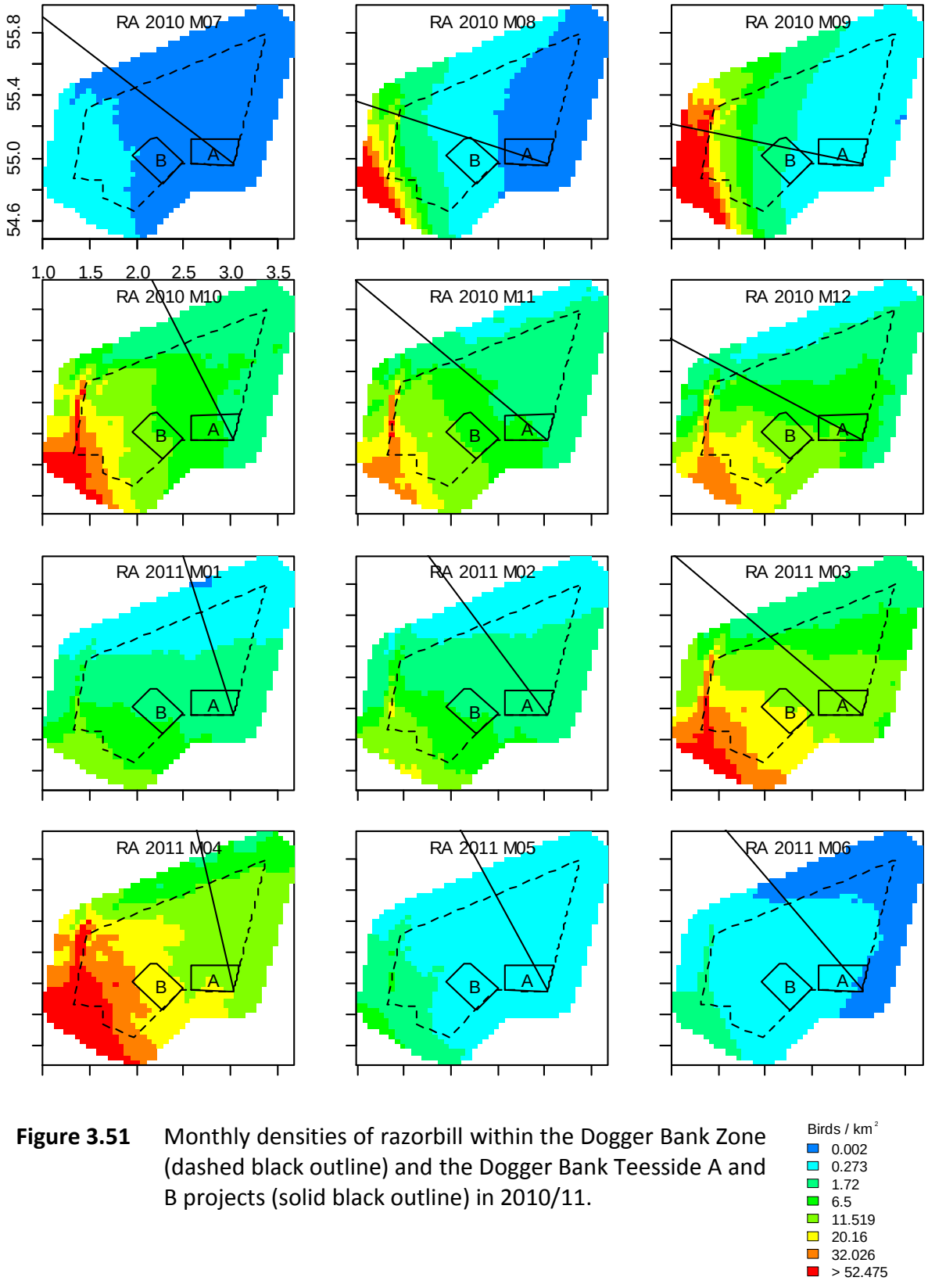

Figure 3.51 Monthly densities of razorbill within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

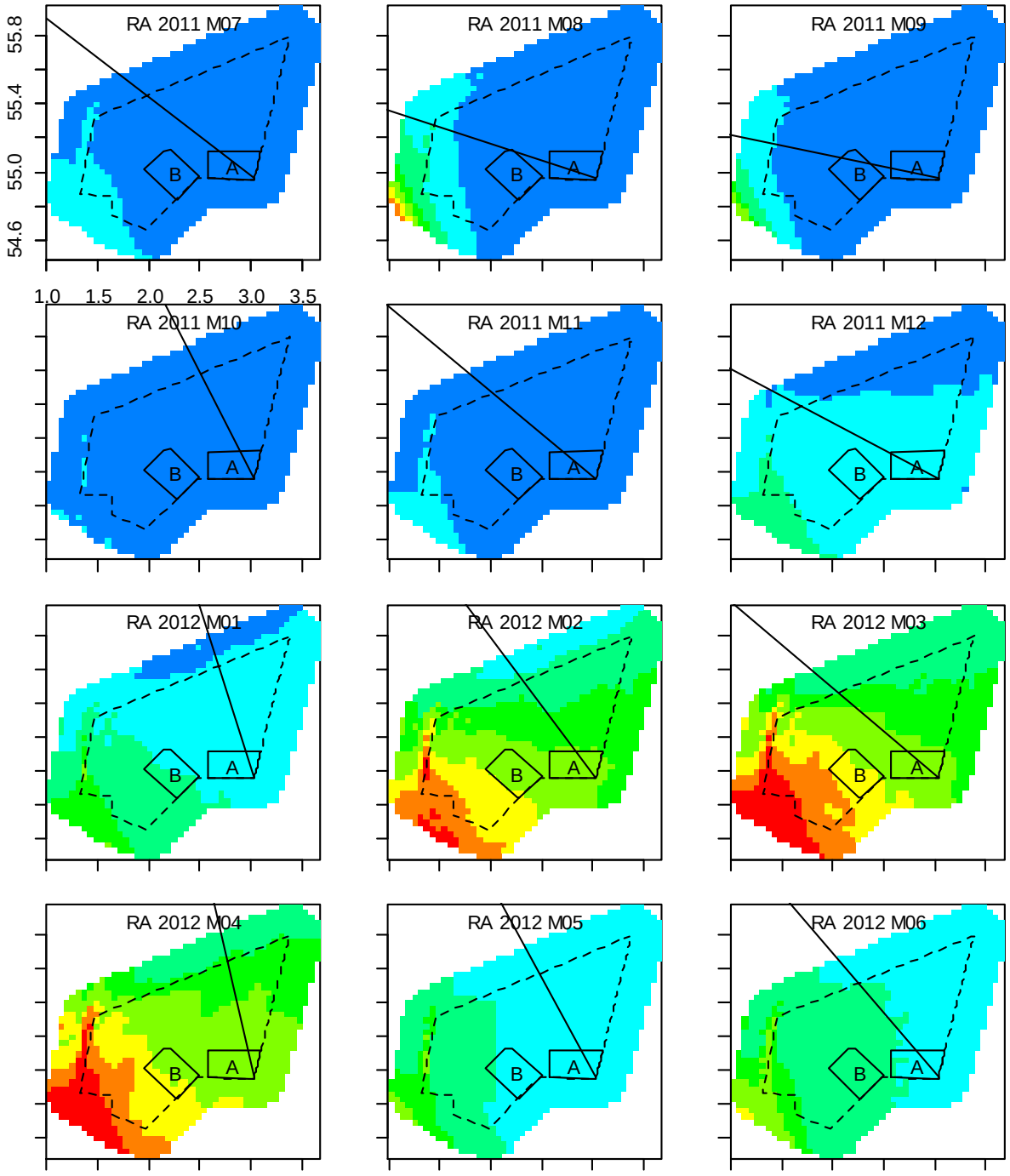

Figure 3.52 Monthly densities of razorbill within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	2,187 (1,909-2,517)	389 (338-447)	416 (362-478)	Jul	48 (39-60)	8 (7-10)	9 (7-11)	37 (29-46)	6 (5-8)	7 (5-8)	Jul	43 (34-53)	7 (6-9)	8 (6-10)
Feb	2,514 (2,235-2,793)	439 (389-488)	468 (415-520)	Aug	148 (119-174)	26 (21-31)	28 (22-33)	19 (13-24)	3 (2-4)	3 (2-5)	Aug	84 (66-99)	15 (12-18)	16 (12-19)
Mar	2,209 (1,956-2,437)	379 (335-419)	402 (356-444)	Sep	429 (346-506)	77 (62-91)	82 (66-98)	6 (4-9)	1 (1-2)	1 (1-2)	Sep	218 (175-258)	39 (31-47)	42 (33-50)
Apr	1,138 (1,007-1,284)	198 (174-223)	210 (186-237)	Oct	1,984 (1,758-2,226)	349 (309-392)	373 (330-418)	17 (12-25)	3 (2-4)	3 (2-5)	Oct	1,001 (885-1,125)	176 (155-198)	188 (166-212)
May	69 (56-82)	12 (10-14)	13 (10-15)	Nov	1,684 (1,507-1,871)	297 (265-329)	317 (283-352)	26 (19-36)	5 (3-6)	5 (4-7)	Nov	855 (763-953)	151 (134-168)	161 (143-179)
Jun	62 (50-74)	11 (9-13)	12 (9-14)	Dec	2,304 (2,047-2,563)	403 (357-448)	429 (381-477)	171 (137-219)	30 (24-38)	32 (25-41)	Dec	1,238 (1,092-1,391)	216 (190-243)	231 (203-259)
Jul	48 (39-60)	8 (7-10)	9 (7-11)	Jan	968 (838-1,115)	168 (145-194)	179 (155-207)	407 (350-484)	71 (61-85)	76 (65-91)	Jan	1,187 (1,032-1,372)	209 (181-242)	224 (194-259)
Aug	148 (119-174)	26 (21-31)	28 (22-33)	Feb	1,069 (932-1,238)	185 (161-215)	198 (172-229)	2,758 (2,396-3,212)	480 (417-559)	512 (445-596)	Feb	2,114 (1,854-2,414)	368 (322-421)	392 (344-448)
Sep	429 (346-506)	77 (62-91)	82 (66-98)	Mar	3,527 (3,176-3,963)	606 (544-680)	644 (578-724)	3,923 (3,492-4,386)	681 (605-762)	726 (645-812)	Mar	3,220 (2,875-3,595)	555 (495-620)	591 (527-660)
Oct	1,984 (1,758-2,226)	349 (309-392)	373 (330-418)	Apr	4,245 (3,800-4,702)	743 (665-824)	794 (711-881)	3,321 (2,915-3,727)	581 (509-651)	621 (544-695)	Apr	2,901 (2,574-3,237)	507 (449-566)	542 (480-605)
Nov	1,684 (1,507-1,871)	297 (265-329)	317 (283-352)	May	236 (198-276)	40 (34-47)	43 (36-50)	328 (264-400)	56 (45-69)	60 (48-74)	May	211 (173-253)	36 (30-43)	39 (32-46)
Dec	2,304 (2,047-2,563)	403 (357-448)	429 (381-477)	Jun	123 (102-146)	21 (17-25)	22 (18-27)	518 (425-635)	89 (73-110)	95 (78-117)	Jun	234 (192-285)	40 (33-49)	43 (35-53)

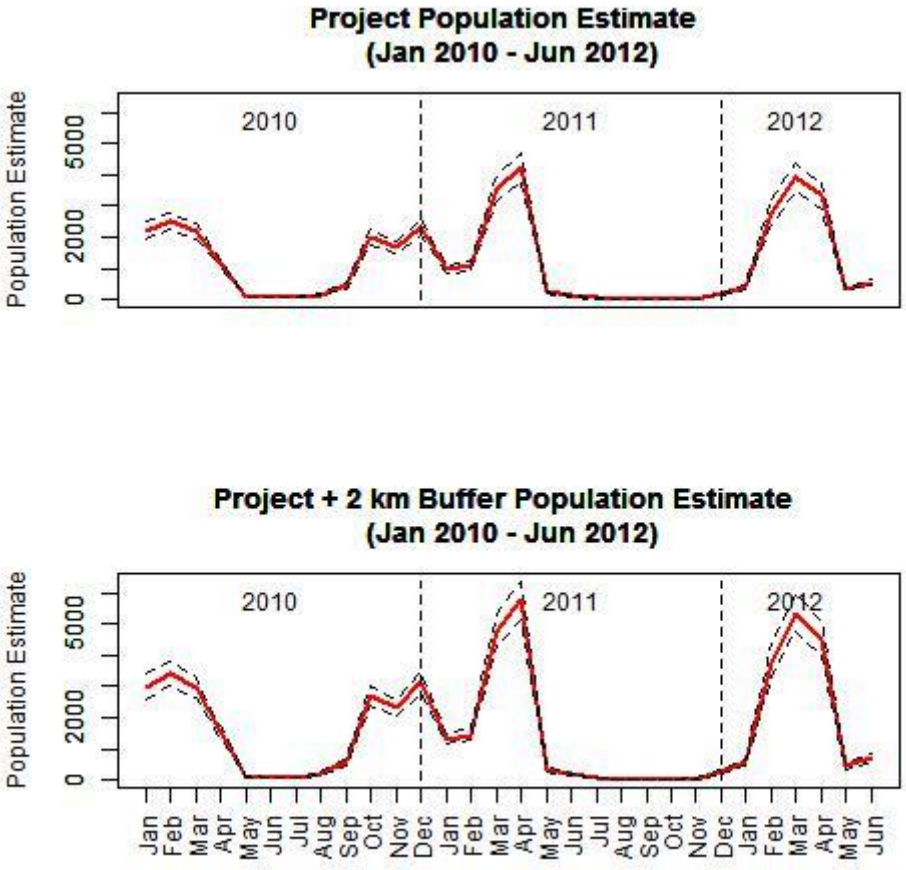

Figure 3.53 Modelled monthly population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	3,346 (2,929-3,871)	591 (517-684)	631 (551-729)	Jul	76 (61-95)	13 (11-17)	14 (11-18)	61 (46-74)	11 (8-13)	11 (9-14)	Jul	68 (53-84)	12 (9-15)	13 (10-16)
Feb	3,978 (3,527-4,434)	700 (620-780)	746 (661-831)	Aug	190 (150-226)	34 (27-41)	36 (29-43)	24 (17-32)	4 (3-6)	5 (3-6)	Aug	107 (83-129)	19 (15-23)	21 (16-25)
Mar	3,514 (3,127-3,882)	613 (544-677)	651 (579-719)	Sep	550 (434-656)	100 (79-120)	107 (84-128)	8 (6-12)	2 (1-2)	2 (1-2)	Sep	279 (220-334)	51 (40-61)	54 (43-65)
Apr	1,984 (1,756-2,235)	348 (307-392)	370 (327-417)	Oct	3,168 (2,797-3,582)	561 (495-635)	597 (527-676)	28 (19-40)	5 (3-7)	5 (4-8)	Oct	1,598 (1,408-1,811)	283 (249-321)	301 (265-342)
May	117 (93-140)	21 (16-25)	22 (18-26)	Nov	2,769 (2,464-3,076)	490 (435-544)	523 (465-581)	43 (31-60)	8 (6-10)	8 (6-11)	Nov	1,406 (1,247-1,568)	249 (220-277)	265 (235-296)
Jun	106 (84-128)	19 (15-23)	20 (16-24)	Dec	3,893 (3,449-4,328)	682 (604-759)	726 (644-808)	296 (234-374)	52 (41-66)	55 (44-70)	Dec	2,094 (1,841-2,351)	367 (323-412)	391 (344-439)
Jul	76 (61-95)	13 (11-17)	14 (11-18)	Jan	1,741 (1,510-2,005)	305 (264-351)	326 (283-376)	686 (588-816)	121 (104-144)	130 (111-154)	Jan	1,924 (1,676-2,231)	339 (295-393)	362 (315-420)
Aug	190 (150-226)	34 (27-41)	36 (29-43)	Feb	1,939 (1,689-2,227)	340 (296-391)	363 (316-418)	4,808 (4,138-5,624)	841 (725-985)	899 (774-1,051)	Feb	3,575 (3,118-4,095)	627 (547-718)	669 (584-767)
Sep	550 (434-656)	100 (79-120)	107 (84-128)	Mar	5,985 (5,365-6,729)	1,046 (937-1,175)	1,116 (999-1,254)	6,207 (5,520-6,927)	1,089 (967-1,216)	1,167 (1,036-1,303)	Mar	5,235 (4,671-5,846)	916 (816-1,023)	978 (872-1,092)
Oct	3,168 (2,797-3,582)	561 (495-635)	597 (527-676)	Apr	7,256 (6,456-8,060)	1,285 (1,143-1,428)	1,374 (1,221-1,526)	5,778 (5,065-6,514)	1,021 (895-1,151)	1,095 (959-1,234)	Apr	5,006 (4,425-5,603)	885 (782-990)	946 (836-1,059)
Nov	2,769 (2,464-3,076)	490 (435-544)	523 (465-581)	May	396 (327-471)	69 (57-82)	74 (61-88)	548 (438-674)	97 (77-119)	103 (82-127)	May	354 (286-428)	62 (50-75)	66 (54-80)
Dec	3,893 (3,449-4,328)	682 (604-759)	726 (644-808)	Jun	201 (164-243)	35 (29-43)	37 (30-45)	869 (691-1,069)	154 (122-189)	163 (129-201)	Jun	392 (313-480)	69 (55-85)	74 (59-90)

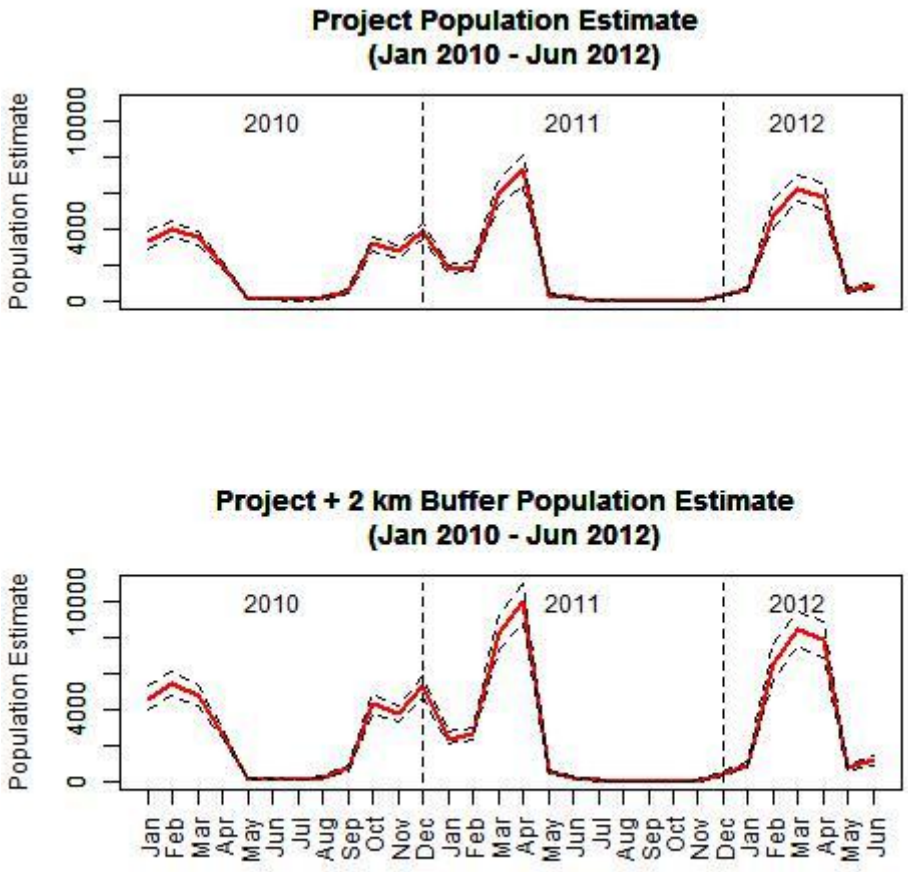

Figure 3.54 Modelled monthly population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	828 (535-1,193)	151 (97-217)	158 (102-227)	Jul	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-1)	0 (0-0)	0 (0-0)	Jul	0 (0-1)	0 (0-0)	0 (0-0)
Feb	243 (176-364)	45 (33-68)	48 (35-71)	Aug	0 (0-1)	0 (0-0)	0 (0-0)	1 (0-1)	0 (0-0)	0 (0-0)	Aug	0 (0-1)	0 (0-0)	0 (0-0)
Mar	41 (30-63)	8 (6-12)	8 (6-12)	Sep	8 (5-13)	2 (1-2)	2 (1-3)	4 (2-6)	1 (0-1)	1 (0-1)	Sep	6 (4-10)	1 (1-2)	1 (1-2)
Apr	4 (3-7)	1 (1-1)	1 (1-1)	Oct	43 (32-62)	8 (6-12)	9 (6-12)	15 (11-22)	3 (2-4)	3 (2-4)	Oct	29 (21-42)	5 (4-8)	6 (4-8)
May	1 (1-2)	0 (0-0)	0 (0-0)	Nov	279 (220-374)	52 (41-70)	55 (44-74)	77 (62-100)	14 (12-19)	15 (12-20)	Nov	178 (141-237)	33 (26-44)	35 (28-47)
Jun	0 (0-1)	0 (0-0)	0 (0-0)	Dec	1,809 (1,436-2,424)	333 (265-443)	350 (279-466)	600 (490-816)	111 (91-152)	118 (96-161)	Dec	1,205 (963-1,620)	222 (178-297)	234 (188-313)
Jul	0 (0-0)	0 (0-0)	0 (0-0)	Jan	813 (624-1076)	150 (115-197)	159 (122-210)	218 (185-284)	41 (34-53)	43 (37-56)	Jan	620 (448-851)	114 (82-156)	120 (87-165)
Aug	0 (0-1)	0 (0-0)	0 (0-0)	Feb	308 (244-403)	57 (46-75)	61 (48-80)	253 (172-412)	46 (32-75)	49 (33-80)	Feb	268 (197-393)	50 (37-73)	53 (39-77)
Sep	8 (5-13)	2 (1-2)	2 (1-3)	Mar	151 (114-217)	28 (21-41)	30 (23-43)	25 (14-46)	5 (3-8)	5 (3-9)	Mar	73 (53-108)	14 (10-20)	14 (10-22)
Oct	43 (32-62)	8 (6-12)	9 (6-12)	Apr	17 (12-25)	3 (2-5)	3 (2-5)	4 (2-9)	1 (0-2)	1 (0-2)	Apr	8 (6-14)	2 (1-3)	2 (1-3)
Nov	279 (220-374)	52 (41-70)	55 (44-74)	May	2 (1-4)	0 (0-1)	0 (0-1)	2 (1-5)	0 (0-1)	0 (0-1)	May	2 (1-4)	0 (0-1)	0 (0-1)
Dec	1,809 (1,436-2,424)	333 (265-443)	350 (279-466)	Jun	1 (0-1)	0 (0-0)	0 (0-0)	2 (0-5)	0 (0-1)	0 (0-1)	Jun	1 (0-2)	0 (0-0)	0 (0-0)

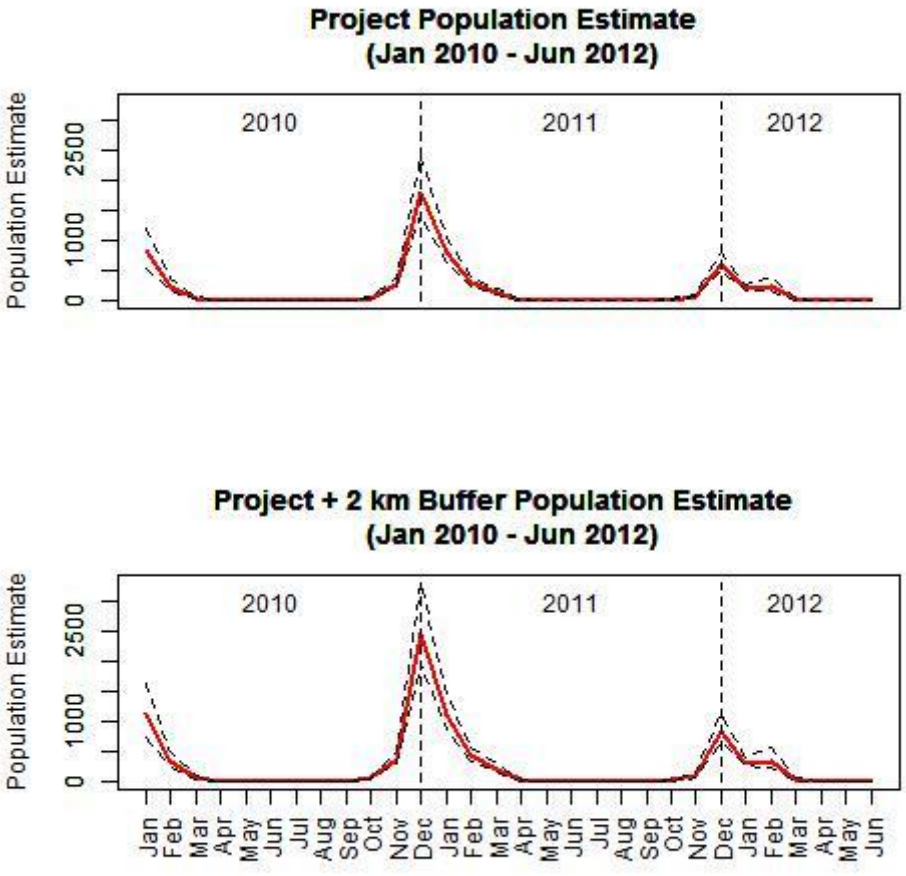

Figure 3.55 Baseline monthly population estimates (and 90% confidence limits) for little auk for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

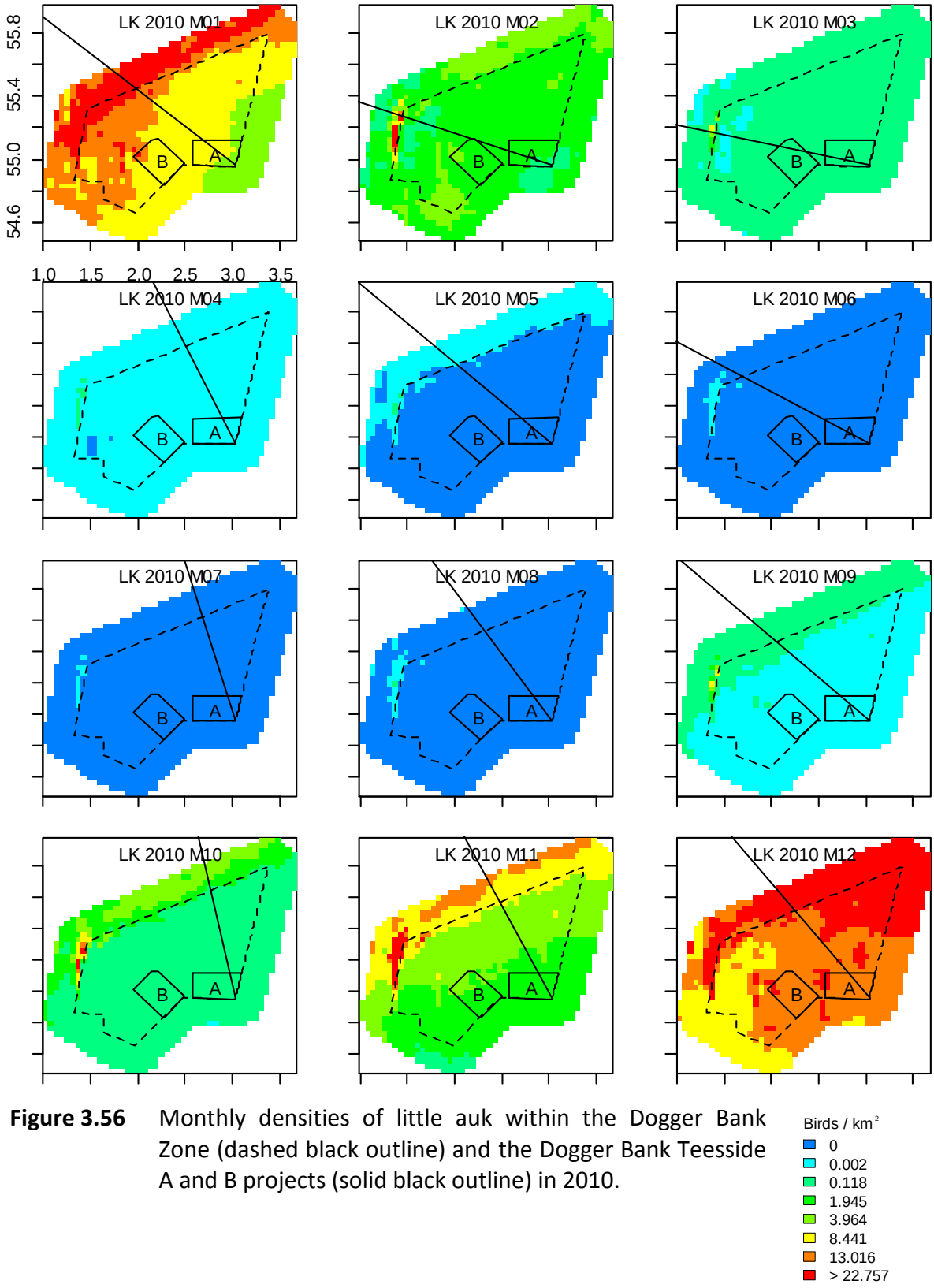

Figure 3.56 Monthly densities of little auk within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

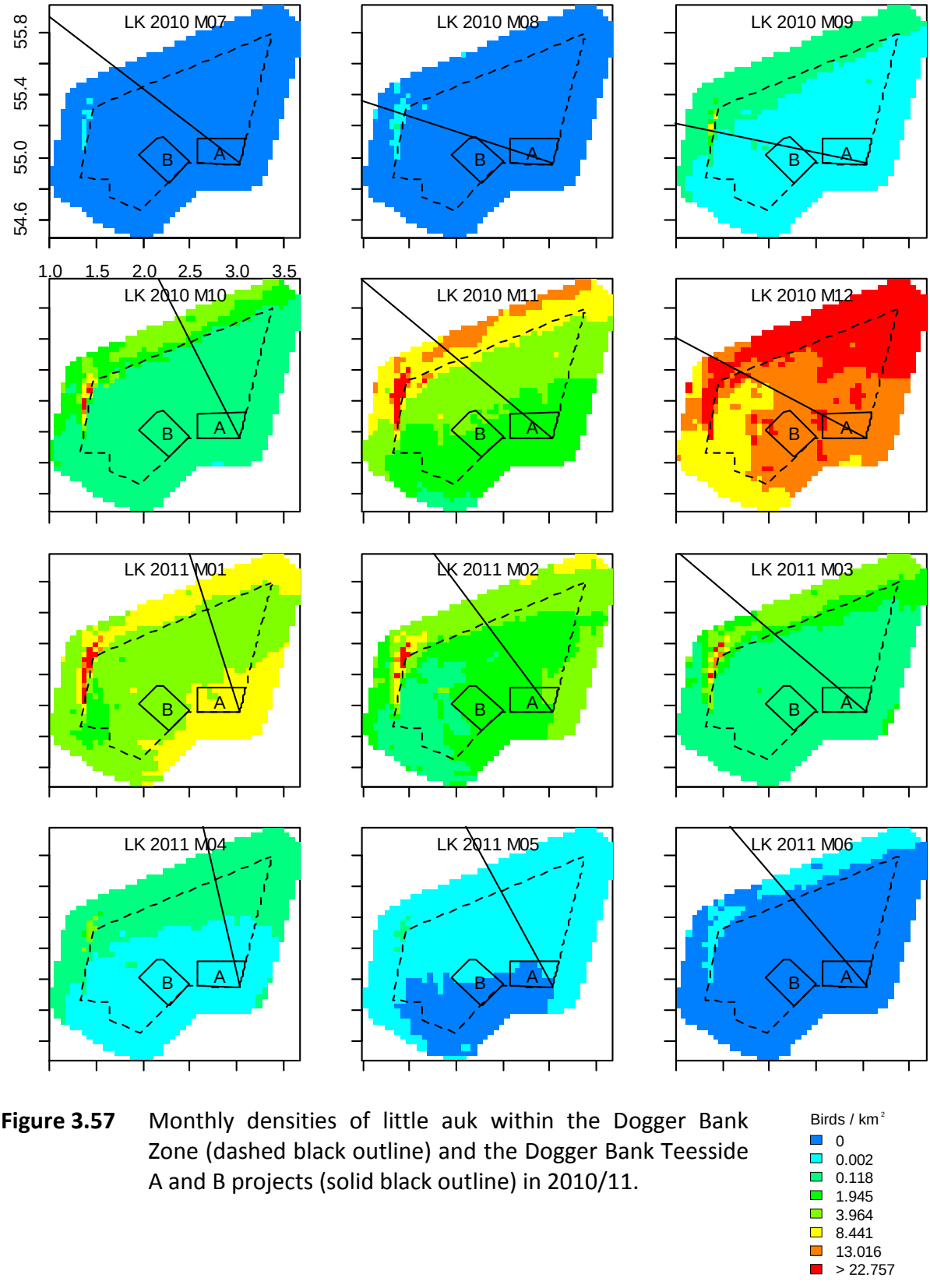

Figure 3.57 Monthly densities of little auk within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

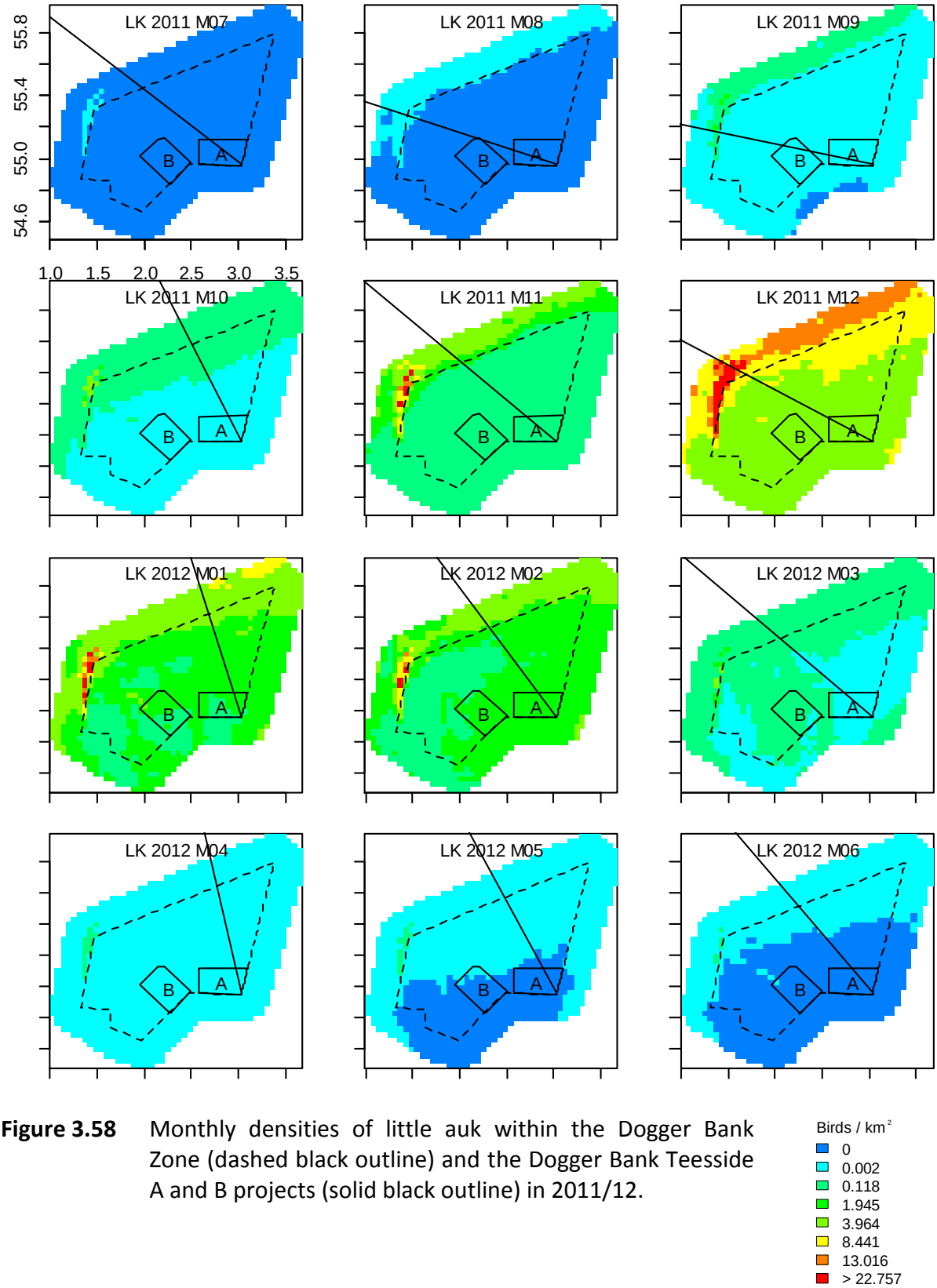

Figure 3.58 Monthly densities of little auk within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	1,281 (843-1,934)	215 (142-328)	227 (150-344)	Jul	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-1)	0 (0-0)	0 (0-0)	Jul	0 (0-1)	0 (0-0)	0 (0-0)
Feb	329 (240-506)	54 (39-84)	57 (41-87)	Aug	0 (0-1)	0 (0-0)	0 (0-0)	1 (0-1)	0 (0-0)	0 (0-0)	Aug	1 (0-1)	0 (0-0)	0 (0-0)
Mar	55 (39-82)	9 (6-13)	9 (7-14)	Sep	11 (7-18)	2 (1-3)	2 (1-3)	5 (3-8)	1 (0-1)	1 (1-1)	Sep	8 (5-13)	1 (1-2)	1 (1-2)
Apr	4 (3-7)	1 (0-1)	1 (0-1)	Oct	58 (43-83)	10 (7-14)	10 (8-15)	18 (13-26)	3 (2-4)	3 (2-5)	Oct	38 (28-55)	6 (5-9)	7 (5-10)
May	1 (1-2)	0 (0-0)	0 (0-0)	Nov	336 (265-451)	56 (44-76)	59 (47-80)	91 (74-117)	15 (12-19)	16 (13-20)	Nov	213 (169-284)	36 (28-47)	38 (30-50)
Jun	0 (0-1)	0 (0-0)	0 (0-0)	Dec	1,965 (1,582-2,628)	325 (262-437)	342 (275-457)	606 (502-807)	100 (82-132)	105 (87-140)	Dec	1,285 (1,042-1,717)	212 (172-285)	224 (181-299)
Jul	0 (0-0)	0 (0-0)	0 (0-0)	Jan	696 (523-934)	114 (85-153)	121 (90-163)	233 (198-303)	39 (33-50)	41 (35-53)	Jan	737 (521-1057)	123 (87-177)	130 (92-187)
Aug	0 (0-1)	0 (0-0)	0 (0-0)	Feb	256 (201-346)	42 (33-57)	44 (35-60)	244 (168-390)	40 (28-64)	42 (29-67)	Feb	276 (203-414)	45 (33-68)	48 (35-72)
Sep	11 (7-18)	2 (1-3)	2 (1-3)	Mar	160 (122-227)	26 (20-37)	27 (21-39)	34 (19-61)	6 (3-10)	6 (3-11)	Mar	83 (60-124)	13 (10-20)	14 (10-21)
Oct	58 (43-83)	10 (7-14)	10 (8-15)	Apr	17 (12-25)	3 (2-4)	3 (2-4)	4 (2-9)	1 (0-1)	1 (0-2)	Apr	8 (6-14)	1 (1-2)	1 (1-2)
Nov	336 (265-451)	56 (44-76)	59 (47-80)	May	2 (1-4)	0 (0-1)	0 (0-1)	2 (1-5)	0 (0-1)	0 (0-1)	May	2 (1-4)	0 (0-1)	0 (0-1)
Dec	1,965 (1,582-2,628)	325 (262-437)	342 (275-457)	Jun	1 (0-1)	0 (0-0)	0 (0-0)	2 (0-5)	0 (0-1)	0 (0-1)	Jun	1 (0-2)	0 (0-0)	0 (0-0)

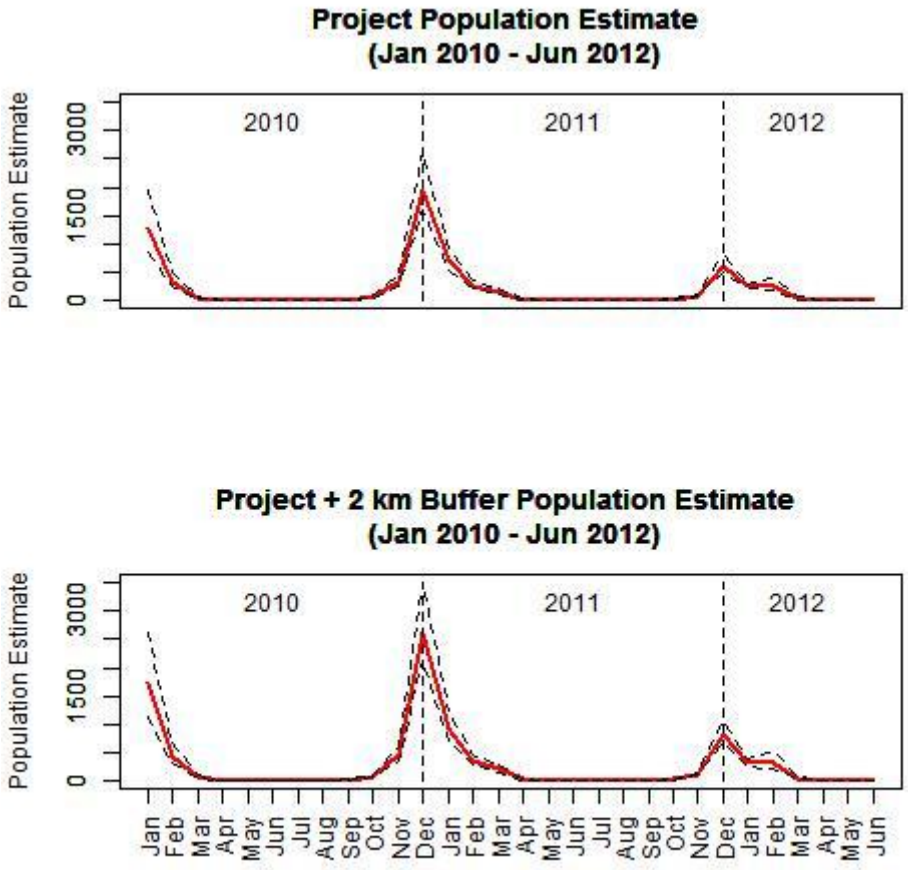

Figure 3.59 Modelled monthly population estimates (and 90% confidence limits) for little auk for the Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	2,108 (1,377-3,127)	366 (240-545)	385 (252-571)	Jul	0 (0-1)	0 (0-0)	0 (0-0)	1 (0-2)	0 (0-0)	0 (0-0)	Jul	1 (0-1)	0 (0-0)	0 (0-0)
Feb	570 (417-871)	99 (72-151)	104 (76-159)	Aug	1 (0-2)	0 (0-0)	0 (0-0)	1 (1-3)	0 (0-0)	0 (0-0)	Aug	1 (1-2)	0 (0-0)	0 (0-0)
Mar	96 (68-145)	17 (12-25)	17 (12-26)	Sep	19 (12-31)	3 (2-6)	4 (2-6)	8 (5-14)	1 (1-2)	2 (1-3)	Sep	14 (9-23)	2 (2-4)	3 (2-4)
Apr	8 (6-14)	1 (1-2)	2 (1-3)	Oct	102 (75-145)	18 (13-26)	19 (14-27)	33 (24-48)	6 (4-8)	6 (4-9)	Oct	67 (50-96)	12 (9-17)	13 (9-18)
May	2 (1-4)	0 (0-1)	0 (0-1)	Nov	615 (486-825)	108 (86-145)	114 (91-153)	168 (136-217)	29 (24-38)	31 (25-40)	Nov	392 (311-521)	69 (55-92)	73 (58-97)
Jun	1 (0-1)	0 (0-0)	0 (0-0)	Dec	3,769 (3,009-5,052)	657 (525-880)	691 (551-923)	1,207 (992-1,623)	211 (173-284)	223 (184-301)	Dec	2,488 (2,000-3,337)	434 (349-582)	457 (368-612)
Jul	0 (0-1)	0 (0-0)	0 (0-0)	Jan	1,512 (1,144-2,023)	264 (200-353)	280 (212-375)	451 (382-587)	79 (67-103)	84 (71-109)	Jan	1,357 (968-1,912)	236 (169-334)	250 (178-352)
Aug	1 (0-2)	0 (0-0)	0 (0-0)	Feb	564 (445-756)	99 (78-133)	105 (83-141)	498 (341-802)	87 (59-140)	92 (63-148)	Feb	544 (401-810)	95 (70-141)	100 (74-149)
Sep	19 (12-31)	3 (2-6)	4 (2-6)	Mar	312 (236-444)	54 (41-77)	58 (43-82)	59 (33-107)	10 (6-18)	11 (6-20)	Mar	156 (112-232)	27 (20-40)	29 (21-43)
Oct	102 (75-145)	18 (13-26)	19 (14-27)	Apr	34 (24-50)	6 (4-9)	6 (5-9)	8 (4-18)	1 (1-3)	1 (1-3)	Apr	17 (11-27)	3 (2-5)	3 (2-5)
Nov	615 (486-825)	108 (86-145)	114 (91-153)	May	5 (3-9)	1 (0-2)	1 (0-2)	4 (2-10)	1 (0-2)	1 (0-2)	May	4 (2-7)	1 (0-1)	1 (0-1)
Dec	3,769 (3,009-5,052)	657 (525-880)	691 (551-923)	Jun	1 (1-3)	0 (0-0)	0 (0-1)	3 (1-10)	1 (0-2)	1 (0-2)	Jun	2 (1-5)	0 (0-1)	0 (0-1)

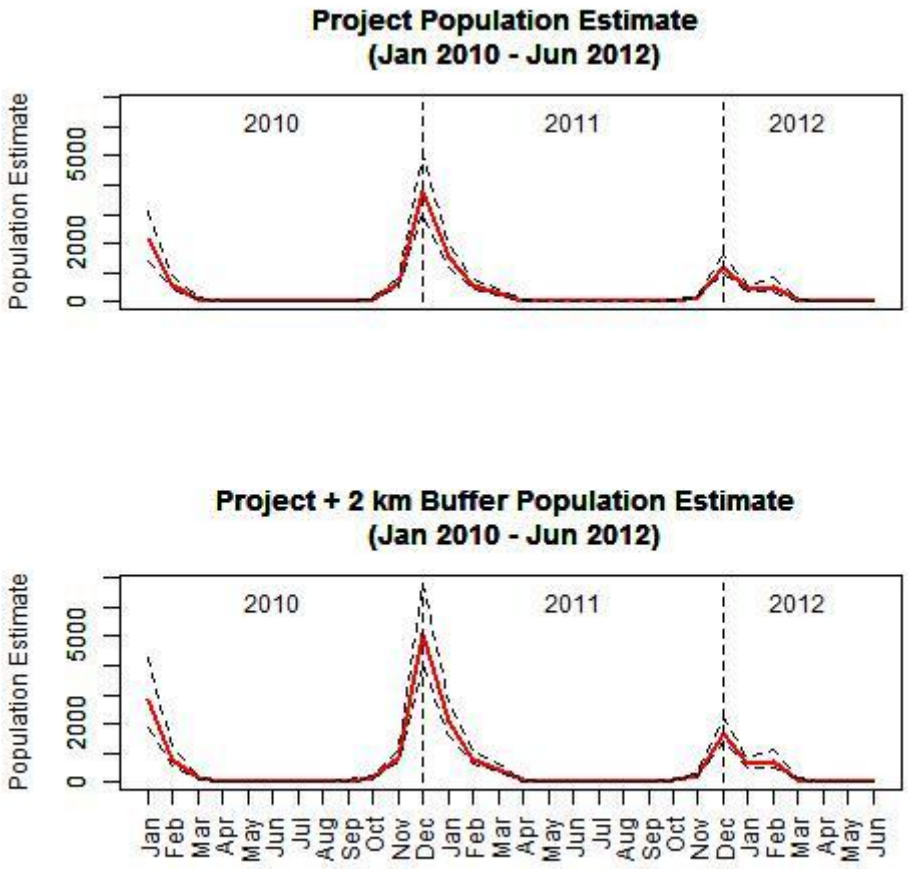

Figure 3.60 Baseline monthly population estimates (and 90% confidence limits) for little auk for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	124 (83-175)	22 (15-31)	23 (16-33)	Jul	12 (9-15)	2 (2-3)	2 (2-3)	17 (14-22)	3 (3-4)	3 (3-4)	Jul	15 (11-19)	3 (2-3)	3 (2-4)
Feb	201 (153-257)	36 (28-46)	38 (29-49)	Aug	12 (9-15)	2 (2-3)	2 (2-3)	9 (7-11)	2 (1-2)	2 (1-2)	Aug	10 (8-13)	2 (1-2)	2 (2-3)
Mar	219 (178-268)	40 (32-48)	42 (34-51)	Sep	98 (76-127)	18 (14-23)	19 (15-25)	28 (21-36)	5 (4-7)	5 (4-7)	Sep	63 (49-81)	12 (9-15)	12 (10-16)
Apr	49 (40-62)	9 (7-11)	10 (8-12)	Oct	136 (107-172)	25 (20-32)	27 (21-33)	22 (16-28)	4 (3-5)	4 (3-5)	Oct	79 (61-100)	15 (11-18)	15 (12-19)
May	34 (28-42)	6 (5-8)	7 (5-8)	Nov	193 (152-227)	35 (28-41)	37 (29-43)	21 (15-27)	4 (3-5)	4 (3-5)	Nov	107 (84-127)	19 (15-23)	20 (16-24)
Jun	21 (17-27)	4 (3-5)	4 (3-5)	Dec	422 (351-497)	76 (63-89)	80 (66-93)	50 (37-61)	9 (7-11)	9 (7-12)	Dec	236 (194-279)	42 (35-50)	45 (37-53)
Jul	12 (9-15)	2 (2-3)	2 (2-3)	Jan	418 (350-502)	75 (63-91)	79 (66-95)	61 (48-75)	11 (9-13)	12 (9-14)	Jan	201 (161-251)	36 (29-45)	38 (30-47)
Aug	12 (9-15)	2 (2-3)	2 (2-3)	Feb	452 (380-533)	82 (69-96)	86 (72-101)	155 (126-188)	28 (23-34)	29 (24-36)	Feb	269 (220-326)	49 (40-59)	51 (42-62)
Sep	98 (76-127)	18 (14-23)	19 (15-25)	Mar	582 (509-681)	106 (93-123)	111 (98-130)	148 (125-176)	27 (23-32)	28 (24-34)	Mar	316 (271-375)	57 (49-68)	60 (52-71)
Oct	136 (107-172)	25 (20-32)	27 (21-33)	Apr	125 (105-151)	23 (19-28)	24 (20-29)	40 (32-53)	7 (6-10)	8 (6-10)	Apr	71 (59-89)	13 (11-16)	14 (11-17)
Nov	193 (152-227)	35 (28-41)	37 (29-43)	May	70 (59-83)	13 (11-15)	14 (12-16)	34 (28-44)	6 (5-8)	7 (5-8)	May	46 (38-56)	8 (7-10)	9 (7-11)
Dec	422 (351-497)	76 (63-89)	80 (66-93)	Jun	35 (28-43)	6 (5-8)	7 (5-8)	24 (20-31)	4 (4-6)	5 (4-6)	Jun	27 (22-34)	5 (4-6)	5 (4-7)

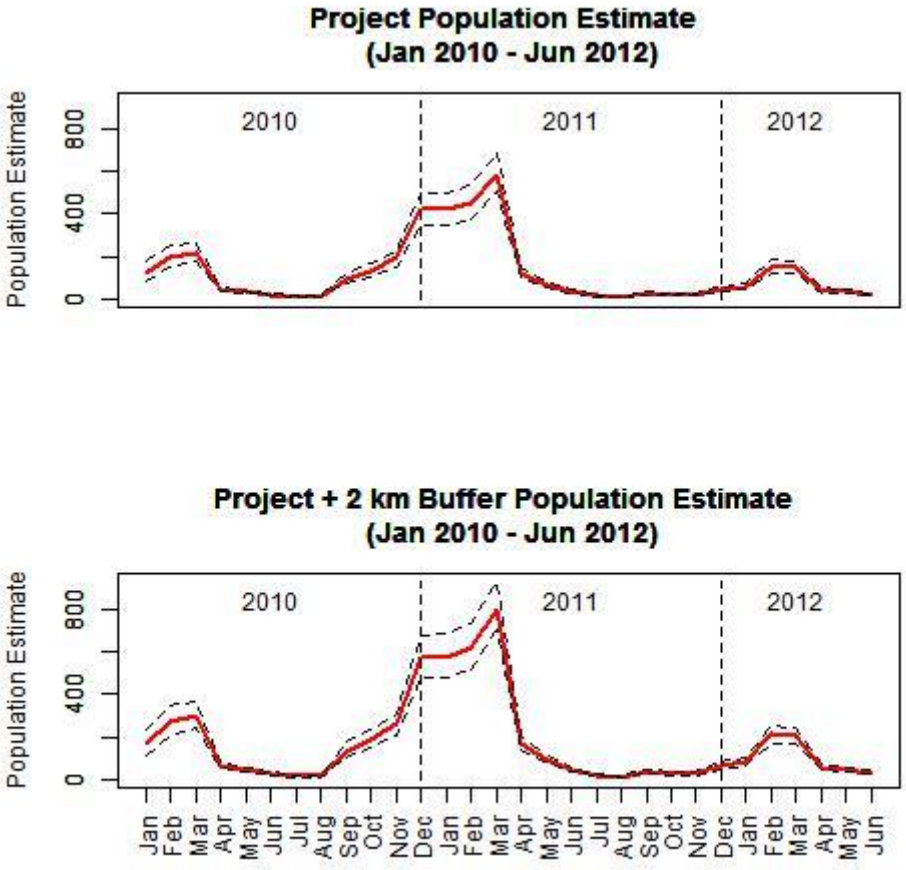

Figure 3.61 Baseline monthly population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside A, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

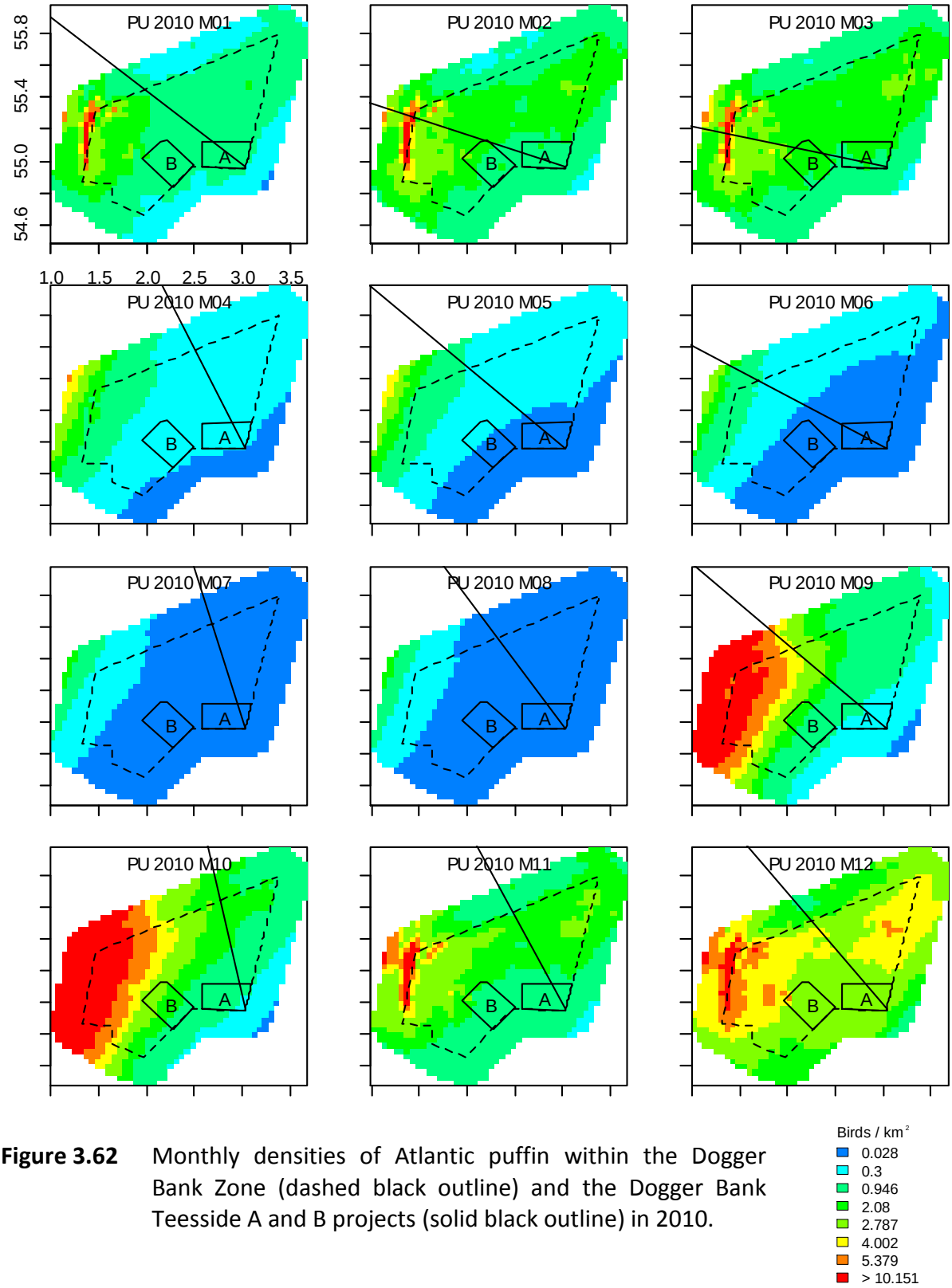

Figure 3.62 Monthly densities of Atlantic puffin within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010.

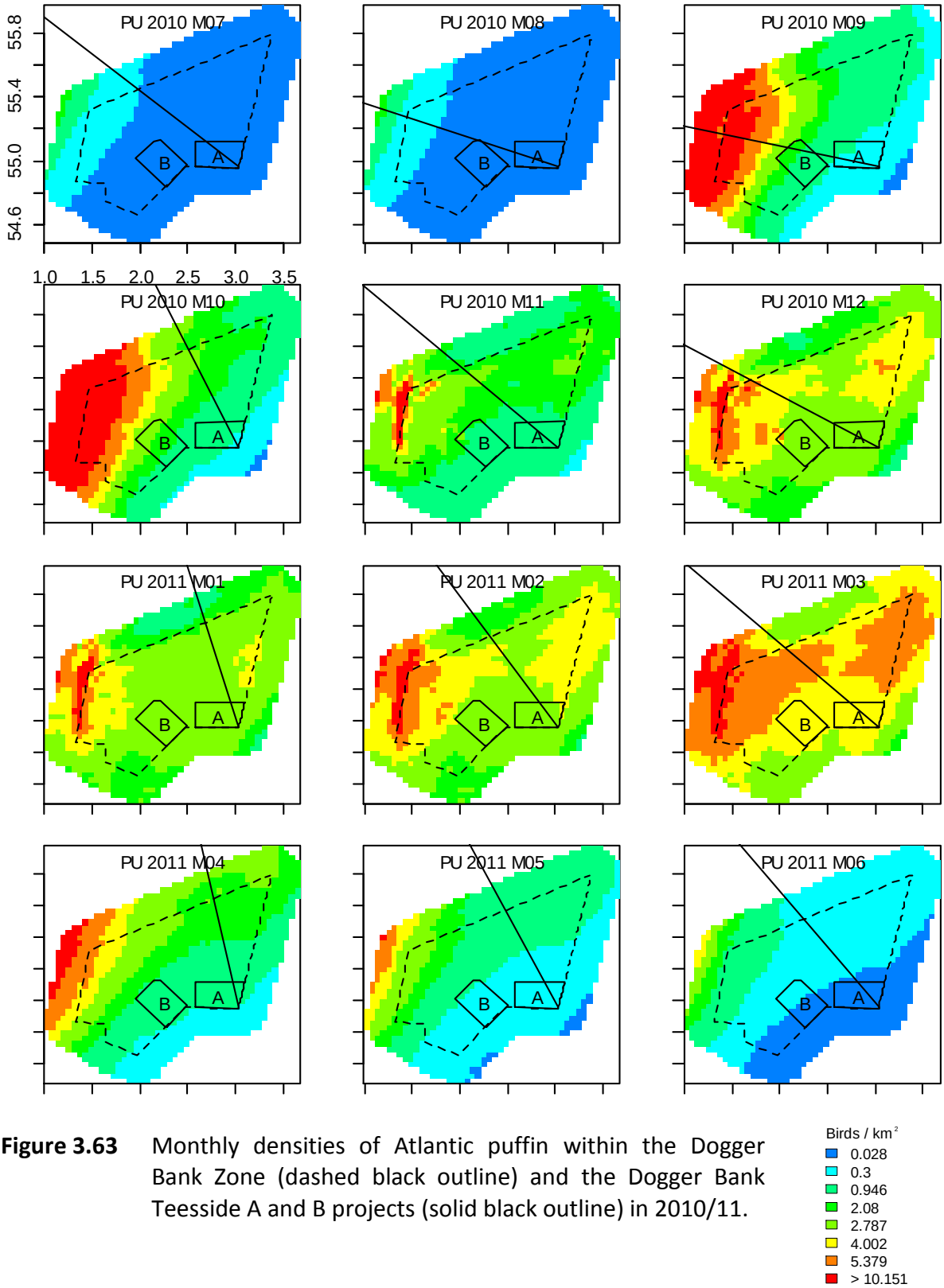

Figure 3.63 Monthly densities of Atlantic puffin within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2010/11.

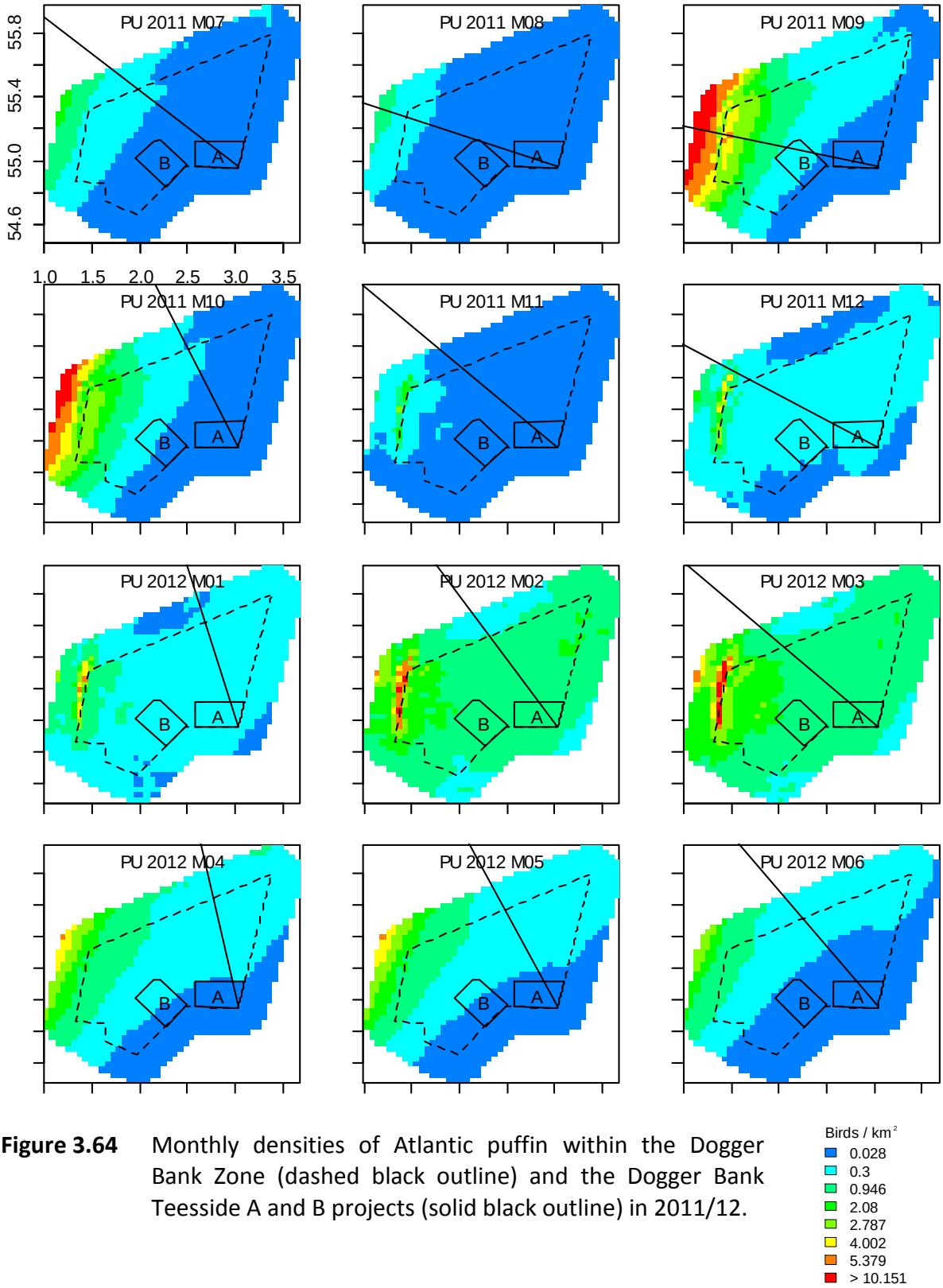

Figure 3.64 Monthly densities of Atlantic puffin within the Dogger Bank Zone (dashed black outline) and the Dogger Bank Teesside A and B projects (solid black outline) in 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	150 (104-209)	26 (18-37)	28 (20-39)	Jul	17 (13-22)	3 (2-4)	3 (2-4)	24 (19-29)	4 (3-5)	4 (4-5)	Jul	21 (16-26)	4 (3-4)	4 (3-5)
Feb	234 (179-294)	41 (31-51)	43 (33-55)	Aug	17 (12-21)	3 (2-4)	3 (2-4)	12 (10-15)	2 (2-3)	2 (2-3)	Aug	14 (11-18)	3 (2-3)	3 (2-3)
Mar	252 (207-304)	43 (36-53)	46 (38-56)	Sep	209 (169-279)	38 (31-50)	41 (33-53)	60 (47-76)	11 (9-14)	12 (9-15)	Sep	134 (108-178)	24 (20-32)	26 (21-34)
Apr	62 (51-76)	11 (9-13)	11 (9-14)	Oct	289 (234-379)	52 (42-68)	56 (45-73)	45 (35-57)	8 (6-10)	9 (7-11)	Oct	167 (135-218)	30 (24-39)	32 (26-42)
May	44 (37-54)	8 (6-9)	8 (7-10)	Nov	213 (176-249)	37 (31-44)	40 (33-47)	23 (17-28)	4 (3-5)	4 (3-5)	Nov	118 (96-138)	21 (17-24)	22 (18-26)
Jun	27 (22-34)	5 (4-6)	5 (4-6)	Dec	448 (383-527)	78 (67-91)	83 (71-97)	51 (38-61)	9 (7-11)	9 (7-11)	Dec	250 (211-294)	44 (37-51)	46 (39-54)
Jul	17 (13-22)	3 (2-4)	3 (2-4)	Jan	399 (334-487)	69 (57-84)	73 (61-89)	64 (51-77)	11 (9-13)	12 (10-14)	Jan	204 (163-258)	35 (28-45)	38 (30-48)
Aug	17 (12-21)	3 (2-4)	3 (2-4)	Feb	432 (357-524)	75 (62-90)	80 (66-96)	155 (131-186)	27 (23-32)	29 (24-34)	Feb	273 (222-334)	47 (39-58)	50 (41-62)
Sep	209 (169-279)	38 (31-50)	41 (33-53)	Mar	608 (543-698)	104 (94-120)	111 (100-128)	170 (145-205)	30 (25-36)	31 (27-38)	Mar	343 (298-402)	59 (52-69)	63 (55-74)
Oct	289 (234-379)	52 (42-68)	56 (45-73)	Apr	159 (140-184)	28 (24-32)	30 (26-35)	50 (41-63)	9 (7-11)	9 (8-12)	Apr	90 (77-108)	16 (13-19)	17 (14-20)
Nov	213 (176-249)	37 (31-44)	40 (33-47)	May	91 (80-107)	16 (14-19)	17 (15-20)	44 (36-54)	8 (6-9)	8 (7-10)	May	60 (51-72)	10 (9-12)	11 (9-13)
Dec	448 (383-527)	78 (67-91)	83 (71-97)	Jun	46 (39-57)	8 (7-10)	9 (7-11)	31 (26-40)	5 (5-7)	6 (5-7)	Jun	35 (29-44)	6 (5-8)	6 (5-8)

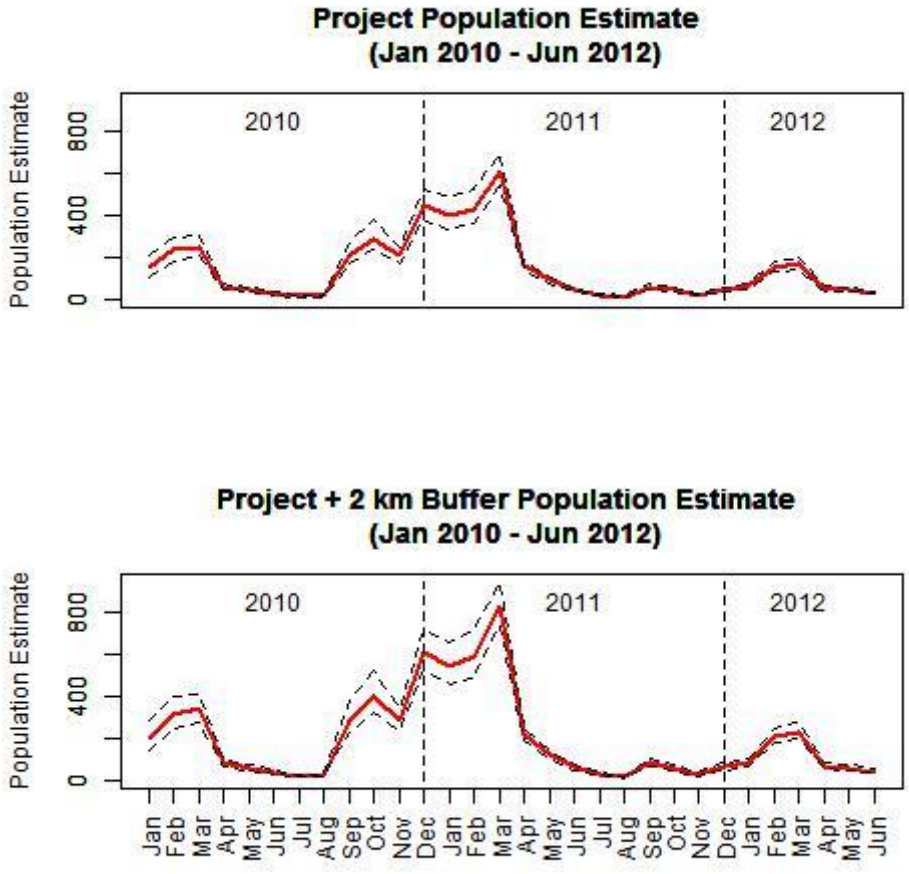

Figure 3.65 Modelled monthly population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside B, and the project with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	272 (186-384)	48 (33-68)	51 (35-72)	Jul	29 (22-37)	5 (4-7)	6 (4-7)	42 (33-52)	7 (6-9)	8 (6-10)	Jul	35 (27-45)	6 (5-8)	7 (5-8)
Feb	435 (332-549)	77 (59-97)	82 (62-103)	Aug	28 (21-36)	5 (4-6)	5 (4-7)	21 (17-27)	4 (3-5)	4 (3-5)	Aug	25 (19-31)	4 (3-6)	5 (4-6)
Mar	471 (382-574)	83 (68-101)	88 (71-107)	Sep	309 (252-397)	56 (46-72)	60 (49-78)	87 (68-114)	16 (12-21)	17 (13-22)	Sep	198 (160-256)	36 (29-47)	39 (31-50)
Apr	112 (92-139)	20 (16-24)	21 (17-26)	Oct	426 (341-553)	77 (62-100)	83 (66-106)	67 (52-87)	12 (9-16)	13 (10-17)	Oct	246 (196-320)	45 (36-58)	48 (38-62)
May	78 (65-95)	14 (12-17)	15 (12-18)	Nov	405 (328-482)	72 (58-86)	76 (62-91)	44 (32-54)	8 (6-10)	8 (6-10)	Nov	224 (180-268)	40 (32-48)	42 (34-51)
Jun	49 (39-61)	9 (7-11)	9 (7-12)	Dec	869 (741-1,024)	154 (131-181)	162 (138-191)	101 (76-123)	18 (13-22)	19 (14-23)	Dec	485 (409-573)	86 (72-101)	91 (76-107)
Jul	29 (22-37)	5 (4-7)	6 (4-7)	Jan	818 (683-991)	144 (120-175)	153 (127-185)	126 (100-151)	22 (18-27)	24 (19-28)	Jan	405 (323-509)	72 (57-90)	76 (60-95)
Aug	28 (21-36)	5 (4-6)	5 (4-7)	Feb	885 (739-1,055)	156 (131-187)	166 (138-198)	311 (257-373)	55 (45-66)	58 (48-70)	Feb	544 (443-659)	96 (78-117)	102 (83-124)
Sep	309 (252-397)	56 (46-72)	60 (49-78)	Mar	1,191 (1,059-1,374)	210 (187-242)	223 (198-257)	317 (273-382)	56 (48-67)	60 (51-72)	Mar	660 (571-777)	116 (101-137)	123 (107-145)
Oct	426 (341-553)	77 (62-100)	83 (66-106)	Apr	286 (245-339)	51 (44-61)	55 (46-64)	90 (74-115)	16 (13-21)	17 (14-22)	Apr	163 (137-198)	29 (24-35)	31 (26-37)
Nov	405 (328-482)	72 (58-86)	76 (62-91)	May	162 (139-190)	29 (25-34)	31 (26-36)	77 (64-98)	14 (12-17)	15 (12-19)	May	106 (89-127)	19 (16-23)	20 (17-24)
Dec	869 (741-1,024)	154 (131-181)	162 (138-191)	Jun	81 (67-100)	15 (12-18)	15 (13-19)	55 (46-71)	10 (8-13)	10 (9-13)	Jun	62 (51-77)	11 (9-14)	12 (10-15)

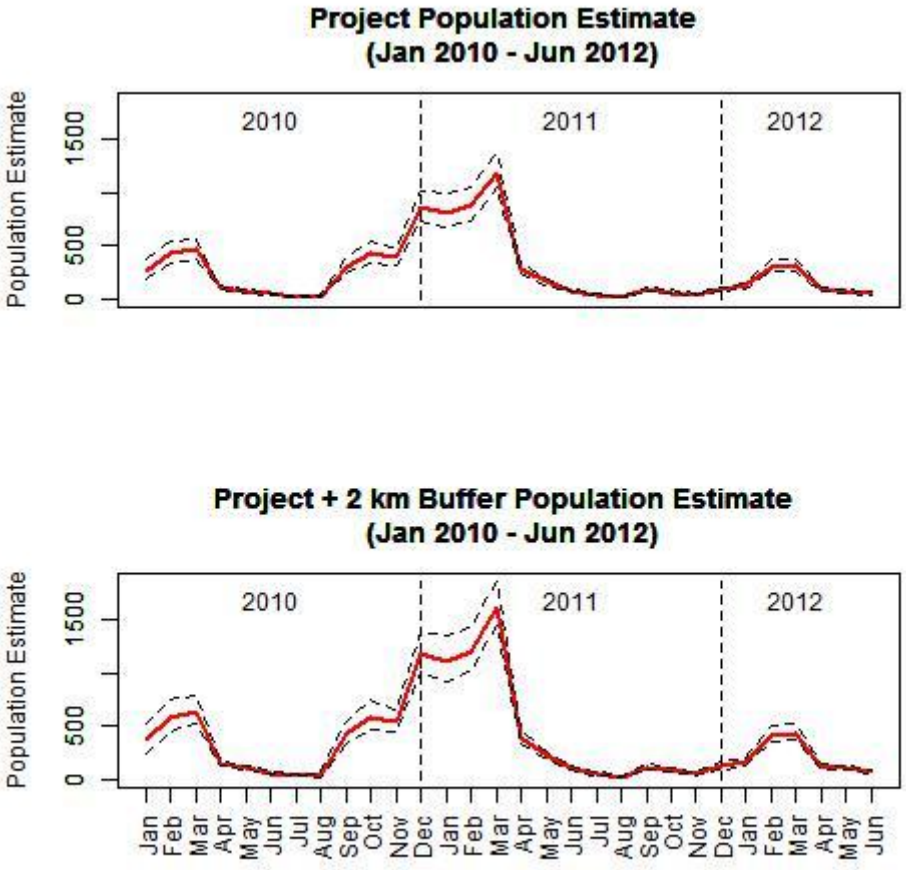

Figure 3.66 Baseline monthly population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside A and B, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 18th 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. 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. 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. 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. Guide: 1-5% of population/habitat lost
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the 'no change' situation. 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 Species of international or national importance, i.e. those whose numbers surpass 1% of international or national populations 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) EU Birds Directive Annex 1 species, EU Habitats Directive priority habitat/species and Wildlife and Countryside Act Schedule 1 species (if not covered above) 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]	Yes[5,9]
	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; [9]Kubetzki *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 (Hamer *et al.* 2000, 2001, 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 paragraphs 4.3.21 and 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 of wind farms 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 858 and 726 round trips to port per project year (assuming a six year construction phase) – 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 696 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 from the wind farm area was applicable. Rates of displacement were derived directly from species-sensitivity scores to disturbance from boats (from Furness & Wade 2012, Furness *et al.* 2012, 2013), as given in Table 4.8.

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 for Dogger Bank Teesside A and B, and together with all three cable routes including for 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	698	0	0	0	0
Northern gannet	47	430	<1	8	0	<1
Great skua	7	32	0	0	0	0
Great black-backed gull	19	70	<1	1	0	0
Black-legged kittiwake	555	1,800	11	35	0	0
Common guillemot	885	6,342	34	244	2	12
Razorbill	19	373	<1	14	<1	<1
Atlantic puffin	49	201	1	4	<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. From December 2010 onwards, surveyors specified the confidence with which they were assigning flying birds to individual flight height bands during boat surveys. Out of 25,927 records collected of flying birds, confidence in the band that individuals were assigned to was assessed as high on 23,870 occasions (92% of the time). These assessments were not made prior to December 2010.

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. Due to limitiations in how the data have been collected, we present results from option 1 based on the proportion of birds flying at a height of 20m or above (Table 4.16); given that turbines with a minimum height above sea-level of 26m are considered, this is likely to be highly precautionary. For option 3 of the Band model, we estimated the proportion of birds flying within the rotor swept area of turbines from the modelled distributions presented in Cook *et al.* (2012) and based on the hub height and radius of the turbine designs presented in Table 4.17.

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	Observed Prop. At CRH (proportion of birds recorded flying above 20m during boat surveys)	Prop. Above 20m Based on Models Presented in Cook *et al.* (2012) (with 95% CIs)	Modelled Prop. At CRH (26m – 193m) Based On Models Presented in Cook *et al.* (2012) (with 95% CIs)
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);

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	Mean Rotation Speed (m/s)	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 261km and 220km for Dogger Bank Teesside A and Dogger Bank Teesside B 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, 10m 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.

		Construction / decommissioning			
Species	**Season**	**2010**	**2010/2011**	**2011/2012**	**Mean**
White-billed diver	All	4	4	4	4
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**
White-billed diver	All	8	8	7	7
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]	<0.1	0	Negligible
Displacement (o)	3		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] 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 three 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**.

<u>Migrants</u>

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 *Vanellus vanellus*	6.65 (1.33 - 19.96)	<0.1%	3.42%	Very High	Very Low	Medium	Negligible	Negligible
Red knot *Calidris canutus*	2.22 (0.44 - 6.65)	<0.1%	3.18%	Very High	Medium	Very High	Negligible	Minor adverse
Sanderling *Calidris alba*	0.57 (0.11 - 1.7)	<0.1%	3.18%	Very High	Medium	Very High	Negligible	Minor adverse
Dunlin *Calidris alpina schinzii (passage)*	0.05 (0.01 - 0.14)	<0.1%	3.16%	Very High	Very Low	Medium	Negligible	Negligible
Dunlin *Calidris alpina alpina* (passage & winter)	4.78 (0.96 - 14.35)	<0.1%	2.78%	Very High	Very Low	Medium	Negligible	Negligible
Ruff *Philomachus pugnax*	0.04 (0.01 - 0.12)	<0.1%	4.03%	Very High	Very Low	Medium	Negligible	Negligible
Common snipe *Gallinago gallinago*	6.54 (1.31 - 19.61)	<0.1%	3.19%	Very High	Very Low	Medium	Negligible	Negligible
Black-tailed godwit *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 *Limosa lapponica*	0.86 (0.17 - 2.57)	<0.1%	3.55%	Very High	Very Low	Medium	Negligible	Negligible
Whimbrel *Numenius phaeopus*	0.17 (0.03 - 0.51)	<0.1%	3.24%	Very High	High	Very High	Negligible	Minor adverse
Eurasian curlew *Numenius arquata* (non-breeding)	1.42 (0.28 - 4.25)	<0.1%	3.58%	Very High	Very Low	Medium	Negligible	Negligible
Greenshank *Tringa nebularia*	0.0003 (0.0001 - 0.0009)	<0.1%	2.47%	Very High	Very Low	Medium	Negligible	Negligible
Common redshank *Tringa totanus britannica* (breeding)	0.04 (0.01 - 0.12)	<0.1%	3.14%	Very High	Very Low	Medium	Negligible	Negligible
Common redshank Icelandic population *Tringa totanus robusta* (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.

		Construction / decommissioning			
Species	**Season**	**2010**	**2010/2011**	**2011/2012**	**Mean**
White-billed diver	All	4	4	4	4
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**
White-billed diver	All	8	8	7	7
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	33 (27-39)

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)	3		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 bird 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 three 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 33 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.

		Construction / decommissioning			
Species	**Season**	**2010**	**2010/2011**	**2011/2012**	**Mean**
White-billed diver	All	8	8	7	7
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**
White-billed diver	All	15	16	15	15
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	124 (106-180)
Black-legged kittiwake	Apr-Sep	867 (774-961)
Common guillemot	May-Jul	169 (156-186)
Razorbill	May-Jul	54 (44-66)

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)	3	100% displaced 37.5% mortality 4km buffer	10,000	<0.1	5,000[3]	<0.1	0	Negligible
Displacement (o)	5		10,000	<0.1	5,000[3]	0.11	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 three 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 five 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 124 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 867 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.

		Construction / decommissioning			
Species	**Season**	**2010**	**2010/2011**	**2011/2012**	**Mean**
White-billed diver	All	24	23	21	22
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**
White-billed diver	All	45	48	43	43
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 (411-572)
Black-legged kittiwake	Apr-Sep	3,877 (3,468-4,307)
Common guillemot	May-Jul	1,179 (1,082-1,293)
Razorbill	May-Jul	228 (186-278)

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)	8	100% displaced 37.5% mortality 4km buffer	10,000	<0.1	5000[3]	0.16	0	Negligible
Displacement (o)	16		10,000	0.16	5000[3]	0.32	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 eight 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 16 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 *Anser fabalis*	0.10 (0.02 - 0.24)	<0.1%	12.47%	Very High	Low	High	Negligible	Negligible
Barnacle goose (Svalbard population) *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 (Svalbard population) *Branta bernicla hrota*	0.25 (0.041 - 0.62)	<0.1%	7.40%	Very High	High	Very High	Negligible	Minor adverse
Common shelduck *Tadorna tadorna*	3.93 (0.03 - 15.70)	<0.1%	10.28%	Very High	High	Very High	Negligible	Minor adverse
Eurasian wigeon *Anas penelope*	22.25 (0.15 - 89.01)	<0.1%	9.58%	Very High	Very Low	Medium	Negligible	Negligible
Gadwall *Anas strepera*	0.36 (0.002 - 1.45)	<0.1%	5.77%	Very High	Very Low	Medium	Negligible	Negligible
Eurasian teal *Anas crecca*	5.27 (0.04 - 21.09)	<0.1%	9.61%	Very High	Very Low	Medium	Negligible	Negligible
Mallard *Anas platyrhynchos*	16.19 (0.11 - 64.75)	<0.1%	10.28%	Very High	Very Low	Medium	Negligible	Negligible
Northern pintail *Anas acuta*	0.71 (0.005 - 2.84)	<0.1%	9.61%	Very High	Very Low	Medium	Negligible	Negligible
Northern shoveler *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	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

Receptor	Effect	Geographical scale	Value	Species sensitivity	Overall sensitivity	Magnitude	Significance	Confidence
	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
		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	Low	Moderate 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
	Habitat loss or change (operation)	All	Very High	Low	High	Negligible	Negligible	Very Low

Receptor	Effect	Geographical scale	Value	Species sensitivity	Overall sensitivity	Magnitude	Significance	Confidence
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
		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
	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
		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
	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

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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 11 additional projects – Beatrice, East Anglia ONE, the European Offshore Wind Development Centre, Firth of Forth Alpha and Bravo, Galloper, Hornsea Project One, Inch Cape, Moray (Telford, Stevenson and MacColl Offshore Wind Farms), Neart na Gaoithe and Thanet (Table 6.8) (Royal Haskoning 2005, 2010, 2011; Seagreen 2012, 2013; Arcus 2012; APEM 2013a, b, c; Smart Wind Ltd 2013a, b; Technip 2012, Mainstream 2013; Moray Offshore Renewables Ltd. 2012, 2013; RPS 2013). 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 6.9a, and the number of those birds predicted to die, where such information was presented in assessments, is presented in Table 6.9b.

Table 6.8 Tabulation of projects next to sources of information included in the CIA; also shown are where information of disturbance/displacement and collision were available for projects, together with the report status from which information was extracted.

	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; East Anglia One Ltd 2013
	European Offshore Wind Development Centre	-	Consent Authorised	ES / final report	Y	Y	Technip 2012
	Firth of Forth Bravo and Alpha projects	3	Consent Application Submitted	ES	Y	Y	SeaGreen 2012, 2013
	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)
	Inch Cape		Consent Application Submitted	ES	Y	Y	RPS 2013
	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]
	Moray Firth (Telford, Stevenson and MacColl Offshore Wind Farms)	3	Concept/Early Planning	Final ES	Y	Y	Moray Offshore Renewables Ltd. 2012, 2013

	Site	UK Round	Site status	Report type / status	Disturbance / Displacement	Collision	Reference
	Neart na Gaoithe	Scottish	Consent Application Submitted	Draft ES	Y	Y	Mainstream 2013
	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
	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	ES	Y	Y	This assessment
	Dogger Bank Teesside C and D	3	Concept/Early Planning	ES	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.

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. Note also that estimates of the numbers of displaced birds failing to breed were considered in relation to reference populations in the Beatrice and Moray Firth assessments. However, due to fundamental differences in impact assessment methodologies, the numbers from those two assessments could not be reconciled with other assessments that had considered direct mortality of displaced birds, and were thus not included in the cumulative assessment.

Table 6.9 Predictions of (a) the numbers of displaced birds obtained for additional offshore wind farm sites in the North Sea, used as part of the cumulative impact assessment, and (b) where information was presented in assessments, the final magnitudes considering the proportion of those birds displaced that may subsequently die, using displacement mortality rates presented in respective environmental statements and addendums.

(a)

Site	Season	Northern	Common	Razorbill	Little Auk	Atlantic puffin
Beatrice	Total	68	6,014	768		478
East Anglia ONE	Spring	65	430	120		
	Breeding	43				
	Autumn	1,870				
	Winter	64	820	200		
	Total	2,042	1,250	320		
European Offshore Wind	Total	32	386	129		62
Galloper[1]	Breeding[2]					
	Winter[2]		3,219	342		
	Total		3,219	342		
Hornsea Project One	Breeding	239	1,037	366		428
	Post-breeding		5,705	2,926		
	Winter	237	4,609	2,628		503
	Total	476	11,351	5,920		931
London Array I/II	Total	162	2,400	250		
Thanet[1]	Total	37	193[3]	193[3]		193[3]
Neart na Gaoithe	Breeding	1,715	1,095	117		3,450
	Chick on sea		1,487	920		
	Post-breeding		2,923	1,178		1,446
	Winter	626	816	154		318
	Total	2,341	6,321	2,369		5,214
Inch Cape	Breeding	1,001	2,185	819		1,800
	Post-breeding		1,588	1,435		1,344
	Winter	147	880	326	2,319	190
	Total	1,148	4,653	2,580	2,319	3,334
Moray Firth[5]	Breeding	119	5,738	1,320		1,588
Firth of Forth Alpha [5]	Breeding	761	2,858	604		790
Firth of Forth Bravo [5]	Breeding	512	3,215	232		1002
Teesside A and B, Creyke Beck A and B, and 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		**10,138**	**75,154**	**22,215**	**2,769**	**14,334**

[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; [5] Assessment was done on breeding season populations.

(b)

Project	Season	Northern gannet	Common guillemot	Razorbill	Little Auk	Atlantic puffin
Hornsea Project One	All	7	264	121		48
East Anglia ONE	All	30	125	20		
EOWDC	All		386	129	0	62
Neart na Goithe	All	47	332	131		380
Firth of Forth Alpha	Breeding	12	41	9		11
Firth of Forth Bravo	Breeding	8	46	3		14
Teesside A and B, Creyke Beck A and B, and Teesside C and D[4]	All	122 (0)	1,378 (276)	359 (90)	23 (8)	37 (8)
TOTAL		226	2,572	772	23	553

[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, Firth of Forth Alpha and Bravo, Galloper, Greater Gabbard, Hornsea Project One, Humber Gateway, Inch Cape, Lincs, Moray (Telford, Stevenson and MacColl Offshore Wind Farms), Neart na Gaoithe, 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; Seagreen 2012, 2013;l Mainstream 2013; Moray Offshore Renewables Ltd. 2012, 2013; RPS 2013). 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. Furthermore, 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. 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**]	42[1**]	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		314[3]			780[1]	394[1]	115[1]			
European Offshore Wind Development Centre / Aberdeen Offshore Wind Farm	Band (2012) Option 2	2	17			34		12	3	1	
Firth of Forth Alpha	Band (2012 Option 1(*) / Option 3 (**)	3[1**]	493[1**]			148[1**]	6[1**]	146[1*]			
Firth of Forth Bravo	Band (2012 Option 1(*) / Option 3 (**)	5[1**]	334[1**]			104[1**]	6[1**]	121[1*]			
Galloper	Band *et al.* (2007)		112	4	27	148	661	104			
Greater Gabbard	Band (2000)				15[5]		22[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]			
Inch Cape	Band (2000)		675[1]	1[1]	2[1]	547[1]		147[1]			
Lincs	Band (2000)		9				34				
London Array I/II	Band (2000)		5[3]								
Moray (Telford, Stevenson and MacColl Offshore Wind Farms)	Band (2012) Option 3		13[7]			48[3]		59[8]			
Neart na Gaoithe	Band (2012) Option 1		237[3]	0.15[1]	0.18[1]	86[1]	3[1]	21[1]	1[1]	0[1]	0[1]
Race Bank	Band (2000)	8	198				296	96	3	1	
Sheringham Shoal	Band (2000)		31				33				
Teesside	Band (2000)		2[9]	1[9]		28[9]		33[9]			
Thanet	Band (2000)		1			1	32	1			
Triton Knoll	Band (2000)	7	129		4	158	85	487	3		

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
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[10]	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		**42**	**3,627**	**27**	**76**	**2,755**	**2,397**	**2,009**	**37**	**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 99.5% used; [8]Avoidance rate of 98.5% used; [9]Avoidance rate of 99.62% used; [10]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 white-billed 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. For the Inch Cape a negligible significance was concluded for all species, however for the Firth of Forth Alpha and Bravo projects, the loss of potential habitat for sandeels was deemed to have moderate significance for common guillemot, razorbill, and Altantic puffin.

6.3.14 The effect of habitat loss and/or change in other assessments was evaluated in relation to potential impacts at protected sites. Therefore, the North Sea scale assessment for habitat loss and/or change is presented at the protected site level.

6.3.15 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, **Negligible adverse** for white-billed diver, lesser black-backed gull and little auk, and due to the conclusions based on the firth of Forth Alpha and Bravo projects, **Moderate adverse** for common guillemot, razorbill and puffin.

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					
Firth of Forth Alpha and Bravo						Minor			Moderate	Moderate		Moderate
Galloper		Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Negligible		
Triton Knoll		Negligible	Negligible			Negligible			Minor	Minor		Minor
Inch Cape		Negligible	Negligible			Negligible	Negligible	Negligible	Negligible	Negligible		Negligible
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**	**Moderate**	**Moderate**	**Negligible**	**Moderate**

Evaluation for Ornithological Receptors

White-billed diver

Construction and Decommissioning/Operation

Disturbance/displacement

Species-specific sensitivity (Recoverability/Adaptability/Tolerance/Value)

6.3.16 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)

6.3.17 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.

6.3.18 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.

6.3.19 The effect of displacement is thus considered of **negligible magnitude** at both national and biogeographic scales.

Significance

6.3.20 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)

6.3.21 No additional collision estimates for white-billed diver were obtained other than those already presented in section 6.2.

Significance

6.3.22 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**.

<u>Northern fulmar</u>

Construction and Decommissioning/Operation

Operation

Collision

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.23 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 six additional sites – Beatrice, the European Offshore Wind Development Centre, Firth of Forth Alpha and Bravo, 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 42 birds per year.

6.3.24 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of northern fulmar.

6.3.25 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 provided for: East Caithness Cliffs SPA (from the Beatrice Offshore Wind Farm assessment), Buchan Ness to Collieston Coast SPA (from the Firth of Forth Alpha and Bravo assessments), Forth Islands SPA (from the Firth of Forth Alpha and Bravo assessments) and Fowlsheugh SPA (from the Firth of Forth Alpha and Bravo assessments). 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 respective estimates from easch offshore wind farm assessment for all sites amounted to much less than 1% of the population at all protected sites.

6.3.26 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

6.3.27 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)

6.3.28 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)

6.3.29 Predictions of the numbers of birds potentially displaced by other projects were available from 11 additional environmental impact assessments – Beatrice, East Anglia ONE, the European Offshore Wind Development Centre, Firth of Forth Alpha and Bravo, Hornsea Project One, Inch Cape, London Array I/II, Neart na Gaoithe, Moray Firth 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 10,828.

6.3.30 Estimates of the numbers of displaced birds that might be expected to die were available from East Anglia ONE, Hornsea Project One, Neart na Gaoithe, and Firth of Forth Alpha and Bravo (Table 6.8b). 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 226 birds across all projects that were predicted to be lost through displacement mortality.

6.3.31 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 the following individual protected sites: Flamborough Head and Bempton Cliffs SPA (from the Hornsea Project One assessment) and the Forth Islands SPA (from the Neart na Gaoithe, and Firth of Forth Alpha and Bravo assessments).

6.3.32 For the Flamborough Head and Bempton Cliffs SPA, 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.

6.3.33 For the Forth Islands SPA, 52 birds were predicted to be impacted from the Neart na Gaoithe, and Firth of Forth Alpha and Bravo assessments. When added to the total

number 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 (60 birds), the total number impacted at this site was 112 birds, representing less than 1% of the population.

6.3.34 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

6.3.35 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)

6.3.36 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 22 additional environmental impact assessments – Beatrice, Breeveerten II, Dudgeon, East Anglia ONE, the European Offshore Wind Development Centre, Firth of Forth Alpha, Firth of Forth Bravo, Galloper, Hornsea Project One, Humber Gateway, Inch Cape, Lincs, Moray Firth, Neart na Gaoithe, Race Bank, Sheringham Shoal, Teesside, Thanet, Triton Knoll and Westernmost Rough – the cumulative collision estimate for northern gannet is 3,627 birds per year.

6.3.37 The cumulative collision estimate amounts to less than 1% of the British breeding population (0.5%) and of the biogeographic population of northern gannet (0.4%). The predicted number of collisions reflects an increase of 6.6% of the background mortality at a national level and 4.5% at an biogeographic level. Under this approach, the impact of collisions on northern gannet populations would be considered to be of **negligible magnitude** at the national level and **low magnitude** at the biogeographic scale**.**

6.3.38 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 Flamborough Head and Bempton Cliffs SPA (from the Triton Knoll, Dudgeon, East Anglia and Hornsea assessments), and for the Forth Islands SPA (from Firth of Forth Alpha and Bravo, and Neart na Gaoithe).

6.3.39 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 791 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 5.0% of the population and an increase in background mortality of 61.6% 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.

6.3.40 The cumulative collision estimate for northern gannet for the Firth of Forth Alpha and Bravo, Neart na Gaoithe, 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 Forth Islands SPA amounts to 1,015 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 0.9% of the population and an increase in background mortality of 10.6% at this site.

6.3.41 Based on these figures, the numbers of collisions apportioned to the Flamborough Head and Bempton Cliffs and Forth Islands SPAs for these projects is likely to be a considerable over-estimate, for the reasons outlined above. Therefore, the cumulative effect of collisions for northern gannet for Flamborough Head and Bempton Cliffs SPA is considered to be of **low magnitude** and for the Forth Islands SPA is considered to be **negligible magnitude**.

Significance

6.3.42 The cumulative collision risk estimate for birds at the Flamborough Head & Bempton Cliffs and Forth Islands SPAs was considered to be of a **low magnitude** and therefore, **moderate adverse.** At a national scale, collision risk estimates represent an increase of between 5% and 20% adult background mortality, and at the biogeographic scale collision risk estimates reflect an increase of less than 5% adult background mortality. Consequently, the cumulative effect of collision at these scales was considered to be of **low magnitude** and therefore **moderate adverse** at the national scale and **negligible magnitude** and **minor adverse** at the biogeographic scale.

Arctic skua

Operation

Collision

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.43 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 seven additional projects – Beatrice, Galloper, Hornsea Project One, Humber Gateway, Inch Cape, Nearth na Gaoithe and Teesside, the cumulative collision estimate for Arctic skua is estimated as 27 birds per year.

6.3.44 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of Arctic skua.

6.3.45 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.

6.3.46 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

6.3.47 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**.

<u>Great skua</u>

Operation

Collision

Species Overall sensitivity to collision – Very High (see section 5.2)

Magnitude of effect (Duration/Frequency/Extent/Size)

6.3.48 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 eight additional projects – Beatrice, Galloper, Greater Gabbard, Hornsea Project One, Humber Gateway, Inch Cape, Neart na Gaoithe and Triton Knoll, the cumulative collision estimate for Great skua is estimated as 76 birds per year

6.3.49 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of great skua.

6.3.50 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.

6.3.51 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

6.3.52 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)

6.3.53 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 16 available environmental impact assessments – Beatrice, Blyth Demonstrator, East Anglia ONE, the European Offshore Wind Development Centre, Galloper, Firth of Forth Alpha and Bravo, Hornsea Project One, Humber Gateway, Inch Cape, Moray Firth, Neart na Gaoithe, Teesside, Thanet, Triton Knoll and Westernmost Rough, the annual cumulative collision estimate for black-legged kittiwake is 2,755 birds per year.

6.3.54 The cumulative collision estimate amounts to less than 1% of the British breeding population (0.2%) and of the biogeographic population (<0.1%) of black-legged kittiwake. The predicted cumulative collision rates reflect an increase in background mortality of 4.0% at the national level and less than 1% 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.

6.3.55 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 eight SPAs: East Caithness Cliffs (from the Beatrice and Moray Firth assessments), Flamborough Head and Bempton Cliffs (from the East Anglia One, Hornsea Project One and Triton Knoll assessments), North Caithness SPA (from the Moray Firth assessment), Troup, Lions and Pennans Heads (from the Moray Firth assessment), Forth Islands (from the Firth of Forth Alpha and Bravo, and Neart na Gaoithe assessments), Fowsheugh (from the Firth of Forth Alpha and Bravo, and Neart na Gaoithe assessments), St Abbs Head to Fast Castle (from the Firth of Forth Alpha and Bravo, and Neart na Gaoithe assessments), and Buchan Ness to Collieston Coast (from the Firth of Forth Alpha and Bravo assessments).

6.3.56 The cumulative collision estimate for black-legged kittiwake for the Flamborough Head and Bempton Cliffs SPA amounts to 538 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 0.6%, 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.

6.3.57 The cumulative collision estimate for black-legged kittiwake for the East Caithness Cliffs SPA amounts to 99 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).

6.3.58 The cumulative collision estimate for black-legged kittiwake for the North Caithness Cliffs SPA amounts to 26 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% of the population at this site).

6.3.59 The cumulative collision estimate for black-legged kittiwake for the Troup, Lions and Pennans Heads **SPA** amounts to 28 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% of the population at this site).

6.3.60 The cumulative collision estimate for black-legged kittiwake for the Forth Islands SPA amounts to 39 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% of the population at this site).

6.3.61 The cumulative collision estimate for black-legged kittiwake for the Fowlsheugh SPA amounts to 32 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 0.2%) of the population at this site).

6.3.62 The cumulative collision estimate for black-legged kittiwake for the St Abbs Head to Fast Castle **SPA** amounts to 30 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% of the population at this site).

6.3.63 The cumulative collision estimate for black-legged kittiwake for the Buchan Ness to Collieston Coast SPA amounts to 17 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% of the population at this site).

6.3.64 The numbers of collisions of adult birds apportioned to the Flamborough Head and Bempton Cliffs SPA represents up to approximately 10.8% 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. Likewise, the numbers of collisions of adult birds apportioned to the Forth Islands SPA represented up to 5.6% of the background mortality of this species, hence may also be considered of **low magnitude**. The numbers of collisions of adult birds apportioned to the seven other SPAs where data from other projects was available, represents approximately less than 5% of the background mortality of adult black-legged kittiwakes at these sites (East Caithness Cliffs 1.4%, North Caithness Cliffs 1.4%, Troup, Lions and Pennans Heads 1.0%, Fowlsheugh 1.9%, St Abb's Head to Fast Castle 1.0% and Buchan Ness to Collieston Coast 0.8%). The cumulative effect of collisions for black-legged kittiwake at these SPAs, based on the sites for which data were available, is therefore considered to be of **negligible magnitude**.

Significance

6.3.65 The cumulative collision risk estimates to birds at the Flamborough Head & Bempton Cliffs and Forth Islands SPAs 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)

6.3.66 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 16 additional available environmental impact assessments – Breeveerten II, Dudgeon, East Anglia ONE, Firth of Forth Alpha and Bravo, Galloper, Greater Gabbard, Hornsea Project One, Humber Gateway, Inch Cape, Lincs, Moray Firth, Neart na Gaoithe, Race Bank, Sheringham Shoal, Thanet, Triton Knoll, Westernmost Rough – the cumulative collision estimate for lesser black-backed gulls is estimated at 2,397 birds per year.

6.3.67 The annual cumulative collision estimate amounts to 0.7% of the British breeding population of lesser black-backed gulls. The annual cumulative collision estimate amounts to 1.9% 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). The annual cumulative collision estimate amounts to less than 1% (0.4%) of the biogeographic population of this species.

6.3.68 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.

6.3.69 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 the East Anglia ONE assessment for the Alde-Ore estuary SPA (Appendix 13). 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 0.38% of the population and an increase in background mortality of 1.83% at this site. Therefore this effect is considered of **negligible magnitude** for the Alde-Ore estuary SPA.

6.3.70 In addition, collision estimates were available from the Firth of Forth Alpha and Bravo and Neart na Gaoithe projects for the Forth Islands SPA (Appendix 13). The cumulative collision estimate for lesser black-backed gull for this site combining the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D project estimate with the other projects amounts to just seven 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 0.2% of the population and an increase in background mortality of 0.9% at this site. Therefore this effect is considered of **negligible magnitude** for the Forth Islands SPA.

Significance

6.3.71 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)

6.3.72 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 18 available environmental impact assessments – Beatrice, Blyth Demonstrator, Breeveerten II, the European Offshore Wind Development Centre, East Anglia ONE, Firth of Forth Alpha and Bravo, Galloper, Hornsea Project One, Humber Gateway, Inch Cape, Moray Firth, Neart na Gaoithe, Race Bank, Teesside, Thanet, Triton Knoll and Westernmost Rough – the cumulative collision estimate for great black-backed gulls is estimated at 2,009 birds per year.

6.3.73 The annual cumulative collision estimate amounts to 3.9% of the British breeding population of great black-backed gull, and 2.6% 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. The cumulative collision estimate amounts to less than 1% (0.5%) of the biogeographic population of the great black-backed gull.

6.3.74 The predicted cumulative collision rates reflect an increase in background mortality of 43.4% at the national level (referenced to the breeding population) and 5.3% 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.

6.3.75 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

6.3.76 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)

6.3.77 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)

6.3.78 Predictions of the numbers of birds potentially displaced by other projects were available from 12 additional environmental impact assessments – Beatrice, East Anglia ONE, the European Offshore Wind Development Centre, Firth of Forth Alpha and Bravo, Galloper, Hornsea Project One, London Array I/II, Moray Firth, Neart na Gaoithe 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 77,757 (Table 6.8a).

6.3.79 Estimates of the numbers of displaced birds that might be expected to die were available for six projects: East Anglia ONE, the European Offshore Wind Development Centre), Firth of Forth Alpha and Bravo, Hornsea Project One and Neart na Gaoithe (Table 6.8b). 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, provided a cumulative estimate of displaced birds that might be expected to die of 2,572.

6.3.80 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 the following individual protected sites: Flamborough Head and Bempton Cliffs SPA (from the Hornsea project One assessment), Forth Islands SPA (from the Neart na Gaoithe and Firth of Forth Alpha and Bravo assessments), Fowlsheugh SPA (from the European Offshore Wind Development Centre, Neart na Gaoithe, and Firth of Forth Alpha and Bravo assessments), St. Abb's Head to Fast Castle SPA (from the Neart na Gaoithe, and Firth of Forth Alpha and Bravo assessments), Farne Islands SPA (from the Neart na Gaoithe assessment), and Buchan Ness to Collieston Coast SPA (from the European Offshore Wind Development Centre, Neart na Gaoithe, and Firth of Forth Alpha and Bravo assessments). In the case of the European Offshore Wind Development Centre, while

the assessment only apportions numbers of displaced birds to protected sites, a worst case 100% mortality was presented in the assessment.

6.3.81 For Flamborough Head and Bempton Cliffs SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (244 birds), the total number lost from the site was 371 birds, less than 1% (0.40%) of the total population of the site (see Appendix 13).

6.3.82 For the Forth Islands SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (50 birds), combining the total lost from other assessments for this site (53 birds), the total number lost, 103 birds, was less than 1% (0.37%) of the total population of the site (see Appendix 13).

6.3.83 For the Fowlsheugh SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (98 birds), combining the total lost from other assessments for this site (136 birds), the total number lost, 234 birds, was less than 1% (0.42%) of the total population of the site (see Appendix 13).

6.3.84 For the St. Abb's Head to Fast Castle SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (22 birds), combining the total lost from other assessments for this site (107 birds), the total number lost, 129 birds, was less than 1% (0.21%) of the total population of the site (see Appendix 13).

6.3.85 For the Buchan Ness to Collieston Coast SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (39 birds), combining the total lost from other assessments for this site (300 birds), the total number lost, 329 birds, was between 1 and 5% (1.62%) of the total population of the site. Note, however, that the number of guillemots impacted from the EOWDC assessment alone was 1.5% (see Appendix 13).

6.3.86 For the Farne Islands SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (132 birds), combining the total lost from other assessments for this site (5 birds), the total number lost, 137 birds, was less than 1% (0.17%) of the total population of the site (see Appendix 13).

6.3.87 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

6.3.88 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)

6.3.89 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 five available environmental impact assessments – Beatrice, the European Offshore Wind Development Centre, Neart na Goithe, Race Bank and Triton Knoll – the cumulative collision estimate for common guillemot is estimated as 37 birds per year.

6.3.90 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of common guillemot.

6.3.91 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.

6.3.92 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.

6.3.93 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

6.3.94 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)

6.3.95 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)

6.3.96 Predictions of the numbers of birds potentially displaced by other projects were available from 12 additional environmental impact assessments – Beatrice, East Anglia ONE, the European Offshore Wind Development Centre, Firth of Forth Alpha and Bravo, Galloper, Hornsea Project One, Inch Cape, London Array I/II, Moray Firth, Neart na Gaoithe, 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 22,573.

6.3.97 Estimates of the numbers of displaced birds that might be expected to die were available for six projects: East Anglia ONE, the European Offshore Wind Development Centre, Firth of Forth Alpha and Bravo, Hornsea Project One and Neart na Gaoithe (see Table 6.8b). 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 772.

6.3.98 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 the following individual protected sites: Flamborough Head and Bempton Cliffs SPA (from the Hornsea project One assessment), Forth Islands SPA (from the Neart na Gaoithe and Firth of Forth Alpha and Bravo assessments), Fowlsheugh SPA (from the European Offshore Wind Development Centre and Firth of Forth Alpha and Bravo assessments), St. Abb's Head to Fast Castle SPA (from the Neart na Gaoithe, and Firth of Forth Alpha and Bravo assessments) and the Farne Islands SPA (from the Neart na Gaoithe assessment). In the case of the European Offshore Wind Development Centre, while the assessment only apportions numbers of displaced birds to protected sites, a worst case 100% mortality was presented in the assessment.

6.3.99 For Flamborough Head and Bempton Cliffs SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and

Dogger Bank Teesside C and D projects (63 birds), the total number lost, 142 birds, was less than 1% (0.63%) of the total population of the site (see Appendix 13).

6.3.100 For the Forth Islands SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (15 birds), combining the total lost from other assessments for this site (7 birds), the total number lost, 22 birds, was less than 1% (0.39%) of the total population of the site (see Appendix 13).

6.3.101 For the Fowlsheugh SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (16 birds), combining the total lost from other assessments for this site (34 birds), the total number lost, 50 birds, was less than 1% (0.82%) of the total population of the site (see Appendix 13).

6.3.102 For the St. Abb's Head to Fast Castle SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (10 birds), combining the total lost from other assessments for this site (1 bird), the total number lost, 11 birds, was less than 1% (0.22%) of the total population of the site (see Appendix 13).

6.3.103 For the Farne Islands SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (2 birds), combining the total lost from other assessments for this site (<1 bird), the total number lost, 2 birds, was less than 1% (0.19%) of the total population of the site (see Appendix 13).

6.3.104 Cumulative displacement would affect less than 1% of the British breeding population (up to 0.23%) 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

6.3.105 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)

6.3.106 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 Neart na Gaoithe and Race Bank – the cumulative collision estimate for razorbill is estimated as just 11 birds per year.

6.3.107 The cumulative collision estimate amounts to less than 1% of the British breeding population and of the biogeographic population of razorbill.

6.3.108 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.

6.3.109 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

6.3.110 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)

6.3.111 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)

6.3.112 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

6.3.113 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)

6.3.114 No additional collision estimates for little auk were obtained other than those already presented in section 6.2.

6.3.115 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

6.3.116 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)

6.3.117 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)

6.3.118 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, Firth of Forth Alpha and Bravo, Hornsea Project One, Inch Cape, Neart na Gaoithe, Moray Firth 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 15,102.

6.3.119 Estimates of the numbers of displaced birds that might be expected to die were available for the European Offshore Wind Development Centre, Firth of Forth Alpha and Bravo, Hornsea Project One and Neart na Gaoithe (see Table 6.8b). 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 553 displaced birds that might be expected to die.

6.3.120 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 the following individual protected sites: Flamborough Head and Bempton Cliffs SPA (from the Hornsea project One assessment), Forth Islands SPA (from the Neart na Gaoithe and Firth of Forth Alpha and Bravo assessments), Coquet SPA (from the Hornsea Project One assessment), and Farne Islands SPA (from the Hornsea Project One assessment).

6.3.121 For Flamborough Head and Bempton Cliffs SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (<1 bird), the total number lost, 3 birds, was less than 1% (0.31%) of the total population of the site (see Appendix 13).

6.3.122 For the Forth Islands SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (12 birds), combining the total lost from other assessments for this site (264 birds), the total number lost, 276 birds, was less than 1% (0.23%) of the total population of the site (see Appendix 13).

6.3.123 For the Coquet Island SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (3 birds), combining the total lost from other assessments for this site (9 birds), the total number lost, 12 birds, was less than 0.1% (0.06%) of the total population of the site (see Appendix 13).

6.3.124 For the Farne Islands SPA, in addition to the number of birds lost from the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects (7 birds), combining the total lost from other assessments for this site (18 birds), the total number lost, 25 birds, was less than 0.1% (0.05%) of the total population of the site (see Appendix 13).

6.3.125 Cumulative displacement would affect much less than 1% of the British breeding population and 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

6.3.126 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)

6.3.127 Only one single assessment (Neart na Goithe) presented numbers for this species, however these were considered zero. No further collision estimates for Atlantic puffin were obtained other than those already presented in section 6.2.

6.3.128 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

6.3.129 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

6.3.130 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, Moray Firth, Neart na Gaoithe and Teesside.

6.3.131 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.

6.3.132 The cumulative numbers of barnacle geese and common scoters predicted to collide across these wind farms is presented in Table 6.12 below.

6.3.133 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 *Anser fabalis*	74%	High
Barnacle Goose (Svalbard population) *Branta leucopsis*	59%	Very High
Light-bellied Brent Goose (Svalbard population) *Branta bernicla hrota*	62%	Very High
Shelduck *Tadorna tadorna*	69%	Very High
Eurasian wigeon *Anas penelope*	62%	Medium
Gadwall *Anas strepera*	41%	Medium
Teal *Anas crecca*	62%	Medium
Mallard *Anas platyrhynchos*	68%	Medium
Pintail *Anas acuta*	62%	Medium
Shoveler *Anas clypeata*	61%	Medium
Pochard *Aythya ferina*	61%	Medium
Tufted Duck *Aythya fuligula*	61%	Medium
Scaup *Aythya marila*	51%	Medium
Common Scoter *Melanitta nigra*	62%	High
Velvet Scoter *Melanitta fusca*	74%	High
Goldeneye *Bucephala clangula*	69%	High
Red-breasted Merganser *Mergus serrator*	55%	Very High
Goosander *Mergus merganser* (Breeding Males)	74%	Very High
Goosander *Mergus merganser* (Non-breeding)	59%	Very High
Bittern *Botaurus stellaris*	63%	Medium
Great Crested Grebe *Podiceps cristatus*	53%	Very High

Species	% migration zone	Overall Sensitivity
Slavonian Grebe *Podiceps auritus*	62%	Very High
Hen Harrier *Circus cyaneus* (breeding)	48%	Very High
Hen Harrier *Circus cyaneus* (non-breeding)	75%	Very High
Coot *Fulica atra*	67%	Medium
Oystercatcher *Haematopus ostralegus* (non-breeding)	63%	Very High
Ringed Plover *Charadrius hiaticula* (non-breeding)	61%	High
Golden Plover *Pluvialis apricaria* (non-breeding)	50%	Medium
Grey Plover *Pluvialis squatarola*	68%	Very High
Lapwing *Vanellus vanellus*	68%	Medium
Knot *Calidris canutus*	62%	Very High
Sanderling *Calidris alba*	62%	Very High
Dunlin *Calidris alpina* *schinzii* & *C. a. arctica* *(passage)*	61%	Medium
Dunlin *Calidris alpina alpina* (passage & winter)	61%	Medium
Ruff *Philomachus pugnax*	67%	Medium
Snipe *Gallinago gallinago*	62%	Medium
Black-tailed Godwit *Limosa limosa islandica*	57%	Medium
Bar-tailed Godwit *Limosa lapponica*	72%	Medium
Whimbrel *Numenius phaeopus*	60%	Very High
Curlew *Numenius arquata* (non-breeding)	68%	Medium
Greenshank *Tringa nebularia*	58%	Medium
Redshank *Tringa totanus britannica* (breeding)	66%	Medium
Redshank Icelandic population *Tringa totanus robusta*	57%	Medium

Species	% migration zone	Overall Sensitivity
(non-breeding)		
Redshank mainland Europe population *Tringa totanus* (non-breeding)	74%	Medium
Turnstone *Arenaria interpres*	62%	Very High
Short-eared *Owl Asio flammeus*	67%	Medium
Nightjar *Caprimulgus europaeus*	60%	Medium

Barrier effects

6.3.134 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.

6.3.135 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.

6.3.136 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.

6.3.137 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

6.3.138 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	Magnitude	Significance	Confidence
White-billed diver	Displacement (operation)	National	Medium	-	-	Negligible	Negligible	Very Low
		Biogeographic	Medium	-	-	Negligible	Negligible	Very Low
	Collision (operation)	National	Medium	High	High	Negligible	Negligible	Very Low
		Biogeographic	Medium	High	High	Negligible	Negligible	Very Low
	Habitat loss or change (operation)	Protected site	Medium	-	-	-	Negligible	Very Low
Northern fulmar	Collision (operation)	Protected site	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
		National	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
		Biogeographic	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
	Habitat loss or change (operation)	Protected site	Very High	-	-	-	Minor adverse	Very Low
Northern gannet	Displacement (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	Low	Moderate adverse	Very Low
		National	Very High	Very High	Very High	Low	Moderate adverse	Very Low
		Biogeographic	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
	Habitat loss or change (operation)	Protected site	Very High	-	-	-	Minor adverse	Very Low
Arctic skua	Collision (operation)	Protected site	Very High	High	Very High	Negligible	Minor adverse	Very Low
		National	Very High	High	Very High	Negligible	Minor adverse	Very Low
		Biogeographic	Very High	High	Very High	Negligible	Minor adverse	Very Low
	Habitat loss or change (operation)	Protected site	Very High	-	-	-	Minor adverse	Very Low
Great skua	Collision (operation)	Protected site	Very High	High	Very High	Negligible	Minor adverse	Very Low

Receptor	Effect	Geographical scale	Value	Species sensitivity	Overall sensitivity	Magnitude	Significance	Confidence
		National	Very High	High	Very High	Negligible	Minor adverse	Very Low
		Biogeographic	Very High	High	Very High	Negligible	Minor adverse	Very Low
	Habitat loss or change (operation)	Protected site	Very High	-	-	-	Minor adverse	Very Low
Black-legged kittiwake	Collision (operation)	Protected site	Very High	Very High	Very High	Low	Moderate adverse	Very Low
		National	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
		Biogeographic	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
	Habitat loss or change (operation)	Protected site	Very High	-	-	-	Minor adverse	Very Low
Lesser black-backed gull	Collision (operation)	Protected site	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
		National	Very High	Very High	Very High	Low	Moderate adverse	Very Low
		Biogeographic	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
	Habitat loss or change (operation)	Protected site	Very High	-	-	-	Negligible	Very Low
Great black-backed gull	Collision (operation)	Protected site	Very High	Very High	Very High	Low	Moderate adverse	Very Low
		National	Very High	Very High	Very High	Low	Moderate adverse	Very Low
		Biogeographic	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
	Habitat loss or change (operation)	Protected site	Very High	Low	High	Negligible	Negligible	Very Low
Common guillemot	Displacement (operation)	Protected site	Very High	-	-	Low	Moderate 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	Very Low
		National	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
		Biogeographic	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
	Habitat loss or change (operation)	Protected site	Very High	-	-	-	Moderate adverse	Very Low

Receptor	Effect	Geographical scale	Value	Species sensitivity	Overall sensitivity	Magnitude	Significance	Confidence
Razorbill	Displacement (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	Very Low
		National	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
		Biogeographic	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
	Habitat loss or change (operation)	Protected site	Very High	-	-	-	Moderate adverse	Very Low
Little auk	Displacement (operation)	National	High	-	-	Negligible	Negligible	Very Low
		Biogeographic	High	-	-	Negligible	Negligible	Very Low
	Collision (operation)	National	High	Medium	High	Negligible	Negligible	Very Low
		Biogeographic	High	Medium	High	Negligible	Negligible	Very Low
	Habitat loss or change (operation)	Protected site	High	-	-	-	Negligible	Very Low
Atlantic puffin	Displacement (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	Very Low
		National	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
		Biogeographic	Very High	Very High	Very High	Negligible	Minor adverse	Very Low
	Habitat loss or change (operation)	Protected site	Very High	-	-	-	Moderate adverse	Very Low

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)

7.5.2 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 and the Forth Islands SPA, for black-legged kittiwake for Flamborough Head & Bempton Cliffs SPA and the Forth Islands 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. Impacts of moderate adverse significance were also predicted for northern gannet at the national and biogeographic population scales.

Habitat loss and/or change

7.6.4 Impacts of moderate significance were predicted for common guillemot, razorbill and Atlantic puffin; however, such conclusions were based on the outputs of the Firth of Forth Alpha and Bravo assessments that concluded moderate significance. In isolation, the Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D projects were considered to have negligible significance on any receptor.

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**/ **Moderate** / **Moderate** / **Moderate**
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_/ **Moderate** /Minor
Great black-backed gull	-	-	Negligible	Negligible	-	**Moderate**/**Moderate**/ **Moderate**/Minor
Common guillemot	Minor/Minor/ Minor/Minor	**Moderate**/Minor/ Minor/Minor	Minor	**Moderate**	Minor/Minor/ Minor/Minor	Minor/Minor/ Minor/Minor
Razorbill	Minor/Minor/ Minor/Minor	Minor/Minor/ Minor/Minor	Minor	**Moderate**	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	**Moderate**	-	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.

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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

		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

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

		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

		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

					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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

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

		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

		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

		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

		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

		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

		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

		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

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

		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

		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

		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

		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

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

		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

		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

		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

		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

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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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

		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 Dogger Bank Teesside A and B assessment to reflect those comments and discussions from the Dogger Bank 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. Table 6.2: We would like clarification if 'peak count' and 'monthly total' are the same? Are these raw counts? 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
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
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
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? 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
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
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
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%. 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
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
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. 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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Chapter / section
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
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
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. 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
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
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
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
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
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
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
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
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
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
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
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). 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
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? 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. o Auks, seaducks and gannets: There is insufficient evidence presented to suggest that a figure of 90% displacement for these species is precautionary. 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. 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
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
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 Dogger Bank 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

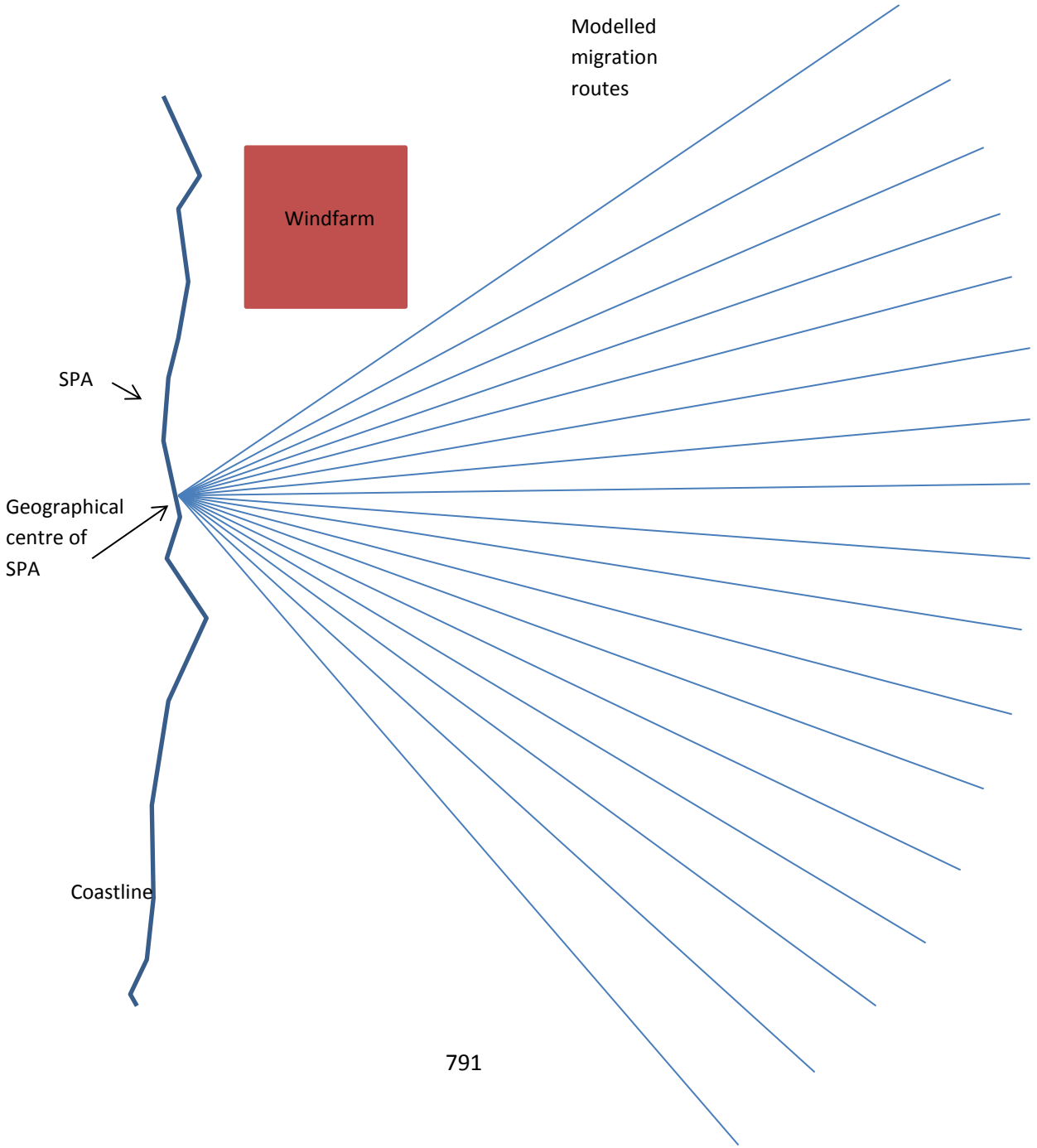
Consultee	Reason	Detail of response	Details on how comment has been addressed	Chapter / section
JNCC / NE	Ecological scope assumptions	Section 3.3.31 - Will additional mortality due to increased collisions of attracted birds be taken into account?	The potential for attraction is considered in assessing 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 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. http://infrastructure.planningportal.gov.uk/projects/eastern/galloper-offshore-wind-farm/?ipcsection=hearings Click through to 'Showing 51 to 60 of 108 entries' and then '121029 EN010003 NE Written Summary of Biodiversity Hearing Submissions'. 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 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: · 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. · 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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Chapter / section
NE	HRA Screening (for Creyke Beck projects)	APPROACH TO MIGRANT WATERBIRDS continued · 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. · 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. 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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Chapter / section
NE	HRA Screening (for Creyke Beck projects)	APPROACH TO MIGRANT WATERBIRDS continued The exercise should be repeated for all OWFs lying within the corridor established by Wright *et al.* (2012), to establish cumulative effect. · 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 Dogger Bank Teesside A and B, Creyke Beck A and B and Teesside C and D projects within the Dogger Bank zone. 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 Dogger Bank 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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Chapter / section
		· 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
NE	HRA Screening (for Creyke Beck projects)	POPULATION FIGURES FOR THE PROPOSED EXTENSION TO THE FLAMBOROUGH SPA. Review of the Flamborough Head and Bempton Cliffs Special Protection Area 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. 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. 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: Fulmar – 1,447 pairs or 2,894 breeding adults (2008-2011) 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) Kittiwake – 44,520 pairs or 89,041 breeding adults (2008-2011) Guillemot – 41,607 pairs or 83,214 breeding adults (2008-2011) Puffin – 490 pairs or 980 breeding adults (2008-2011) Herring gull – 711 pairs or 1,421 breeding adults (2008-2011) Razorbill - 10,570 pairs or 21,140 breeding adults (2008-2011) 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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES (for Creyke Beck projects)	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). 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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES (for Creyke Beck projects)	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
RSPB	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects) – 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 (for Creyke Beck projects) – 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.	

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES (for Creyke Beck projects) – 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 (for Creyke Beck projects) – 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.	
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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. 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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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. 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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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. 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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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. 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. 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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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. 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 (for Creyke Beck projects)	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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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.	

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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) (see Appendix 11C of the ES), 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).	
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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) (see Appendix 11C of the ES) 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 (for Creyke Beck projects)	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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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. 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. 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. 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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	A5.19. We note the following differences and suggestions regarding the final figures suggested for percentage of time spent underwater : □ 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). □ 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). □ Atlantic puffin – We suggest this value is recalculated based on our comments on the other auk figures above. □ 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 (for Creyke Beck projects)	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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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. 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 (for Creyke Beck projects)	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. 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. 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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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	
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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. 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 Dogger Bank 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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 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 (for Creyke Beck projects)	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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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. 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 (for Creyke Beck projects)	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 Dogger Bank 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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 Dogger Bank 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 Dogger Bank Teesside A and B project areas.	Section 6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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: - Gannet – cumulatively with other plans and projects at North Sea level (collision) - Black-legged kittiwake - cumulatively with other plans and projects at North Sea level (collision) - Lesser black-backed gull - cumulatively with other plans and projects at North Sea level (collision) - Great black-backed gull - cumulatively with other plans and projects at North Sea level (collision) - Common guillemot – cumulatively with other plans and projects at North Sea level (displacement) - 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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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. 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. 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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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. 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. 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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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.	
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 to provide average values across the two years of surveys, as well as values for each individual year.	

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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.	
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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	

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	TA: 35, 3.1.8. Boast should read boat	Amended	
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	TA: 4.5.1. Need to replace XX with appropriate chapter number (13?)	Amended	
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	TA: 4.3.90. Need to give appropriate fish chapter reference not XX	Amended	
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	TA: 216-7, Clarify the apparent contradiction in the following text: *"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.	
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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.	

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
NE/JNCC	Consultation on draft ES (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 (for Creyke Beck projects)	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 Dogger Bank Teesside A and B and Creyke Beck 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 (for Creyke Beck projects) – HRA report	Advice relating to English SPAs – Definition of seabird breeding seasons 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. 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. 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. 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. 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 March for English SPA colonies. Frederiksen *et al.* (2012)3 indicates that kittiwakes should be back at their colonies in	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 (for Creyke Beck projects) – HRA report	Advice relating to English SPAs – Use of maximum foraging ranges when considering impacts on breeding seabird SPAs 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. 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. 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. 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 (for Creyke Beck projects) – 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. 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. 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. 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. 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 (for Creyke Beck projects) – 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 (for Creyke Beck projects) – HRA report	Advice relating to Scottish SPAs – Population estimates 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 (for Creyke Beck projects) – HRA report	Seabird SPAs – impacts in the non-breeding season. 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.	

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES	2.1.6 It is unfortunate that the number of categories and the bandwidths for flight height estimation varied over time around the critical height of the lower blade sweep.	An extra flight height category was added during the period of data collection to provide improved understanding of behaviour.	Section 2
RSPB	Consultation on draft ES	Population estimation. Information is not presented as to the fit of each model for each species, so it is not possible to determine appropriateness of adopted figures in each and every case. Model based methods are recommended for this purpose Buckland *et al.* 2012).	A manuscript on the population modelling has been prepared for publication in the scientific literature and is currently (January 2014) under peer-review. This provides additional confirmation of the modelling procedure and of model fit.	Section 2
RSPB	Consultation on draft ES	2.7.7 The basis for regional population estimation relies on old (ESAS) data and therefore may not be applicable for context with recently collected site-based data.	It is acknowledged that the baseline population estimates are based on more recent and intensive survey than those obtained from ESAS. However, the latter provide a means for assessing populations within the North Sea for all species considered and for different times of year.	Section 2
RSPB	Consultation on draft ES	Table 4.5 Gannet – connectivity also applies to Bass Rock in winter, see Kubetzki *et al.* 2009 & Fort *et al.* 2012.	We have now updated Table 4.5 with this information.	Section 4
RSPB	Consultation on draft ES	4.3.33 Use of VMS data for sandeel fishery is useful but restricted to one of the main prey items; distribution of clupeids also is associated with several breeding seabirds and adult survival, eg puffin (Breton & Diamond 2013), Sandwich tern.	Danish VMS data are used in the population modelling as a proxy for the availability of sandeels. While it is acknowledged that the distribution of other prey species such as clupeids may also help explain the distributions of some seabird species, comparative data for other prey were not available for inclusion in the modelling.	Section 4
RSPB	Consultation on draft ES	4.3.40 Mortality rates presented for DBT represent the proportion of those birds predicted to be displaced that might be lost to the population. No attempt is made to assess this effect in relation to changes in background annual mortality and consequent population-level effects for relevant SPAs or more widely.	Please also see points made above with respect to the consultation on draft ES for Creyke Beck projects. 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.	Section 4
RSPB	Consultation on draft ES	Table 4.16 It is unclear what is considered the proportion at collision risk height (PCH) across model options, since PCH will be different between column 6 and 8. Using footnotes to explain do not make it clearer; the difference should be explicit in the column labels.	Clarification has been provided in the table and text.	Section 4

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES	Table 4.17 Rotation speed is presented with no indication of what the figure means. Is it minimum, mean or maximum, or some other value?	Clarification has been provided in the table and text.	Section 4
RSPB	Consultation on draft ES	Collision Risk Modelling. Formatting: The collision risk modelling suffers from being spread over several documents, i.e. chapter 11, Chapter 11A, and its appendices 6, 7 and 12. Cross referencing between the documents is not straightforward, and the layout and explanation of methods between documents is far from clear.	Clarifications are being provided with respect to other comments on methodology. Information in the technical report is separated between the main text and appendices, such that it is clear which values are taken forward in the assessment.	Sections 4-6
RSPB	Consultation on draft ES	Collision Risk Modelling overview. Band Option 3 with 98% avoidance rate (99% for gannet) is applied for DBT. Whilst the extended model may offer some advantages, these are more than countered by several fundamental problems (see further comment about Option 3 below): a) The lack of empirical data to validate the collision risk model forseabirds; b) Unknown error associated with flight height estimation during data gathering is compounded by the modelling to 1m bandwidths. c) The 98% avoidance rate applied with Option 3 was originally calculated for Option 1. Avoidance rate is a correction factor accounting for variability in several biological parameters and is considered by Band to be model-specific. Our understanding is that the appropriate avoidance rate for Option 3 is likely to be lower as Option 3 already accounts for some of the incorporated variability. The extended model is the subject of considerable debate, which has prompted a review and further work, commissioned by Marine Scotland and due to deliver by the end of March 2014. The group carrying out this work includes the BTO. Until this work is complete, Option 3 has to be considered to be “work in progress.” d) Collision risk predictions obtained from Option 3 are substantially lower than those obtained from Option 1, inappropriately so if a lower avoidance rate correction is applicable, as per c) above. e) 99% avoidance rate for gannets is based on data primarily from birds migrating/non-breeding season and may not apply to breeding birds.	Additional detail regarding the flight height modelling is provided in Johnston *et al.* (2014). Discussion with regards to Collision Risk Modelling options and the appropriate avoidance rates to use within Collision Risk Modelling is ongoing. To inform this, a separate document (Forewind and SmartWind 2013) has been produced to provide a review of avoidance rates of seabirds at offshore wind farms and the applicability of their use within the Band collision risk model. We also note the MROG Paper “Summary of current issues with Collision Risk Modelling approaches”. As is noted, further work has been commissioned by Marine Scotland that should also better inform this issue. Option 3 was used throughout the assessment as it allows variation in turbine design (i.e. in their size and height above sea level) to be more accurately incorporated into the assessment of collision risk. 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 and thus represented the most appropriate Option to use. However, as stated above, discussions in this regard are ongoing.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES	Cont. Given the current understanding for breeding seabirds, we consider the more precautionary avoidance rate of 98% should be applied for gannets (at least for the breeding season), as for other species, as an indicative value, until empirical data improve the evidence base. Until there is a better evidential base for the collision risk model in general, and the extended Band model has been peer-reviewed, in combination with the calculation of an appropriate avoidance rate, the RSPB are unhappy with the application of Option 3 alone. Currently, we suggest that the assessment should use either Option 1 and 98%, thereby facilitating cumulative impact assessment, or present both Option 3 and Option 1 across a range of avoidance rates. We acknowledge that Option 1 has been presented, in an appendix, but it is not carried forward into the assessment. Furthermore, the presentation of a single value, without a measure of variance, gives a misleading view of the validity of the CRM output.		

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES	The use of Option 3. The main assessment is based on the extended Band model (2012), Option 3, and while some results for the basic model, Options 1 and 2, are presented in the further appendices (6,7 and 12), it would be preferable that they were referred to in the assessment (chapter11) and it's Technical Report (11A). Band (2012) explicitly states: "A collision risk assessment for a specific site should not be based solely on the use of generic data. Where generic data is used, it is recommended that the collision risk for three different options is stated. Supporting text should then discuss and justify which of the options is most likely to characterise the collision risks at this site." As such, while we welcome the tables presenting the range of options in appendix 6, we would prefer that full reference was made to them in the main assessment. The reference to a range of model options is crucially important, as the extended model and particularly it's associated source data and avoidance rates, is still in question and the subject of wide debate and on-going work across the SNCBs and offshore wind stakeholders. As such it should be considered a work in progress, and therefore not suitable for consideration alone in the consenting process. However, the RSPB acknowledge that it can provide useful contextual information for that consideration. Given these caveats with Option 3, Option 1 should also be presented throughout the document.	Discussion with regards to Collision Risk Modelling options and the appropriate avoidance rates to use within Collision Risk Modelling is ongoing. To inform this, a separate document (Forewind and SmartWind 2013) has been produced to provide a review of avoidance rates of seabirds at offshore wind farms and the applicability of their use within the Band collision risk model. We also note the MROG Paper "Summary of current issues with Collision Risk Modelling approaches". As is noted, further work has been commissioned by Marine Scotland that should also better inform this issue. Option 3 was used throughout the assessment as it allows variation in turbine design (i.e. in their size and height above sea level) to be more accurately incorporated into the assessment of collision risk. 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 and thus represented the most appropriate Option to use. However, as stated above, discussions in this regard are ongoing.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES	Avoidance Rates. The assessment is based on the use of a generic avoidance rate of 98%, with 99% for gannet. While the use of 98% is supported in the text by reference to guidance (SNH, 2010) and a review (Cook et al, 2012), the use of 99% for gannet is not, nor is it justified in the supporting text, except by reference to the Triton Knoll application. It is our position that 98% should remain the default avoidance rate for gannet, as stated in SNH (2010) and Cook et al (2012) until empirical evidence is available to justify a change applicable to breeding as well as nonbreeding seasons. In terms of the presentation of avoidance rates, Band (2012) states: "*The collision risk estimate should conclude with a table showing potential collision mortality using a range of assumed avoidance rates, it is recommended that collision risks be evaluated assuming avoidance rates of 95%, 98%, 99% and 99.5%*". While the RSPB acknowledge that all these avoidance rates are presented in Appendix 6, Table 5.3, the main assessment, Chapter 11, Table 7.5 omits 95%. Given that a key concern with the use of the extended model is the cross-option applicability of avoidance rates, the main assessment should also include 95%.	Discussion with regards to Collision Risk Modelling options and the appropriate avoidance rates to use within Collision Risk Modelling is ongoing. To inform this, a separate document (Forewind and SmartWind 2013) has been produced to provide a review of avoidance rates of seabirds at offshore wind farms and the applicability of their use within the Band collision risk model. We also note the MROG Paper "Summary of current issues with Collision Risk Modelling approaches". As is noted, further work has been commissioned by Marine Scotland that should also better inform this issue.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES	Flight height bands and confidence levels. Within the methods two additional types of data are described as being collected (Chapter 11A, para 2.1.6), but are not mentioned in any of the results. These are the recording of confidence levels alongside the height bands during boat based survey, and the use of an additional height band at 20-25m from December 2010. Both of these would have given very useful contextual information. The extended model relies on flight height distribution curves presented in Cook *et al.*, (2012). These modelled distributions assume that birds are correctly assigned to the correct height category. This assumption is not validated, and initial indications, e.g. from terrestrial trials and offshore postconstruction monitoring, are that it may not be valid. Given that the CRM outputs can be strongly influenced by an upward shift of the rotor hub of a few metres, these inaccuracies in raw data may have important implications to the output of collision risk estimated. As such the presentation of confidence limits gathered during data collection would add valuable context. However, and this is not entirely clear from the methods, if no validation of these confidence limits was made and seems subjective, they may be subject to a similar range of inaccuracies as the height data. Key to the contrast in collision rates between the options is that options 2 and 3 allow for varying the height of turbines, although they rely on the use of modelled data to do this. Using this additional height band in Option 1, i.e. by increasing the lower limit of the PCH to 25m, would allow, to some extent, the calculation of changes in collision rate with the revised WCS in mitigation, without the need for Option 3.	Clarification has been added to the text.	Section 4

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES	Table 4.21 It is questionable whether these increases in adult background mortality rates could be considered acceptable in the context of an SPA population, eg that an increase of 5-20% in adult background mortality could constitute an impact of low magnitude.	Please also see points made above with respect to the consultation on draft ES for Creyke Beck projects. 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 thresholds, any decision as to what might be deemed significant (and above which further investigation of potential impacts is required) is, in essence, arbitrary. In relation to the size of a reference population, a value of 1% is commonly used to define a lower threshold for assessing the magnitude of an effect (e.g. Percival 1999, Table 4.1 of the ornithology technical report). However, 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%. While the EU guidance is acknowledged, it is noted that this guidance is provided in relation to the potential impacts of hunting and applied specifically to the migratory components of the populations considered. There remains a lack of common guidance for EIA purposes that provides a comparative framework for assessing the magnitude of an effect, at all relevant population scales, in relation to background mortality to that provided by, for example by Percival (1999), in relation to the size of a reference population. 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. Further assessment of the population level consequences of predicted impacts is provided through the use of PBR approaches in the HRA for northern gannet and black-legged kittiwake.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES	4.3.129 The application of a "correction factor" for those species for which less than 100% of the population is included in the SPA site network takes no account of the geographical distribution of colonies and their status, but assumes even distribution of birds irrespective of whether or not they originate from SPA colonies.	The apportioning to protected sites reflects the species' population size at each site and, for breeding birds, the distance of the site from the wind Farm project(s). Different correction factors are applied to breeders and non-breeders in the breeding season and non-breeding season to account for their potential different origins.	Sections 4-6
RSPB	Consultation on draft ES	Displacement & Barrier effects. The additive mortality arising from displacement and barriers is unknown (CEH displacement study, Forth & Tay, Searle *et al.* in prep.). Reduced breeding productivity is most likely to be the proximate effect of displacement/barriers, for adult seabirds. Whilst expecting that generally long-lived adults will abandon a breeding attempt to safeguard their own survival to make another breeding attempt in another year, there may be consequences for body condition into thewinter and knock-on effects for overwinter survival, as borne out by the CEH work. CEH individual based models indicate that effects on adult and chick survival increased when the distance between the SPA colony and wind farm were smallest, and the main effect driving survival was the cost of the barrier effect rather than displacement per se. The CEH study is a preliminary, but valuable, step in improving our understanding of displacement and barrier effects. In presenting the matrices of displacement x mortality, at least the relative sensitivity for each species can be assessed, although the matrices in Appendix 10 present predictions for the whole year, rather than distinguishing breeding/non-breeding totals.	The valuable work of CEH in understanding the potential impacts on demography of displacement and barrier effects is acknowledged. Further discussion of the likely impacts associated with displacement is provided in an independent review (Furness 2013),	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES	5.2.1 & 5.2.2 The relationship between the values tabulated in Appendix 9 and eg Table 5.1 is not clear. How are the apportionment values applied to the relevant displacement values? The relationship between the matrices presented in Appendix 10 and their equivalent tables in the main assessment are clear, eg Table 5.1.	We appreciate the confusion here as this is a complex process. A worked example is provided using razorbill for the full six projects for operational disaplcement. The appropriate displacement rate for razorbill is 50%, with 5% mortality (see section 4, Table 4.8 and paragraph 4.3.33). In section 6 of the ornithology technical report, Table 6.1 gives the number of birds displaced calculated assuming the 50% rate, and correcting for the number of birds underwater potentially missed by surveys (16.4% for razorbill). This gives breeding season values (means across all three 12 month periods) of: 784 (confidence interval, 640-959) during breeding, and 6,405 (5610-7283) during non-breeding. The sum of these components is: 7,188 (6,251-8,242), which matches the 50% displacement, 100% mortality value presented in Appendix 10 Table A10.18d. Appendix 9 Table A9.59d gives the apportioning table for razorbill. The total number of breeding birds impacted (during the breeding season) is 20.9, and total number of all non-breeding birds (during both breeding and non-breeding seasons) is 175.37. These are based on median values. <u>Breeding season:</u> Taking the median number of birds from Table 6.1 during the breeding season (784), a portion of these birds are assumed to non-breeders (1/3), thus giving 523 breeders and 261 non-breeders. Some of these birds may originate from outside the suite of sites bordering the North Sea, which for both breeding birds and non-breeding birds during the breeding season is assumed to be a proportion of 0.8 (see Table 4.23 and paragraph 4.3.129). This gives a total of 418 breeders and 209 non-breeders during the breeding season. Applying the 5% mortality value to these figures gives 20.9 and 10.5 birds lost. The 20.9 value is given at the bottom of Table A9.59d (third column from left).	Sections 5 and 6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES	Cont.	Non-breeding season: Taking the mean number of non-breeding season birds from Table 6.1 (6,405), all are assumed to be non-breeders. Adjusting for birds potentially originating from outside the North Sea, a proportional value of 0.515 was applied (Table 4.23), giving 3298.6 displaced birds to apportion to protected sites, of which 5% are lost due to mortality giving 164.9 birds. The respective non-breeding components during the breeding season and non-breeding season can then be added together (10.5 + 164.9) to give the total "non-breeding" component of the population across all seasons (= 175.37), which is quoted at the bottom of Table A9.59d (sixth column from left). These totals are apportioned amongst protected sites following the methodology detailed in section 4. Median proportions of populations are also presented in Appendix 9 tables, together with upper and lower confidence limits, however, the DB Teesside assessment was carried out on these upper CI values.	
RSPB	Consultation on draft ES	5.2.383 In excess of 1% of the relevant reference populations of migratory bean goose, hen harrer and ruff were estimated to pass through DBT. However, the low confidence in the assessment for migratory birds, owing to the paucity of knowledge, means that this finding can only point to the possibility that these species might be at greater risk than other migratory species passing through DBT.	This is acknowledged.	Sections 5 and 6
RSPB	Consultation on draft ES	Table 5.7 Low or very low confidence in many aspects of the environmental assessment for most species, highlight the general lack of understanding about the impacts of offshore wind farms on seabirds and white-billed diver. This means that it is particularly difficult to provide a comprehensive environmental assessment for DBT, or indeed for any of the Round 3 zones, necessitating a precautionary approach.	This is acknowledged, and we also note that this assessment is precautionary.	Sections 5 and 6
RSPB	Consultation on draft ES	6.3.6, 6.3.7 & Table 6.8. Only a subset of other proposed offshore wind farm sites were included in the cumulative impact assessment for displacement/barrier effects, on the basis of available data. Proposed sites in the Firths of Moray, Forth & Tay have been screened out for inadequate reasons.	Further projects have been included in the CIA list following the publication of recent reports. These projects include an extra five sites as follows: Moray Firth, Firth of Forth Alpha and Firth of Forth Bravo, Inch Cape, and Neart na Gaoithe.	Section 6.3

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
RSPB	Consultation on draft ES	6.3.9 & Table 6.10. Only a subset of other proposed offshore wind farm sites were included in the cumulative impact assessment for collision risk, on the basis of available data. Proposed sites in the Firths of Moray, Forth & Tay have been screened out for inadequate reasons.	Further projects have been included in the CIA list following the publication of recent reports. See above.	Section 6.3
RSPB	Consultation on draft ES	6.3.10 & Table 6.10. Incompatible estimations of collision risk, by different projects, using different versions of the collision risk model and different avoidance rates, make assessment of cumulative impacts difficult and unreliable, notably so when set against the current state of knowledge. This is a general criticism, applicable to all the Round 3 projects.	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 been possible in some cases. The assumptions used in deriving collision risk estimates in other assessments are highlighted in tabulated summaries where these differ from those used in this assessment.	Section 6.3
RSPB	Consultation on draft ES	Table 6.10 It would be helpful to recalculate avoidance rates from other sites wherenecessary. This would be a simple exercise (unlike recalculating using a different model option).	See response above.	Section 6.3
RSPB	Consultation on draft ES	Table 6.14 Formatted incorrectly and cannot be read.	Table 6.14 and also Table 6.7 have now reformatted to landscape orientation.	Section 6.3
RSPB	Consultation on draft ES	7.7 Monitoring We welcome the recognition of the value of post consent monitoring, should the project be consented, but consider this section rather premature in view of the adequacy of the cumulative impact assessment in particular.	It is acknowledged that the full scope and specific objectives of monitoring will need to be determined through consultation with the relevant stakeholders.	Section 7
RSPB	Consultation on draft ES	Table A6.2 Option 2 has a lower collision estimate than Option 3. This is counter-intuitive and should be discussed in the text. Presumably it is because of the dual peaked distribution reported in Cook et al (2012) (though not in Johnston et al, 2014). In general there should be more discussion of these comparative results.	This is the result of the dual peak in the distribution; additional text has been added as a clarification.	Appendix 6
RSPB	Consultation on draft ES	Tables A7.1-6 These tables wrongly state that Option 1 corrects for variable collision risk within the rotor swept area; it is Option 3 that does this.	This text has been amended.	Appendix 7
RSPB	Consultation on draft ES	Appendix 12 There is no discussion of how the tabulated figures have been calculated, and no reference or discussion of this appendix within the text. Presumably the figures are calculated using Option 2.	Figures were calculated using option 3; additional text has been added as a clarification.	Appendix 12

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	52. Presentation of baseline, effects and impacts. 52.3. In the assessment of mortality impacts from collision risk modelling, we welcome the presentation of figures on the additional mortality relative to baseline mortality (i.e. additional mortality as a % of baseline mortality) in addition to the use of "% of total population affected". However it is not consistently presented across impacts and receptors and the interpretation in table 3.13, that an increase in baseline mortality of less than 5% is considered "negligible‟ is not consistent with our advice that where there are predicted increases of greater than 1% relative to baseline mortality, further assessment of impacts at the appropriate population scale is required . 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. The derivation of this threshold originates from the "small numbers" concept, which in turn was devised to address exploitation of species that may be hunted or taken judiciously for other purposes, under Article 9 of the Birds Directive (Article 9(1)(c) allows for the use of derogations for the capture, keeping or other judicious use of certain birds. Apart from general conditions, there are four specific conditions, which must be respected in order to apply a derogation under Article 9(1)(c). It must represent "judicious use". It must relate to „small numbers‟. It is only permissible if carried out under „supervised conditions‟. Finally it must be on a "selective basis".). By comparison, the Applicant considers <5% increase in background adult mortality has negligible impact (Table 3.13) Where figures presented represent >1% increase in mortality, further assessment of the population level consequences should be made, for example through the use of population modelling techniques, or reference to existing literature (e.g. SOSS-04, PVA for northern gannets) before a conclusion can be made on negligible impact. Furthermore, changes to baseline mortali ty need to be assessed for the other impacts e.g. displacement.	Please also see points made above with respect to the consultation on draft ES for Creyke Beck projects. 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 thresholds, any decision as to what might be deemed significant (and above which further investigation of potential impacts is required) is, in essence, arbitrary. In relation to the size of a reference population, a value of 1% is commonly used to define a lower threshold for assessing the magnitude of an effect (e.g. Percival 1999, Table 4.1 of the ornithology technical report). However, 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%. While the EU guidance is acknowledged, it is noted that this guidance is provided in relation to the potential impacts of hunting and applied specifically to the migratory components of the populations considered. There remains a lack of common guidance for EIA purposes that provides a comparative framework for assessing the magnitude of an effect, at all relevant population scales, in relation to background mortality to that provided by, for example by Percival (1999), in relation to the size of a reference population. 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. Further assessment of the population level consequences of predicted impacts is provided through the use of population modelling techniques in the HRA for northern gannet and black-legged kittiwake.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES		Cont. 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 – e.g. where birds are displaced to, the carrying capacity in those areas – are likely to determine how long this will take to happen and thus the changes in annual mortality required.	
JNCC/NE	Consultation on draft ES	52. Presentation of baseline, effects and impacts. 52.4. JNCC and Natural England note that the percentage increase relative to baseline mortality figures for lesser black-backed gull and great black-backed gull are incorrectly presented in Ch 11: 10.3.14 and 10.3.15 as the cumulative impacts presented for Creyke Beck A & B and Teesside C & D are lower than for Teesside A & B alone, and the percentage increases with respect to background mortality do not agree with those presented in the Technical Appendix. Furthermore, those figures provided in the Technical Appendix, Appendix 7 using Option 1 of the Band Model have incorrect increases relative to background mortality presented. For example, the 70 birds estimated to collide in the breeding season represents a 2.4% increase relative to baseline mortality at a national population level when <1% increase is stated in the report. This erroneous underestimate is exaggerated further when Teesside A & B projects are assessed in combination with Creyke Beck A & B and Teesside C & D. These figures and their interpretation should be thoroughly checked and revised accordingly throughout all documents.	Cumulative impacts presented in the technical report for the Dogger Bank Teesside A and B, Creyke Beck A and B and Teesside C and D projects are greater than for the Teesside A and B projects alone. Figures provided in the Technical Appendix, Appendix 7 using Option 1 of the Band Model have been checked and amended / clarified as necessary.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	52. Presentation of baseline, effects and impacts. 52.5. Perhaps as a result of the impact-by-impact approach taken to assessing ornithology impacts the draft ES and draft Habitats Regulations Assessment IfAA Report does not quantitatively consider 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. 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 the consideration of impacts at both the SPA and national levels.	Please see paras. 7.1.3. and 7.1.4 of the EIA. In summary, while it is agreed that it is important to consider the combined impacts of each effect for each receptor, consideration of the combined effects of the two key effects for which quantitative information is provided, displacement and collision, 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, 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. As also summarised, 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.	Section 7
JNCC/NE	Consultation on draft ES	53. Displacement effects 53.1. 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, the review of seabird species displacement presented in Appendix B and the provision of displacement matrices in Appendix 10 of the Ornithology Technical Report.	This is noted.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	53. Displacement effects 54. However, Forewind, while assessing impacts over a 2km buffer, has reduced the impact of effect on a decreasing scale with distance from wind farm over the buffer area. While we do not disagree that it is likely that the impact of the wind farm on displacement of species will decrease with distance, there is no empirical evidence to date that provides any scale over which the decline would occur. JNCC and Natural England therefore continue to advise displacement effects should be assessed at a constant rate within the defined buffer area until such time that evidence suggests otherwise.	The buffer zone displacement rates used in the draft ES were based on a 75-25% delineation for 0-1km and 1-2km distance bands for the majority of species, and 0-2km and 2-4km distance bands for divers. There is good evidence suggesting displacement rates follow such gradients. Evidence from the Horns Rev and Nysted wind farms (Petersen et al. 2006) for auk species (guillemot and razorbill), gannet, common scoter, and diver species, show that, post-construction, the numbers of birds and bird clusters increase with increasing distance from the wind farm (Tables 24 and 25, and Tables 27 and 28 in Petersen et al. 2006). This evidence also strongly suggests that displacement for these species/species groups is likely to be proportionally greater nearer the wind farm than at greater distance. Whilst this is only one single study, this evidence provides scientific justification for the chosen 75-25% ratio delineation, and the displacement rates used.	Sections 4-6
JNCC/NE	Consultation on draft ES	53. Displacement effects 54.1. A 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.	It is predicted that the levels of boat traffic will be even through through the construction and decommissioning phases, as the number of boat trips required per turbine will be the same. The values for construction/decommissioning thus 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. In light of the uncertainty of the exact construction plan that will be applied, 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. Hence, given the same displacement rates, the values for the numbers of birds displaced during construction and decommissioning are taken to 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.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	53. Displacement effects 54.2. The displacement-associated mortality rates selected by the Applicant are within the range of those provided by other Applicants for auks. However, JNCC and Natural England have outstanding concerns regarding the importance of Dogger Bank Teesside A and B to sandeels (see below). Depending on the outcome of discussions, we may advise that a higher displacement mortality percentage would be appropriate for auks and we would welcome further discussion with Forewind on this issue. For northern gannet, we do not agree with Forewind‟s approach of applying a 0% displacement related mortality rate for assessing the impacts of Teesside A and B projects on their own, and it seems counter intuitive to the their approach of applying a 5% mortality rate for cumulative assessment purposes. JNCC and Natural England will therefore apply the 5% mortality rate to inform our assessment at both scales.	As per JNCC/NE guidance, predicted impacts of displacement, for each project and species, are provided (in Appendix 10) based on a range of displacement and mortality rates. For mortality rates, we follow the guidance and highlight cells in light green for higher confidence, and dark green for most confidence. The likely implications of displacement for species survival/productivity are considered in the review carried out in Furness (2013) (see Appendix 11C of the ES), which takes into account the relative quality of habitat and habitat availability in the North Sea. Forewind have also provided considerable mitigation through moving the wind farm boundaries away from high intensity sandeel habitat to the West (see also Chapter 13 of the ES which discusses suitable habitat with Teesside A & B for sandeel). While, for auks, a negligible or zero value for mortality may be concluded from Furness (2013), precaution has been retained by using a 5% value (highlighted using a bold border to cells in Appendix 10). Northern gannet is a species with a large foraging range outside of the breeding season. Given the amount of available alternative habitat, and given previous discussions on the topic with NE and JNCC, it was considered appropriate to reflect within the assessment the fact that displacement from an area the size of the Dogger Bank Teesside A and B projects, when considered alone, would be unlikely to result in any mortality. It is considered more likely that mortality will only occur when northern gannet are displaced from larger areas, greater than the size of the Dogger Bank Teesside A and B projects, and for this reason, at the cumulative level, a precautionary mortality rate of 5% is applied.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	53. Displacement effects 54.3. Displacement, particularly cumulative displacement, has the potential to reduce species survival/productivity, and consequently could impact at a site or population level. As the Applicant was unable to locate published displacement mortality rates from other projects, save for Hornsea Project One and the European Offshore Wind Deployment Centre (EOWDC), it has not assessed in-combination/cumulative displacement impacts adequately. Furthermore, though displacement mortality has been presented with reference to populations, values have not been compared against background mortality rates which give a better indication of potential impacts on populations. We welcome further discussions with the Applicant regarding the derivation of appropriate figures for adequate assessment of the cumulative effects of displacement.	Further projects have been included in the CIA list following the publication of recent reports. New data have now been added where this is available (including new information for Scottish sites of Inch Cape, Neart na Gaoithe, Firth of Forth Alpha and Bravo, and Moray Firth). However, note where other assessments have not provided additional data, the existing information provided in original Environmental Statements or Addendums has not been reworked using the methodology employed within the Dogger Bank Teesside A and B assessment. This is in keeping with the CIA methodology outlined in section 6.3.5. With respect to displacement, see response above.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	53. Displacement effects 54.4. JNCC and Natural England note that displacement data for white-billed diver, assessed as being of regional importance, have been inconsistently recorded. For example these data are absent from Tables 6.1, 6.2, 7.1, 7.2, 10.3, 10.4, 10.6 and 10.7 but the species is scored as Medium Value, High Sensitivity and Negligible magnitude of effect in Tables 6.3, 7.3, 10.5 and 10.8. Additionally, clarification is sought as to why a mortality rate of 37.5% has been chosen for this species when a precautionary 100% mortality of displaced birds has been and continues to be assumed for red-throated divers in OWF casework relating to the Outer Thames Estuary SPA.	We agree that the presentation of this species in summary tables should be provided, and so in the technical ornitohology appendix to the ES, Tables 5.1, 5.8, 5.15, and 6.1 have been updated. Note, however, that white-billed diver was not a species that was modelled due to its scarcity. Abundance for this species was estimated by scaling raw counts from the area surveyed to the area of the respective projects+buffers. Therefore, confidence limits are not available. We note the point regarding mortality rate for this species. The protocol we use to define mortality rates is based on sensitivity scores of 1-5 from Furness & Wade (2012) (see section 4). However, if other information was available for a given species, then such data should be used. For red-throated divers, the outer-Thames estuary SPA approach assumed 100% mortality. Whilst white-billed divers may be similar to red-throated divers, there is no additional information for this species nor any certainty that they would respond in the same way. Therefore, we followed the methodology suing the 1-5 scale in Furness and Wade (2012). This gave a mortality rate of 37.5% for this species was derived using a scale from 0-50% applied to sensitivity scores of 1-5 from Furness & Wade (2012) (see section 4). This value was therefore deemed appropriate in keeping with the methodology outlined.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	55. Population Scales 55.1. For adequate assessment of EIA impacts in particular, it is important to present predicted mortality (from collision and displacement) against appropriate population scales. It is particularly important to characterise and define the Biologically Defined Minimum Population Scale (BDMPS). This is the minimum biologically appropriate scale at which, cumulatively and alone, all predicted impacts can be quantified and measured against. For some species more recent estimates are available, for example the SOSS04 PVA report for northern gannets and Frederiksen *et al.* (2012) for black-legged kittiwakes. The developer should provide more detailed recent species-specific information for the calculation of „wider regional" populations which would allow verification of whether appropriate BDMPS have been used. Differences in the values used for BDMPS will produce different estimates of change to baseline mortality which is critical to assessing impacts for HRA and EIA.	We agree that it is important to be able to use appropriate population scales and definitions in order to best assess predicted impacts in the EIA and to apportion non-breeding season impacts to individual SPAs. The assessment considers the proportion of birds potentially impacted by an effect at the wider biogeographic scale, at a national scale, and also at the scale of individual protected sites. The biogeographic populations and thresholds follow standard definitions (EIA para 2.7.3). At present, these agreed biogeographic populations provide the minimum and appropriate wider scale to assess impacts against. Although it is recognised that further refinement would be desirable, we would suggest that the characterisation and definition of appropriate Biologically Defined Minimum Population Scales (BDMPSs) is a significant undertaking, that would require agreement or discussions with a number of parties (including, perhaps, those responsible for present definitions of populations at biogeographic and national scales, e.g. the UK Avian Population Estimates Panel) and, as such, is beyond the scope of this assessment. We understand that present JNCC/Natural England work aims to provide such definitions.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES		Cont. While current agreed biogeographic populations provide the minimum and appropriate wider scale to assess impacts against, refinement is appropriate and possible in apportioning non-breeding season impacts to individual SPAs. The population estimates and breeding proportions presented in WWT Consulting & MacArthur Green Ltd (2012) for northern gannets and Frederiksen *et al.* (2012) for black-legged kittiwakes provide a means to this, in that they indicate the proportions of birds wintering in different regions, including the North Sea, from different breeding origins. Similar data are not available for other species. Therefore, in our assessment, we have assumed that all non-breeders originate from breeding populations in the North Sea, using the populations presented in Skov *et al.* (1995). This is likely to be precautionary, in that if some birds originate from alternative breeding areas (to the north), we would overestimate the proportion of birds held on Natura sites. One critical advantage in using the figures reported in Skov *et al.* (1995) is that the assessment is able to allow for the variation in numbers of birds present in the North Sea across all months. This approach provides a better assessment of the proportion of birds that might originate from SPAs in the breeding and non-breeding seasons. We also consider an alternative estimate of the number of birds originating from SPAs, taken from Stroud *et al.* (2001) (EIA para. 4.3.127).	

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	56. Collision Risk Modelling (CRM) 56.1. Collision Risk Modelling (CRM) outputs are from the Band (2012) guidance, recommended by the Statutory Nature Conservation Bodies (SNCBs) including Natural England and JNCC. However, within this guidance, there are two model types ("basic" and "extended") and several options (usually referred to as 1, 2 and 3) which represent bird flight distribution in different ways. While the Applicant has presented potential collision risk impacts from the project against a range of CRM model options (in Appendix 6 and 7 of the Technical Appendix), following Band (2012), they have used Option 3 outputs as the sole basis on which assessment of impacts are made. The use of Option 3 to inform the impact assessment results in significantly lower predicted mortalities when compared with Option 1 results. JNCC and Natural England currently recommend the use of the "basic" Band model (i.e. Option 1 or 2 depending on whether site specific data is appropriate, see Band 2012), not the "extended" Band model used in Option 3. This advice is based on issues regarding some of the assumptions underpinning these options, and in particular from the uncertainty around the appropriateness of applying Avoidance Rates (ARs) derived using the „basic" Band model to the "extended" Band model. Please see Annex 2 for a recent paper produced by the Marine Renewables Ornithology Group (MROG), of which Natural England and JNCC are members, providing an explanation of the uncertainty. Furthermore, use of the basic Band model allows comparison of cumulative impacts to be made with earlier assessments where the basic model (or a variation thereof) has been used.	Discussion with regards to Collision Risk Modelling options and the appropriate avoidance rates to use within Collision Risk Modelling is ongoing. To inform this, a separate document (Forewind and SmartWind 2013) has been produced to provide a review of avoidance rates of seabirds at offshore wind farms and the applicability of their use within the Band collision risk model. We also note the MROG Paper "Summary of current issues with Collision Risk Modelling approaches". As is noted, further work has been commissioned by Marine Scotland that should also better inform this issue. Option 3 was used throughout the assessment as it allows variation in turbine design (i.e. in their size and height above sea level) to be more accurately incorporated into the assessment of collision risk. 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 and thus represented the most appropriate Option to use. However, as stated above, discussions in this regard are ongoing.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	56. Collision Risk Modelling (CRM) 56.2. Natural England and JNCC do not agree that it is appropriate to focus the impact assessment for collision mortality for northern gannet on figures derived from a 99% avoidance rate, and we consider that equal consideration should be given to figures based on a 98% rate.	Discussion with regards to Collision Risk Modelling options and the appropriate avoidance rates to use within Collision Risk Modelling is ongoing. To inform this, a separate document (Forewind and SmartWind 2013) has been produced to provide a review of avoidance rates of seabirds at offshore wind farms and the applicability of their use within the Band collision risk model. We also note the MROG Paper "Summary of current issues with Collision Risk Modelling approaches". As is noted, further work has been commissioned by Marine Scotland that should also better inform this issue.	Sections 4-6
JNCC/NE	Consultation on draft ES	56. Collision Risk Modelling (CRM) 56.3. 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.* 2012.	See comment on consultation on the draft ES for the Dogger Bank Creyke Beck projects. 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. Each image would need to be revisited for aerial surveys for the two and a half years used to inform this assessment.	Sections 4-6
JNCC/NE	Consultation on draft ES	56. Collision Risk Modelling (CRM) 56.4. 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, or failing that supplied to JNCC and Natural England for checking purposes.	Due to the number of collision risk scenarios needed to be considered through the course of the Dogger Bank programme, all collision risk modelling has been undertaken through the package 'R'. Hence, CRM spreadsheets do not exist in the standard Band Excel format.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	57. Assessment of cumulative and in-combination effects 57.1. Natural England and JNCC have provided comments on the approach that Forewind has used for assessing projects to be included for cumulative and in-combination assessment of impacts in the Natural England and JNCC Relevant Representation on the Dogger Bank Creyke Beck projects. For the Dogger Bank Teesside projects ES, Forewind has now included Hornsea Project One and East Anglia One data into the assessments. However the ES still excludes a number of Scottish projects that are within the consenting system (e.g. Moray Offshore Renewables Limited, Inch Cape, Seagreen Alpha and Bravo, Neart na Gaoithe). These projects should be included within the overall assessment, and if there is lower confidence in the data available this should be stated. Additionally, the assessment excludes a number of constructed/operational projects (e.g., Gunfleet Sands, Kentish Flats, Lynn and Inner Dowsing and Scroby Sands). Impacts from these wind farms are unlikely to have been incorporated as part of the baseline and as such should be included in the cumulative/in-combination assessment. We suggest that Forewind consider the document "JNCC and Natural England Suggested Tiers for Cumulative Impact Assessment" (attached as Annex 1) which provides a framework for deciding which projects should be considered in the context of cumulative impact.	Further projects have been included in the CIA list following the publication of recent reports. These projects include an extra five sites as follows: Moray Firth, Firth of Forth Alpha and Firth of Forth Bravo, Inch Cape, and Neart na Gaoithe. However, note where other assessments have not provided additional data, the existing information provided in original Environmental Statements or Addendums has not been reworked using the methodology employed within the Dogger Bank Teesside A and B assessment. This is in keeping with the CIA methodology ouotlined in section 6.3.5. Following the Forewind CIA strategy, as previously consulted on with stakeholders including JNCC and Natural England, Forewind note that 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 has 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.	Section 6.3

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	Cont. Forewind has not made any attempt to compare results from other projects using consistent models and parameters. For example, in assessing collision mortalities across different projects the Forewind has used the Extended Band model (Option 3) figures whereas the majority of other projects have presented figures using the Basic Band model (Option1) or equivalent earlier versions of the Band collision risk model. Additionally, for northern gannet Forewind has used an avoidance rate of 99% with the outputs from the Band Option 3 model for the cumulative assessment and added the resultant figures to other projects that have used a mixture of 97, 98 and 99% avoidance rates. It is extremely challenging to draw conclusions on the significance of impact from the cumulative/ in-combination assessment when the estimated impacts have not been standardised. In this context please see the Natural England/JNCC advice provided for the East Anglia Offshore Wind Farm Interested Parties deadline 4, on the 25th November which can be found on the PINs website and which sets out a more strategic assessment of the in-combination impacts on gannet and kittiwake populations of the Flamborough Head and Filey coast pSPA, with an appropriate assessment taking into consideration all projects currently in the planning system: East Anglia Advice on the Planning Portal.	Forewind acknowledge and share the frustration of a lack of consistent approach across the industry, however, as previously stated our assessment can only present the data that are available within the assessments presented. Forewind previosuly provided a response in the form of a letter to NE/JNCC advice to East Anglia, this can also be found on the PINS website.	
JNCC/NE	Consultation on draft ES	Cont. Similarly, in presenting displacement figures, Forewind has used a variable displacement rate applied to the buffer with distance from the windfarm site which does not align with the approach used in other assessments and Natural England/JNCC guidance.	See point 54 above	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	57. Assessment of cumulative and in-combination effects 57.2. Forewind has also only included information in the cumulative assessment for OWFs that have presented displacement mortality figures in their ES/impact assessments – i.e. numbers displaced AND numbers expected to die which reduces the number of projects that are included. The list of projects considered is further reduced when only projects that have apportioned displacement mortality to SPAs are included. This excludes displacement data from a number of projects. If published displacement figures are available (i.e. number of birds displaced) it is possible to apply a standard % mortality figure to this for use in a cumulative assessment. Similarly, if population estimates are available then it is also possible to calculate displacement levels for constructed and consented OWFS that did not conduct a displacement assessment, and to use this information in the cumulative assessment.	See also 57.1. Where other assessments have not provided additional data, the existing information provided in Environmental Statements or Addendums has not been reworked using the methodology employed within the Dogger Bank Teesside A and B assessment. This is in keeping with the CIA methodology ouotlined in section 6.3.5.	Section 6.3

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	57. Assessment of cumulative and in-combination effects 57.3. 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 Dogger Bank Teesside A and B, Creyke Beck A and B and 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. This also reflects a lack of information from other assessments that would enable the cumulative impact of the potential barrier effects posed to migrants to be assessed, 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.	Section 6.3

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	58. Availability of diving birds 58.1. Natural England and JNCC acknowledge that due to sitting and flying birds being combined for population estimation modelling by Forewind, the method used to assess availability of auks for aerial survey detection used the proportion of the total foraging trip rather than the proportion of time on the water. As this method differs from that used at other offshore wind farm sites (e.g. East Anglia One Offshore Wind farm), we request further engagement with Forewind, to ensure that this method suitably accounts for availability bias and results in appropriate populations estimates.	We welcome the acknowledgement of the approach taken. Correction for diving birds is a difficult issue dependent on the nature of the data presented (i.e. flying and sitting birds, or just birds on the sea), and also dependent on the studies chosen for review. Here, population estimates included both birds on the sea and birds in flight; therefore, we have applied an appropriate correction factor incorporating the proportion of flight time from reviewed activity budgets. If only birds on the sea were considered, then a different correction factor would have been needed. We also refer back to our original responses to comments previously received on this issue.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	60. Migratory seabirds 60.1. 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 impact from the OWF at the regional or national scales, and therefore which species have been appropriately 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.	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. 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. The extent to which numbers would need to be underestimated due to turnover to result in a change in the magnitude of impact predicted is considered.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	60. Migratory seabirds 60.2. We advise that Forewind reviews 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 Teesside.	See above.	Sections 4-6
JNCC/NE	Consultation on draft ES	61. Barrier Effects 61.1. Ornithology Technical Report A:5.2.384 and C11:10.2.16. JNCC seeks 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 additional distance calculated simply represents, for an individual project, half the length of the perimeter of the project. This length is assessed relative to the shortest alternative route, in order to simply demonstrate the maximum proportional increase in the distance that might be travelled.	Section 4
JNCC/NE	Consultation on draft ES	62. Height of flying birds from digital aerial surveys 62.1. We appreciate that height assessment from digital video surveys is still being evaluated and such data are thus not available at this time. We look forward to a comparison of results between this and boat data when it is available.	See response above.	Sections 4-6
JNCC/NE	Consultation on draft ES	63. Estimation of Baseline Populations 63.1. Forewind has developed a novel approach to estimate population sizes associated with the development site by combining digital aerial and boat-based survey results. Whilst we note the approach appears robust, it has not been subject to specific peer review and there are a number of aspects which require further explanation e.g. availability bias (see further comments above) and some aspects which have the potential to reduce confidence in population estimates e.g. confidence in species identification, surveys being undertaken in sea state 5 etc.	A manuscript on the population modelling has been prepared for publication in the scientific literature and is currently (January 2014) under peer-review. This provides additional information of the modelling procedure and of model fit. See also comment on consultation on the draft ES for the Dogger Bank Creyke Beck projects: 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 3

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES	64. Ornithology Technical Report: Figure 3.1 (and repeated for each project, projects combined and for each species): We appreciate the presentation of all years' data on a common graph, however having each year indicated on the graph would make it clearer.	This has been amended.	Section 3
JNCC/NE	Consultation on draft ES	65. Ornithology Technical Report: Figure 3.2 (and repeated for each year for each species): JNCC previously believed 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. This wasn‟t produced for Creyke Beck but the Applicant agreed this could be produced for Teesside A & B.	See response above. We have updated all tables to provide average values across the two and a half years of surveys, as well as values for each individual year.	Section 3
JNCC/NE	Consultation on draft ES	66. Ornithology Technical Report: 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.	A list of appendices is already provided. Figures and tables in appendices are now also included in respective lists.	
JNCC/NE	Consultation on draft ES	67. Ornithology Technical Report: Appendix 4. Figure A4.1 would benefit from greater legibility, maybe grouping species names on each side of the figure would help.	The figure has been amended for clarity.	Appendix 4

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES – HRA report	140. Definition of seabird breeding seasons 140.1. Natural England appreciates that breeding seasons for some species presented by the Applicant have now been extended from those months given in Kober *et al.* 2010 and that March is included for black-legged kittiwakes. We also appreciate that modelling specific breeding periods for each colony may be too complex to consider within the current assessment framework. It is for this reason that obtaining and referencing colony specific-breeding periods is important to ensure the range of dates used encompass those expected in the area and birds potentially attending colonies for breeding at either end of the breeding season are included as such. We would suggest that evidence verifying this has been checked should be included in the report to give confidence that the season months provided are appropriate, for example the inclusion of September in the breeding season for black-legged kittiwake.	During the consultation on draft ES for the Dogger Bank Creyke Beck projects, JNCC/NE suggested the following to guide us in defining breeding seasons for species included in the assessment: "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." Therefore, careful consideration was given to the trends in species abundance in the Dogger Bank Zone throughout the period of study (e.g. Tables 3.3 and 3.4 in the ornithology technical report), and any peaks in abundance pre- and post-breeding were taken to indicate normal dispersal periods to and from breeding sites. With this in mind, the following decisions were made for the species in question and where seasons in Kober *et al.* (2010) were altered. For northern gannet, Kober *et al.* (2010) suggested a breeding season of May to September. We included extra months of March and April based on the numbers present in the Dogger Bank Zone. A pre-breeding peak in 2011 in March and post-breeding peaks in October in both years suggested these were likely dispersing birds warranting the chosen season with the addition of April.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES – HRA report	Cont.	For black-legged kittiwake, Kober *et al.* (2010) suggested a breeding season of May to September. From the trends in species abundance it was clear that there was a peak in both 2010 and 2011 in March (Tables 3.3 and 3.4) that alluded to a breeding season spanning from April to September, which was chosen originally in previous drafts of the ES. However, a comment was received from Natural England/JNCC on the HRA during the draft ES consultation period ("O.1.9. Assessment of Impacts on SPA Designated Features, Main Concerns"). This was as follows: "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 March for English SPA colonies. Frederiksen *et al.* (2012) indicate that kittiwakes should be back at their colonies in April across the entire North Atlantic breeding range (including colonies much further north); Brown and Grice (2005) defined the breeding season as March to July; Mendel *et al.* (2008) state that kittiwakes in the North Sea return to their colonies from February onwards." Following this comment, we agreed with Stakeholders to alter black-legged kittiwake to also include March as part of the breeding season. For common guillemot and razorbill, Kober *et al.* (2010) suggested a breeding season between May and June, with an additional post-breeding season of August and September. We adjusted this to also include July in the breeding season – for both species, in both years very clear peaks in numbers in the Zone were seen for April and August. In line with Kober *et al.* (2010) we also included post-breeding months for August and September, but following guidance from Stakeholders, these months were eventually grouped with other winter months within the apportioning. For Atlantic puffin, Kober *et al.* (2010) chose a breeding season of April to July, however a clear peak in the abundance trend for this species during September (Tables 3.3 and 3.4) indicated for breeding most likely spanned an extra month April-August, hence why this period was chosen. For northern fulmar, see below.	

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES – HRA report	Cont.	Additional information obtained from local bird reports supporting decisions of breeding seasons Information from the Northumbria Naturalist with particular focus on the Farne Islands was checked in detail from 2010-2012, and briefly reviewed for the previous five years before to check for general pattern agreement (although with the caveat that seasons can shift over time in relation to extrinsic pressures). For common guillemot, first eggs were seen on 10 April, 9 April and 10 April in each year and in each year the cliffs were bare by the end of July. For razorbill, first eggs were on 27, 21, and 20 April respectively and last fledgings occurred early August (cliffs bare by late July). For Atlantic puffin, first eggs were seen 13, 15, and 18 April respectively, and latest fledgings were mid-August. For black-legged kittiwake, first eggs were recorded on 1 May, 28 April, and 26 April, the latter two years being earlier than previously, and the latest fledgings were late August. For fulmar, the first eggs were 12 May, 15 May and 13 May in each year and the last fledgings early to mid-September, thereafter cliffs were bare. For the auks, this information verified the use of Kober et al. (2010) with the additional month of July for common guillemot and razorbill, and justified an inclusion of August for Atlantic puffin. For northern fulmar, this information suggested the inclusion of additional months of August and September (beyond Kober et al. 2010) for the end of the breeding season for this species.	

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES – HRA report	141. Apportioning breeding season impacts to individual English SPAs. 141.1.1. Natural England acknowledges that the Applicant has now used mean-maximum foraging ranges for scoping in sites for assessment of impacts for all seabird species except northern gannets, black-legged kittiwakes, common guillemots and razorbills. For black-legged kittiwakes, common guillemots and razorbills, Natural England agree it has been appropriate to retain maximum foraging ranges as preliminary results from FAME tracking data indicates larger maximum foraging ranges than Thaxter *et al.* (2012) and additionally, the concentration of birds in the western part of the Dogger Bank Zone during the breeding season suggests that birds from breeding colonies do forage in this area. However there is conflicting information presented in the various reports regarding which SPAs have been included on the basis of being within the maximum foraging distance for kittiwake – for example page 107 of the HRA screening report states that Flamborough and Filey Coast pSPA and Farne Islands SPA are within the maximum foraging distance, but section 6.6.125 of the IfAA report states that only Flamborough and Filey Coast pSPA is within maximum foraging range. For northern gannet, Flamborough and Filey Coast pSPA is the only SPA within the mean maximum foraging range given in Thaxter *et al.* (2012). The Applicant has also scoped in Forth Islands SPA which is within the maximum foraging range (but not the mean max) cited in Thaxter *et al.* (2012) based on tracking data from Wakefield *et al.* (2013). However whilst this study shows that Bass Rock birds have travelled to Dogger Bank, the tracking data from Flamborough Head and Bempton Cliffs birds suggest a far higher proportion of birds will be from these colonies and, further, this is presented in the Wakefield *et al.* paper as evidence for mutual exclusion in foraging areas between colonies. 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 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. This can be addressed to some extent by using an appropriate method of apportioning of birds to SPAs.	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. With respect to northern gannet, the decision to scope in the Forth Islands SPA to the assessment, was based not only on the evidence from Wakefield *et al.* (2013) – for instance see Figure 1 in Wakefield *et al.* (2013), but as per Table 4.5 in the ornithology technical report, also information presented in previous studies for this SPA from Hamer *et al.* (2000, 2001), using data collected in 1998 and from Hamer *et al.* (2007) for 2002 and 2003. Northern gannets are flexible in foraging ranges between years (Hamer *et al.* 2007); in particular, data from 1998 suggests larger foraging ranges than other years, and maps presented in these studies suggest northern gannets foraging from Bass Rock do overlap with the Dogger Bank Zone (see Figure 1 in Hamer *et al.* 2000, Figure 1 in Hamer *et al*. 2001, and Figures 1 and 2 in Hamer *et al.* 2007). Therefore, this site could not be excluded from the apportioning approach taken. Bass Rock is a much larger colony than Flamborough Head and Bempton Cliffs (breeding individuals: Bass Rock, 110,964; Flamborough Head and Bempton Cliffs: 16,938), hence weighting percentages reflect this. We also note also that Dogger Bank, albeit geographically closer to Bempton Cliffs, runs along the confluence of the two colonies in terms of their foraging range distributions (again, see Figure 1 in Hamer *et al.* 2000, figure 1 in Hamer *et al*. 2001, and Figures 1 and 2 in Hamer *et al.* 2007).	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES – HRA report	141. Apportioning breeding season impacts to individual English SPAs. 141.2. However, Natural England also has an issue with the equation that Forewind have used to apportion impacts to individual SPAs. The equation used by the Applicant assumes numbers of affected birds are inversely proportional to the square of the distance to the colony, and colony size.However evidence submitted in relation to the Galloper Offshore Wind Farm by Natural England showed the relationship may well decline more steeply than distance squared allowed. For example the density of northern gannets around any given colony is predicted to decline by density -2.440 (NE 2012) Use of this exponent would reduce the apportionment of impacts to the Forth Islands SPA and consequently increase that to the Flamborough and Filey Coast pSPA.	We agree that the decline in density over distance is steeper based on the suggested exponent for northern gannet (as provided in Natural England's advice to the Examining Authority in relation to the Galloper case) than using the inverse distance squared used in the draft 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. Therefore, to an extent, the relative difference in apportioning resulting from use of the different formulae will be of less consequence for the Dogger Bank projects because of the distance of the projects offshore. For northern gannet for example, for Teesside A, the Forth Islands SPA received a weighting of 68.19% and Flamborough Head and Bempton Cliffs, 31.64%. These would alter to 62.69% and 37.15%, respectively using the exponent -2.440 (NE 2012). These sites are over 100 km from the Teesside A and B and Creyke Beck A and B and Teesside C and D projects. Equivalent exponential distance functions, are not currently available for most other species, and would require work that is beyond the scope of this assessment. The distance weighting function methodology in the Dogger Bank Teesside A and B assessment was applied across all species, which was preferable to avoid inconsistent results between species. In addition, information on the number of birds is available around Bass Rock from ship-based surveys during the breeding season for northern gannets (see figure 2 in Camphuysen *et al.* 2012). Although a proportion of these birds are likely to include non-breeders and immature birds, the drop off from Bass Rock is less steep than the inverse square would suggest. It is likely that different rates of decline may be present for different colonies. Camphuysen *et al.* 2012. Identifying ecologically important marine areas for seabirds using behavioural information in combination with distribution patterns. Biol Cons 156, 22-29.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES – HRA report	141.3. Apportioning non-breeding season impacts to individual SPAs: Forewind has used calculations based on Skov *et al.* 1995 to determine "wider region" populations from which to apportion non-breeding populations to individual SPAs. We note in section 6.3.21 of the AA report that "The magnitude of each impact 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 the wider region as a whole." Natural England acknowledges that this approach is broadly in line with the interim advice note published on this matter (JNCC & NE 2013)). However, Natural England recommends that the population figures used for this „wider region‟ assessment are presented clearly, more up-to date population estimates are used where available (e.g. the SOSS04 PVA report for northern gannets and Frederiksen *et al.* (2012) for black-legged kittiwakes) and an explanation is given of how these figures have been produced, including what species-specific evidence has been used.	See response above.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES – HRA report	142. Migratory waterbirds 142.1. Natural England notes that apportioning the migratory waterbirds predicted to transit the OWF to individual SPAs has not been attempted (e.g. Ch 11, App A: 4.2.11), and as a result the potential collision risk to features of specific SPAs has not been assessed in detail in either the draft ES or AA report. 142. Migratory waterbirds 142.2. Wright *et al.* (2012) propose a number of alternative ways in which the estimated overall collision mortality predicted to occur at such large scales might be assigned to particular SPAs, for example to inform HRAs. Wright *et al.* (2012) set out 5 alternatives as follows: • All mortality could be assigned to the single nearest SPA population; • The total mortality could be distributed evenly between all UK SPA populations (i.e. all SPA populations lose the same percentage of birds); • The total mortality could be distributed between UK SPA populations based on a weighting according to distance from the windfarm in question (i.e. the majority assigned to the nearest SPAs or any other SPA in turn); • As a precautionary approach, all mortality could be assigned to each single SPA in turn; and A modelling approach such as the randomised simulation modelling currently being conducted by APEM could be used.	The assessment of collision impacts on migrating waterbirds considers, for each species, the percentage of a given reference population that the number of estimated annual collisions might represent. While a methodology has recently been developed to consider the migration routes of birds arriving at a single point location (SPA) from across a wide front and thus potentially weight the apportioning of impacts from projects to protected sites according to their location within the migration zone, we believe this is inappropriate for the reasons stated in Appendix 3 (p.668) of the ornithology technical report. In particular, 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, 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. Given this uncertainty as to the destinations or origins of birds, our assessment assumes that the percentage of a given reference population impacted through collision also applies to individual SPAs, i.e. option 2 from Wright *et al.* (2012).	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES – HRA report	142. **Migratory waterbirds** 142.3. Wright *et al*. (2012) note that the way in which this process is carried out should be agreed with the relevant statutory nature conservation body. JNCC and Natural England have previously provided the following advice and hope that it identifies a suitable way forward in assessing impacts on individual SPAs and providing quantitative data to inform the AA report: • JNCC and Natural England 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; • 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 into the assessment; • 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 outwith 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; • 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;	Predicted collision mortality for migratory species is estimated for the Dogger Bank projects following the methodologies proposed by Wright *et al*. (2012). With respect to the apportioning of these impacts to protected sites, please see comments above. With respect to cumulative assessment, please see comments below.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES – HRA report	Cont. • The exercise should be repeated for all OWFs lying within the corridor established by Wright *et al.* (2012), to establish cumulative effect; • 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; and • 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.		
JNCC/NE	Consultation on draft ES – HRA report	142. Migratory waterbirds The AA report should also attempt to assess the cumulative impacts on migratory waterbirds from other OWF as a result of collision mortality. Whilst we accept that limited information from other OWF submissions may be available to carry out such an assessment, meaningful potential impacts on migratory waterbirds are clearly more likely to accrue at the cumulative level – indeed this was one of the reasons behind the development of the SOSS-05/APEM models.	Cumulative collision risk for migrants has been calculated for the Dogger Bank Teesside A and B, Creyke Beck A and B and Teesside C and D projects within the Dogger Bank zone. 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 Dogger Bank 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.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
JNCC/NE	Consultation on draft ES – HRA report	143. Cumulative Impacts Assessment (CIA) 143.1. Regarding the discussion of already-operational projects in 7.2.17, Natural England advises that the cumulative impact assessment in the HRA report will need to incorporate the impacts of operational OWF, due to the potential for existing projects to have ongoing effects (yet to be reflected in the baseline eg mortality rates) on long-lived but slow-to-mature seabird populations. Built, operational developments are not part of an HRA in-combination assessment, but they are part of an existing baseline of impacts, accumulated over time. Thus, built, operational windfarms should form part of the assessment (in the sense of being a cumulative impact) but not strictly speaking be part of the in-combination element of the assessment unless there are residual effects. Natural England is concerned that Table 7-2 does not appear to consider cumulative impacts arising from some built, operational projects, projects and others that, whilst not yet in the planning system, are clearly foreseeable (i.e. remaining Round 3 schemes) and a small number of other North SEA OWF. All of these have been considered to some extent in other OWF HRA CIA. One potential solution is to use a tiered approach, similar to the approach taken by Hornsea OWF Project 1. We also refer to the document "JNCC and Natural England Suggested Tiers for Cumulative Impact Assessment" which provides a framework for deciding which projects should be considered in the context of cumulative impact assessment but which can also be used for the purposes of in-combination assessment within Habitats Regulations Assessment (HRA) (see Annex 1).	Following the Forewind CIA strategy, as previously consulted on with stakeholders including JNCC and Natural England, it is not considered appropriate to include operational wind farms within the cumulative impact assessment. See full response provided under 57.1.	Section 6.3

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
The Wildlife Trusts	Consultation on draft ES	We believe that, in the absence of any definition of 'favourable conservation status' for kittiwake in the UK, we do not have a sufficiently robust audit mechanism to allow review of the kittiwake population at Flamborough in the context of its contribution to the conservation of the species at UK level, and to secure action to address declines. Furthermore, we support the RSPB's comments and once more raise concerns about collision for Kittiwake from Flamborough Head and Bempton Cliffs SPA. We note that the Draft Environmental Statement refers to the Flamborough and Filey Coast pSPA rather than the existing Flamborough Head and Bempton Cliffs SPA. The assessment should be made against the existing SPA, because the pSPA hasn't even been formally consulted upon.	The reference to populations in the proposed Flamborough and Filey Coast pSPA, rather than the existing Flamborough Head and Bempton Cliffs SPA, follows previous advice provided by Natural England on the HRA Screening for Dogger Bank Creyke Beck, 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.	Sections 4-6
The Wildlife Trusts	Consultation on draft ES	We join the RSPB in their concerns relating to the option modelling applied in collision risk scenarios, avoidance rates and potential biological removals (PBR). Use of the Band Option 3 Model for Collision Risk - Although Option 1 with the same avoidance rates is appended, the use of Band Option 3 (aka the extended model) is not appropriate. Whilst this model may offer some advantages, these are more than countered by several fundamental problems. Until there is a better evidential base for the collision risk model in general, and the extended Band model has been peer-reviewed, in combination with the calculation of an appropriate avoidance rate, we are unhappy with the application of Option 3 alone. Currently, we suggest that the assessment should use either Option 1 and 98%, thereby facilitating cumulative impact assessment, or present both Option 3 and Option 1 across a range of avoidance rates. We acknowledge that Option 1 has been presented, in an appendix, but not carried forward into the assessment.	Discussion with regards to Collision Risk Modelling options and the appropriate avoidance rates to use within Collision Risk Modelling is ongoing. A separate document (Forewind and SmartWind 2013) has been produced to provide a review of avoidance rates of seabirds at offshore wind farms and the applicability of their use within the Band collision risk model. Option 3 was used throughout the assessment as it allows variation in turbine design (i.e. in their size and height above sea level) to be more accurately incorporated into the assessment of collision risk. 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 and thus represented the most appropriate Option to use. However, as stated above, discussions in this regard are ongoing.	Sections 4-6

Consultee	Reason	Detail of response	Details on how comment has been addressed	Section
The Wildlife Trusts	Consultation on draft ES	Use of a 99% avoidance rate for gannet - The assessment is based on the use of a generic avoidance rate of 98%, with 99% for gannet. While the use of 98% is supported in the text by reference to guidance (SNH, 2010) and a review (Cook et al, 2012), the use of 99% for gannet is not, nor is it justified in the supporting text, except by reference to the Triton Knoll application. It is our position that 98% should remain the default avoidance rate for gannet, as stated in SNH (2010) and Cook et al (2012) until empirical evidence is available to justify a change applicable to breeding as well as non-breeding seasons.	Discussion with regards to Collision Risk Modelling options and the appropriate avoidance rates to use within Collision Risk Modelling is ongoing. To inform this, a separate document (Forewind and SmartWind 2013) has been produced to provide a review of avoidance rates of seabirds at offshore wind farms and the applicability of their use within the Band collision risk model. We also note the MROG Paper "Summary of current issues with Collision Risk Modelling approaches". As is noted, further work has been commissioned by Marine Scotland that should also better inform this issue.	Sections 4-6

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

1.1This 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.

3.2Seabirds 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

1.1This 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

SUMMARY

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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).

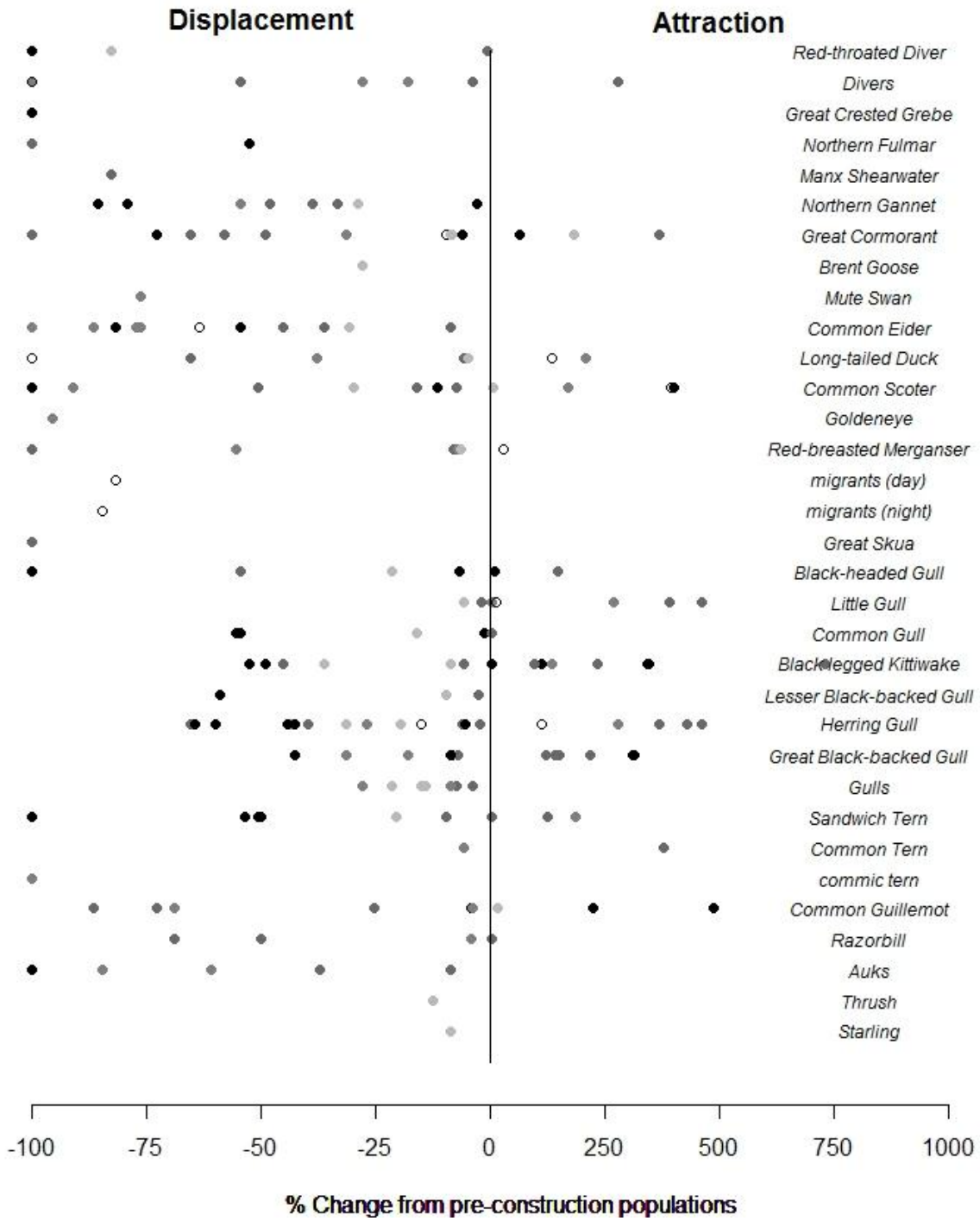

Figure A4.1 Population change relative to pre-construction for species or species groups within operational offshore wind farms in northern Europe. Note the different scales on the x-axis for% changes < and > 0. Note, some sites are represented more than once for each species, where changes in populations 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%)	

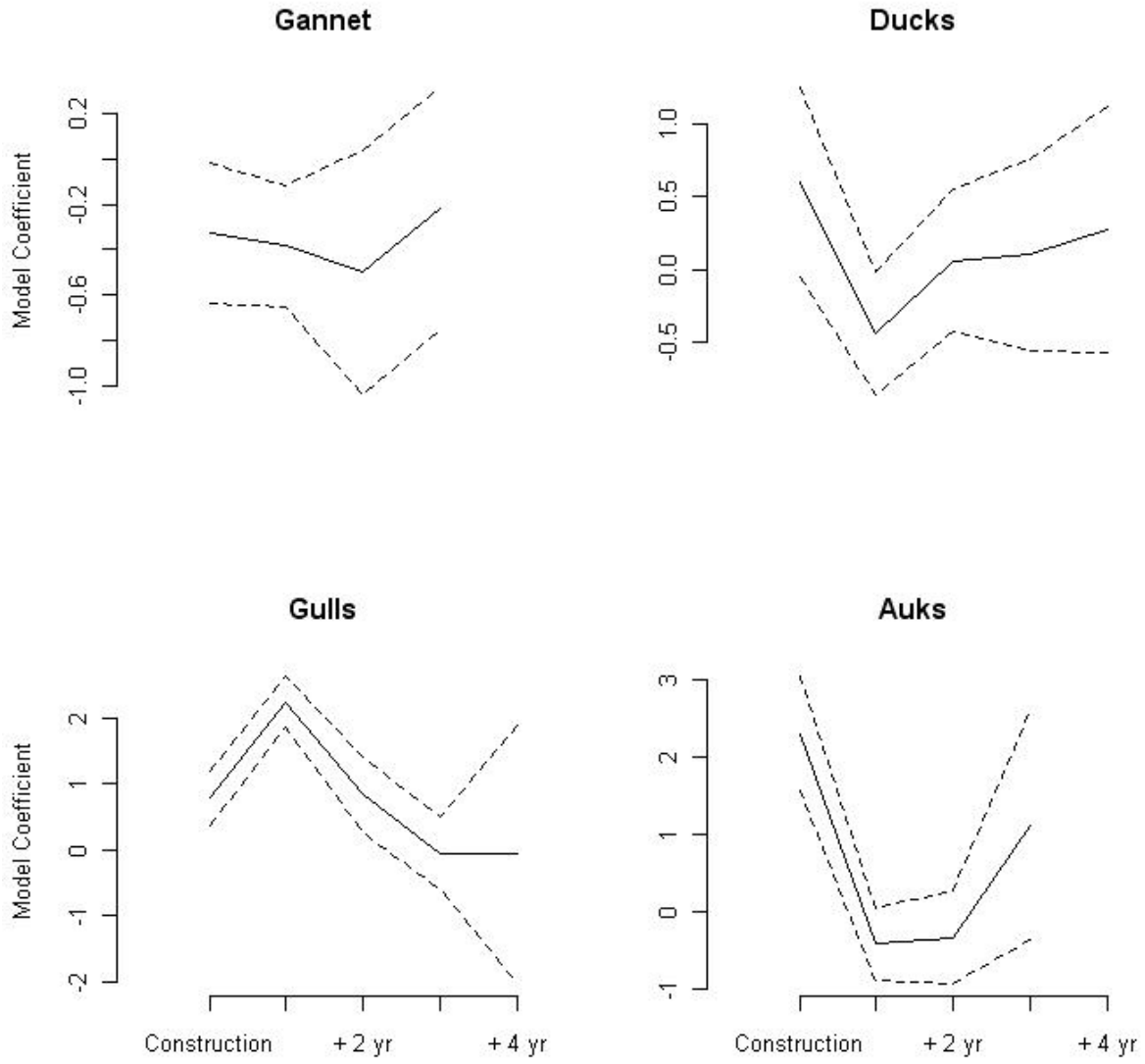

Figure A4.2 Coefficients from models of change in species' populations relative to the baseline estimate in relation to operational phase of the wind farm. Dashed lines show the standard errors of the model coefficients.

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)

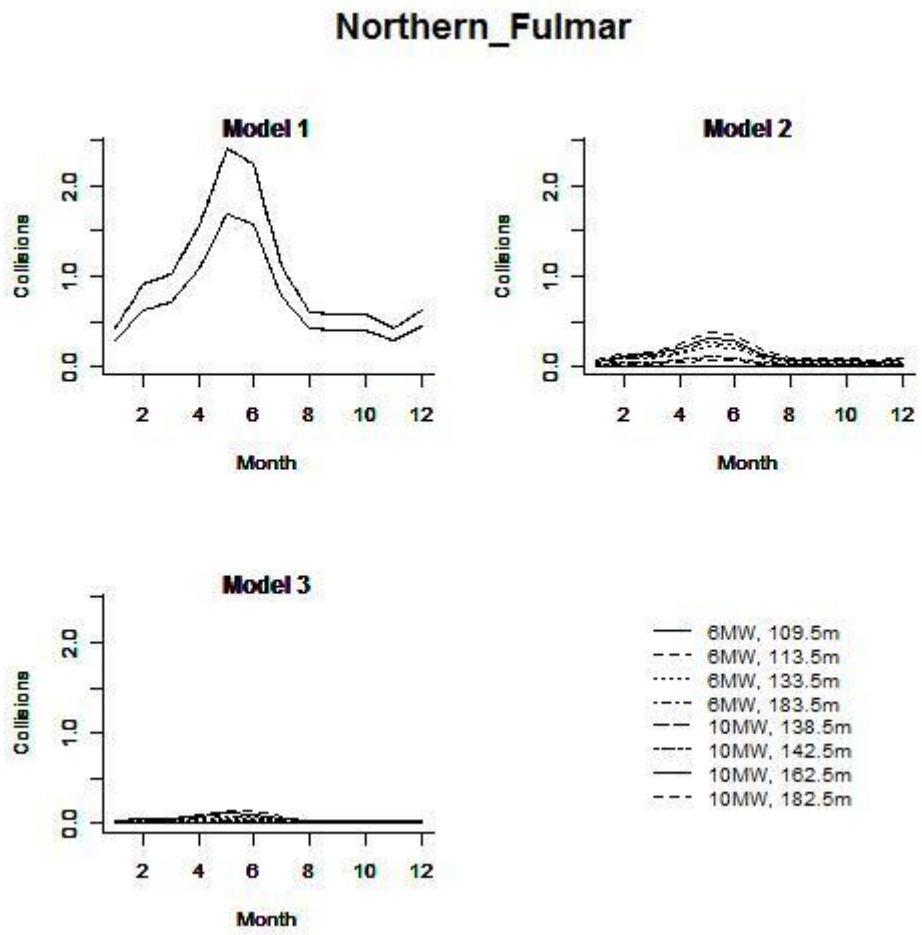

Figure A6.1 Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

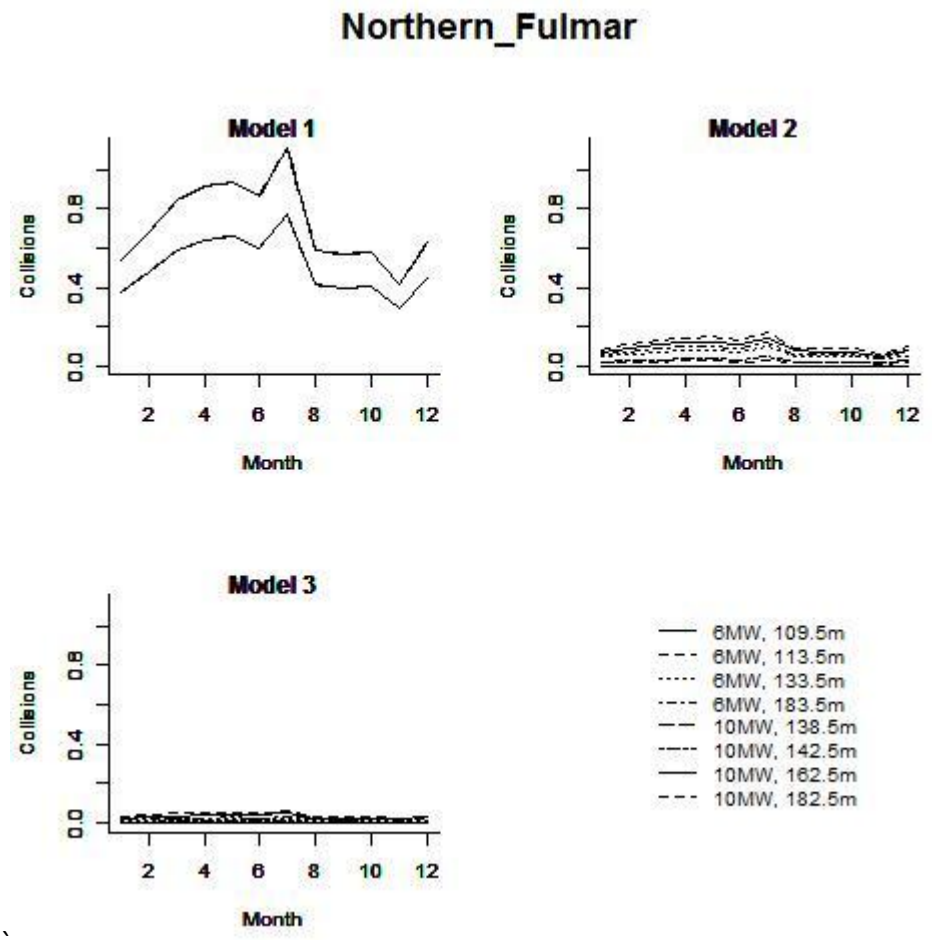

Figure A6.2 Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and 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.

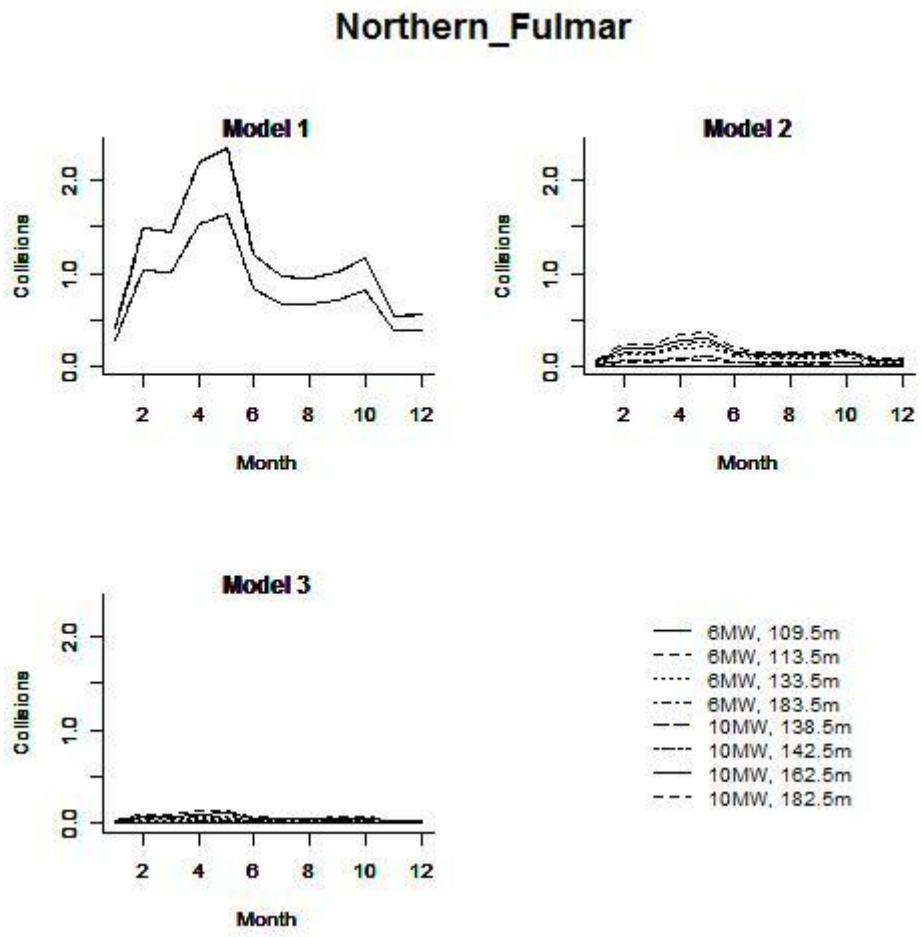

Figure A6.3 Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and 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).

Option 3 of the Band model resulted in greater collision estimates than option 2 for three of the turbine designs considered – 6MW turbines with a minimum height above sea-level of 26m, 30m and 50m. This is a consequence of the dual peak in the flight height distribution of the northern gannet, which means the flight heights of a significant number of birds are likely to overlap with the centre of the rotor-swept area of the turbine, where the collision risk is greatest.

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)

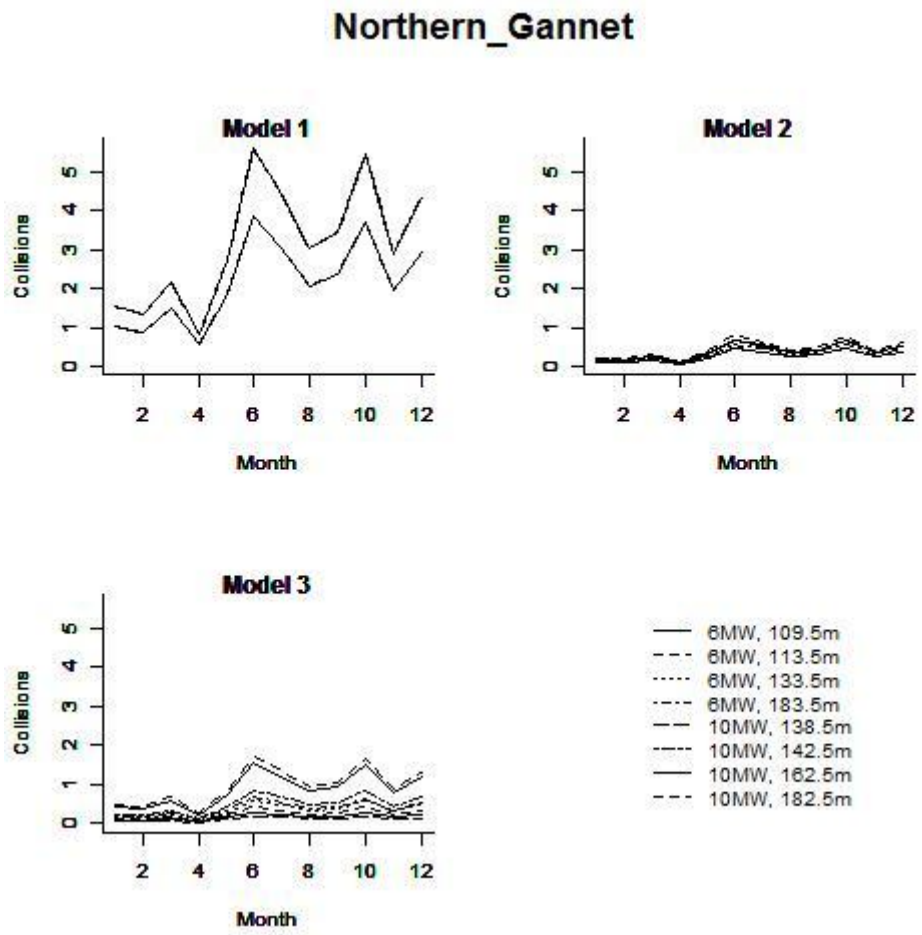

Figure A6.4 Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

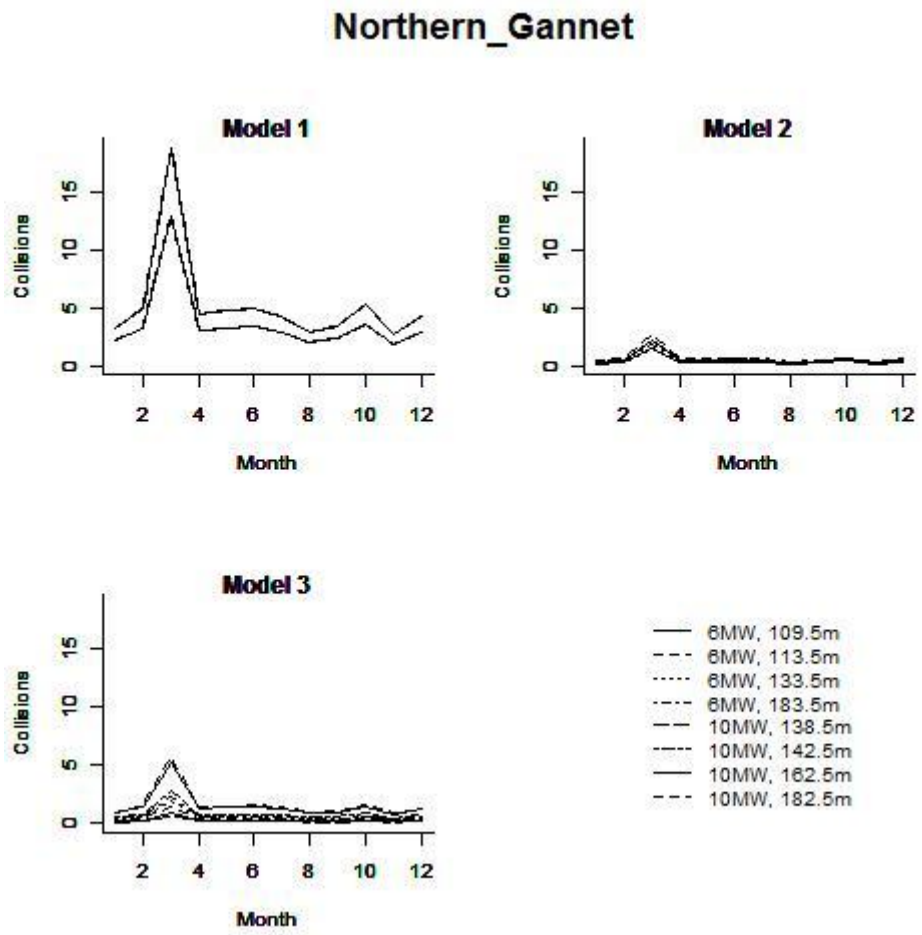

Figure A6.5 Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and 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.

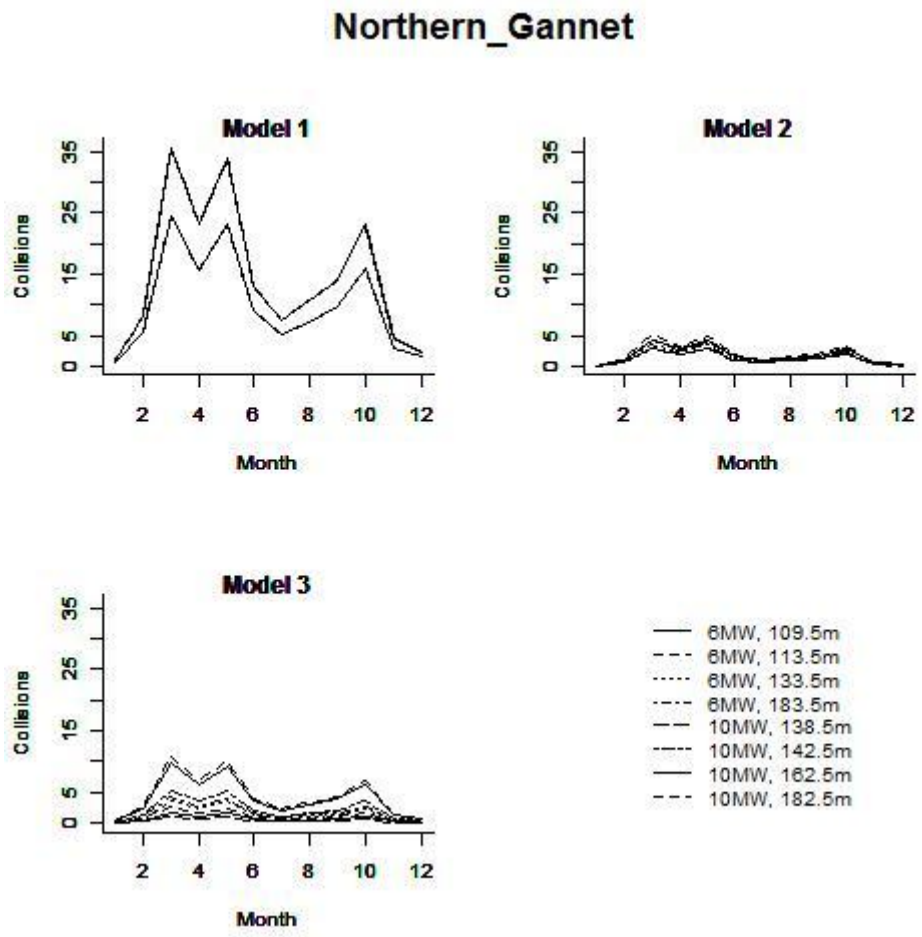

Figure A6.6 Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and 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)

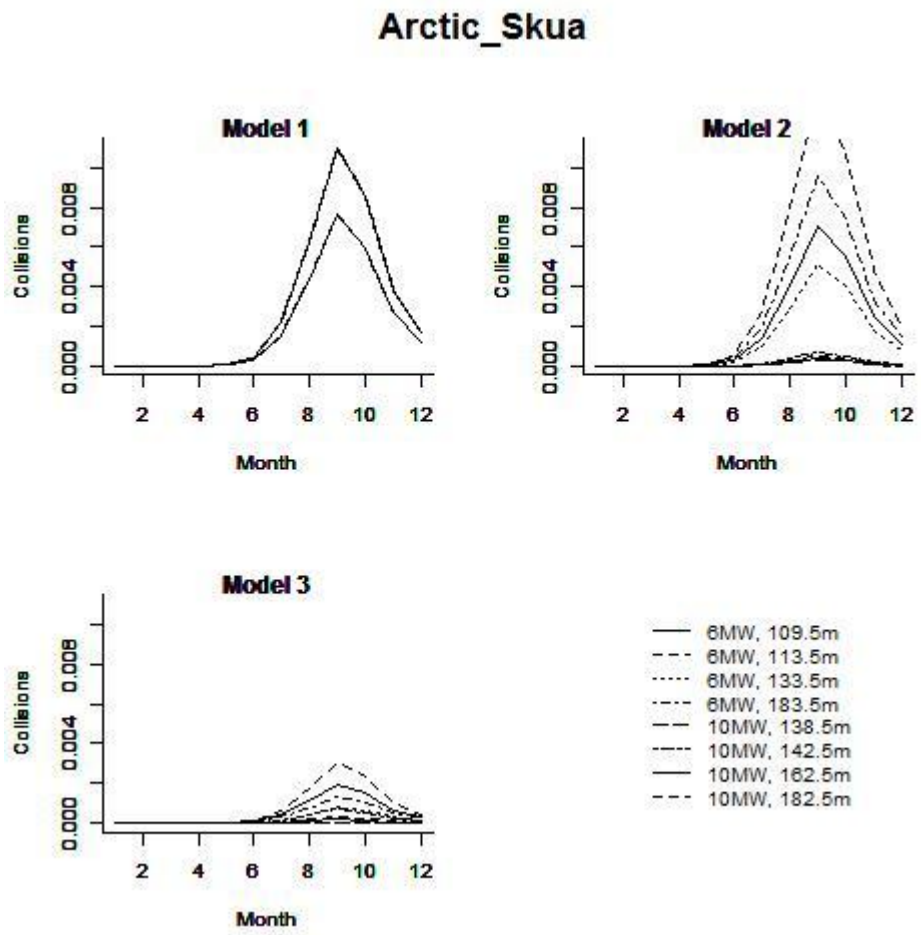

Figure A6.7 Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

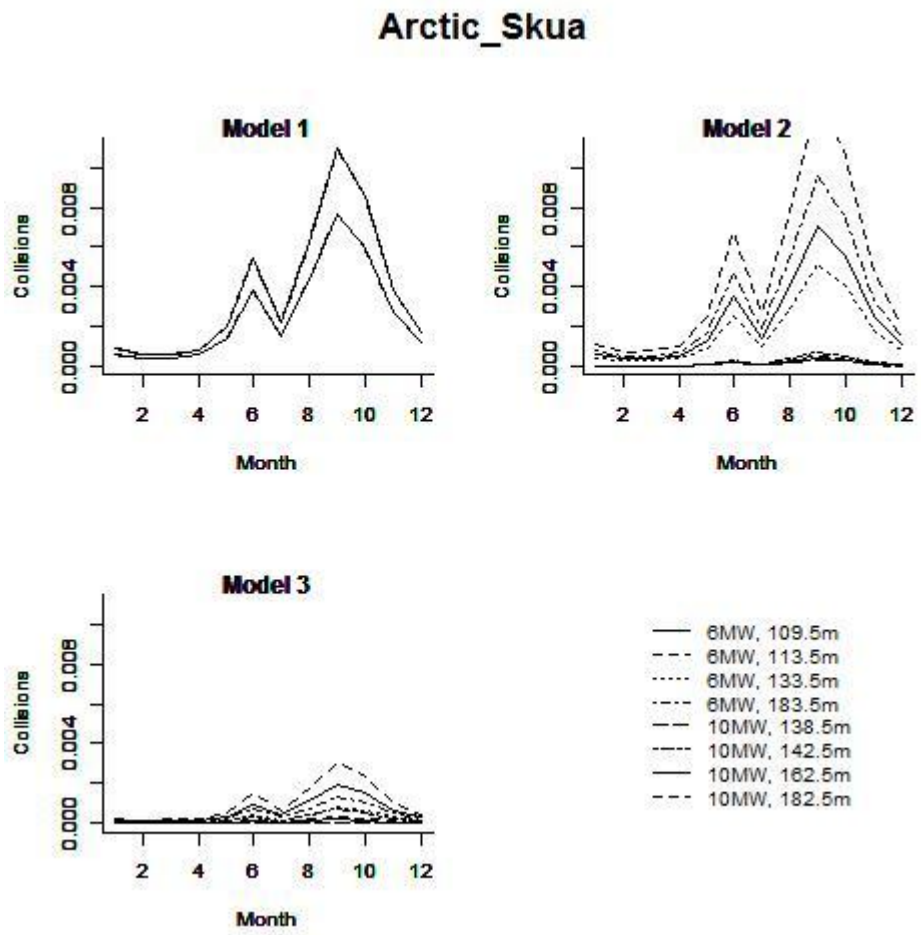

Figure A6.8 Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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.

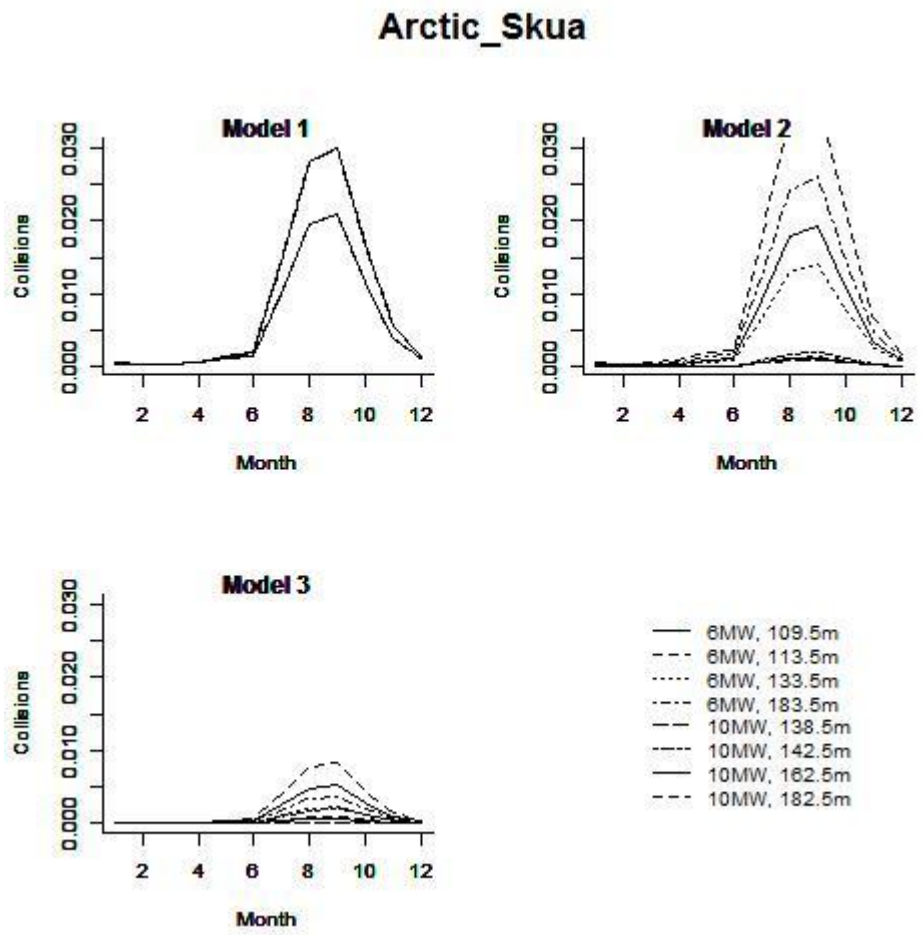

Figure A6.9 Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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)

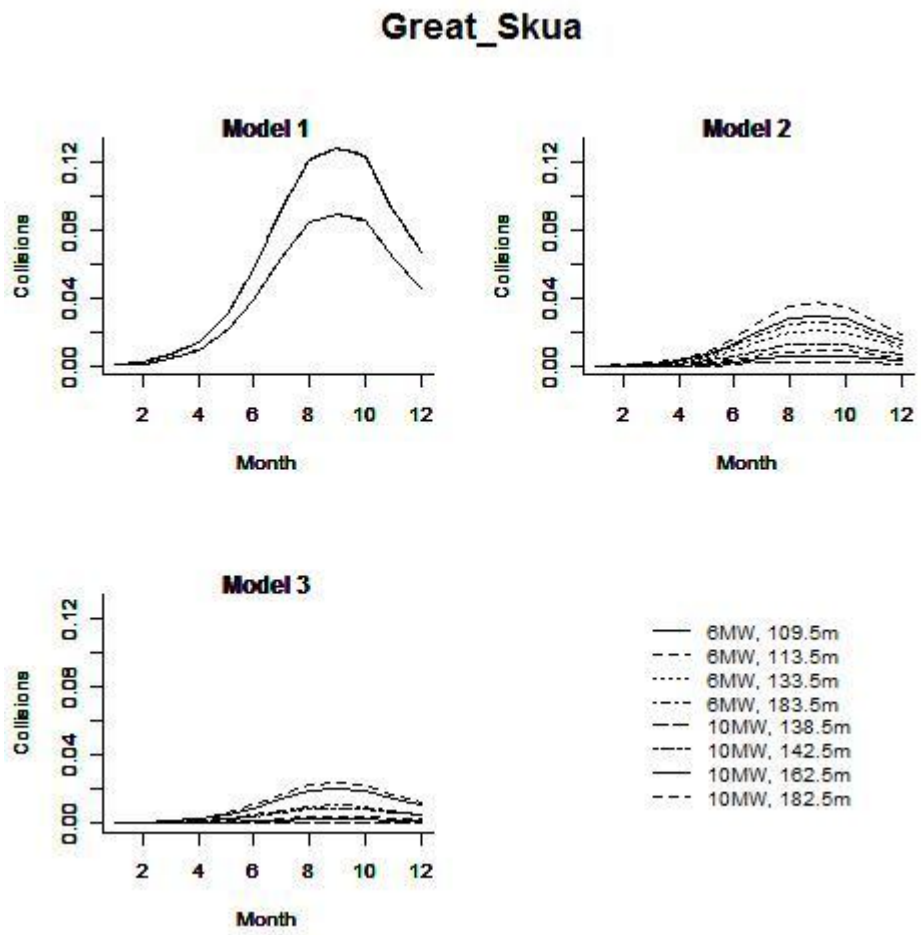

Figure A6.10 Estimated monthly collision rates for great skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

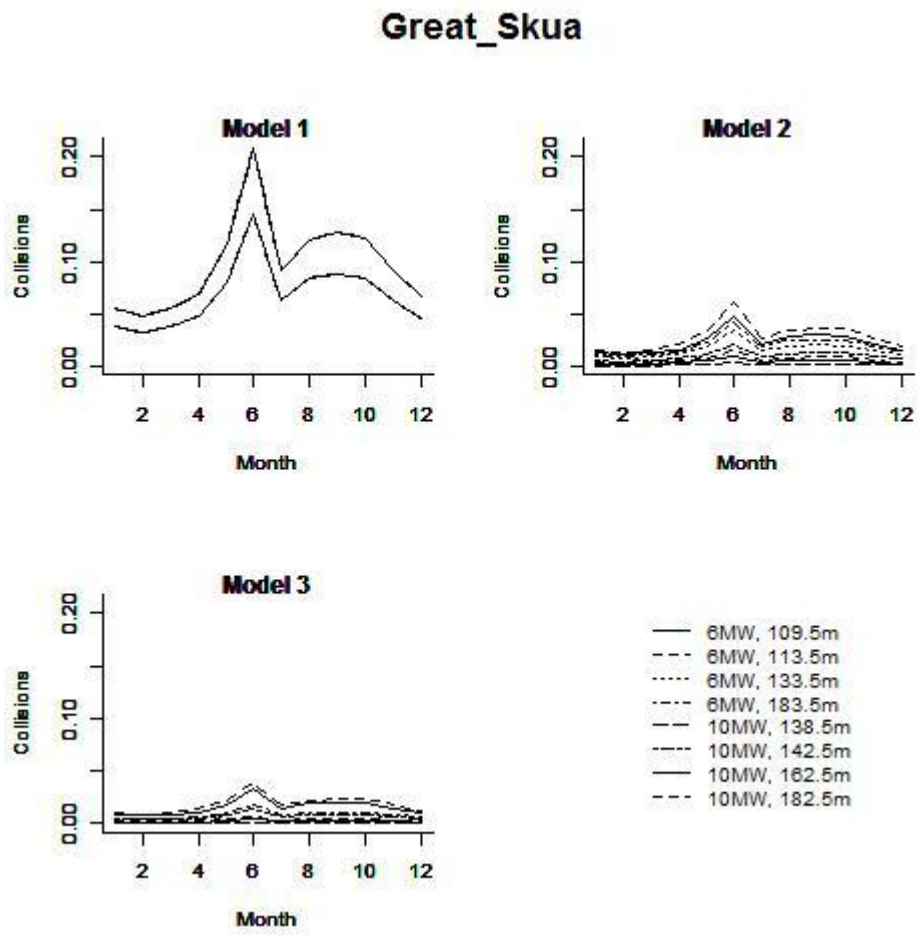

Figure A6.11 Estimated monthly collision rates for great skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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.

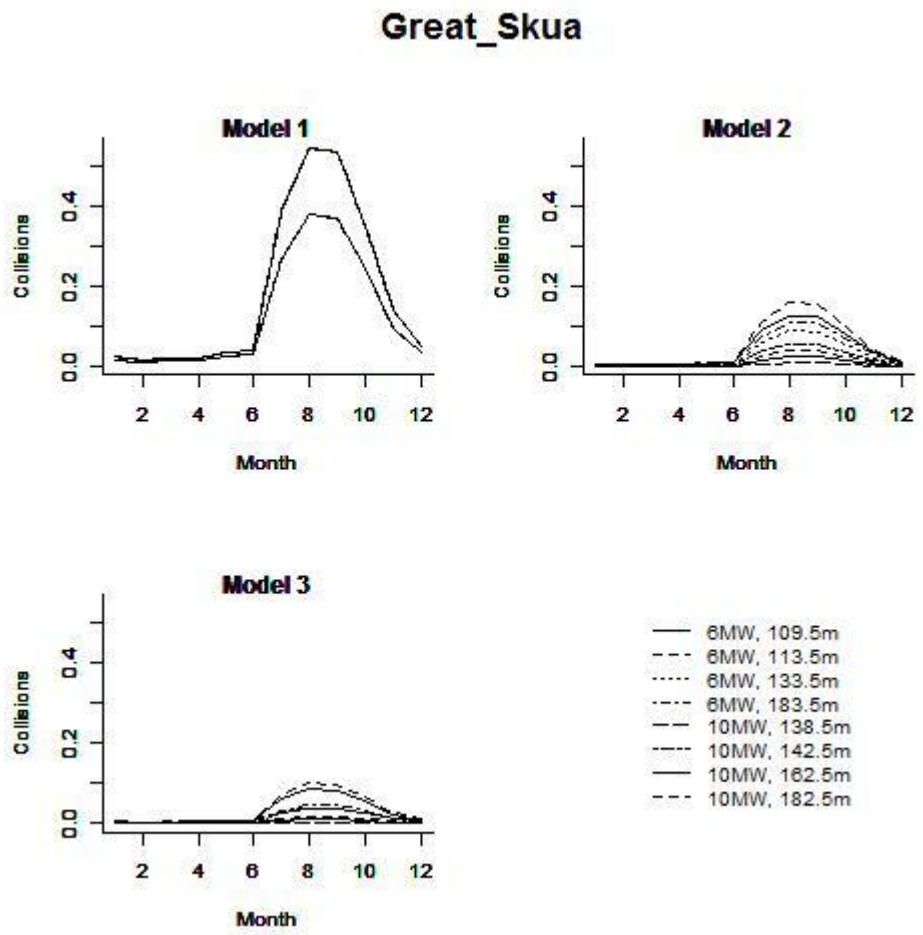

Figure A6.12 Estimated monthly collision rates for great skua in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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)

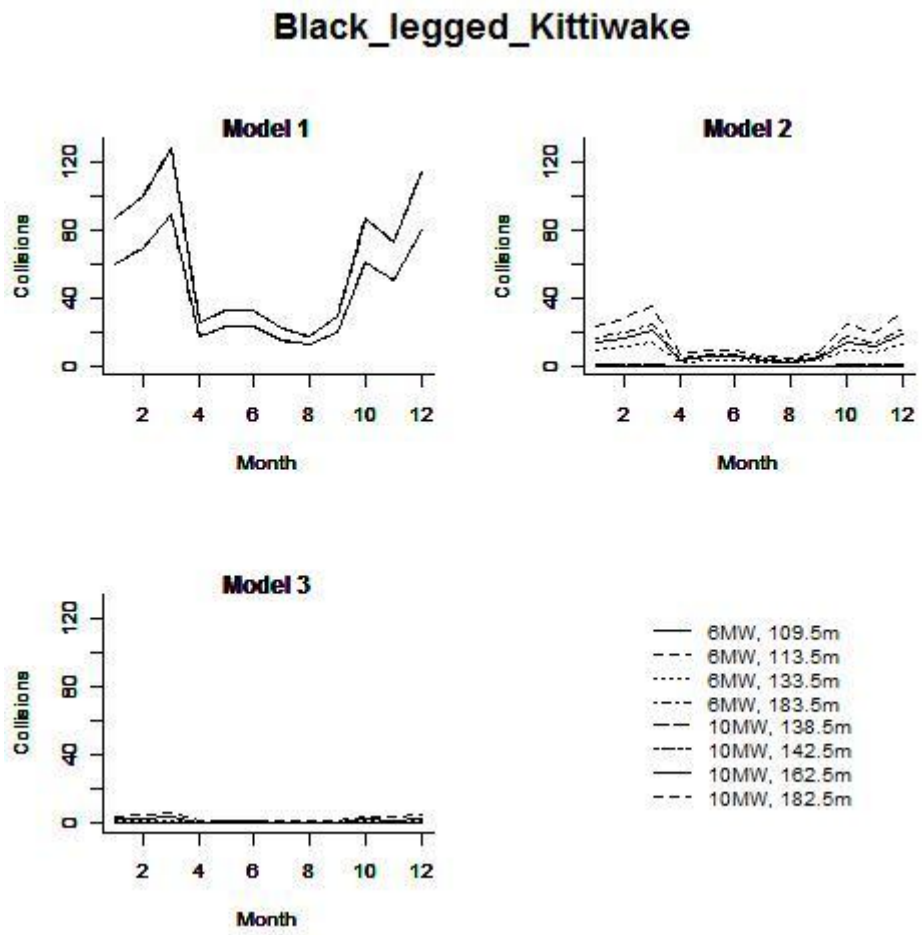

Figure A6.13 Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, 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.

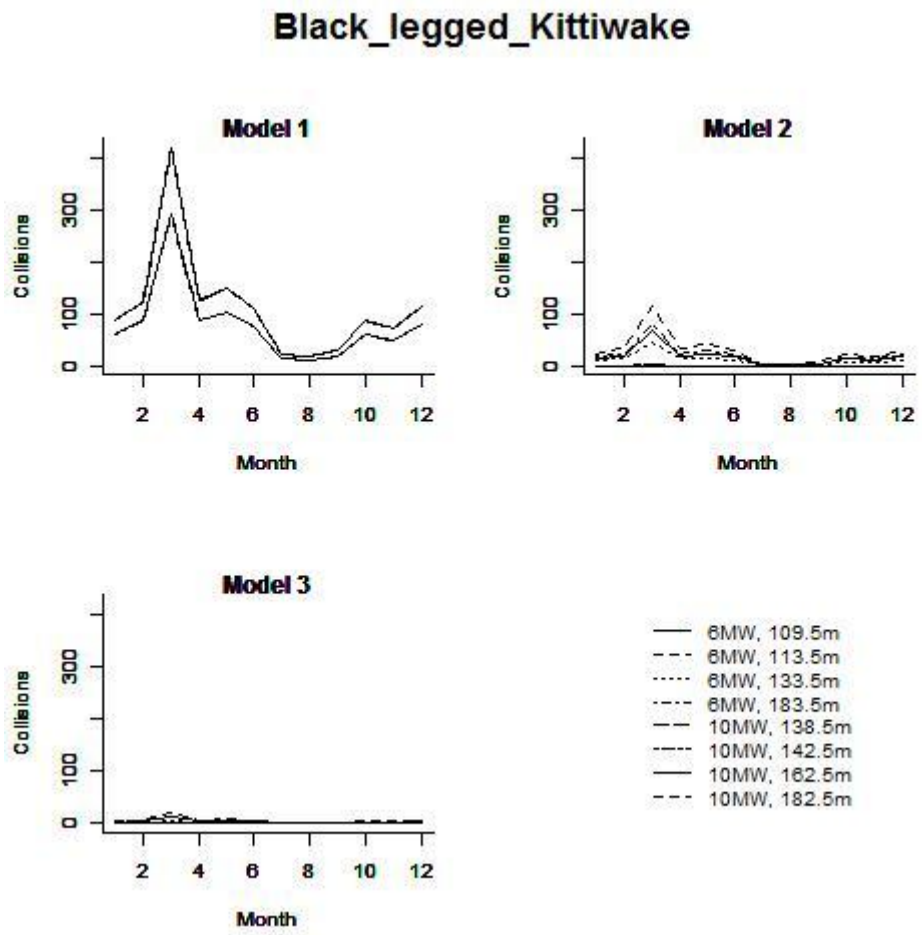

Figure A6.14 Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

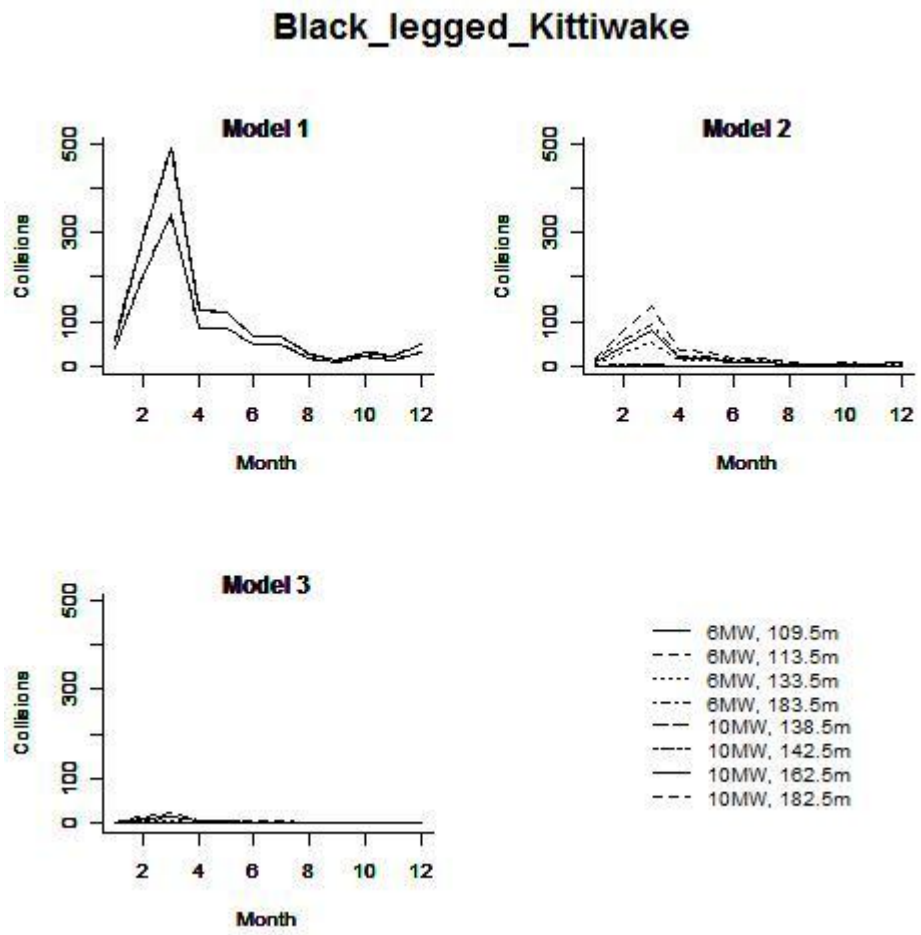

Figure A6.15 Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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)

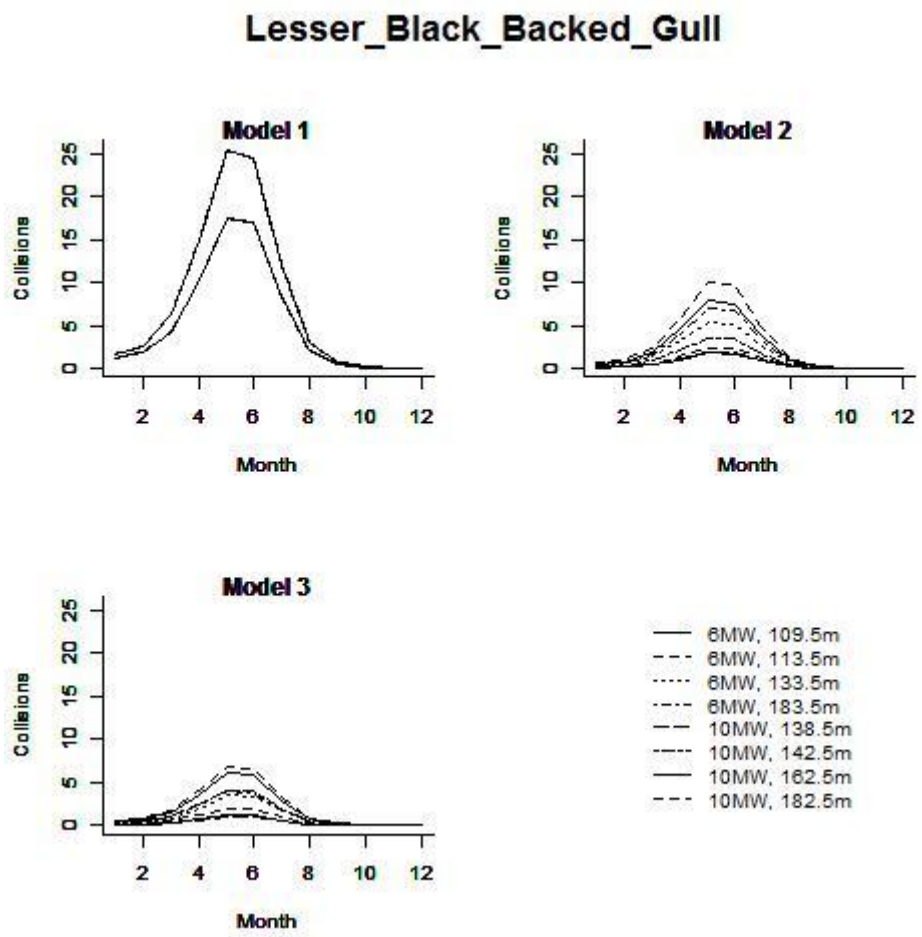

Figure A6.16 Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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.

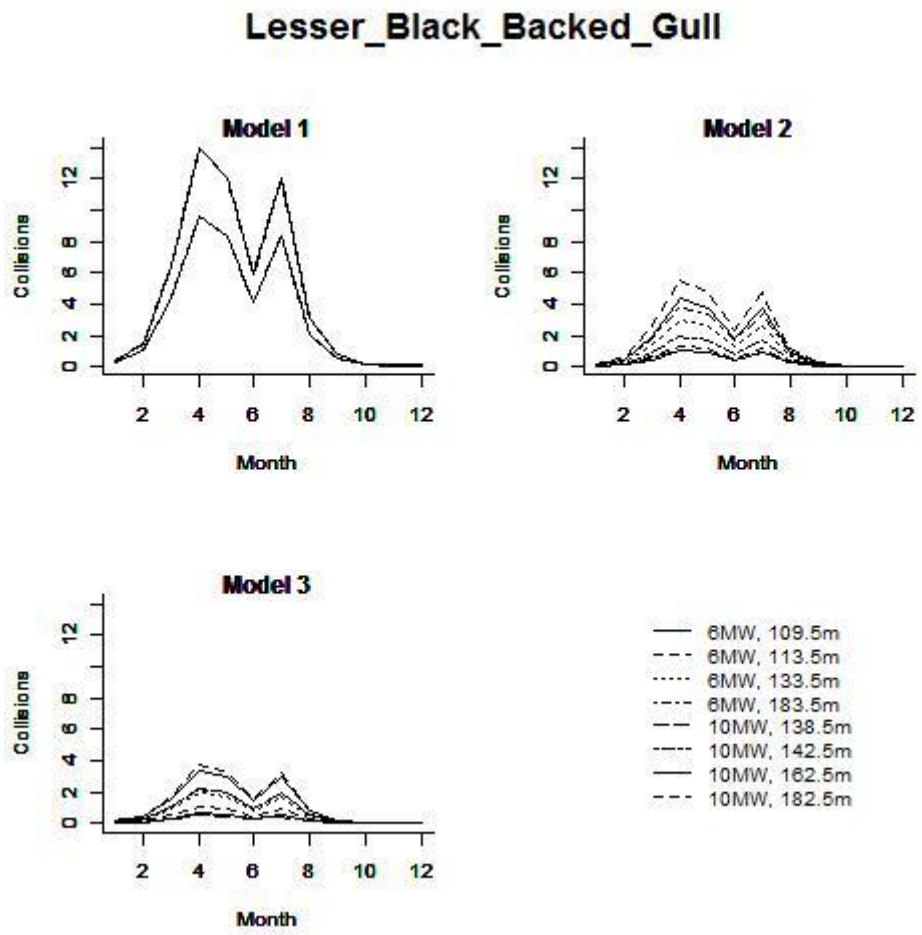

Figure A6.17 Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

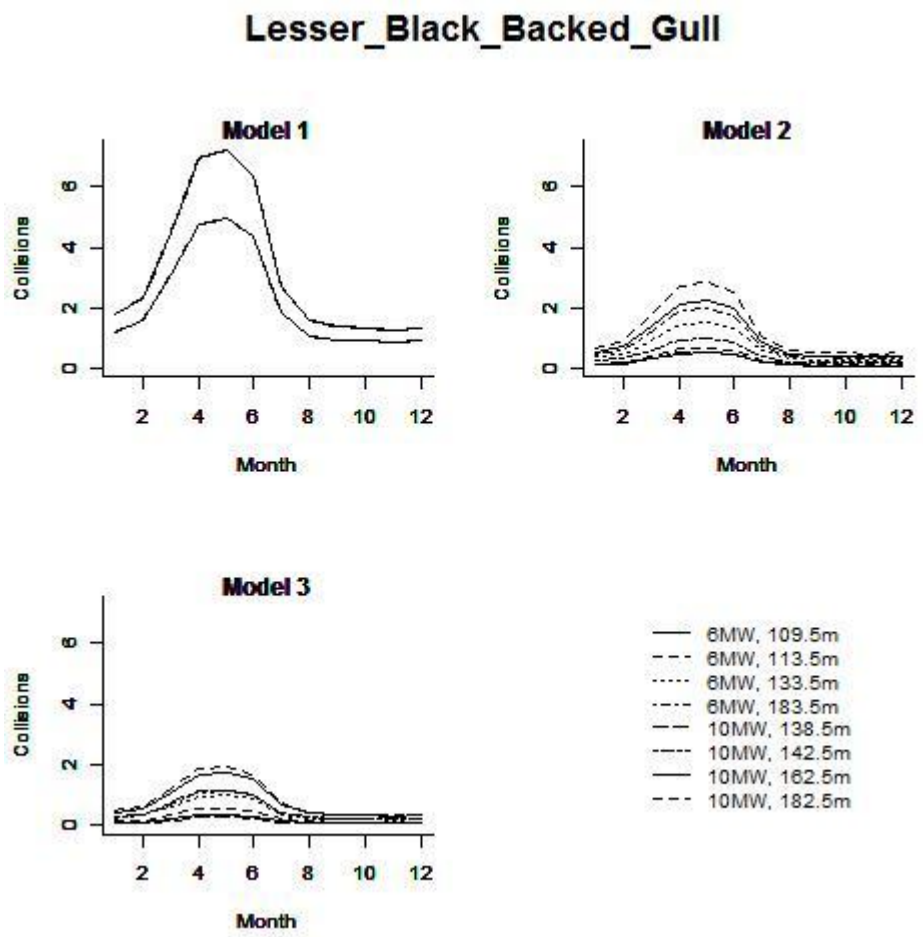

Figure A6.18 Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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)

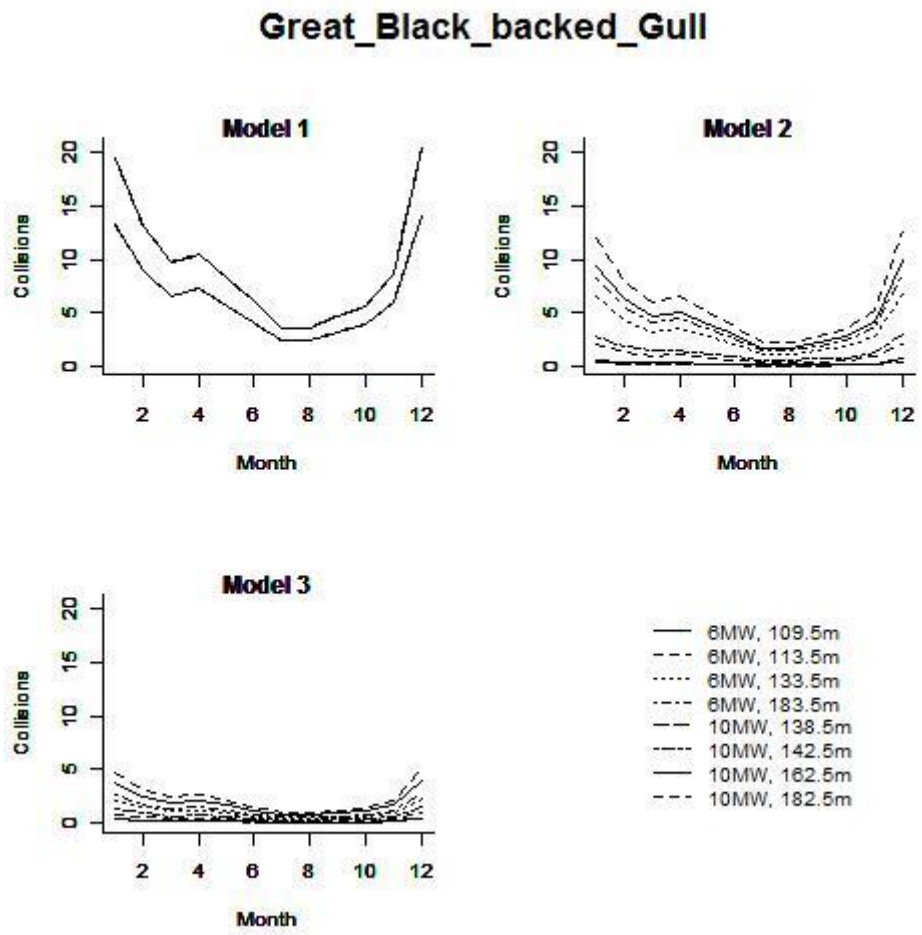

Figure A6.19 Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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.

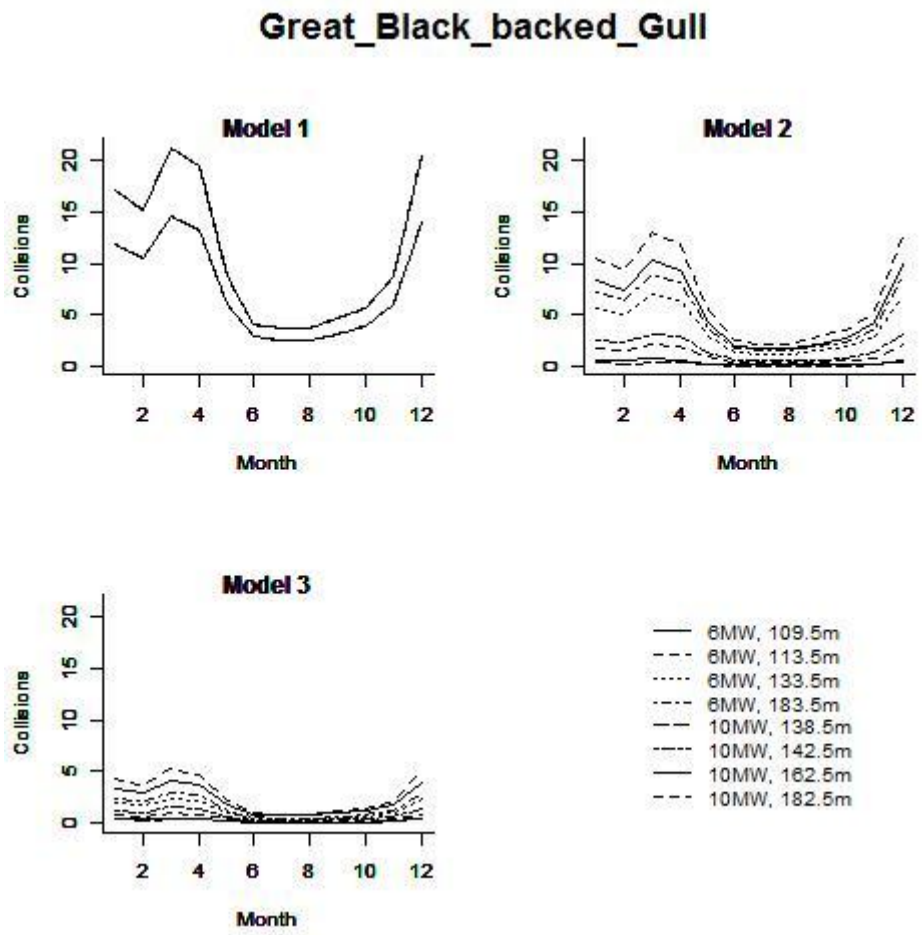

Figure A6.20 Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

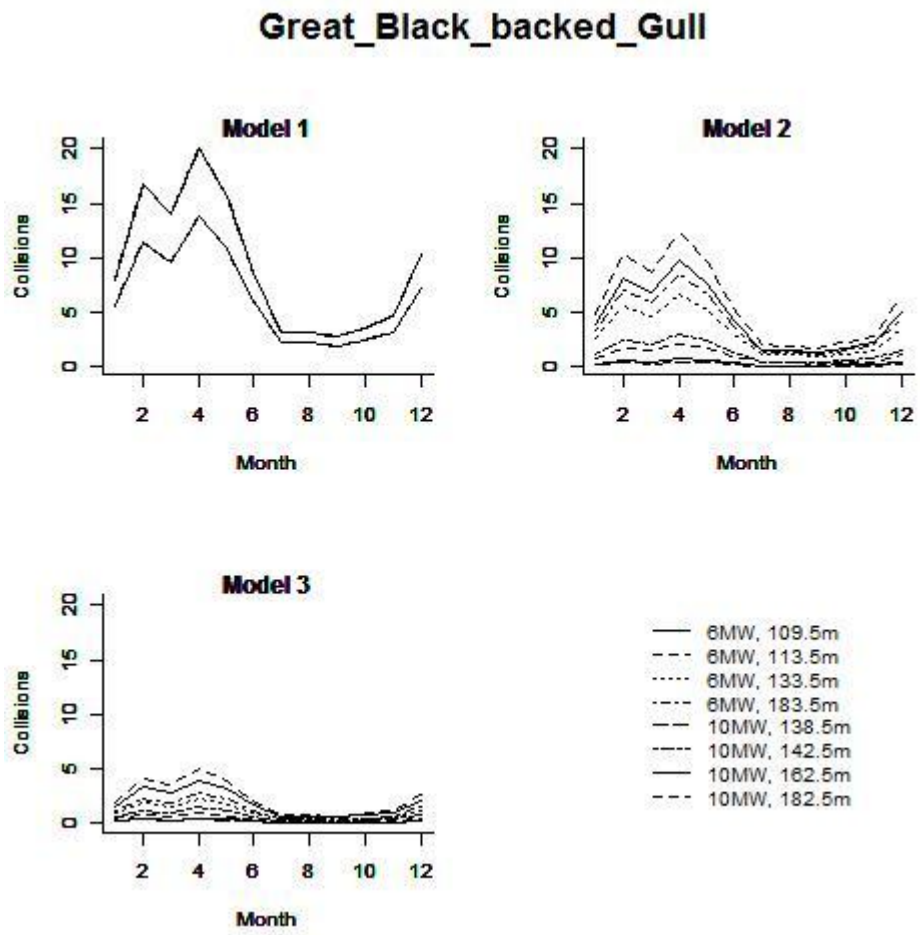

Figure A6.21 Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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)

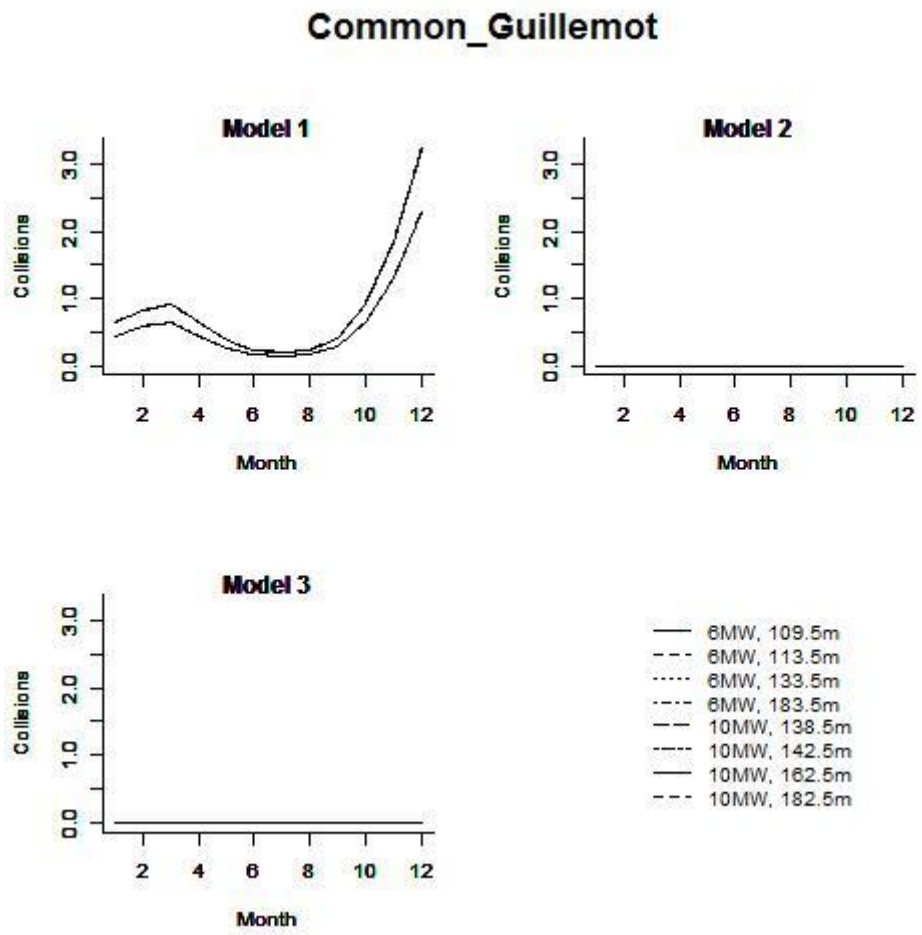

Figure A6.22 Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

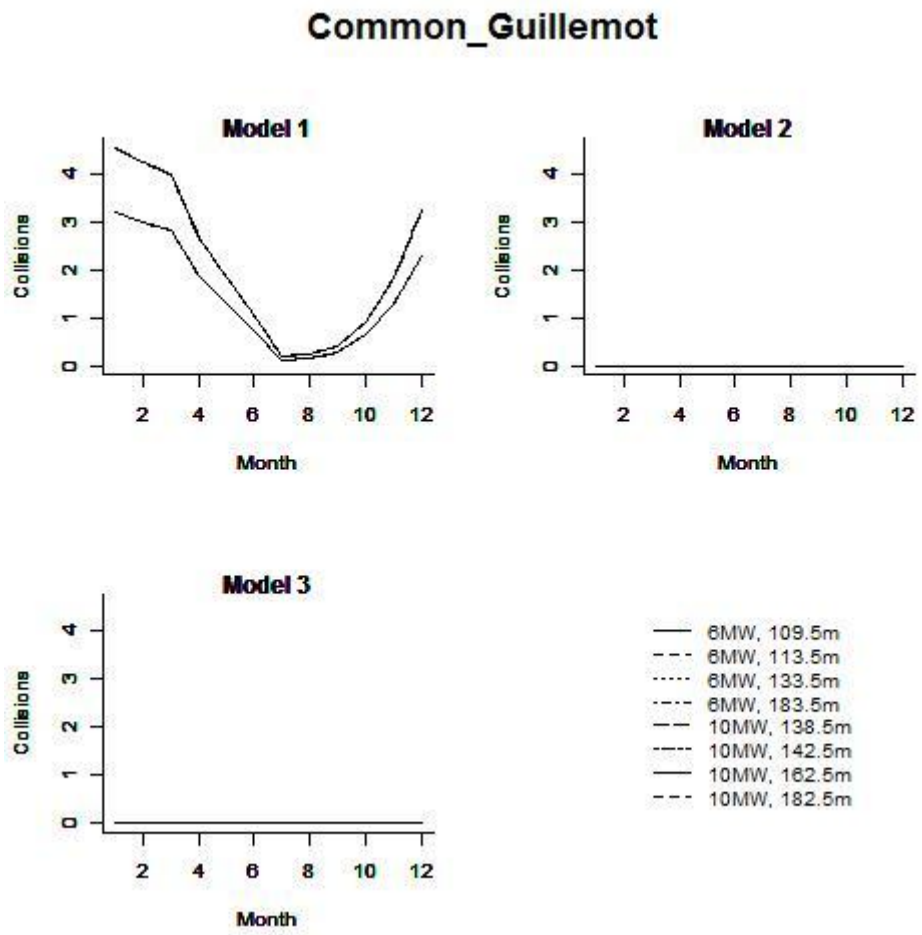

Figure A6.23 Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

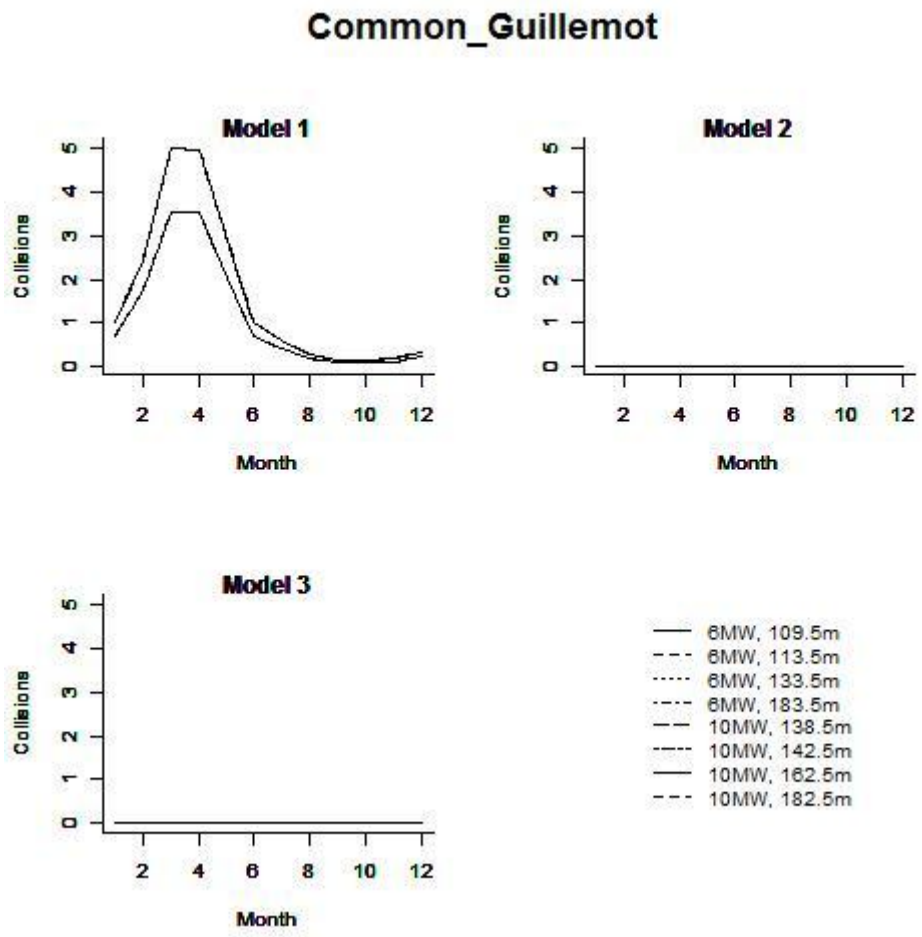

Figure A6.24 Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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)

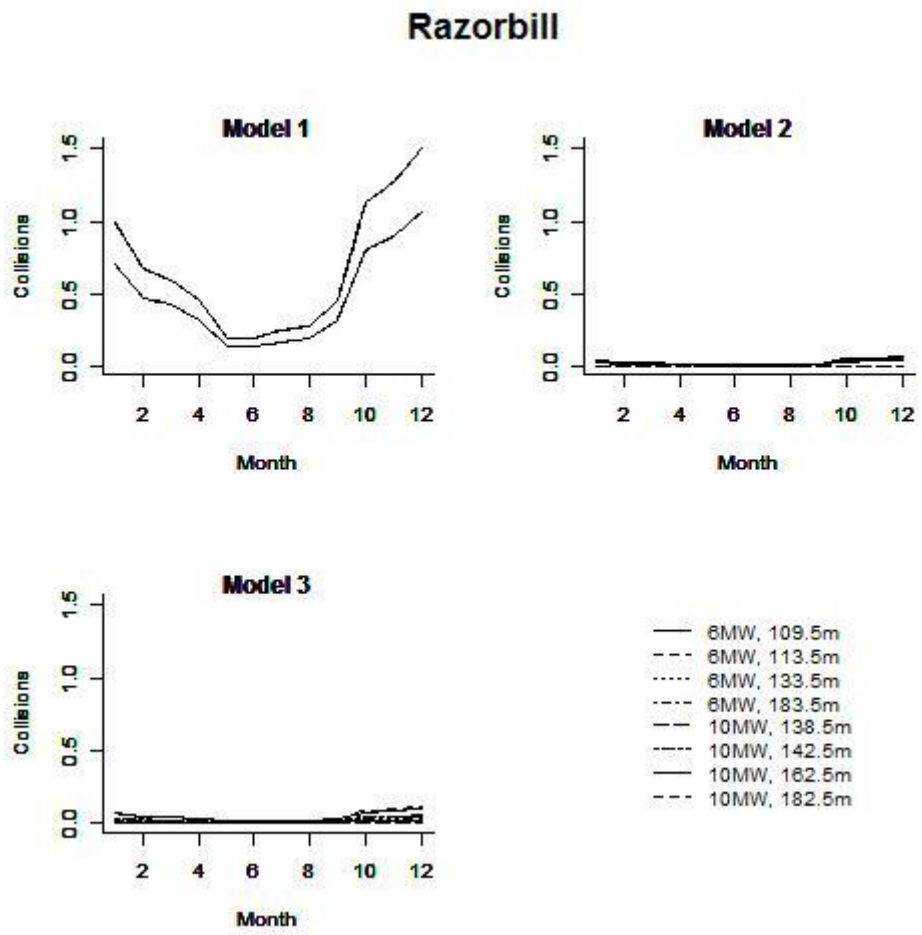

Figure A6.25 Estimated monthly collision rates for razorbill in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

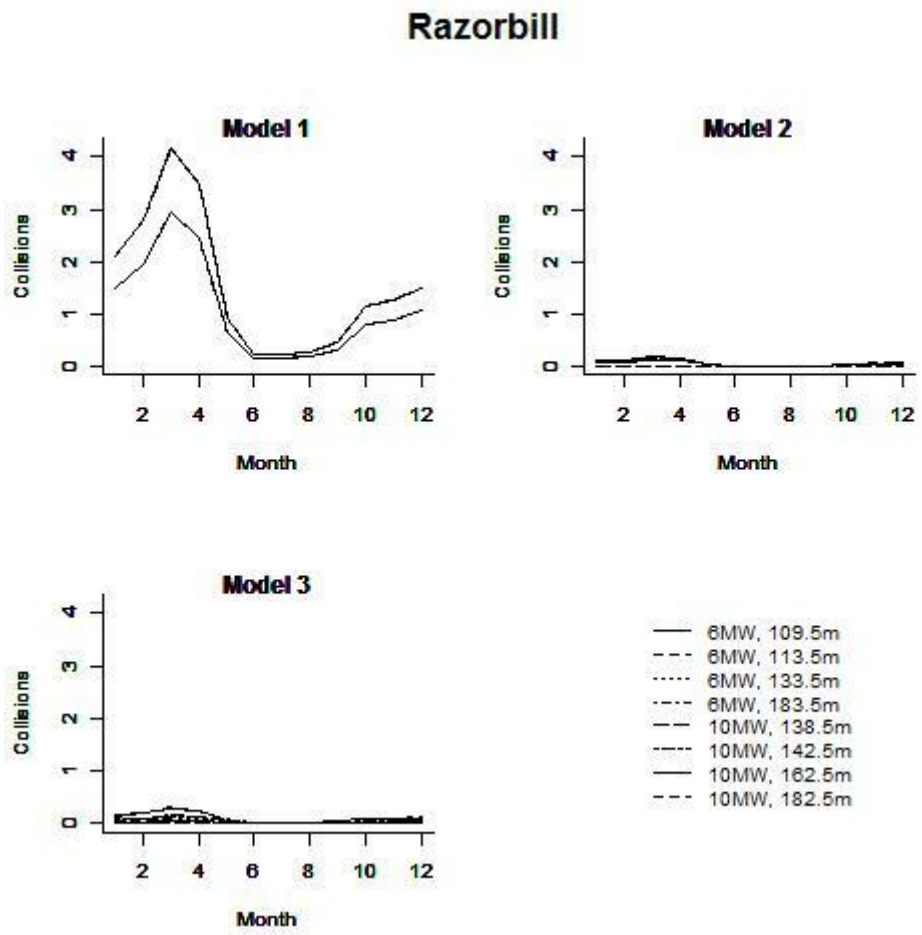

Figure A6.26 Estimated monthly collision rates for razorbill in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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.

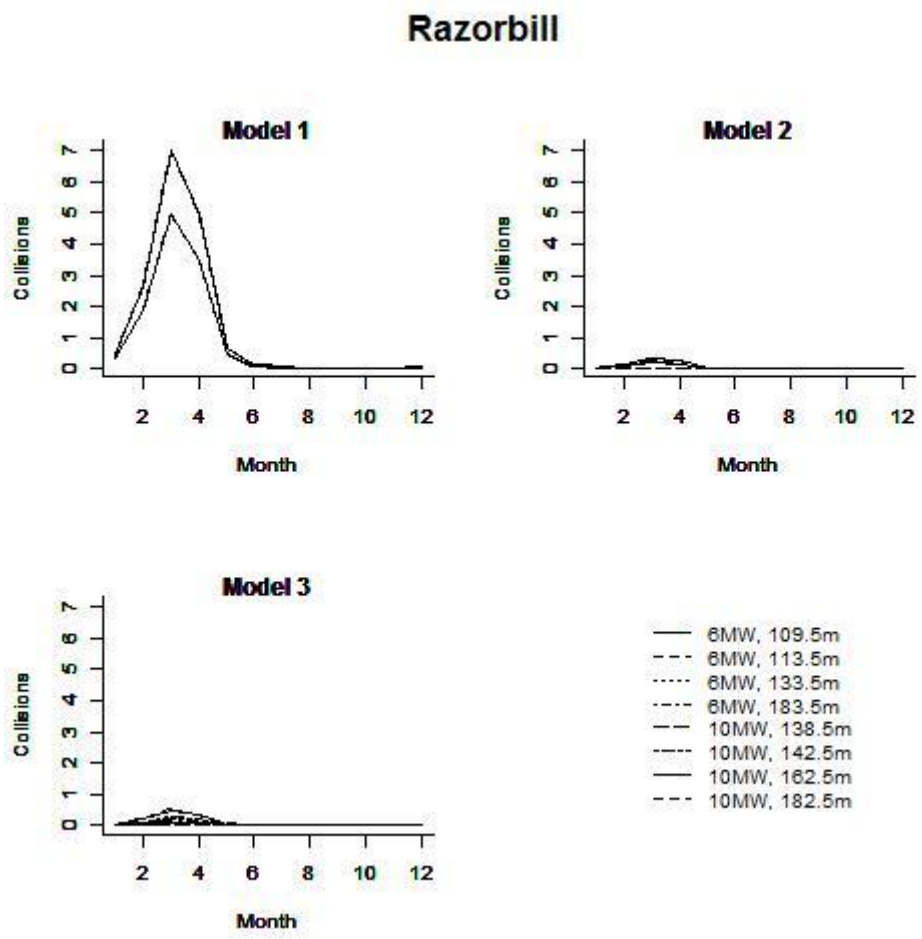

Figure A6.27 Estimated monthly collision rates for razorbill in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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)

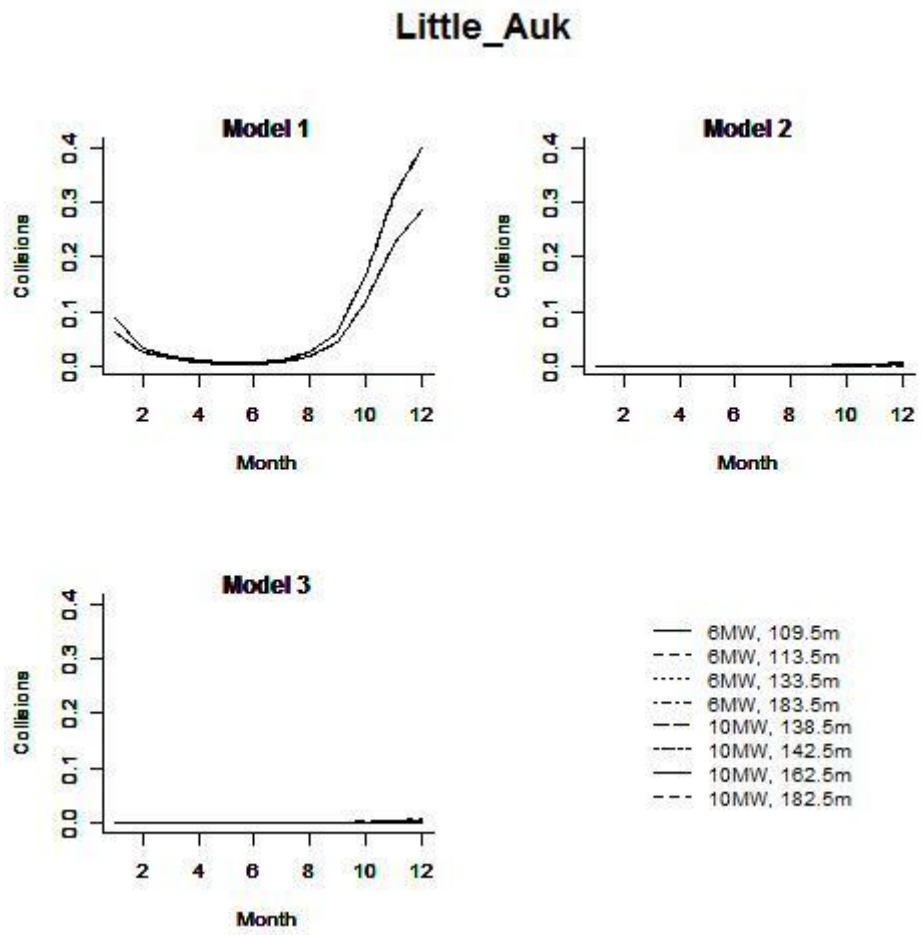

Figure A6.28 Estimated monthly collision rates for little auk in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

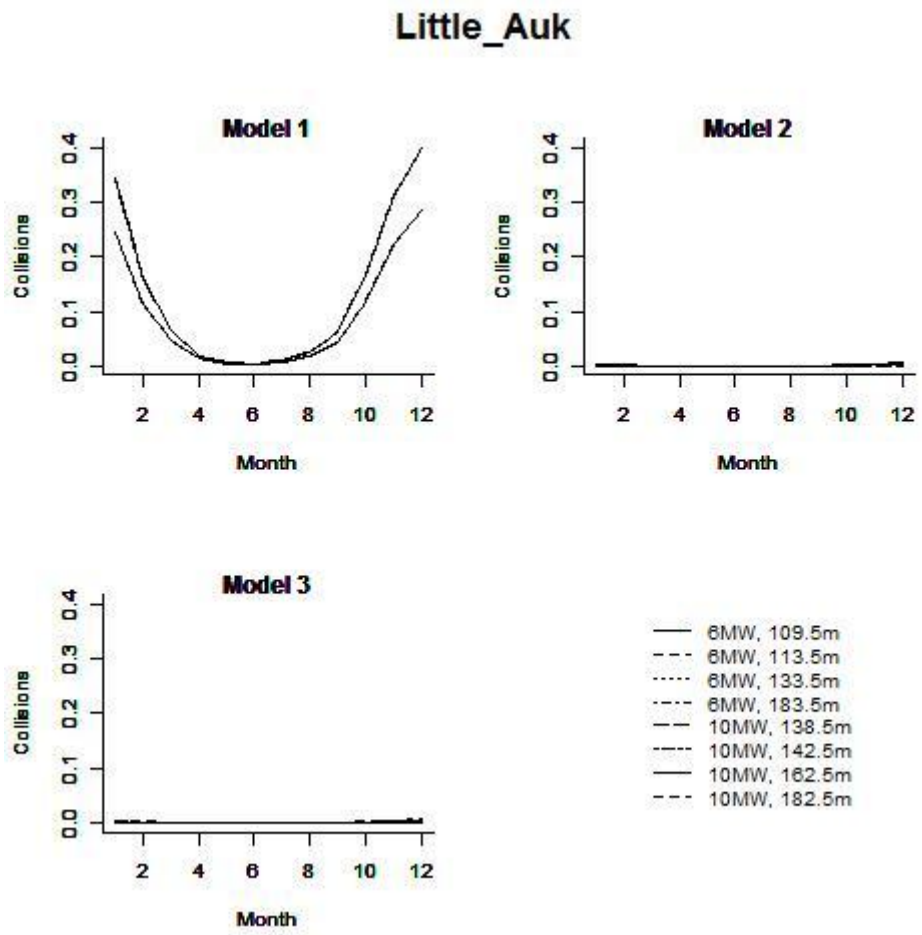

Figure A6.29 Estimated monthly collision rates for little auk in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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.

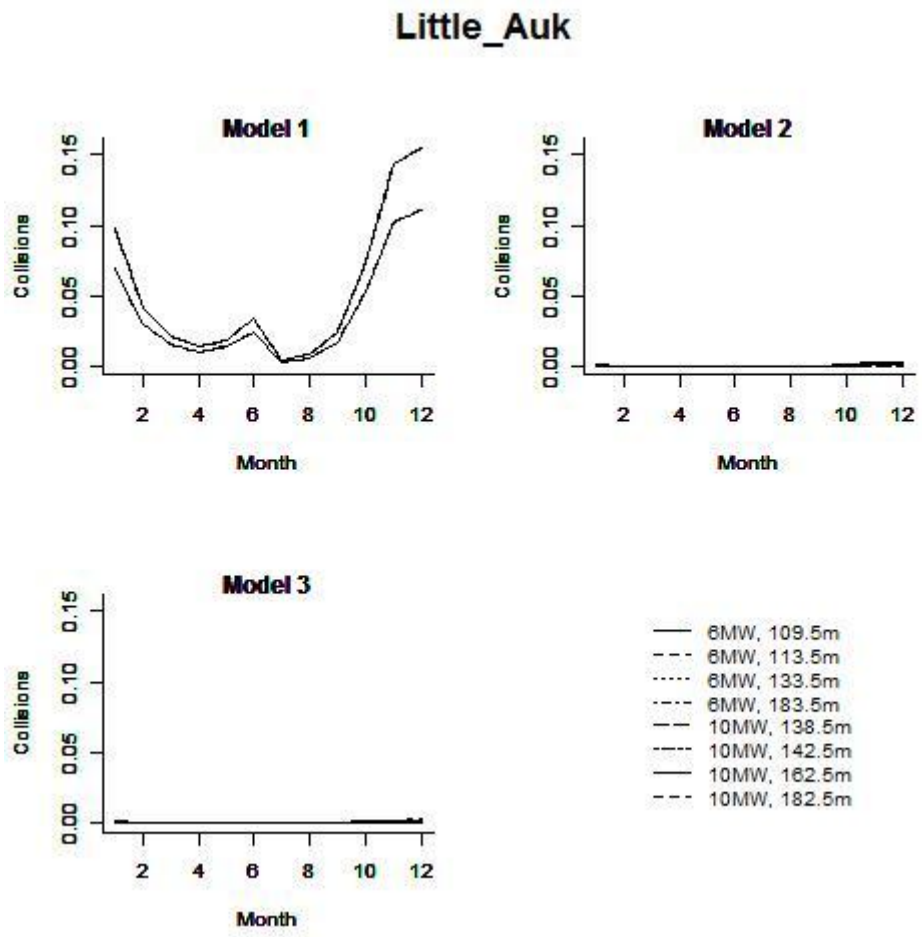

Figure A6.30 Estimated monthly collision rates for little auk in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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)

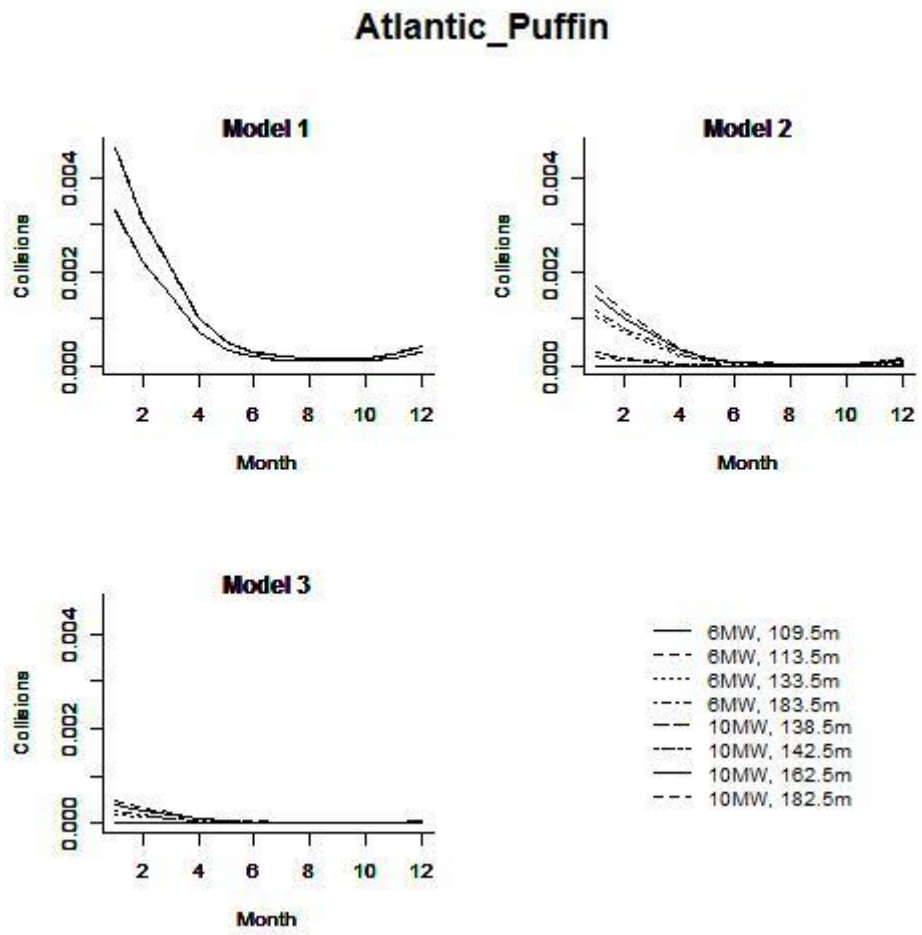

Figure A6.31 Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

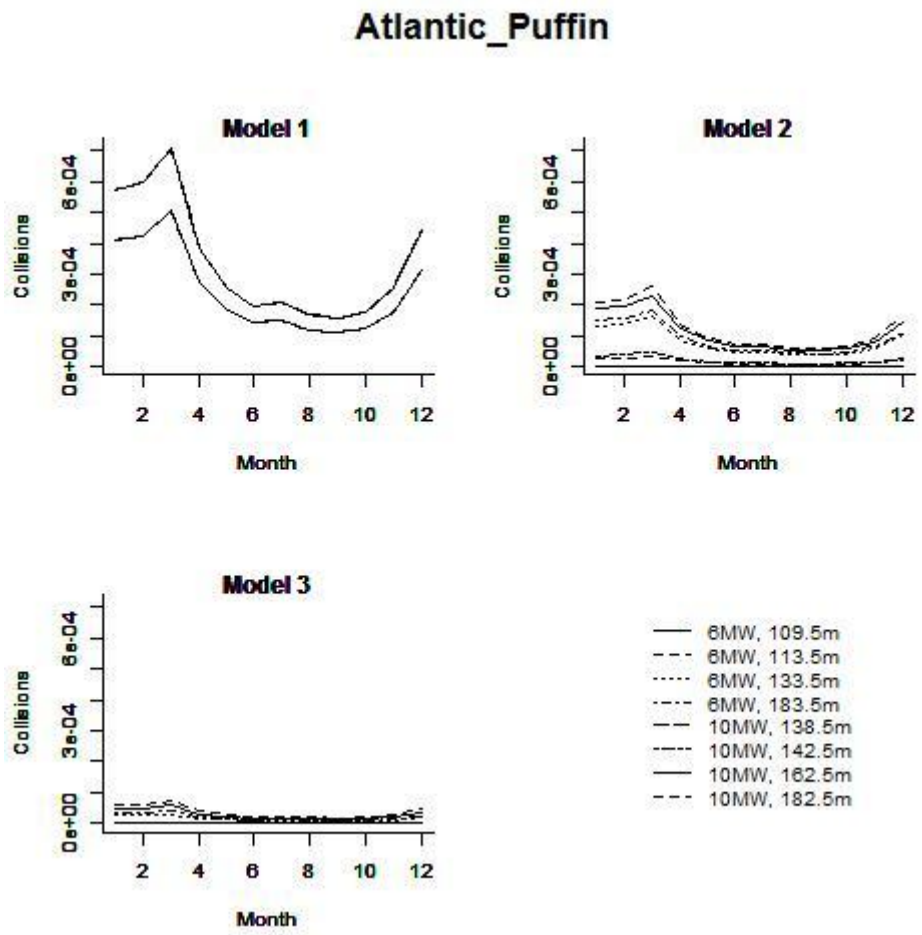

Figure A6.32 Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

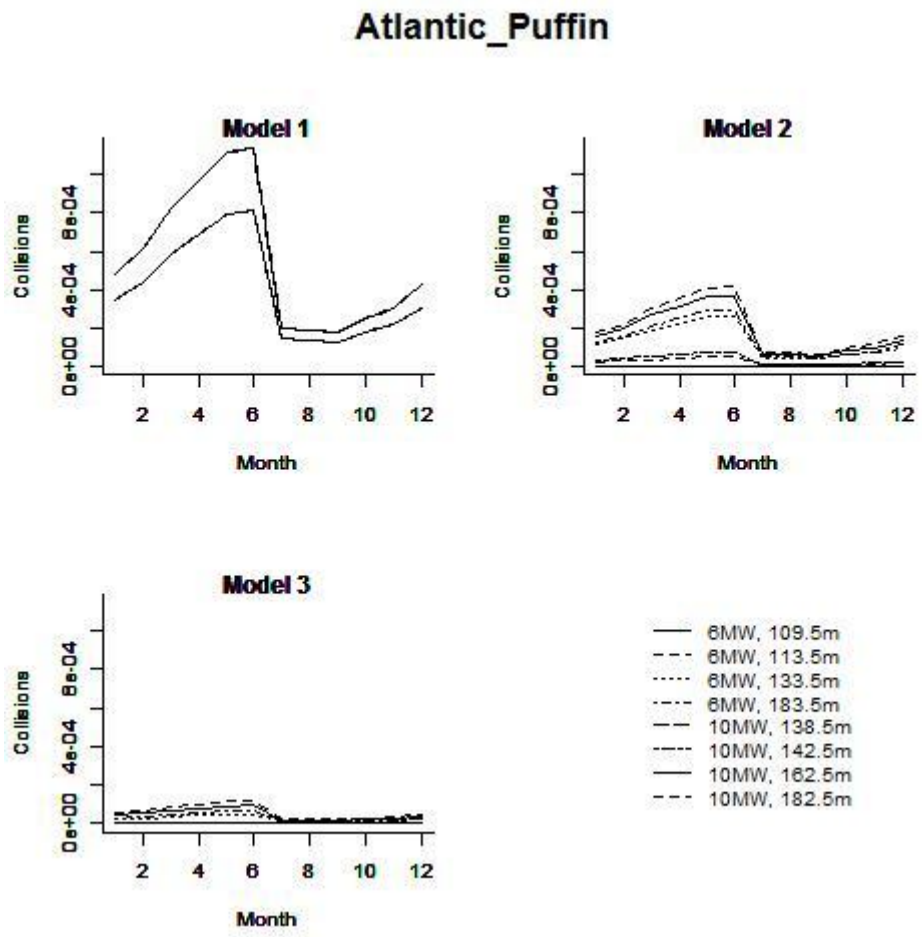

Figure A6.33 Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside A project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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)

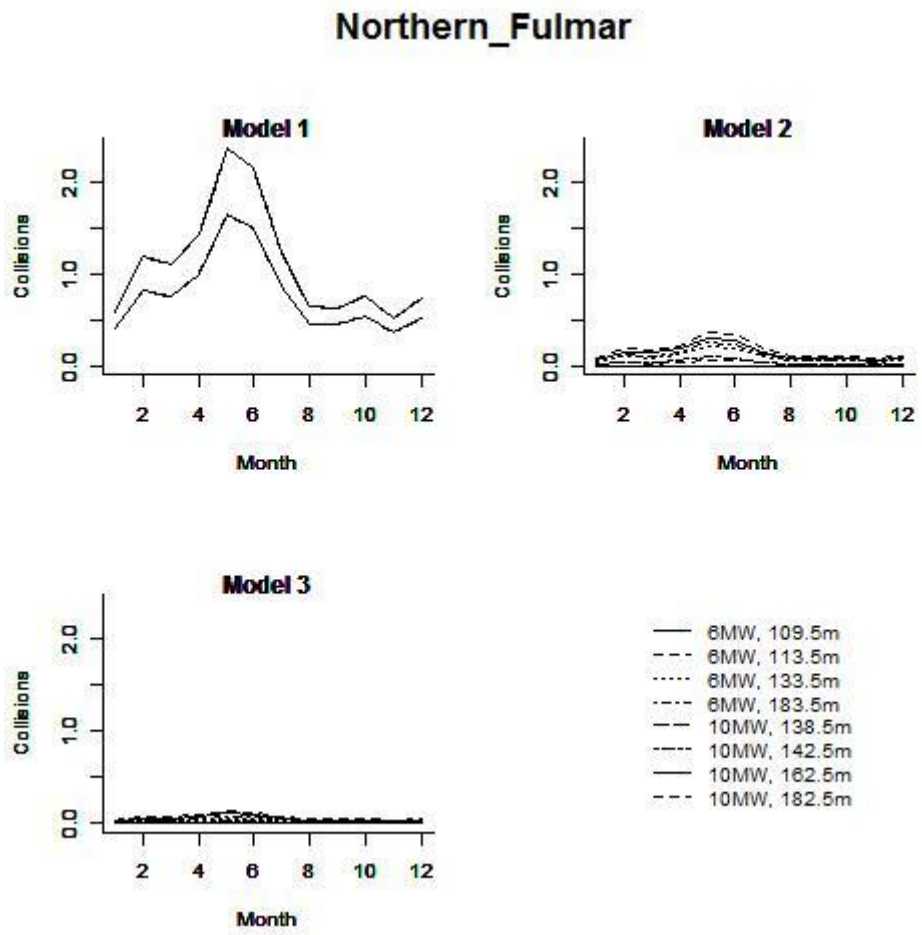

Figure A6.34 Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

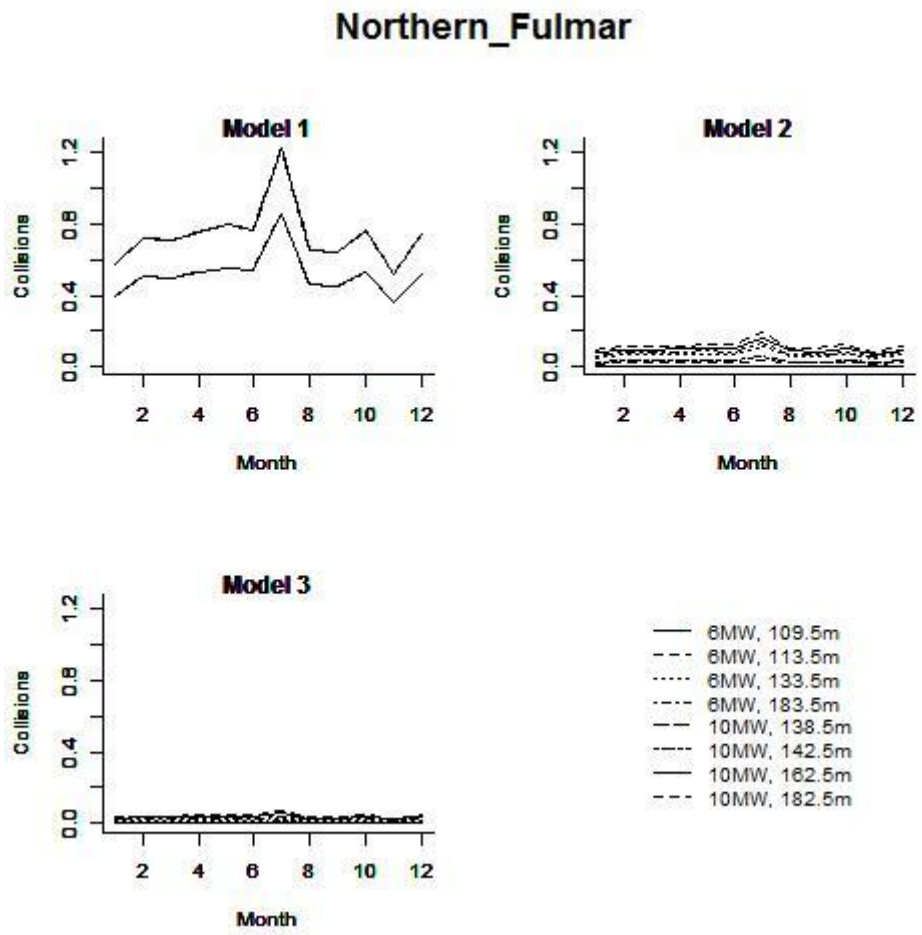

Figure A6.35 Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

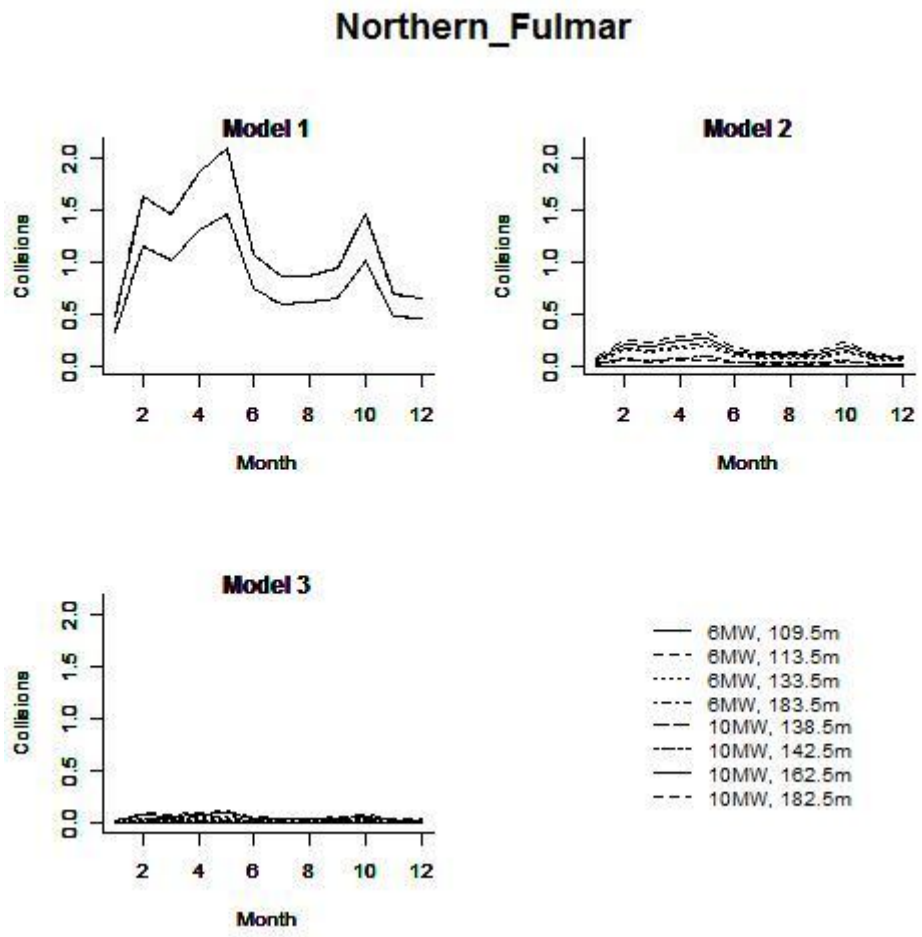

Figure A6.36 Estimated monthly collision rates for northern fulmar in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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).

Option 3 of the Band model resulted in greater collision estimates than option 2 for three of the turbine designs considered – 6MW turbines with a minimum height above sea-level of 26m, 30m and 50m. This is a consequence of the dual peak in the flight height distribution of the northern gannet, which means the flight heights of a significant number of birds are likely to overlap with the centre of the rotor-swept area of the turbine, where the collision risk is greatest.

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)

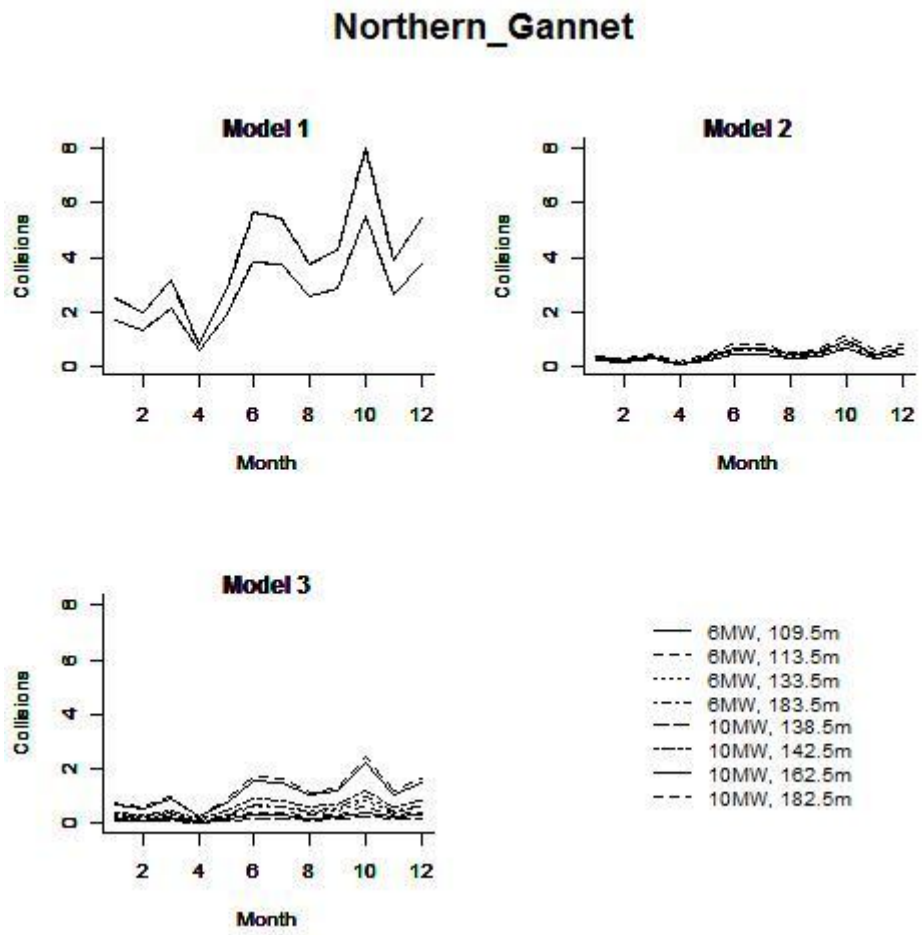

Figure A6.37 Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

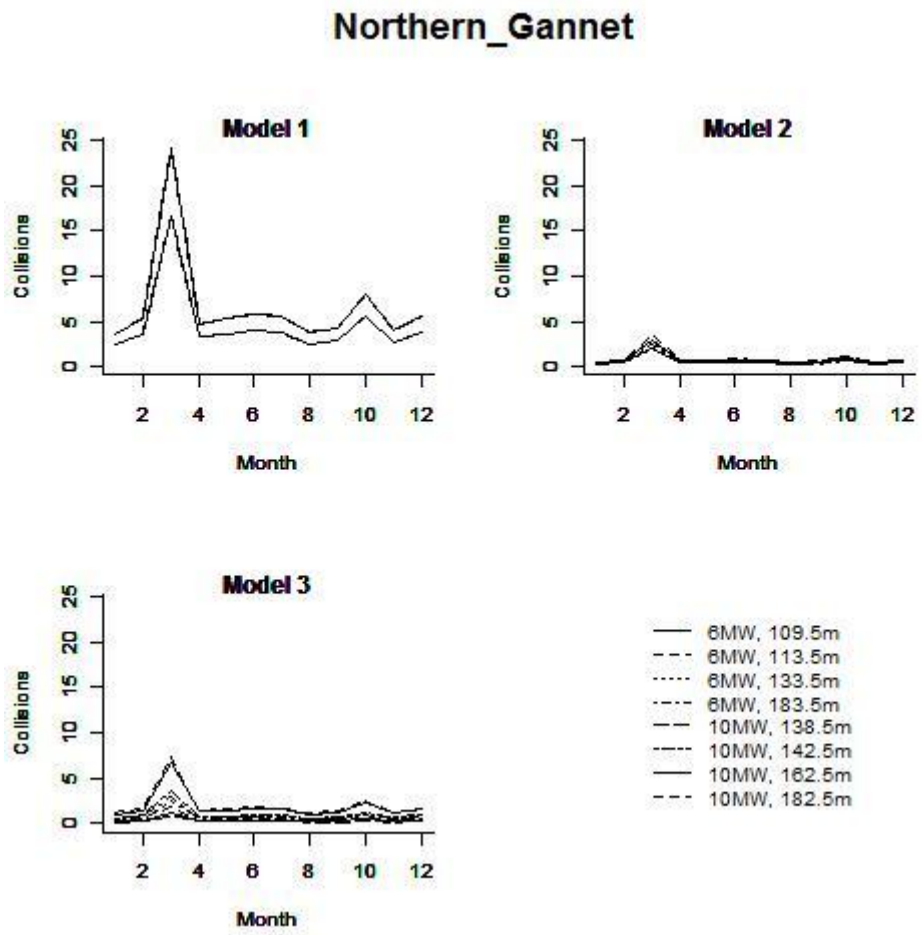

Figure A6.38 Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

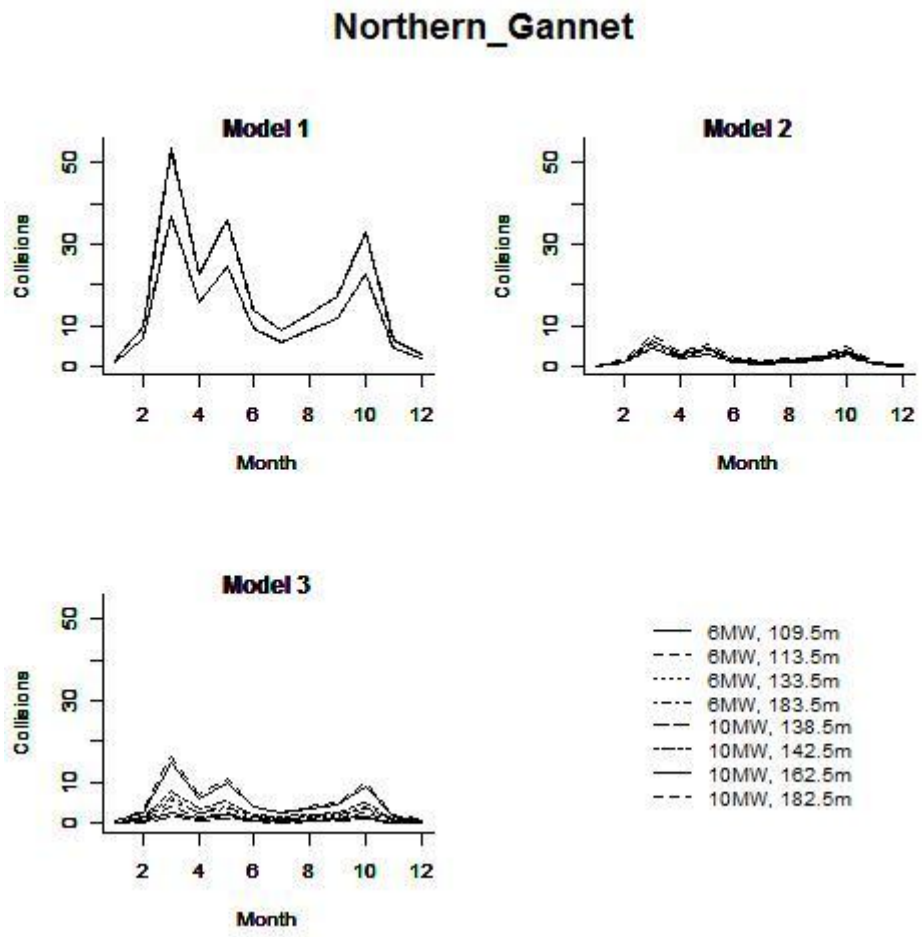

Figure A6.39 Estimated monthly collision rates for northern gannet in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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)

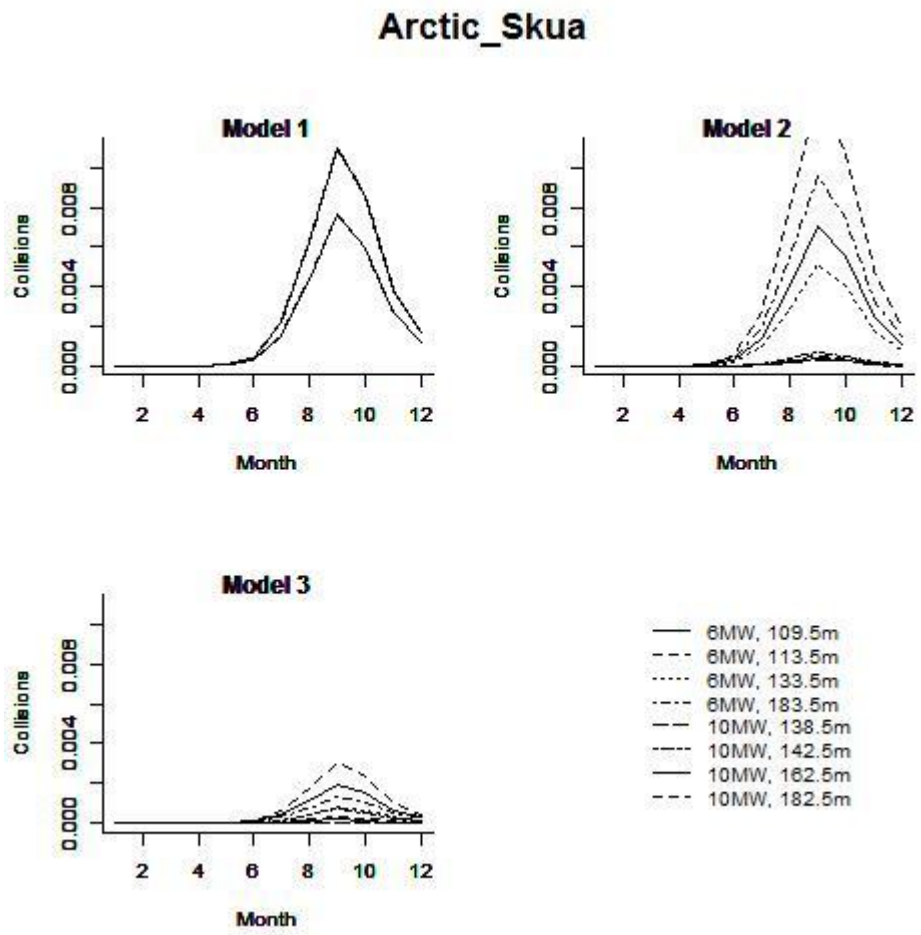

Figure A6.40 Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

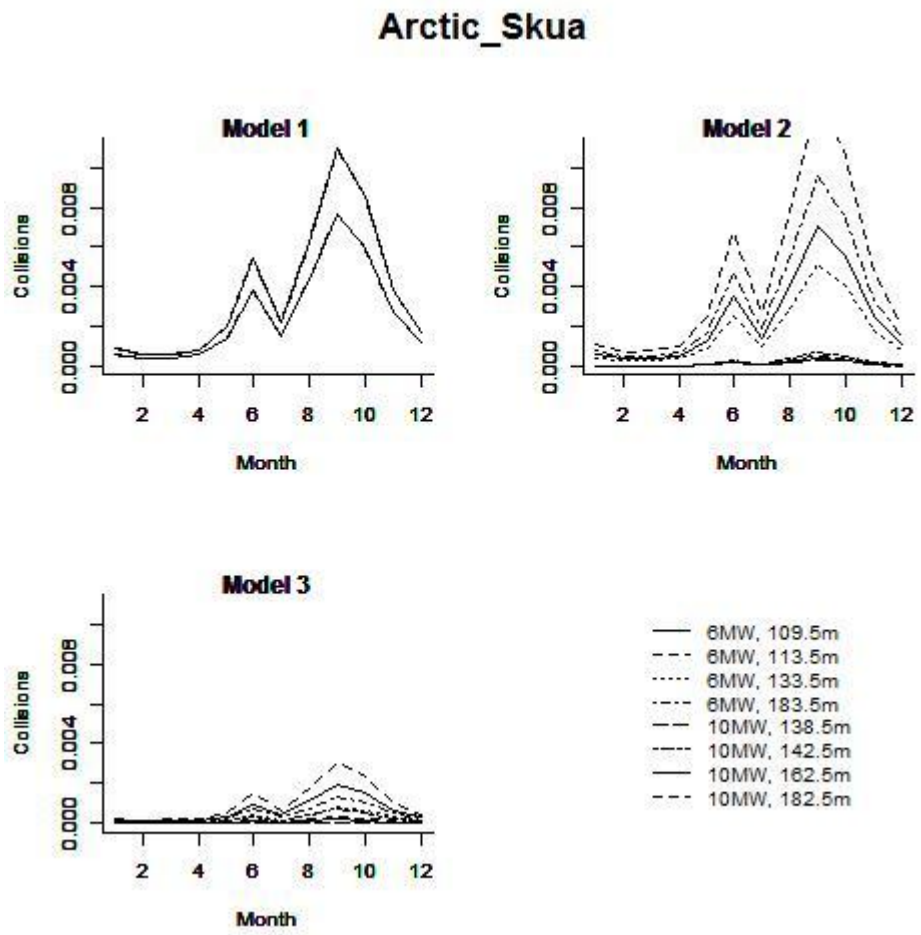

Figure A6.41 Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and 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.

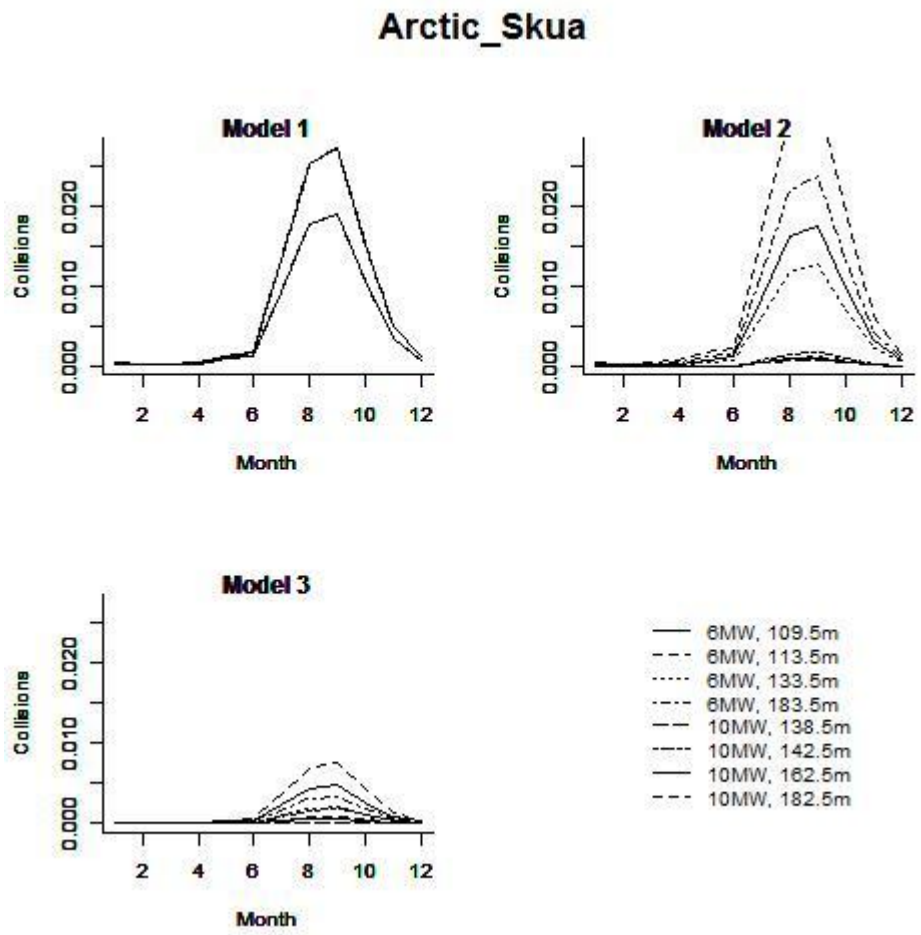

Figure A6.42 Estimated monthly collision rates for Arctic skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and 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)

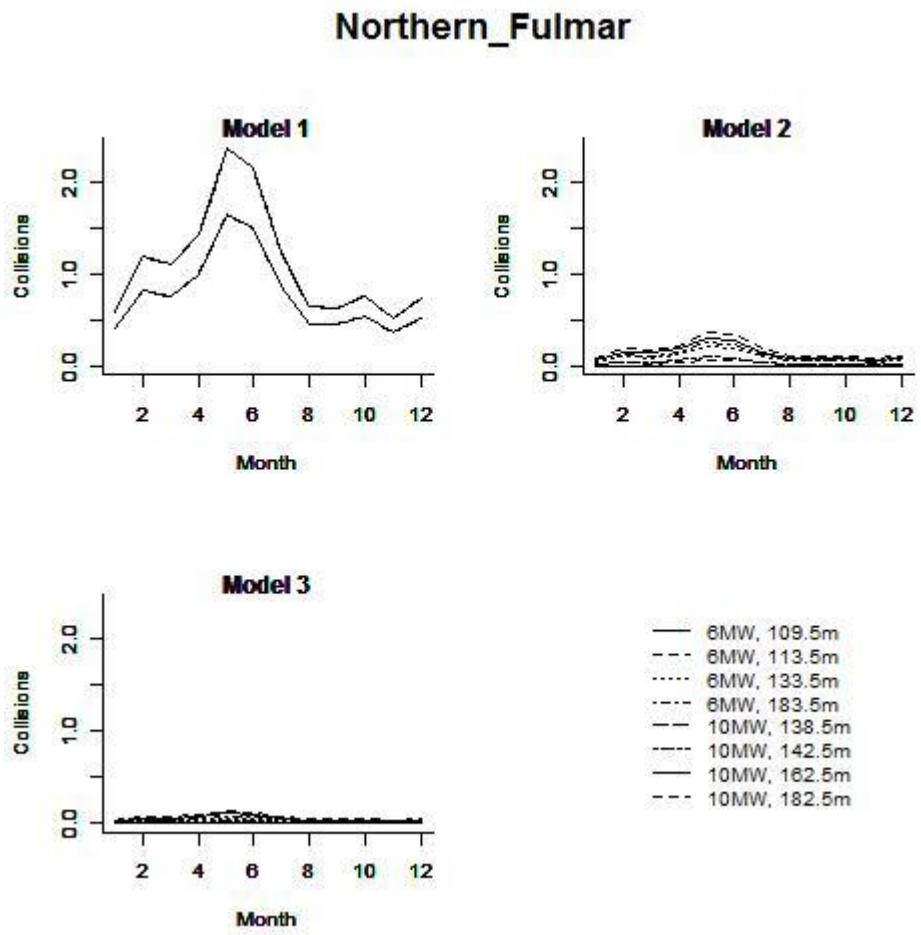

Figure A6.43 Estimated monthly collision rates for great skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

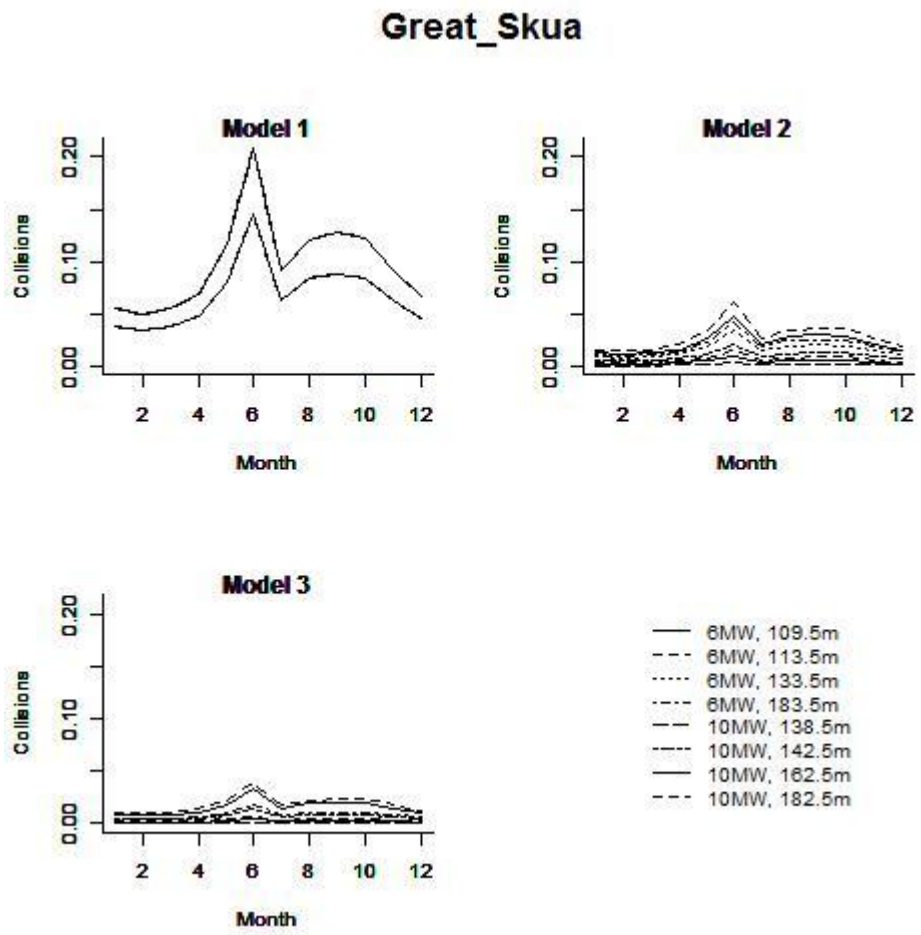

Figure A6.44 Estimated monthly collision rates for great skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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.

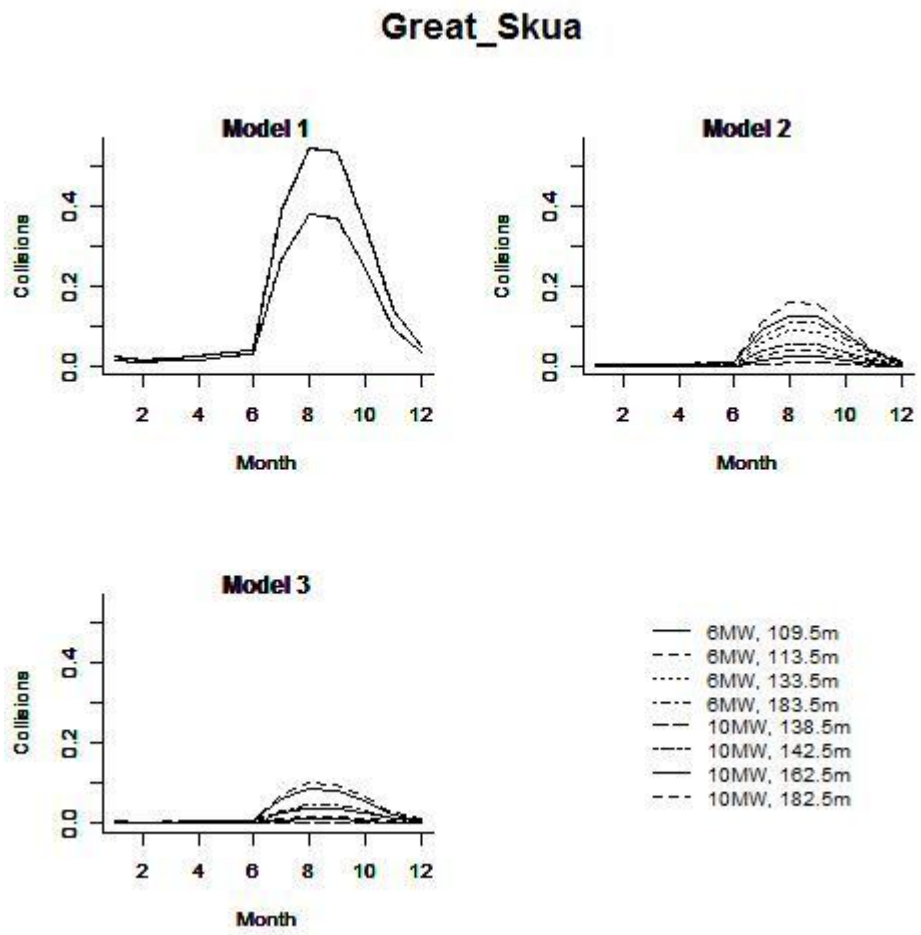

Figure A6.45 Estimated monthly collision rates for great skua in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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)

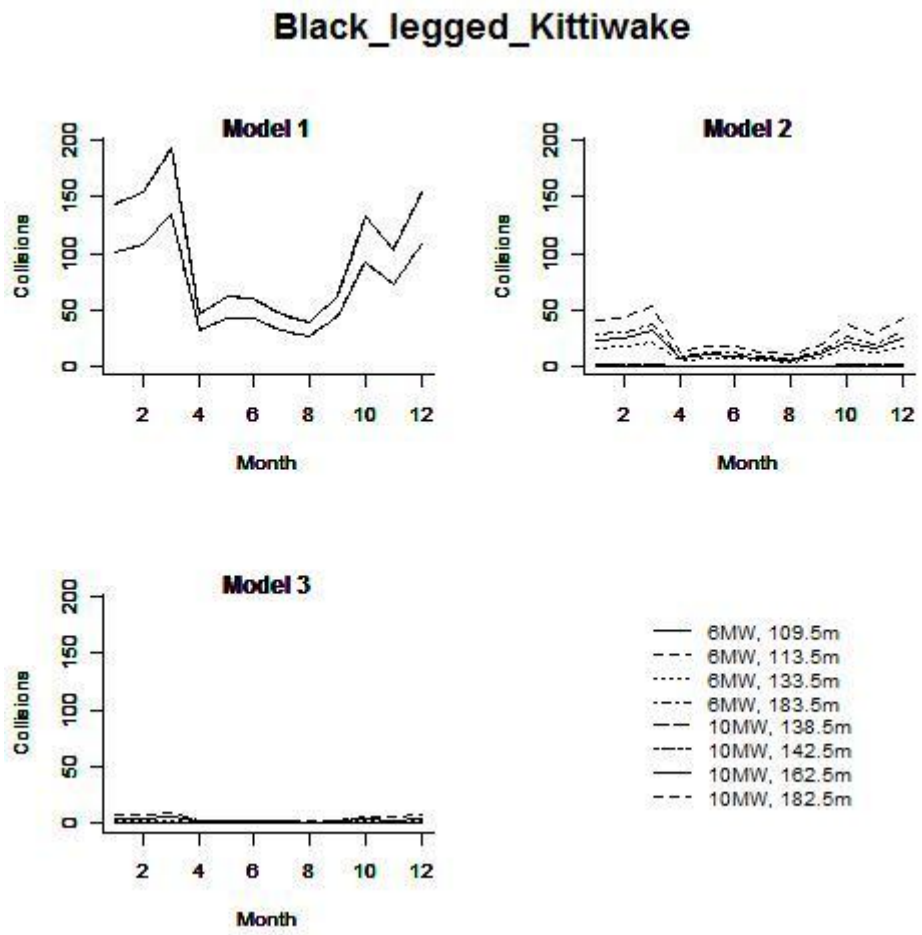

Figure A6.46 Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, 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.

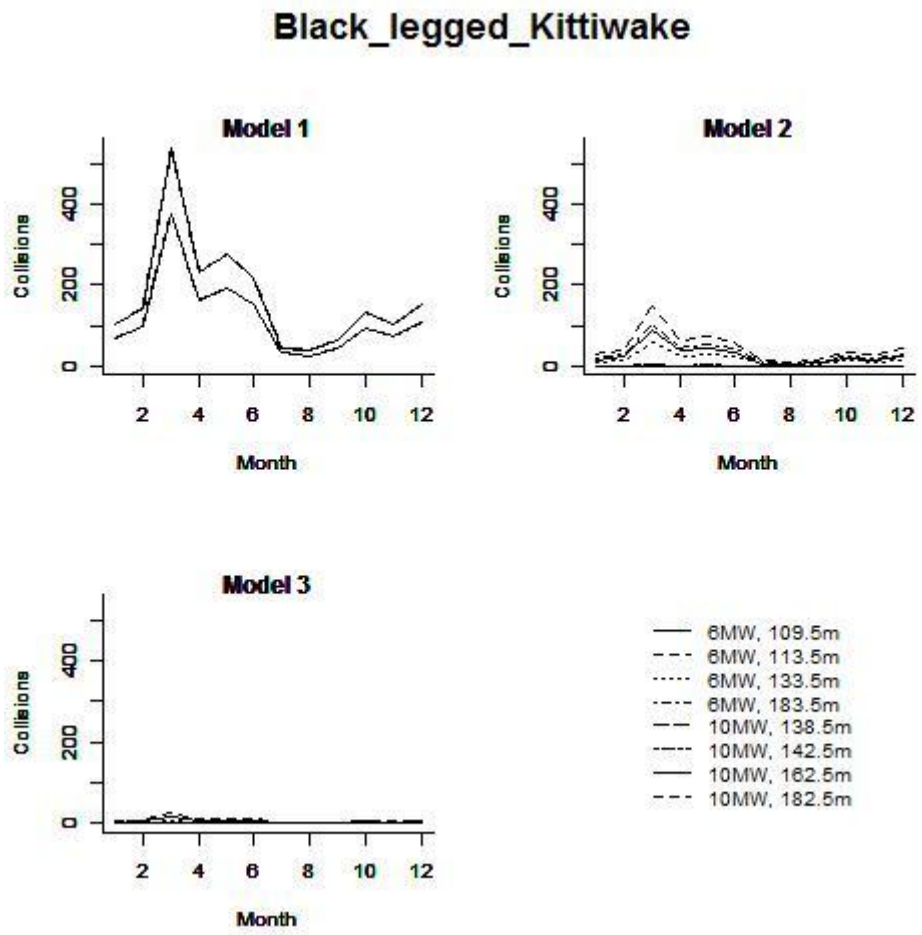

Figure A6.47 Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

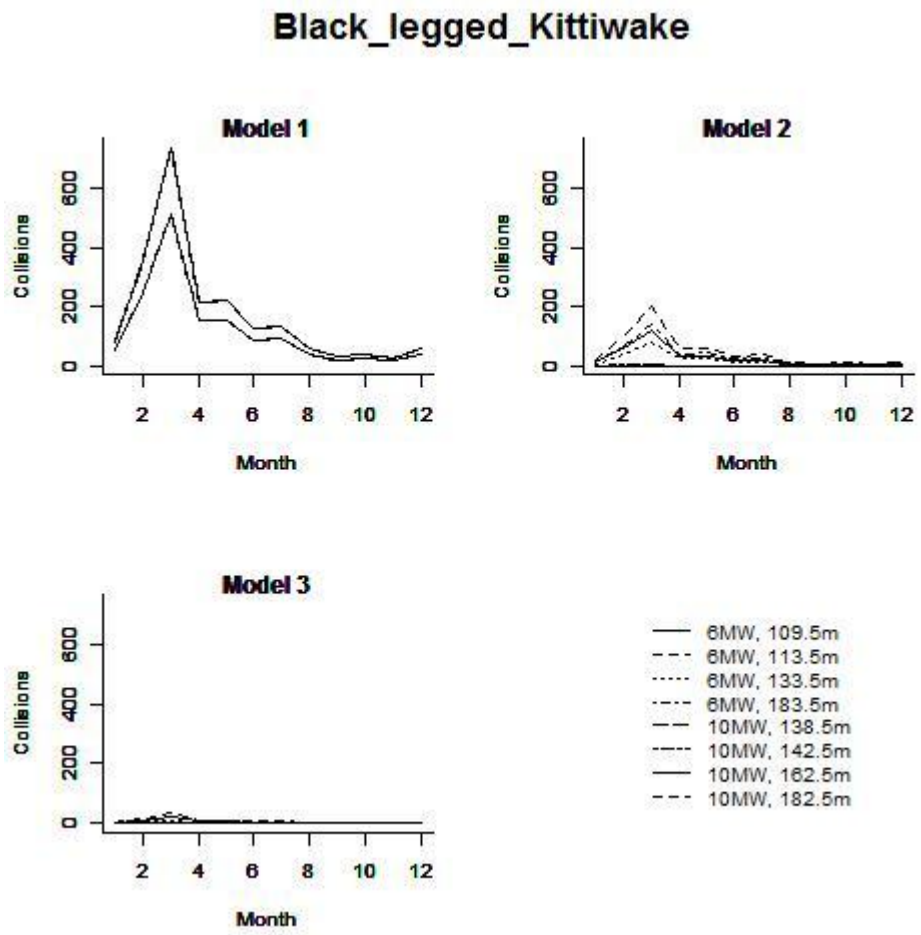

Figure A6.48 Estimated monthly collision rates for black-legged kittiwake in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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)

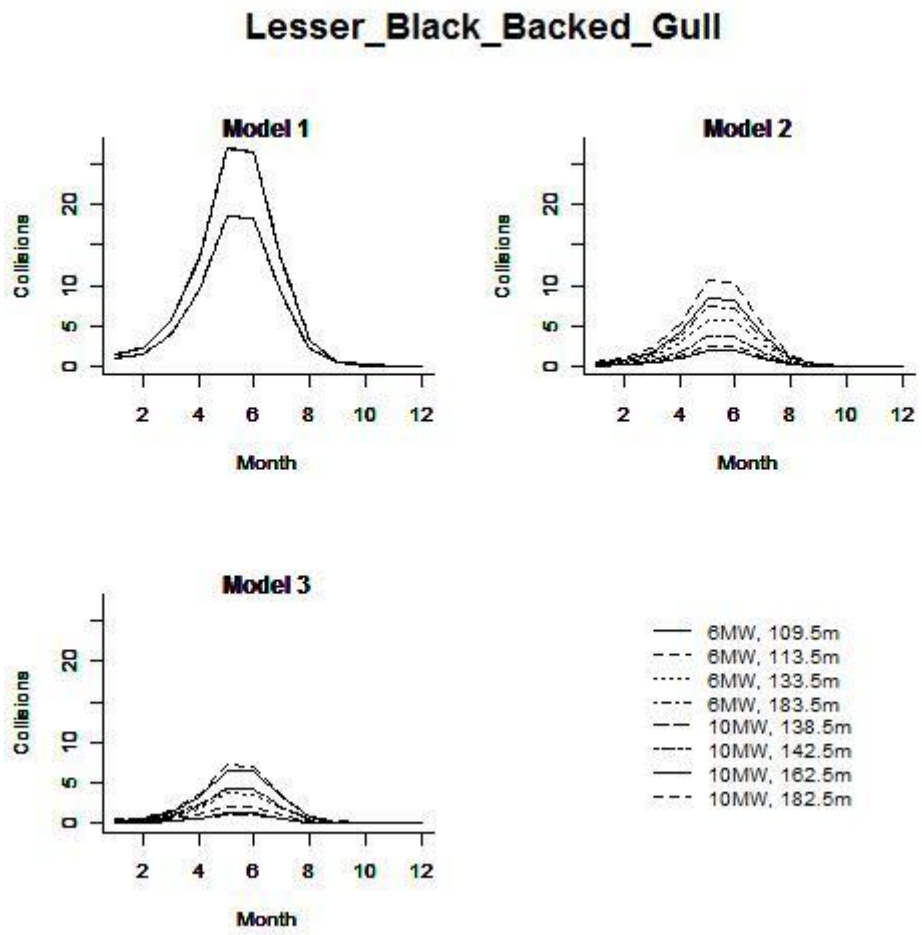

Figure A6.49 Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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.

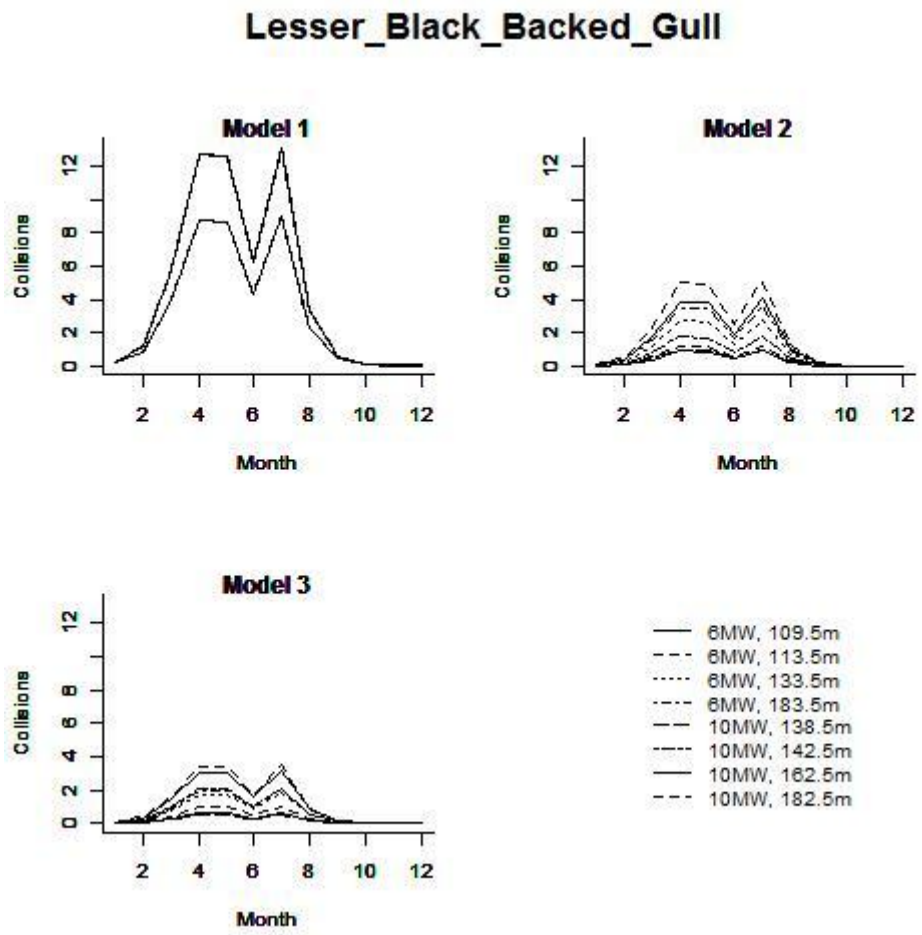

Figure A6.50 Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

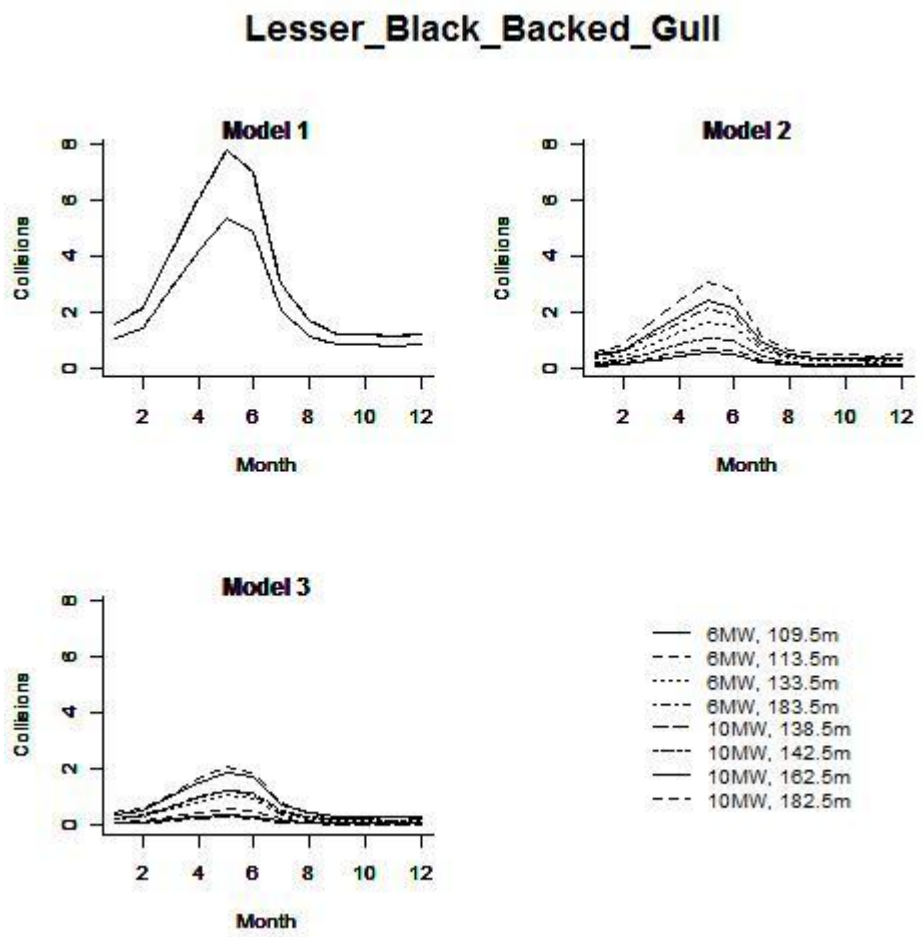

Figure A6.51 Estimated monthly collision rates for lesser black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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)

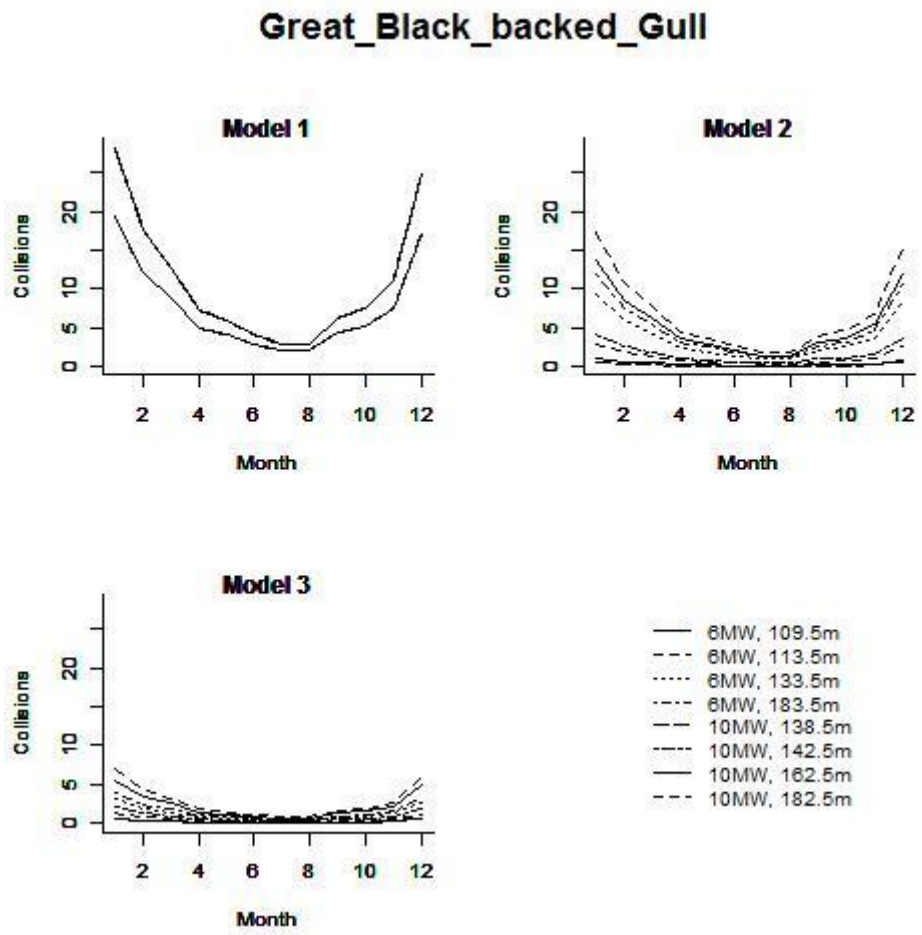

Figure A6.52 Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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.

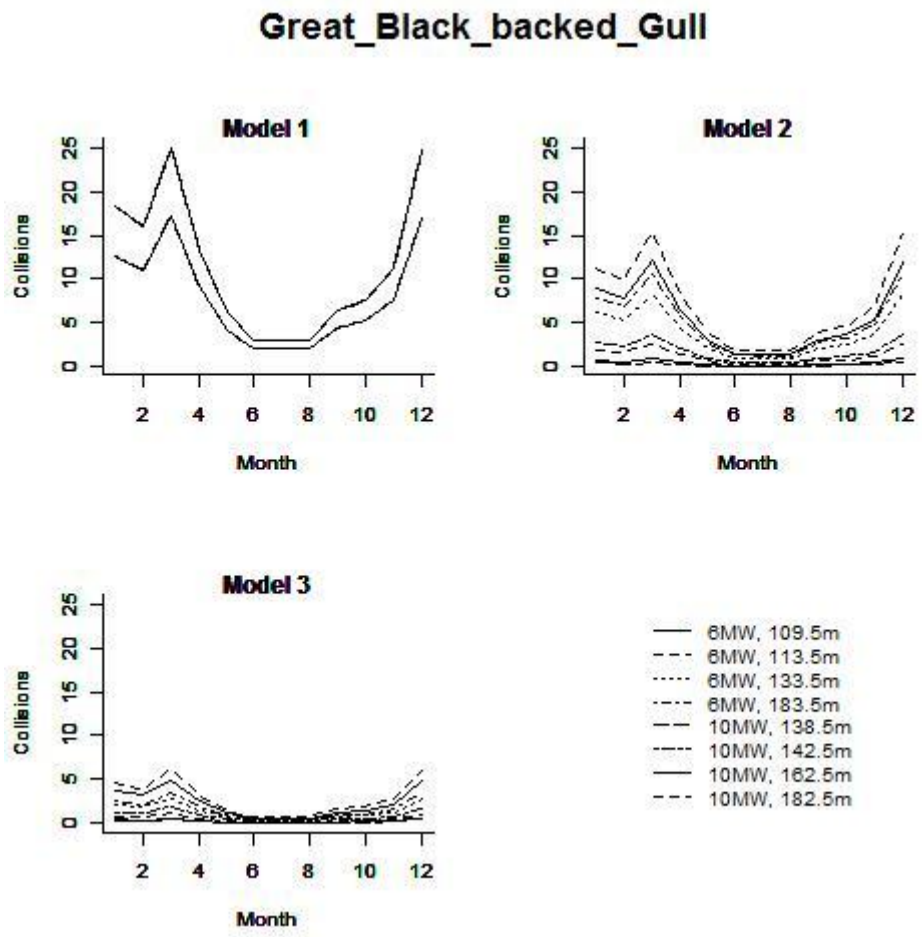

Figure A6.53 Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

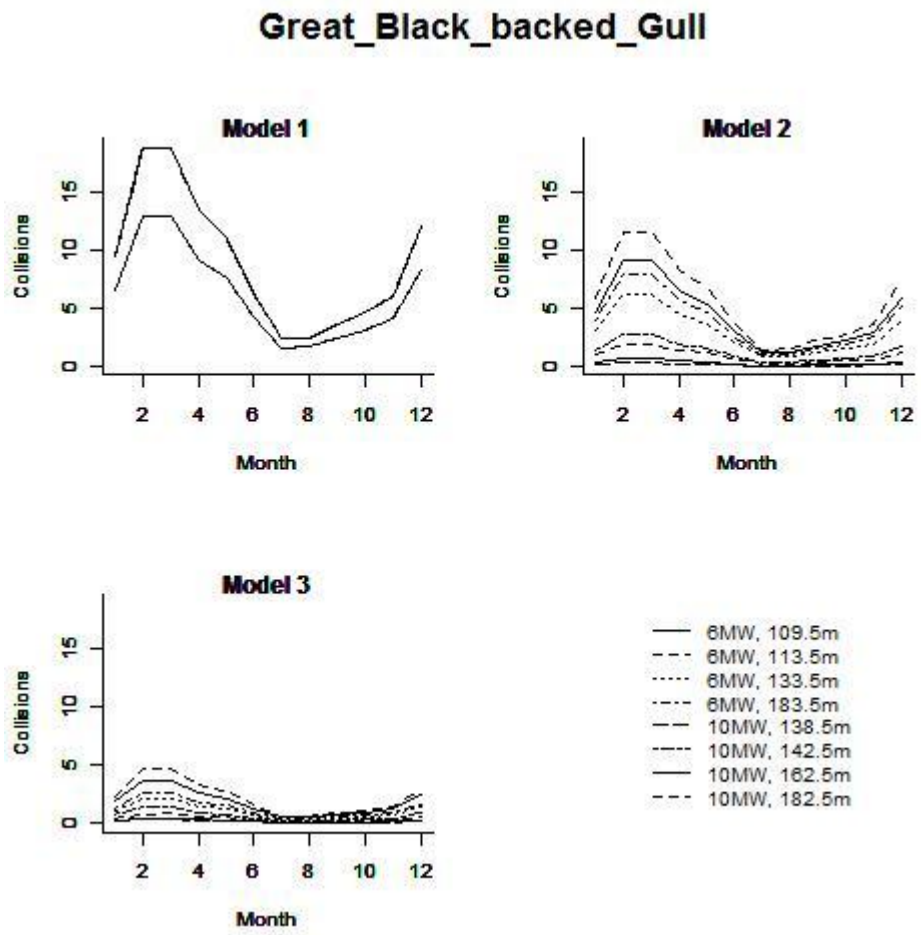

Figure A6.54 Estimated monthly collision rates for great black-backed gull in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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)

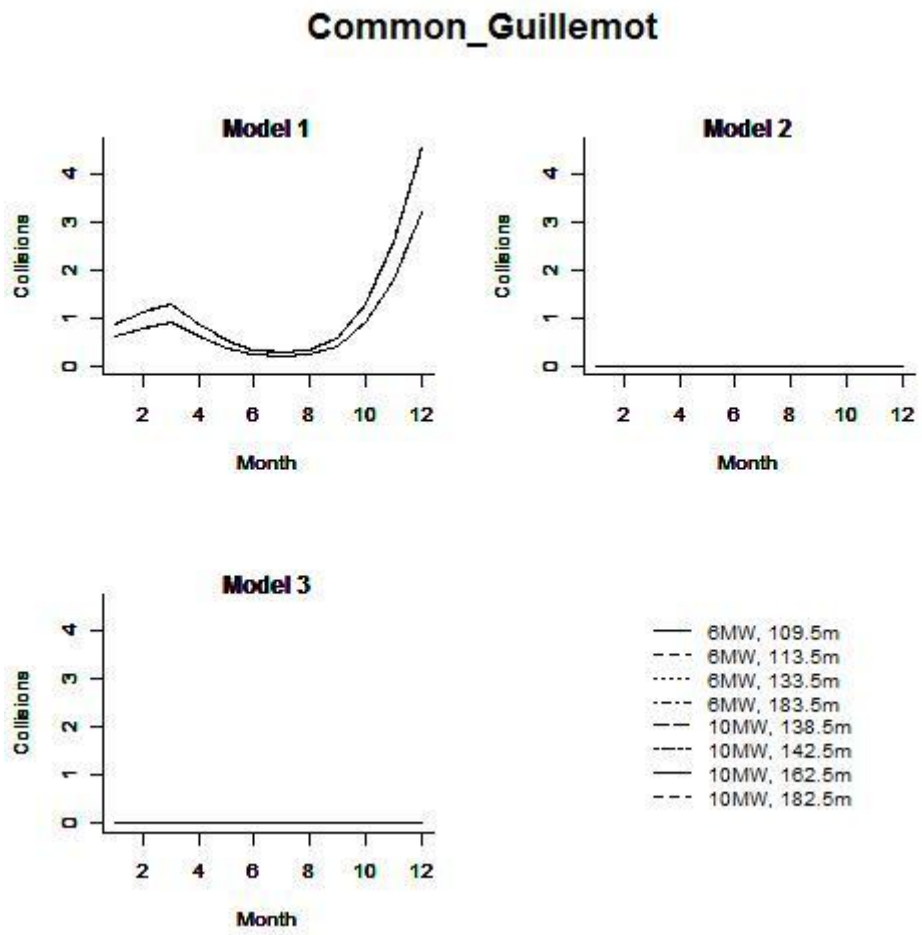

Figure A6.55 Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

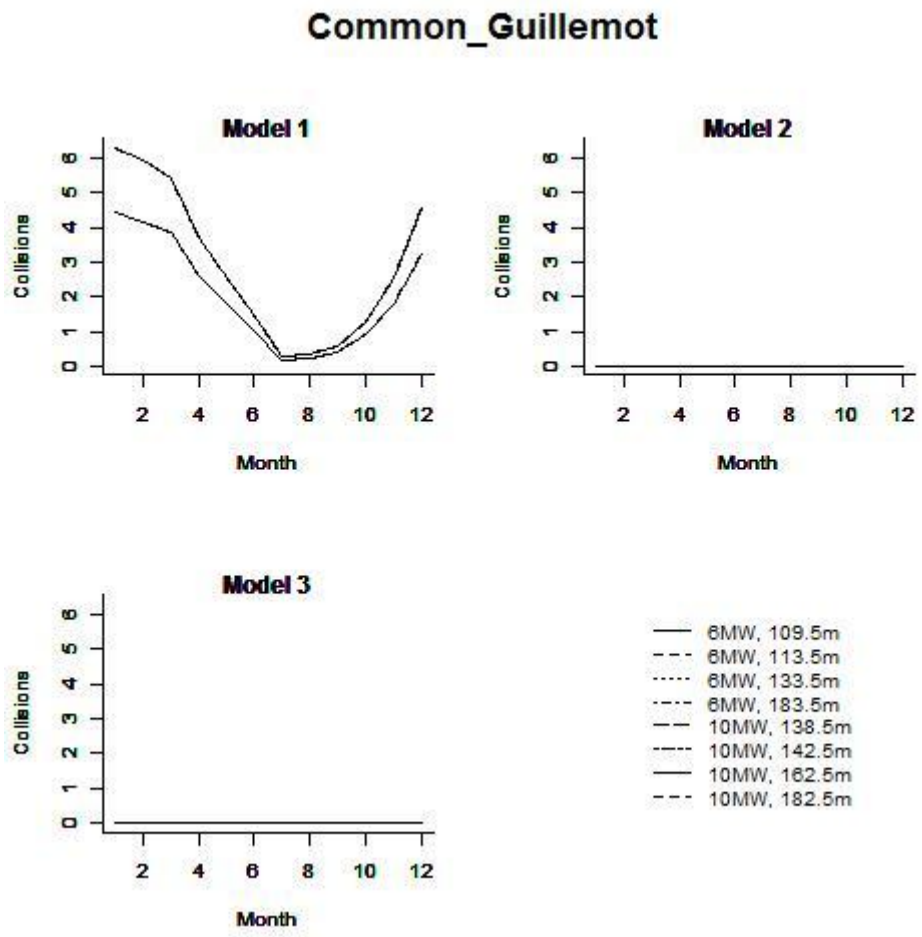

Figure A6.56 Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

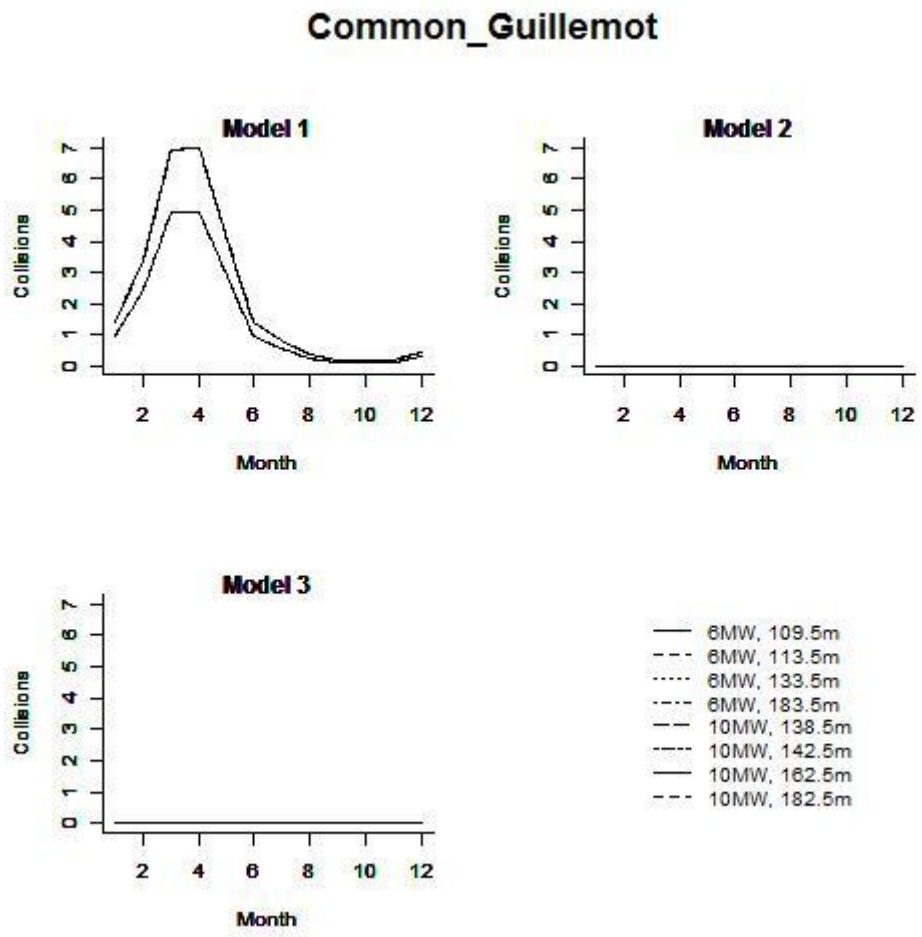

Figure A6.57 Estimated monthly collision rates for common guillemot in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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)

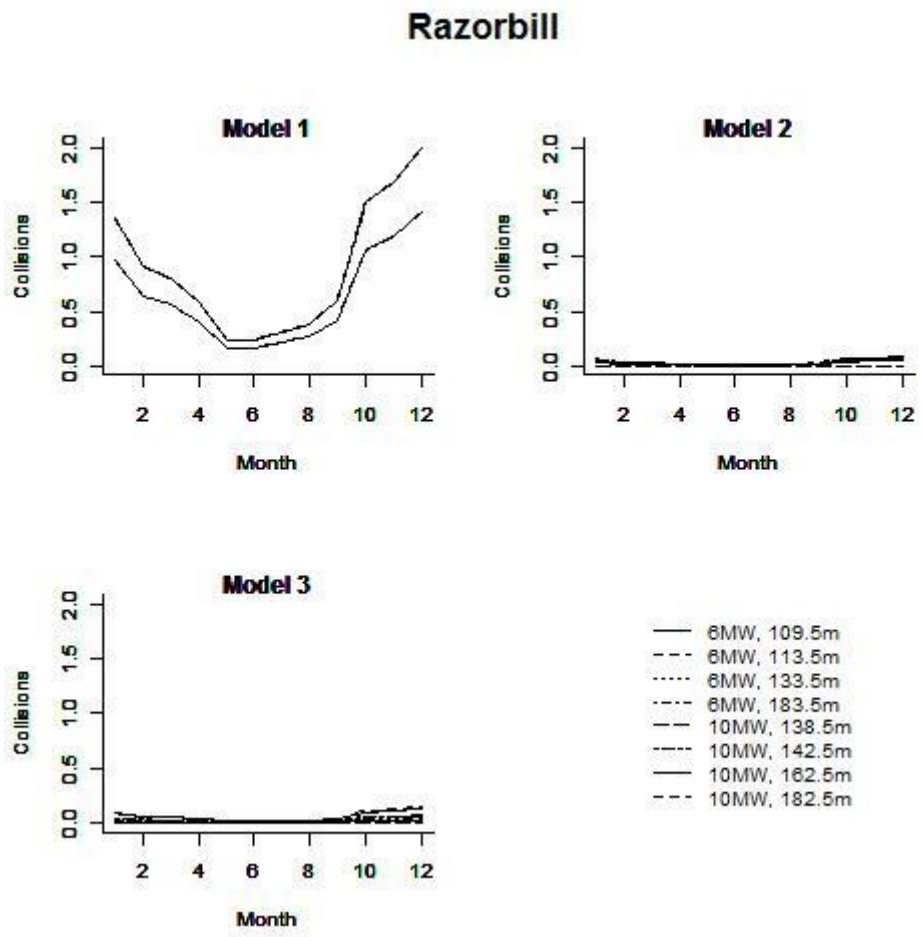

Figure A6.58 Estimated monthly collision rates for razorbill in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

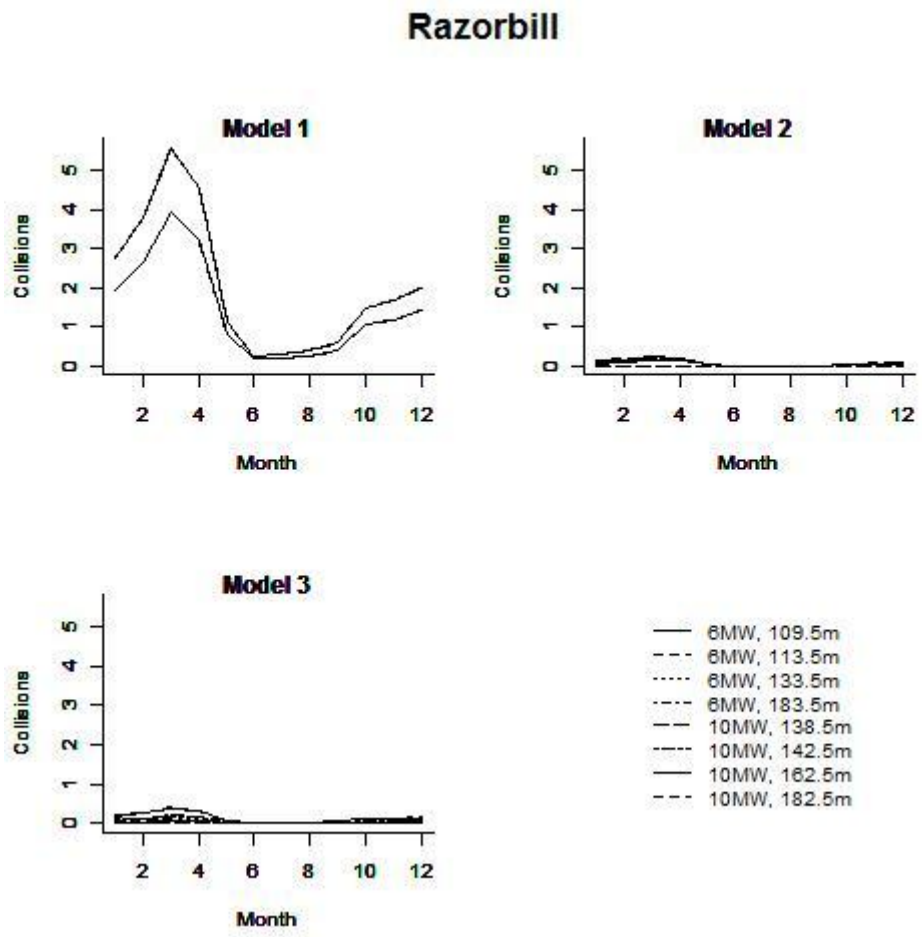

Figure A6.59 Estimated monthly collision rates for razorbill in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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.

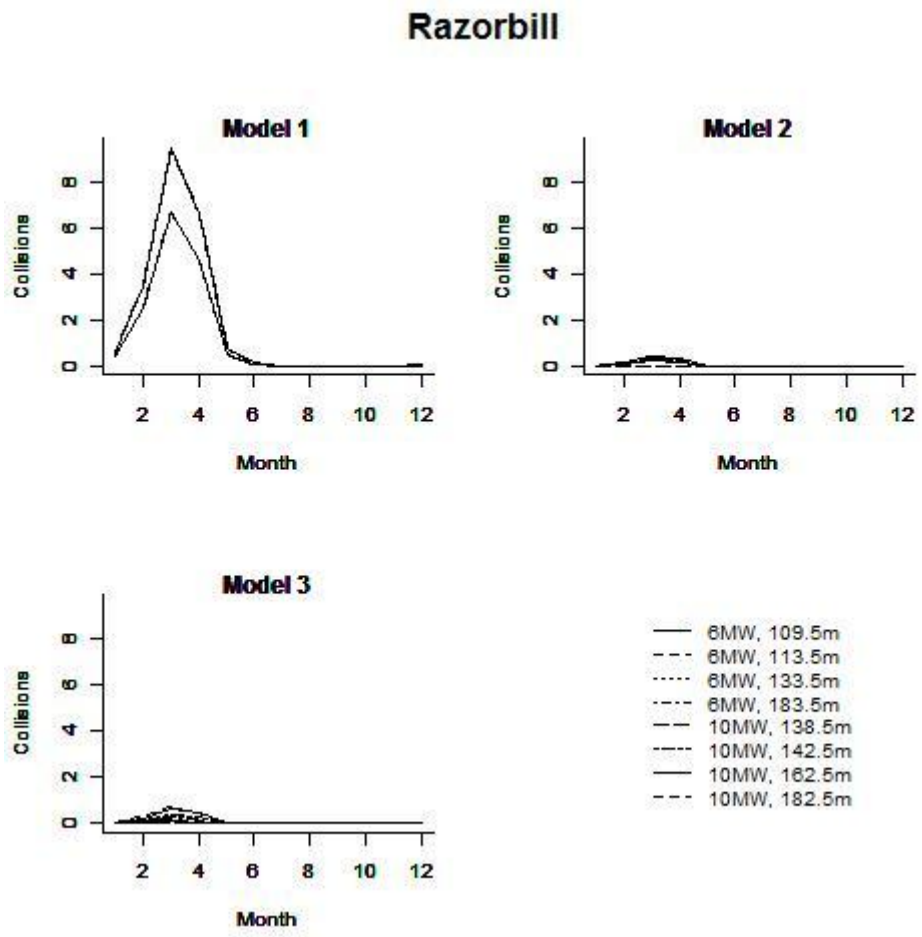

Figure A6.60 Estimated monthly collision rates for razorbill in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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)

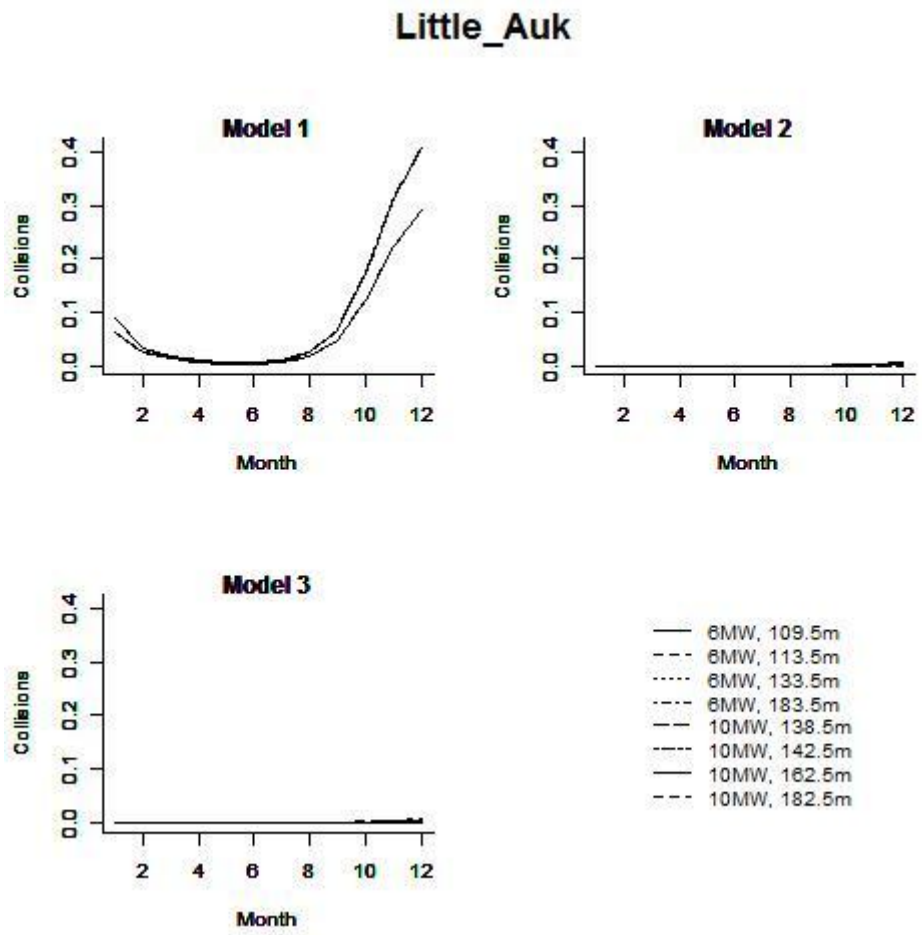

Figure A6.61 Estimated monthly collision rates for little auk in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

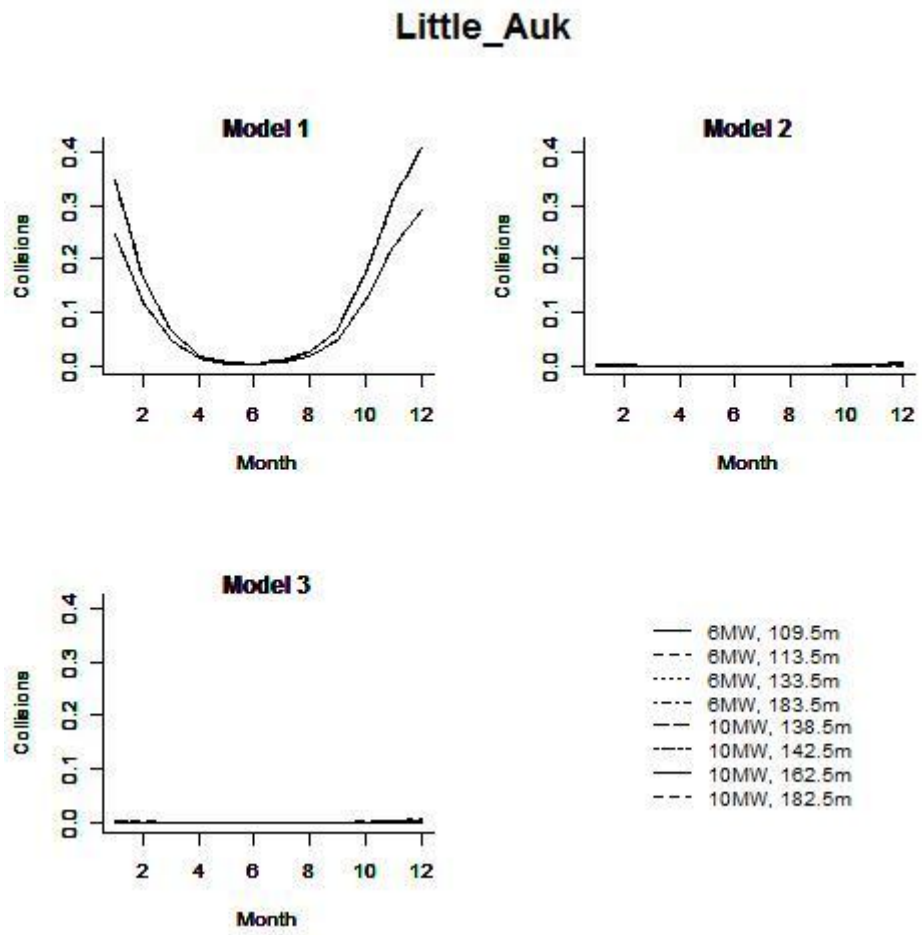

Figure A6.62 Estimated monthly collision rates for little auk in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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.

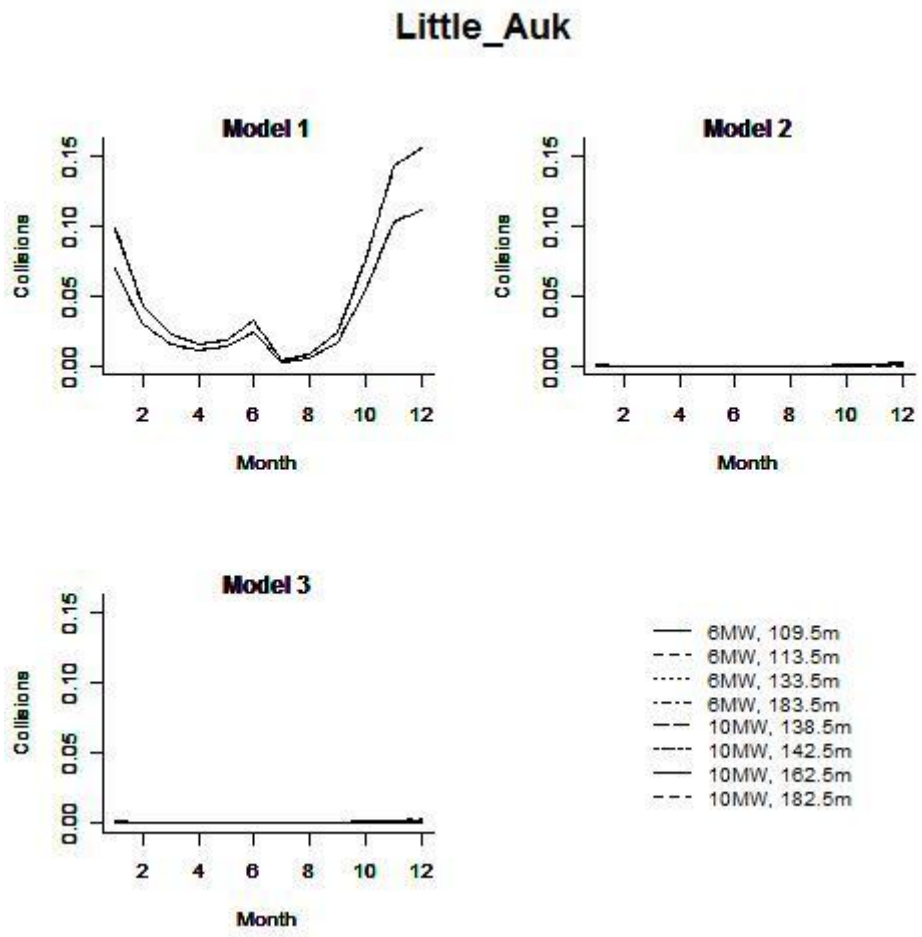

Figure A6.63 Estimated monthly collision rates for little auk in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 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)

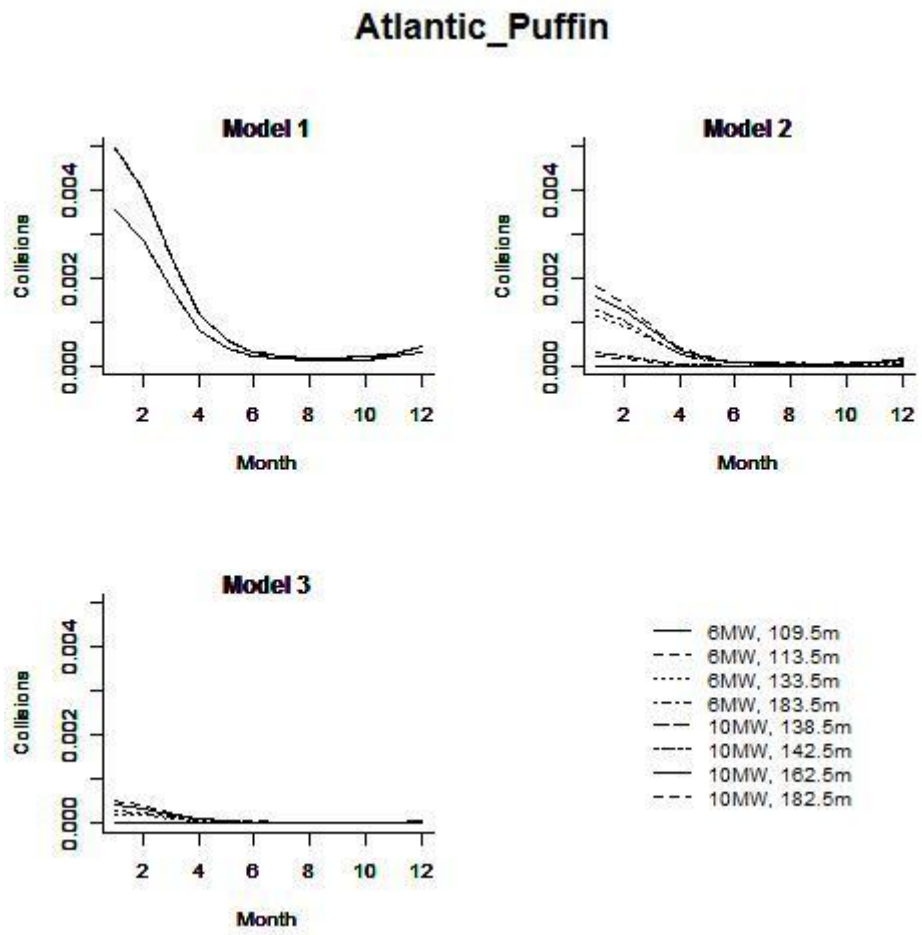

Figure A6.64 Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from 2010. Model 1, using site-specific flight height information, Model 2, using modelled flight height information and Model 3, incorporating 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.

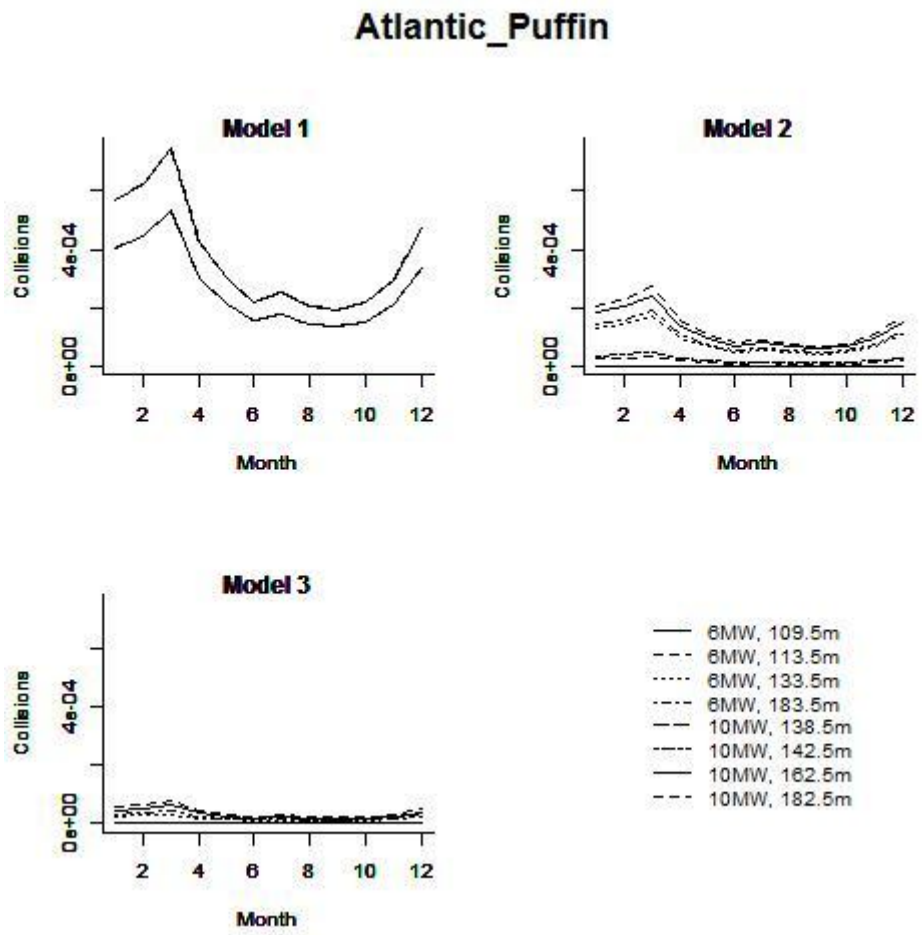

Figure A6.65 Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2010 to June 2011. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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.

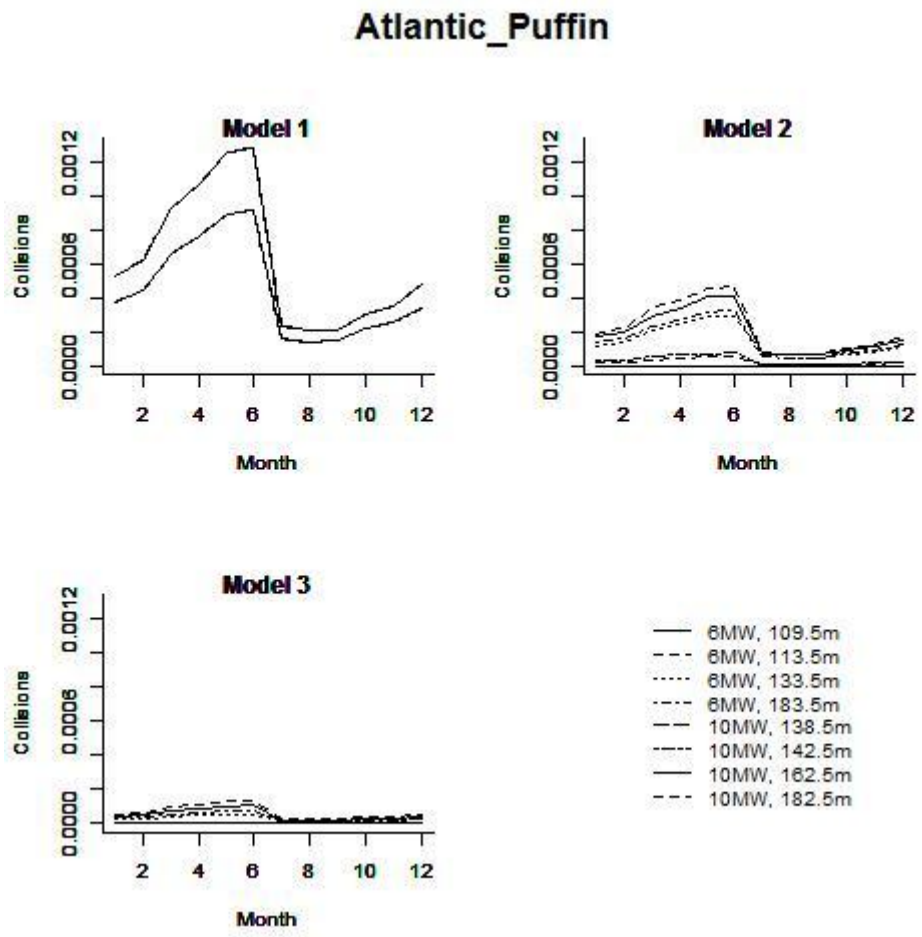

Figure A6.66 Estimated monthly collision rates for Atlantic puffin in the Dogger Bank Teesside B project of the Dogger Bank Zone based on median population estimates from July 2011 to June 2012. Model 1, using site-specific flight height information, Model 2, using modelled flight height information 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 assumes a uniform distribution of birds 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 assumes a uniform distribution of birds 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 1.4% for the national breeding population, 1.7% for the national wintering population and less than 1% at the protected site, protected site suite 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 assumes a uniform distribution of birds 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 assumes a uniform distribution of birds 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 2.1% for the national wintering population and less than 1% at the protected site, protected site suite, national breeding 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 assumes a uniform distribution of birds 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 assumes a uniform distribution of birds 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 1.1% for the national breeding population and less than 1% at the protected site, protected site suite, national wintering 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 2.4% of the national breeding population, 3.8% of the national wintering population and less than 1% at the protected site, protected site suite 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 assumes a uniform distribution of birds 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 assumes a uniform distribution of birds 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 2% in the background mortality of the national population and less than 1% in background mortality of the biogeographic population.

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 3.1% of the national breeding population and less than 1% at the protected site, protected site suite, national wintering 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 4.9% of the national breeding population, 12% of the national wintering population and less than 1% at the protected site, protected site suite and biogeographic population levels.

A7.162. Using Option 1, collision would be considered of **low magnitude** at the national wintering population level and therefore, of moderate significance.

Common guillemot

A7.163. 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.

A7.164. 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.

A7.165. 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

A7.166. 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.

A7.167. 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.

A7.168. 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

A7.169. 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.

A7.170. 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

A7.171. The predicted number of collisions represents an increase in background mortality of less than 1% at the national and biogeographic population levels.

Atlantic puffin

A7.172. 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.

A7.173. 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.

A7.174. 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	SEEVOGELSCHUTZGEBIET 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	0.5 (0.41-0.6)	0.06 (0.05-0.08)
Forth Islands	SPA, SSSI	2.36 (1.95-2.85)	0.05 (0.04-0.06)
Flamborough Head and Bempton Cliffs	SPA, SSSI	27.78 (23.01-33.58)	0.09 (0.08-0.11)
St Abb's Head to Fast Castle	SPA, SSSI	1.98 (1.64-2.39)	0.09 (0.07-0.11)

[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	80.39 (68.75-116.98)	0.07 (0.06-0.11)
Flamborough Head and Bempton Cliffs	SPA, SSSI	43.28 (37.01-62.98)	0.28 (0.24-0.4)
Seevogelschutzgebiet Helgoland	SPA	0.13 (0.11-0.19)	0.06 (0.05-0.08)

[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 (32.68-39.11)	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 (83.49-99.91)	0.08 (0.07-0.08)
Fowlsheugh	SPA, SSSI	7.94 (7.3-8.74)	0.01 (0.01-0.01)
Seevogelschutzgebiet Helgoland	SPA	1.07 (0.98-1.18)	0.02 (0.02-0.02)
St Abb's Head to Fast Castle	SPA, SSSI	24.23 (22.27-26.65)	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 (0.67-1.02)	0.11 (0.09-0.13)
Forth Islands	SPA, SSSI	3.92 (3.15-4.8)	0.09 (0.07-0.11)
Flamborough Head and Bempton Cliffs	SPA, SSSI	46.19 (37.16-56.59)	0.15 (0.12-0.19)
St Abb's Head to Fast Castle	SPA, SSSI	3.29 (2.64-4.03)	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 (64.65-80.27)	0.91 (0.81-1.01)
Flamborough Head and Bempton Cliffs	SPA, SSSI	3696.72 (3307.43-4106.98)	4.85 (4.34-5.39)

[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 (19.12-22.82)	0.07 (0.07-0.08)
Farne Islands	SPA, SSSI	232.39 (213.34-254.56)	0.36 (0.33-0.4)
Forth Islands	SPA, SSSI	61.7 (56.64-67.59)	0.21 (0.19-0.23)
Flamborough Head and Bempton Cliffs	SPA, SSSI	619.89 (569.06-679.02)	0.52 (0.48-0.57)
Fowlsheugh	SPA, SSSI	87.42 (80.25-95.76)	0.13 (0.12-0.14)
Seevogelschutzgebiet Helgoland	SPA	2.49 (2.28-2.72)	0.05 (0.05-0.05)
St Abb's Head to Fast Castle	SPA, SSSI	154.54 (141.87-169.28)	0.35 (0.32-0.38)

[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 (2.86-4.28)	0.45 (0.37-0.55)
Forth Islands	SPA, SSSI	13.28 (10.85-16.23)	0.29 (0.24-0.36)
Flamborough Head and Bempton Cliffs	SPA, SSSI	192.36 (157.2-235.12)	0.64 (0.53-0.79)
Fowlsheugh	SPA, SSSI	4.71 (3.85-5.75)	0.08 (0.06-0.09)
St Abb's Head to Fast Castle	SPA, SSSI	13.87 (11.34-16.95)	0.61 (0.5-0.75)

[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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	306 (214-423)	54 (38-74)	55 (39-75)	Jul	1,611 (1,283-1,968)	313 (248-383)	297 (237-361)	537 (442-654)	99 (82-121)	102 (84-124)	Jul	1,074 (863-1,311)	206 (165-252)	199 (161-242)
Feb	832 (650-1,029)	147 (114-183)	149 (117-185)	Aug	662 (519-820)	129 (101-159)	122 (96-151)	628 (523-757)	116 (97-140)	120 (99-144)	Aug	645 (521-788)	123 (99-150)	121 (97-147)
Mar	781 (619-962)	149 (117-185)	141 (112-173)	Sep	471 (360-610)	92 (70-120)	87 (67-113)	749 (603-907)	139 (112-169)	143 (114-174)	Sep	610 (481-758)	115 (91-144)	115 (91-143)
Apr	1,604 (1,307-1,959)	309 (249-379)	294 (241-358)	Oct	525 (417-650)	93 (74-115)	96 (76-118)	1,203 (953-1,500)	214 (169-266)	219 (173-273)	Oct	864 (685-1,075)	154 (121-191)	158 (125-195)
May	3,202 (2,676-3,808)	621 (512-741)	591 (497-700)	Nov	314 (254-379)	56 (45-68)	57 (46-69)	480 (379-584)	85 (67-104)	87 (69-106)	Nov	397 (316-482)	70 (56-86)	72 (57-88)
Jun	3,285 (2,684-3,894)	636 (519-758)	607 (499-720)	Dec	371 (301-459)	65 (53-82)	67 (54-83)	323 (247-399)	57 (44-71)	59 (45-73)	Dec	347 (274-429)	61 (48-76)	63 (49-78)
Jul	1,611 (1,283-1,968)	313 (248-383)	297 (237-361)	Jan	340 (255-442)	60 (45-78)	62 (46-80)	228 (176-286)	40 (31-51)	41 (32-52)	Jan	291 (215-384)	52 (38-68)	53 (39-69)
Aug	662 (519-820)	129 (101-159)	122 (96-151)	Feb	568 (436-716)	101 (77-127)	103 (79-130)	799 (612-992)	141 (108-176)	144 (110-179)	Feb	733 (566-913)	130 (100-162)	132 (102-165)
Sep	471 (360-610)	92 (70-120)	87 (67-113)	Mar	430 (343-521)	79 (63-96)	81 (65-99)	677 (542-835)	127 (101-157)	125 (100-154)	Mar	630 (501-773)	119 (94-146)	116 (93-142)
Oct	525 (417-650)	93 (74-115)	96 (76-118)	Apr	543 (442-639)	101 (82-119)	104 (84-122)	1,252 (1,014-1,513)	236 (190-286)	235 (190-283)	Apr	1,133 (921-1,370)	216 (174-261)	211 (172-255)
Nov	314 (254-379)	56 (45-68)	57 (46-69)	May	517 (422-612)	96 (78-113)	98 (80-117)	1,458 (1,144-1,758)	276 (215-333)	274 (215-330)	May	1,726 (1,414-2,059)	331 (268-396)	321 (264-382)
Dec	371 (301-459)	65 (53-82)	67 (54-83)	Jun	502 (409-607)	93 (76-113)	95 (77-115)	686 (524-863)	130 (99-163)	129 (98-161)	Jun	1,491 (1,205-1,788)	286 (231-344)	277 (225-332)

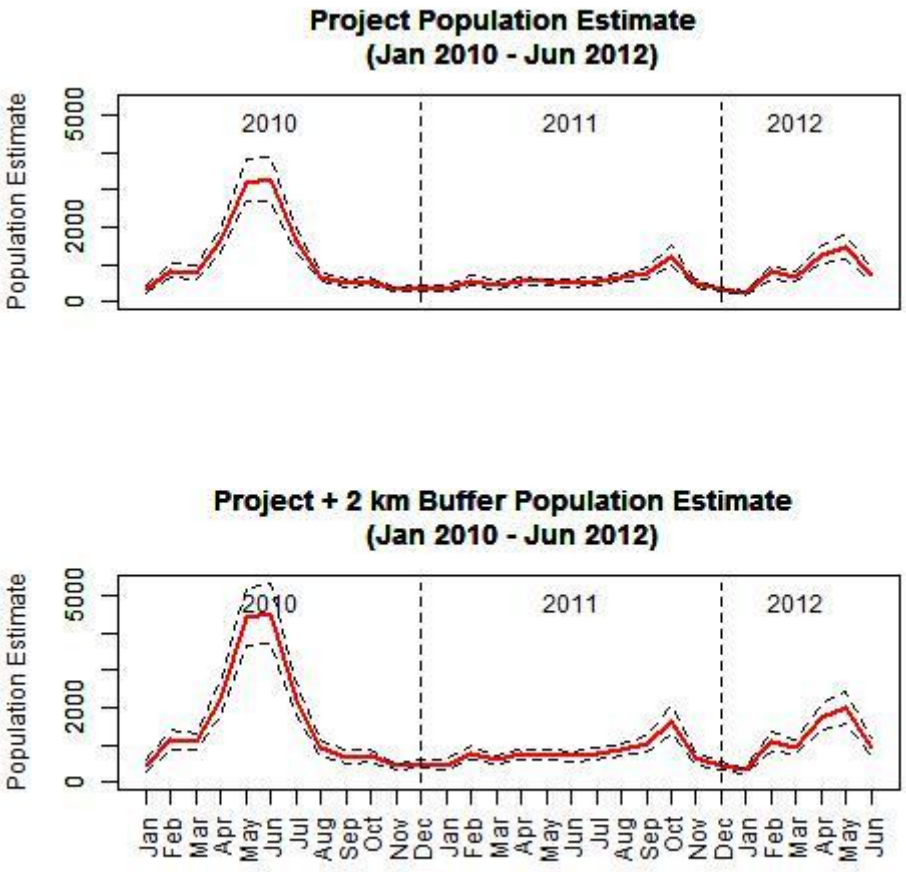

Figure A11.1 Baseline monthly population estimates (and 90% confidence limits) for northern fulmar for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	384 (322-463)	68 (57-82)	68 (57-82)	Jul	470 (404-552)	85 (73-100)	87 (75-102)	1,080 (937-1,277)	195 (169-231)	199 (172-236)	Jul	775 (671-915)	140 (121-165)	143 (123-169)
Feb	252 (211-308)	45 (38-55)	45 (38-55)	Aug	297 (254-349)	54 (46-63)	55 (47-65)	1,376 (1,209-1,593)	250 (219-290)	256 (224-297)	Aug	837 (732-971)	152 (133-177)	156 (136-181)
Mar	311 (259-382)	55 (46-68)	56 (47-69)	Sep	461 (374-566)	84 (68-103)	86 (70-106)	1,864 (1,581-2,193)	341 (288-402)	350 (296-413)	Sep	1,163 (977-1,379)	212 (178-252)	218 (183-259)
Apr	52 (43-65)	9 (8-12)	9 (8-12)	Oct	1,075 (916-1,269)	193 (164-229)	197 (168-234)	3,842 (3,238-4,549)	687 (578-815)	701 (589-831)	Oct	2,459 (2,077-2,909)	440 (371-522)	449 (378-533)
May	226 (195-267)	41 (35-49)	42 (36-50)	Nov	471 (405-561)	84 (72-101)	86 (74-102)	639 (541-761)	114 (97-137)	117 (99-139)	Nov	555 (473-661)	99 (84-119)	101 (86-121)
Jun	558 (481-656)	102 (87-120)	104 (90-123)	Dec	650 (552-771)	116 (98-138)	117 (99-140)	331 (269-406)	59 (48-73)	60 (49-74)	Dec	490 (411-588)	87 (73-105)	89 (74-107)
Jul	470 (404-552)	85 (73-100)	87 (75-102)	Jan	387 (317-494)	69 (57-89)	71 (58-91)	152 (125-191)	27 (22-34)	28 (23-35)	Jan	308 (254-383)	55 (45-68)	56 (46-69)
Aug	297 (254-349)	54 (46-63)	55 (47-65)	Feb	858 (712-1,066)	154 (127-191)	157 (130-195)	1,731 (1,408-2,110)	309 (251-377)	314 (255-383)	Feb	947 (777-1,161)	169 (139-208)	172 (141-211)
Sep	461 (374-566)	84 (68-103)	86 (70-106)	Mar	5,047 (4,323-5,903)	904 (772-1,059)	923 (788-1,082)	9,628 (8,054-11,449)	1,713 (1,430-2,040)	1,737 (1,451-2,070)	Mar	4,996 (4,212-5,911)	890 (750-1,056)	905 (762-1,074)
Oct	1,075 (916-1,269)	193 (164-229)	197 (168-234)	Apr	906 (773-1,069)	165 (140-195)	169 (144-200)	2,784 (2,368-3,343)	505 (429-608)	518 (440-624)	Apr	1,247 (1,062-1,492)	226 (192-271)	232 (197-279)
Nov	471 (405-561)	84 (72-101)	86 (74-102)	May	920 (801-1,067)	167 (145-194)	171 (149-199)	4,321 (3,644-5,151)	788 (663-941)	811 (682-969)	May	1,822 (1,547-2,161)	332 (281-394)	341 (289-406)
Dec	650 (552-771)	116 (98-138)	117 (99-140)	Jun	950 (821-1,118)	172 (148-203)	175 (151-207)	1,291 (1,065-1,572)	234 (193-286)	240 (198-293)	Jun	933 (789-1,115)	169 (143-203)	173 (146-208)

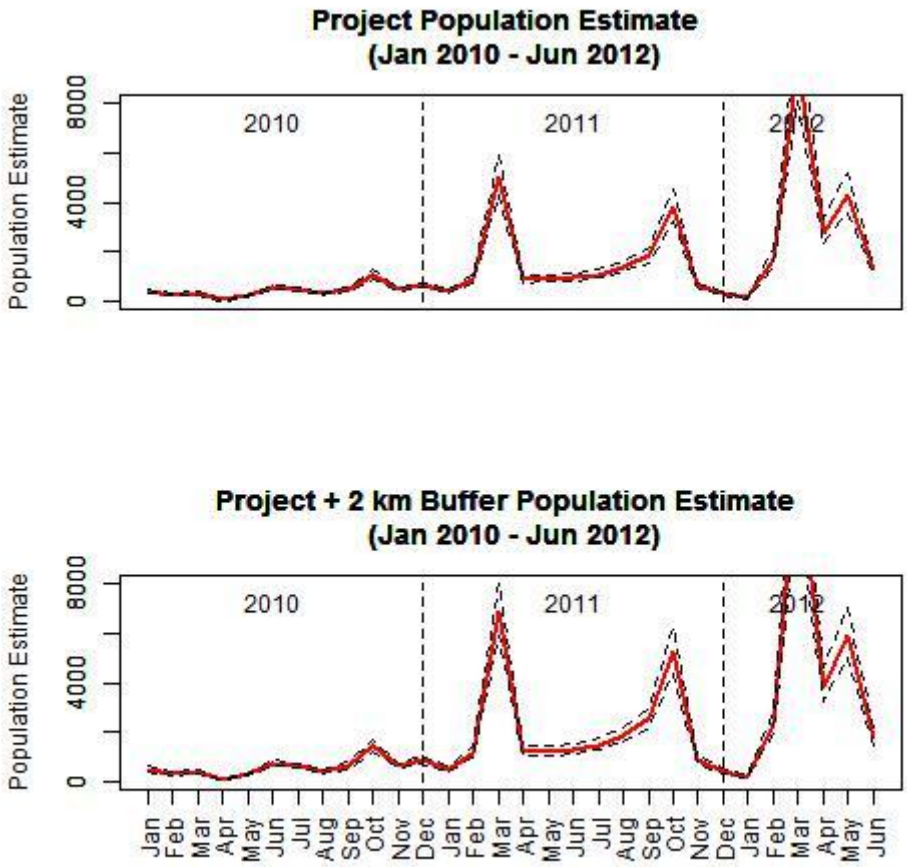

Figure A11.2 Baseline monthly population estimates (and 90% confidence limits) for northern gannet for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	0 (0-997,255)	0 (0-181,367)	0 (0-184,704)	Jul	1 (0-10)	0 (0-2)	0 (0-2)	8 (1-23)	1 (0-4)	1 (0-4)	Jul	5 (0-17)	1 (0-3)	1 (0-3)
Feb	0 (0-13,937)	0 (0-2,535)	0 (0-2,582)	Aug	4 (0-15)	1 (0-3)	1 (0-3)	17 (6-37)	3 (1-7)	3 (1-7)	Aug	11 (3-26)	2 (1-5)	2 (1-5)
Mar	0 (0-568)	0 (0-103)	0 (0-105)	Sep	8 (1-26)	1 (0-5)	1 (0-5)	22 (12-51)	4 (2-10)	4 (2-10)	Sep	15 (7-39)	3 (1-7)	3 (1-7)
Apr	0 (0-63)	0 (0-11)	0 (0-12)	Oct	7 (1-24)	1 (0-4)	1 (0-4)	14 (3-35)	2 (0-6)	3 (0-7)	Oct	10 (2-29)	2 (0-5)	2 (0-5)
May	0 (0-10)	0 (0-2)	0 (0-2)	Nov	4 (0-18)	1 (0-3)	1 (0-3)	6 (0-18)	1 (0-3)	1 (0-3)	Nov	5 (0-18)	1 (0-3)	1 (0-3)
Jun	0 (0-8)	0 (0-2)	0 (0-2)	Dec	2 (0-12)	0 (0-2)	0 (0-2)	2 (0-13)	0 (0-2)	0 (0-2)	Dec	2 (0-13)	0 (0-2)	0 (0-2)
Jul	1 (0-10)	0 (0-2)	0 (0-2)	Jan	1 (0-9)	0 (0-2)	0 (0-2)	1 (0-7)	0 (0-1)	0 (0-1)	Jan	1 (0-332,424)	0 (0-60,457)	0 (0-61,569)
Aug	4 (0-15)	1 (0-3)	1 (0-3)	Feb	1 (0-6)	0 (0-1)	0 (0-1)	0 (0-12)	0 (0-2)	0 (0-2)	Feb	0 (0-4,651)	0 (0-846)	0 (0-862)
Sep	8 (1-26)	1 (0-5)	1 (0-5)	Mar	0 (0-5)	0 (0-1)	0 (0-1)	0 (0-26)	0 (0-5)	0 (0-5)	Mar	0 (0-200)	0 (0-36)	0 (0-37)
Oct	7 (1-24)	1 (0-4)	1 (0-4)	Apr	1 (0-5)	0 (0-1)	0 (0-1)	0 (0-369)	0 (0-67)	0 (0-68)	Apr	0 (0-146)	0 (0-26)	0 (0-27)
Nov	4 (0-18)	1 (0-3)	1 (0-3)	May	1 (0-7)	0 (0-1)	0 (0-1)	1 (0-3,821)	0 (0-690)	0 (0-702)	May	1 (0-1,279)	0 (0-231)	0 (0-235)
Dec	2 (0-12)	0 (0-2)	0 (0-2)	Jun	3 (0-12)	1 (0-2)	1 (0-2)	1 (0-54,871)	0 (0-9,904)	0 (0-10,085)	Jun	1 (0-18,297)	0 (0-3,302)	0 (0-3,363)

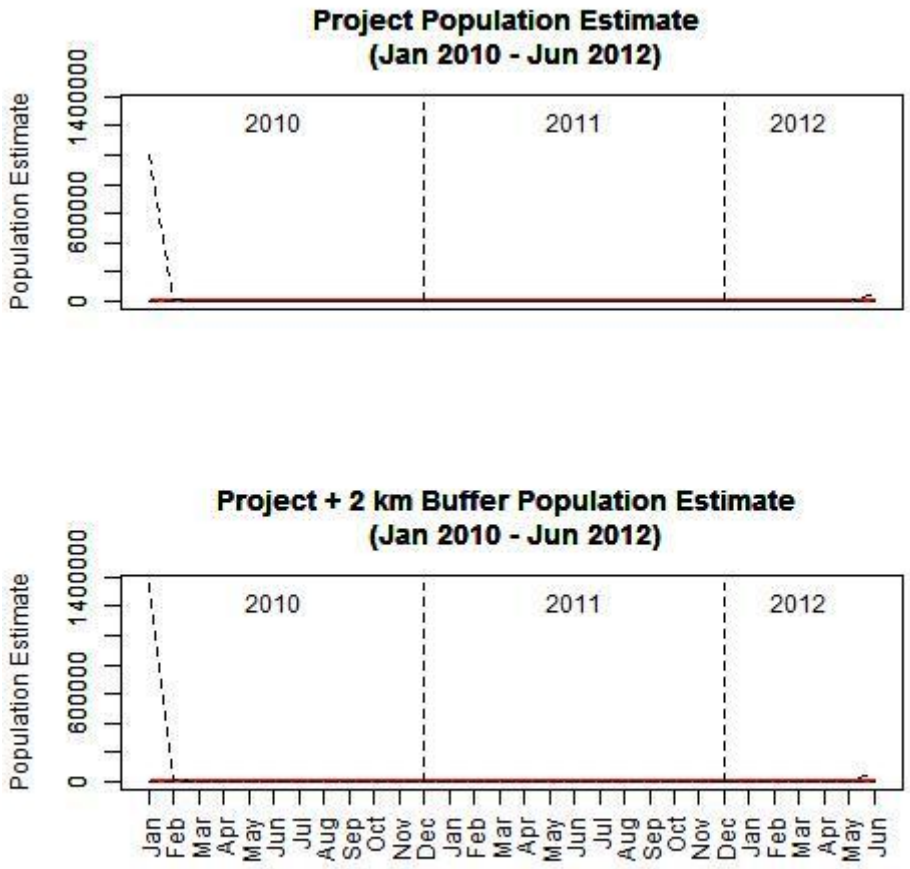

Figure A11.3 Baseline monthly population estimates (and 90% confidence limits) for Arctic skua for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	0 (0-11)	0 (0-2)	0 (0-2)	Jul	5 (2-10)	1 (0-2)	1 (0-2)	21 (13-36)	4 (2-6)	4 (2-7)	Jul	13 (8-23)	2 (1-4)	2 (1-4)
Feb	0 (0-6)	0 (0-1)	0 (0-1)	Aug	8 (3-15)	1 (1-3)	1 (1-3)	34 (24-54)	6 (4-10)	6 (4-10)	Aug	21 (14-34)	4 (2-6)	4 (3-6)
Mar	1 (0-5)	0 (0-1)	0 (0-1)	Sep	9 (5-17)	2 (1-3)	2 (1-3)	39 (28-61)	7 (5-11)	7 (5-11)	Sep	24 (16-39)	4 (3-7)	4 (3-7)
Apr	1 (0-5)	0 (0-1)	0 (0-1)	Oct	10 (5-19)	2 (1-3)	2 (1-3)	30 (20-51)	5 (3-9)	5 (4-9)	Oct	20 (13-35)	4 (2-6)	4 (2-6)
May	2 (0-6)	0 (0-1)	0 (0-1)	Nov	10 (5-18)	2 (1-3)	2 (1-3)	15 (8-28)	3 (2-5)	3 (2-5)	Nov	12 (7-23)	2 (1-4)	2 (1-4)
Jun	3 (1-8)	1 (0-1)	1 (0-1)	Dec	8 (4-17)	1 (1-3)	1 (1-3)	6 (3-14)	1 (0-2)	1 (1-3)	Dec	7 (3-15)	1 (1-3)	1 (1-3)
Jul	5 (2-10)	1 (0-2)	1 (0-2)	Jan	6 (3-14)	1 (1-3)	1 (1-3)	3 (1-8)	1 (0-1)	1 (0-1)	Jan	3 (1-11)	1 (0-2)	1 (0-2)
Aug	8 (3-15)	1 (1-3)	1 (1-3)	Feb	5 (2-12)	1 (0-2)	1 (0-2)	2 (0-6)	0 (0-1)	0 (0-1)	Feb	2 (1-8)	0 (0-1)	0 (0-1)
Sep	9 (5-17)	2 (1-3)	2 (1-3)	Mar	4 (2-10)	1 (0-2)	1 (0-2)	1 (0-6)	0 (0-1)	0 (0-1)	Mar	2 (1-7)	0 (0-1)	0 (0-1)
Oct	10 (5-19)	2 (1-3)	2 (1-3)	Apr	5 (2-10)	1 (0-2)	1 (0-2)	2 (0-7)	0 (0-1)	0 (0-1)	Apr	2 (1-8)	0 (0-1)	0 (0-1)
Nov	10 (5-18)	2 (1-3)	2 (1-3)	May	7 (3-13)	1 (1-2)	1 (1-2)	2 (0-9)	0 (0-2)	0 (0-2)	May	3 (1-9)	1 (0-2)	1 (0-2)
Dec	8 (4-17)	1 (1-3)	1 (1-3)	Jun	12 (7-21)	2 (1-4)	2 (1-4)	2 (0-15)	0 (0-3)	0 (0-3)	Jun	6 (2-15)	1 (0-3)	1 (0-3)

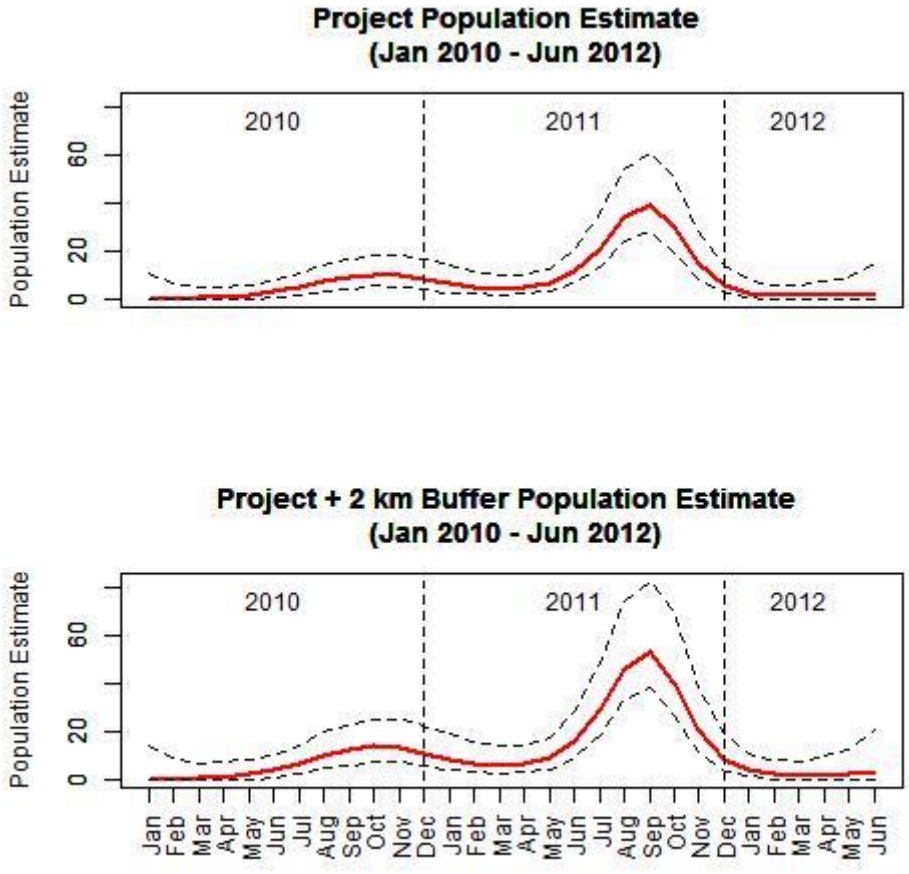

Figure A11.4 Baseline monthly population estimates (and 90% confidence limits) for great skua for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	8,400 (7,253-10,487)	1,546 (1,329-1,934)	1,524 (1,315-1,904)	Jul	5,878 (5,238-6,468)	1,102 (981-1,216)	1,103 (986-1,217)	6,764 (6,026-7,503)	1,250 (1,111-1,389)	1,266 (1,124-1,408)	Jul	6,321 (5,632-6,986)	1,176 (1,046-1,303)	1,185 (1,055-1,313)
Feb	13,032 (11,361-14,767)	2,413 (2,093-2,731)	2,382 (2,074-2,699)	Aug	3,794 (3,362-4,180)	715 (634-791)	718 (638-793)	3,055 (2,730-3,390)	566 (505-630)	575 (514-641)	Aug	3,424 (3,046-3,785)	640 (570-710)	647 (576-717)
Mar	18,441 (16,021-20618)	3,390 (2,933-3,805)	3,368 (2,922-3,770)	Sep	5,304 (4,655-6,047)	991 (870-1,137)	1,001 (878-1,146)	1,896 (1,643-2,140)	353 (305-399)	360 (311-407)	Sep	3,600 (3,149-4,093)	672 (588-768)	681 (595-777)
Apr	6,380 (5,612-7,118)	1,187 (1,043-1,329)	1,188 (1,045-1,328)	Oct	8,038 (7,093-8,968)	1,491 (1,307-1,667)	1,494 (1,314-1,670)	2,115 (1,825-2,411)	386 (332-441)	390 (336-446)	Oct	5,076 (4,459-5,689)	938 (820-1,054)	942 (825-1,058)
May	9,926 (8,911-10,892)	1,861 (1,659-2,049)	1,868 (1,671-2,054)	Nov	5,717 (5,078-6,331)	1,055 (933-1,173)	1,054 (934-1,168)	1,345 (1,188-1,513)	246 (216-277)	249 (219-281)	Nov	3,531 (3,133-3,922)	650 (575-725)	651 (577-725)
Jun	10,184 (9,126-11,258)	1,916 (1,711-2,129)	1,932 (1,729-2,143)	Dec	8,029 (7,156-8,899)	1,477 (1,311-1,642)	1,466 (1,305-1,626)	2,452 (2,142-2,779)	447 (389-508)	452 (393-514)	Dec	5,241 (4,649-5,839)	962 (850-1,075)	959 (849-1,070)
Jul	5,878 (5,238-6,468)	1,102 (981-1,216)	1,103 (986-1,217)	Jan	5,699 (5,000-6,477)	1,041 (912-1,185)	1,052 (921-1,198)	3,053 (2,671-3,432)	561 (490-633)	563 (492-635)	Jan	5,718 (4,975-6,798)	1,050 (910-1,251)	1,046 (909-1,246)
Aug	3,794 (3,362-4,180)	715 (634-791)	718 (638-793)	Feb	10,258 (9,121-11,609)	1,873 (1,663-2,126)	1,894 (1,680-2,150)	15,716 (13,931-17,902)	2,883 (2,548-3,291)	2,889 (2,556-3,297)	Feb	13,002 (11,471-14,759)	2,390 (2,101-2,716)	2,388 (2,103-2,715)
Sep	5,304 (4,655-6,047)	991 (870-1,137)	1,001 (878-1,146)	Mar	36,712 (33,142-41,034)	6,704 (6,039-7,512)	6,787 (6,111-7,609)	32,286 (28,419-36,529)	5,910 (5,192-6,704)	5,918 (5,204-6,707)	Mar	29,146 (25,860-32,727)	5,335 (4,721-6,007)	5,357 (4,745-6,029)
Oct	8,038 (7,093-8,968)	1,491 (1,307-1,667)	1,494 (1,314-1,670)	Apr	18,846 (17,243-20,835)	3,485 (3,182-3,868)	3,544 (3,231-3,935)	12,580 (11,218-14,190)	2,340 (2,080-2,647)	2,366 (2,103-2,674)	Apr	12,602 (11,358-14,047)	2,338 (2,102-2,614)	2,366 (2,126-2,646)
Nov	5,717 (5,078-6,331)	1,055 (933-1,173)	1,054 (934-1,168)	May	18,068 (16,469-19,858)	3,345 (3,043-3,689)	3,408 (3,097-3,760)	14,525 (12,839-16,181)	2,706 (2,393-3,026)	2,747 (2,431-3,070)	May	14,173 (12,740-15,644)	2,637 (2,365-2,921)	2,674 (2,400-2,961)
Dec	8,029 (7,156-8,899)	1,477 (1,311-1,642)	1,466 (1,305-1,626)	Jun	12,906 (11,605-14,346)	2,388 (2,143-2,663)	2,419 (2,169-2,699)	8,854 (7,748-9,922)	1,648 (1,439-1,852)	1,666 (1,456-1,872)	Jun	10,648 (9,493-11,842)	1,984 (1,764-2,214)	2,006 (1,785-2,238)

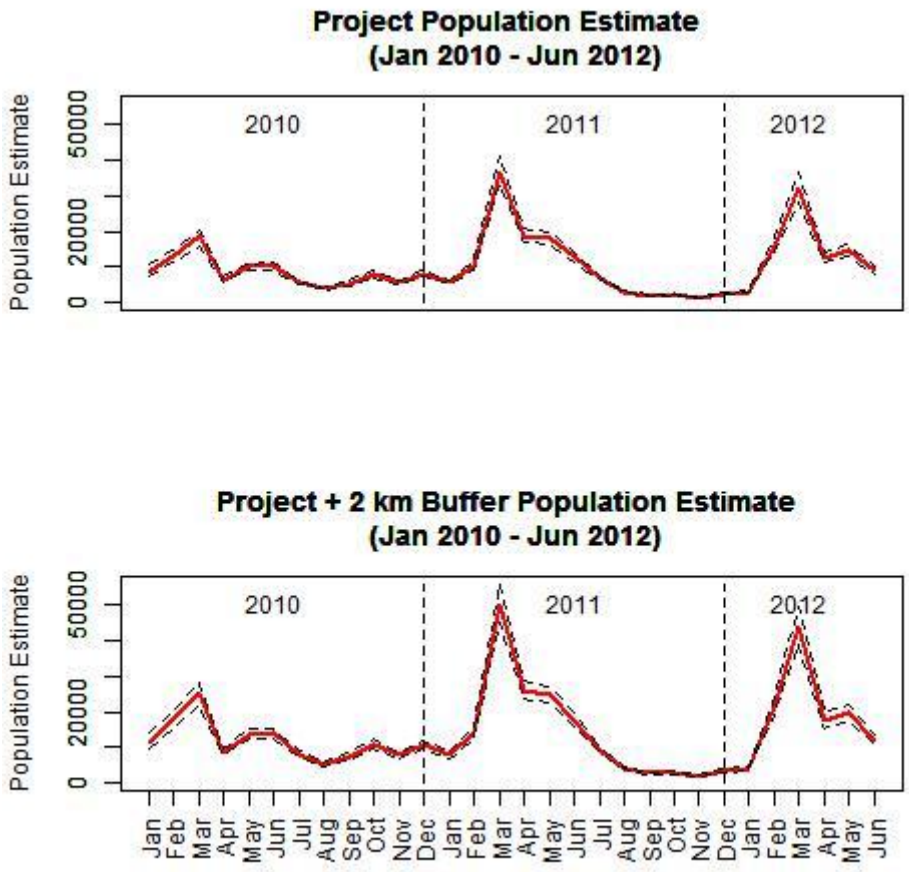

Figure A11.5 Baseline monthly population estimates (and 90% confidence limits) for black-legged kittiwake for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	37 (21-60)	6 (4-11)	7 (4-11)	Jul	414 (278-636)	77 (51-121)	76 (51-115)	140 (85-232)	26 (15-42)	26 (16-43)	Jul	277 (181-434)	51 (33-82)	51 (33-79)
Feb	71 (43-116)	13 (8-21)	13 (8-21)	Aug	134 (71-254)	25 (13-47)	25 (13-46)	54 (31-120)	10 (6-22)	10 (6-22)	Aug	94 (51-187)	17 (9-35)	17 (9-34)
Mar	160 (98-258)	29 (17-46)	29 (18-47)	Sep	62 (22-149)	11 (4-27)	11 (4-27)	33 (17-74)	6 (3-13)	6 (3-13)	Sep	47 (19-111)	8 (3-20)	9 (4-20)
Apr	306 (197-501)	55 (35-90)	56 (36-92)	Oct	13 (3-41)	2 (1-7)	2 (1-8)	15 (8-34)	3 (1-6)	3 (1-6)	Oct	14 (5-38)	2 (1-7)	3 (1-7)
May	759 (558-1,138)	142 (103-218)	139 (103-205)	Nov	4 (1-20)	1 (0-4)	1 (0-4)	12 (7-24)	2 (1-4)	2 (1-4)	Nov	8 (4-22)	1 (1-4)	1 (1-4)
Jun	916 (648-1,303)	170 (120-249)	168 (120-237)	Dec	5 (1-22)	1 (0-4)	1 (0-4)	22 (12-40)	4 (2-7)	4 (2-7)	Dec	14 (7-31)	2 (1-6)	3 (1-6)
Jul	414 (278-636)	77 (51-121)	76 (51-115)	Jan	5 (1-23)	1 (0-4)	1 (0-4)	25 (14-46)	4 (3-8)	5 (3-8)	Jan	22 (12-43)	4 (2-8)	4 (2-8)
Aug	134 (71-254)	25 (13-47)	25 (13-46)	Feb	17 (5-53)	3 (1-10)	3 (1-10)	93 (53-175)	17 (9-32)	17 (10-32)	Feb	60 (33-115)	11 (6-21)	11 (6-21)
Sep	62 (22-149)	11 (4-27)	11 (4-27)	Mar	119 (63-234)	21 (11-42)	22 (12-43)	147 (88-302)	26 (16-54)	27 (16-55)	Mar	142 (83-265)	25 (15-48)	26 (15-48)
Oct	13 (3-41)	2 (1-7)	2 (1-8)	Apr	355 (223-490)	63 (40-88)	65 (41-90)	180 (97-422)	32 (17-76)	33 (18-78)	Apr	280 (172-471)	50 (31-85)	52 (32-87)
Nov	4 (1-20)	1 (0-4)	1 (0-4)	May	462 (329-639)	84 (59-116)	86 (61-119)	250 (97-708)	46 (18-132)	46 (18-131)	May	490 (328-828)	91 (60-155)	91 (61-152)
Dec	5 (1-22)	1 (0-4)	1 (0-4)	Jun	311 (201-440)	56 (36-80)	57 (37-81)	222 (57-590)	41 (10-108)	41 (11-109)	Jun	483 (302-778)	89 (55-146)	89 (56-142)

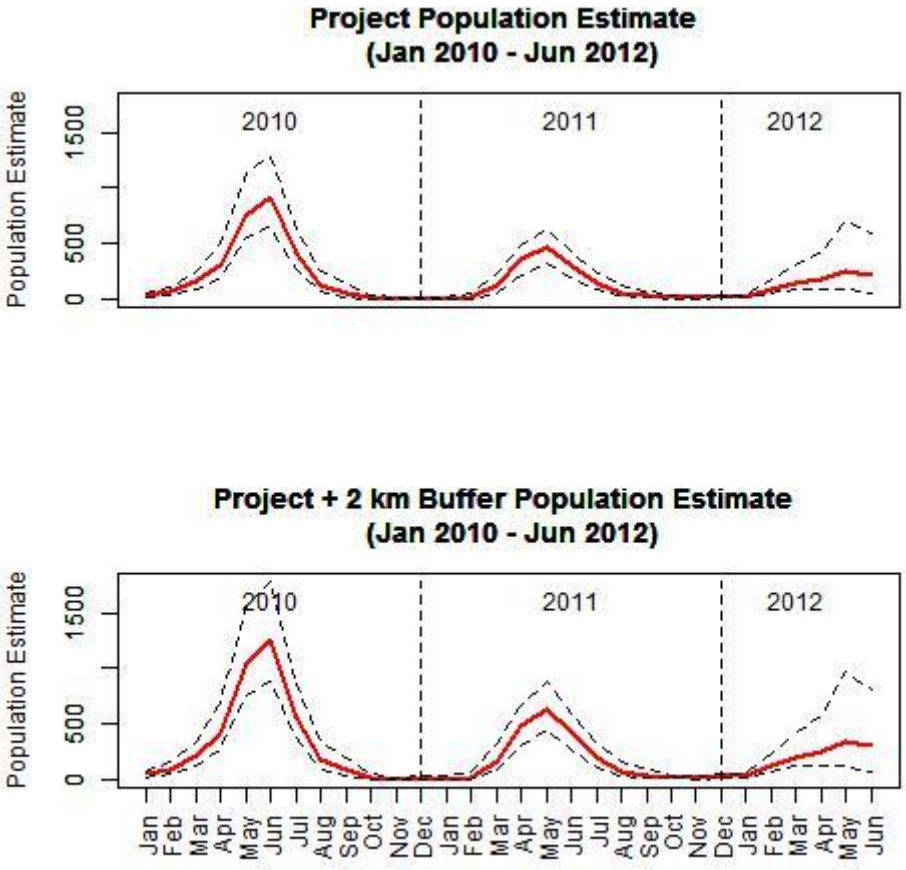

Figure A11.6 Baseline monthly population estimates (and 90% confidence limits) for lesser black-backed gull for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	1237 (958-1,467)	220 (169-261)	223 (172-264)	Jul	45 (22-74)	8 (4-14)	8 (4-14)	78 (37-122)	14 (7-23)	14 (7-23)	Jul	61 (29-98)	11 (5-18)	11 (6-18)
Feb	720 (503-909)	128 (90-162)	130 (91-164)	Aug	49 (25-82)	9 (5-16)	9 (5-15)	76 (36-120)	14 (7-22)	14 (7-22)	Aug	63 (31-101)	12 (6-19)	12 (6-19)
Mar	383 (254-525)	68 (45-93)	69 (46-95)	Sep	142 (75-247)	25 (13-44)	26 (14-45)	150 (79-231)	27 (14-41)	27 (14-42)	Sep	146 (77-239)	26 (14-43)	26 (14-43)
Apr	141 (80-199)	26 (15-38)	26 (15-37)	Oct	218 (131-323)	39 (23-57)	40 (24-59)	174 (107-250)	31 (19-44)	32 (19-45)	Oct	196 (119-286)	35 (21-51)	36 (22-52)
May	89 (48-144)	17 (9-27)	17 (9-27)	Nov	384 (255-506)	68 (45-90)	70 (46-92)	226 (152-293)	40 (27-52)	41 (27-53)	Nov	305 (203-400)	54 (36-71)	55 (37-73)
Jun	60 (31-103)	11 (6-20)	11 (6-19)	Dec	720 (523-906)	128 (93-161)	130 (95-164)	363 (257-466)	65 (46-83)	66 (46-85)	Dec	541 (390-686)	96 (69-122)	98 (71-124)
Jul	45 (22-74)	8 (4-14)	8 (4-14)	Jan	721 (553-907)	128 (98-162)	131 (100-165)	362 (277-454)	64 (49-81)	66 (50-83)	Jan	773 (596-943)	138 (106-168)	140 (108-170)
Aug	49 (25-82)	9 (5-16)	9 (5-15)	Feb	742 (579-924)	132 (103-165)	135 (105-169)	553 (406-725)	99 (72-129)	100 (73-132)	Feb	672 (496-853)	120 (88-152)	122 (90-155)
Sep	142 (75-247)	25 (13-44)	26 (14-45)	Mar	756 (565-959)	134 (100-171)	137 (102-174)	508 (342-688)	90 (61-123)	92 (62-125)	Mar	549 (387-724)	98 (69-129)	100 (70-131)
Oct	218 (131-323)	39 (23-57)	40 (24-59)	Apr	327 (212-445)	60 (39-83)	61 (40-85)	257 (140-365)	48 (26-68)	48 (26-69)	Apr	242 (144-336)	45 (27-63)	45 (27-63)
Nov	384 (255-506)	68 (45-90)	70 (46-92)	May	176 (99-248)	32 (18-45)	33 (19-46)	173 (83-262)	32 (15-49)	32 (16-49)	May	146 (76-218)	27 (14-41)	27 (14-41)
Dec	720 (523-906)	128 (93-161)	130 (95-164)	Jun	105 (53-156)	19 (10-29)	20 (10-29)	91 (38-157)	17 (7-29)	17 (7-29)	Jun	85 (41-139)	16 (8-26)	16 (8-26)

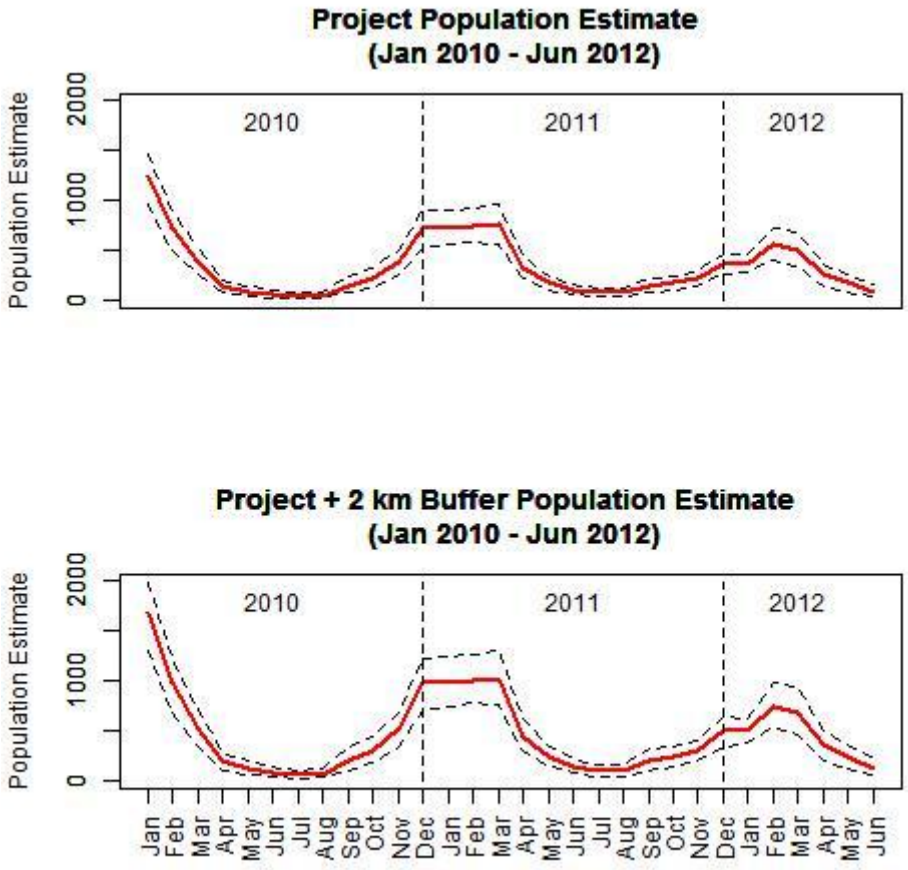

Figure A11.7 Baseline monthly population estimates (and 90% confidence limits) for great black-backed gull for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	Project	0-1km	1-2km	Month	Project	0-1km	1-2km	Project	0-1km	1-2km	Month	Project	0-1km	1-2km
Jan	43,806 (40,080-47,811)	7,883 (7,217-8,621)	7,916 (7,247-8,639)	Jul	4,986 (4,614-5,454)	930 (858-1,020)	958 (884-1,050)	7,580 (6,965-8,319)	1,405 (1,287-1,547)	1,446 (1,324-1,594)	Jul	6,283 (5,790-6,886)	1,167 (1,073-1,283)	1,202 (1,104-1,322)
Feb	40,942 (37,676-44,400)	7,416 (6,811-8,054)	7,432 (6,835-8,061)	Aug	13,645 (12,224-15,219)	2,664 (2,375-2,984)	2,811 (2,505-3,151)	10,579 (9,635-11,835)	2,040 (1,847-2,298)	2,153 (1,945-2,427)	Aug	12,112 (10,929-13,527)	2,352 (2,111-2,641)	2,482 (2,225-2,789)
Mar	34,639 (32,220-37,365)	6,240 (5,796-6,738)	6,286 (5,847-6,783)	Sep	31,851 (28,048-35,522)	6,140 (5,393-6,905)	6,498 (5,705-7,327)	7,046 (6,350-7,868)	1,365 (1,226-1,534)	1,444 (1,295-1,627)	Sep	19,448 (17,199-21,695)	3,752 (3,310-4,220)	3,971 (3,500-4,477)
Apr	23,519 (21,820-25,425)	4,265 (3,953-4,618)	4,318 (4,006-4,671)	Oct	31,102 (28,673-33,607)	5,652 (5,203-6,113)	5,753 (5,301-6,219)	3,678 (3,344-4,012)	663 (603-725)	675 (613-737)	Oct	17,390 (16,009-18,810)	3,158 (2,903-3,419)	3,214 (2,957-3,478)
May	7,350 (6,815-8,055)	1,367 (1,264-1,505)	1,408 (1,302-1,552)	Nov	29,425 (27,331-31,686)	5,324 (4,936-5,737)	5,399 (5,011-5,814)	2,856 (2,607-3,083)	516 (471-557)	525 (479-567)	Nov	16,141 (14,969-17,385)	2,920 (2,703-3,147)	2,962 (2,745-3,190)
Jun	7,077 (6,534-7,695)	1,326 (1,221-1,446)	1,373 (1,265-1,499)	Dec	39,592 (36,841-42,612)	7,138 (6,631-7,688)	7,185 (6,686-7,733)	5,895 (5,404-6,432)	1,062 (973-1,159)	1,077 (987-1,176)	Dec	22,744 (21,122-24,522)	4,100 (3,802-4,423)	4,131 (3,836-4,454)
Jul	4,986 (4,614-5,454)	930 (858-1,020)	958 (884-1,050)	Jan	23,001 (21,075-25,236)	4,146 (3,797-4,552)	4,198 (3,843-4,610)	8,134 (7,432-8,796)	1,472 (1,344-1,592)	1,490 (1,361-1,611)	Jan	24,980 (22,862-27,281)	4,501 (4,119-4,922)	4,534 (4,150-4,953)
Aug	13,645 (12,224-15,219)	2,664 (2,375-2,984)	2,811 (2,505-3,151)	Feb	27,561 (25,495-30,053)	4,971 (4,594-5,423)	5,040 (4,656-5,499)	35,859 (32,693-38,865)	6,473 (5,897-7,024)	6,538 (5,960-7,092)	Feb	34,787 (31,955-37,773)	6,287 (5,767-6,834)	6,337 (5,817-6,884)
Sep	31,851 (28,048-35,522)	6,140 (5,393-6,905)	6,498 (5,705-7,327)	Mar	61,271 (57,309-65,435)	11,053 (10,332-11,811)	11,224 (10,489-11,997)	63,699 (58,766-68,589)	11,480 (10,582-12,368)	11,601 (10,701-12,495)	Mar	53,203 (49,431-57,130)	9,591 (8,904-10,306)	9,704 (9,012-10,425)
Oct	31,102 (28,673-33,607)	5,652 (5,203-6,113)	5,753 (5,301-6,219)	Apr	72,665 (67,442-77,975)	13,136 (12,183-14,102)	13,377 (12,402-14,366)	67,841 (62,995-73,587)	12,296 (11,401-13,349)	12,508 (11,603-13,577)	Apr	54,675 (50,752-58,995)	9,899 (9,179-10,690)	10,068 (9,337-10,871)
Nov	29,425 (27,331-31,686)	5,324 (4,936-5,737)	5,399 (5,011-5,814)	May	18,065 (16,695-19,519)	3,348 (3,087-3,627)	3,461 (3,188-3,756)	21,183 (19,229-23,429)	3,940 (3,568-4,368)	4,081 (3,692-4,525)	May	15,533 (14,246-17,001)	2,885 (2,640-3,167)	2,984 (2,728-3,278)
Dec	39,592 (36,841-42,612)	7,138 (6,631-7,688)	7,185 (6,686-7,733)	Jun	13,378 (12,334-14,584)	2,481 (2,282-2,715)	2,553 (2,346-2,799)	13,545 (12,318-14,995)	2,517 (2,283-2,791)	2,598 (2,355-2,881)	Jun	11,333 (10,395-12,425)	2,108 (1,928-2,317)	2,175 (1,989-2,393)

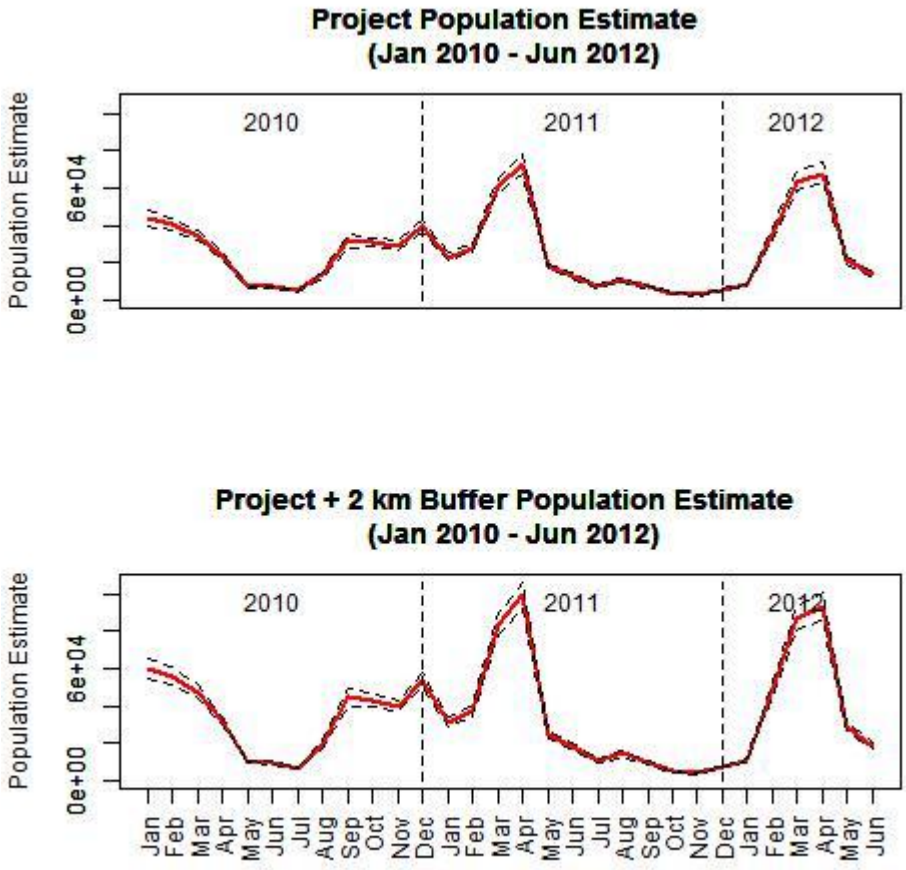

Figure A11.8 Modelled monthly population estimates (and 90% confidence limits) for common guillemot for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	Project	0-1km	1-2km	Month	Project	0-1km	1-2km	Project	0-1km	1-2km	Month	Project	0-1km	1-2km
Jan	16,113 (13,809-18,637)	2,942 (2,515-3,410)	2,921 (2,504-3,382)	Jul	352 (284-436)	65 (52-80)	65 (53-81)	243 (185-305)	44 (34-56)	45 (34-56)	Jul	298 (235-370)	55 (43-68)	55 (43-69)
Feb	15,813 (13,880-17,793)	2,920 (2,546-3,296)	2,899 (2,536-3,263)	Aug	1,830 (1,475-2,243)	369 (294-462)	383 (305-480)	216 (155-286)	43 (30-57)	45 (31-60)	Aug	1,023 (815-1,265)	206 (162-260)	214 (168-270)
Mar	12,304 (10,825-13,717)	2,251 (1,973-2,524)	2,250 (1,977-2,514)	Sep	5,546 (4,450-6,619)	1,106 (877-1,337)	1,157 (914-1,408)	83 (55-120)	17 (11-24)	17 (11-25)	Sep	2,814 (2,252-3,370)	561 (444-680)	587 (463-717)
Apr	6,942 (6,070-7,872)	1,276 (1,112-1,448)	1,284 (1,121-1,456)	Oct	14,630 (12,930-16,591)	2,689 (2,370-3,056)	2,722 (2,403-3,090)	120 (82-172)	22 (15-31)	22 (15-32)	Oct	7,375 (6,506-8,381)	1,356 (1,192-1,543)	1,372 (1,209-1,561)
May	471 (385-566)	86 (71-104)	87 (71-106)	Nov	11,366 (10,185-12,658)	2,079 (1,852-2,320)	2,093 (1,871-2,334)	176 (129-241)	32 (23-44)	32 (24-44)	Nov	5,771 (5,157-6,449)	1,056 (938-1,182)	1,063 (947-1,189)
Jun	469 (384-573)	86 (71-106)	88 (72-108)	Dec	13,282 (11,699-14,806)	2,425 (2,128-2,705)	2,422 (2,130-2,702)	1,071 (847-1,369)	195 (154-249)	197 (155-252)	Dec	7,176 (6,273-8,088)	1,310 (1,141-1,477)	1,309 (1,143-1,477)
Jul	352 (284-436)	65 (52-80)	65 (53-81)	Jan	5,379 (4,576-6,295)	983 (835-1,150)	992 (842-1,161)	2,647 (2,277-3,158)	485 (417-579)	488 (420-583)	Jan	8,046 (6,888-9,363)	1,470 (1,256-1,713)	1,467 (1,255-1,709)
Aug	1,830 (1,475-2,243)	369 (294-462)	383 (305-480)	Feb	6,426 (5,513-7,522)	1,173 (1,003-1,373)	1,184 (1,013-1,387)	16,590 (14,445-19,293)	3,034 (2,637-3,533)	3,049 (2,650-3,547)	Feb	12,943 (11,280-14,869)	2,376 (2,062-2,734)	2,377 (2,066-2,732)
Sep	5,546 (4,450-6,619)	1,106 (877-1,337)	1,157 (914-1,408)	Mar	20,352 (18,223-22,806)	3,714 (3,318-4,171)	3,758 (3,355-4,223)	23,879 (21,320-26,916)	4,354 (3,879-4,916)	4,371 (3,898-4,931)	Mar	18,845 (16,789-21,146)	3,440 (3,056-3,870)	3,460 (3,077-3,889)
Oct	14,630 (12,930-16,591)	2,689 (2,370-3,056)	2,722 (2,403-3,090)	Apr	29,932 (26,685-33,522)	5,463 (4,861-6,125)	5,539 (4,929-6,214)	22,070 (19,294-25,014)	4,045 (3,527-4,596)	4,098 (3,576-4,654)	Apr	19,648 (17,350-22,136)	3,594 (3,167-4,056)	3,640 (3,209-4,108)
Nov	11,366 (10,185-12,658)	2,079 (1,852-2,320)	2,093 (1,871-2,334)	May	1,602 (1,348-1,897)	293 (246-348)	298 (250-355)	2,324 (1,879-2,878)	425 (344-528)	433 (350-538)	May	1,466 (1,204-1,780)	268 (220-327)	273 (224-333)
Dec	13,282 (11,699-14,806)	2,425 (2,128-2,705)	2,422 (2,130-2,702)	Jun	862 (707-1,031)	157 (129-189)	159 (130-192)	3,619 (2,962-4,467)	662 (540-822)	671 (547-834)	Jun	1,650 (1,351-2,023)	302 (246-372)	306 (249-378)

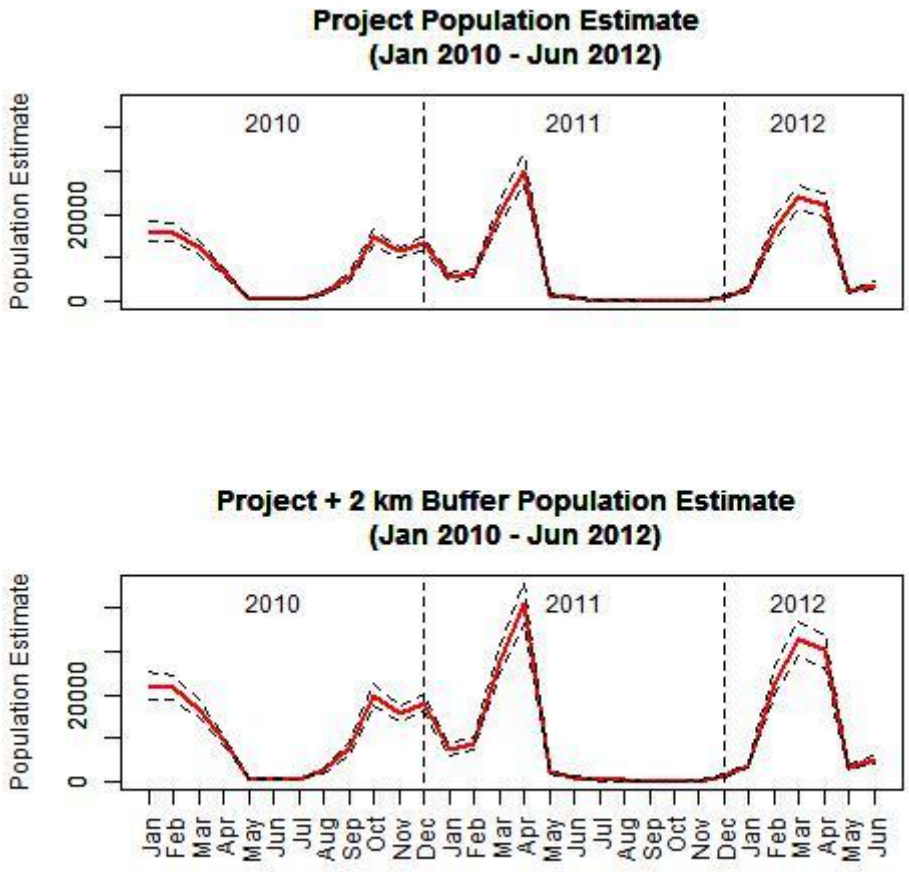

Figure A11.9 Modelled monthly population estimates (and 90% confidence limits) for razorbill for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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% Cls = 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% Cls = 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% Cls = 5,435-8,653), with a mean population peak of 9,037 birds (90% Cls = 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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	7,962 (5,245-12,088)	1,444 (955-2,217)	1,444 (948-2,178)	Jul	1 (1-3)	0 (0-0)	0 (0-0)	2 (1-6)	0 (0-1)	0 (0-1)	Jul	2 (1-4)	0 (0-1)	0 (0-1)
Feb	1,678 (1,226-2,571)	304 (220-468)	303 (221-461)	Aug	3 (2-6)	1 (0-1)	1 (0-1)	5 (2-10)	1 (0-2)	1 (0-2)	Aug	4 (2-8)	1 (0-1)	1 (0-1)
Mar	253 (182-384)	46 (33-70)	46 (33-70)	Sep	87 (55-142)	16 (10-27)	17 (10-27)	35 (22-61)	7 (4-11)	7 (4-12)	Sep	61 (38-101)	11 (7-19)	12 (7-19)
Apr	22 (15-36)	4 (3-7)	4 (3-7)	Oct	417 (308-595)	79 (58-113)	80 (59-115)	121 (89-174)	22 (16-32)	23 (17-33)	Oct	269 (198-384)	51 (37-72)	52 (38-74)
May	6 (4-11)	1 (1-2)	1 (1-2)	Nov	2,109 (1,674-2,808)	392 (309-525)	399 (316-531)	562 (459-724)	104 (85-134)	107 (87-138)	Nov	1,336 (1,067-1,766)	248 (197-330)	253 (201-334)
Jun	2 (1-5)	0 (0-1)	0 (0-1)	Dec	9,781 (7,998-12,775)	1,783 (1,454-2,341)	1,795 (1,471-2,339)	3,442 (2,871-4,531)	628 (522-826)	644 (535-847)	Dec	6,612 (5,435-8,653)	1,206 (988-1,583)	1,220 (1,003-1,593)
Jul	1 (1-3)	0 (0-0)	0 (0-0)	Jan	3,407 (2,510-4,664)	616 (454-845)	632 (466-867)	1,338 (1,133-1,734)	244 (207-318)	249 (210-323)	Jan	4,235 (2,962-6,162)	768 (539-1,127)	775 (541-1,123)
Aug	3 (2-6)	1 (0-1)	1 (0-1)	Feb	1,399 (1,094-1,904)	256 (200-348)	262 (205-357)	1,271 (887-2,015)	230 (161-366)	234 (164-372)	Feb	1,449 (1,069-2,163)	263 (194-394)	266 (196-397)
Sep	87 (55-142)	16 (10-27)	17 (10-27)	Mar	842 (637-1,165)	154 (116-213)	158 (119-218)	175 (98-316)	32 (18-57)	32 (18-58)	Mar	424 (306-622)	77 (56-113)	79 (57-116)
Oct	417 (308-595)	79 (58-113)	80 (59-115)	Apr	120 (84-175)	22 (16-33)	23 (16-34)	25 (12-56)	5 (2-10)	5 (2-11)	Apr	55 (37-89)	10 (7-17)	10 (7-17)
Nov	2,109 (1,674-2,808)	392 (309-525)	399 (316-531)	May	16 (9-28)	3 (2-5)	3 (2-5)	15 (6-35)	3 (1-7)	3 (1-7)	May	12 (6-25)	2 (1-5)	2 (1-5)
Dec	9,781 (7,998-12,775)	1,783 (1,454-2,341)	1,795 (1,471-2,339)	Jun	4 (2-9)	1 (0-2)	1 (0-2)	11 (3-34)	2 (1-6)	2 (1-7)	Jun	6 (2-16)	1 (0-3)	1 (0-3)

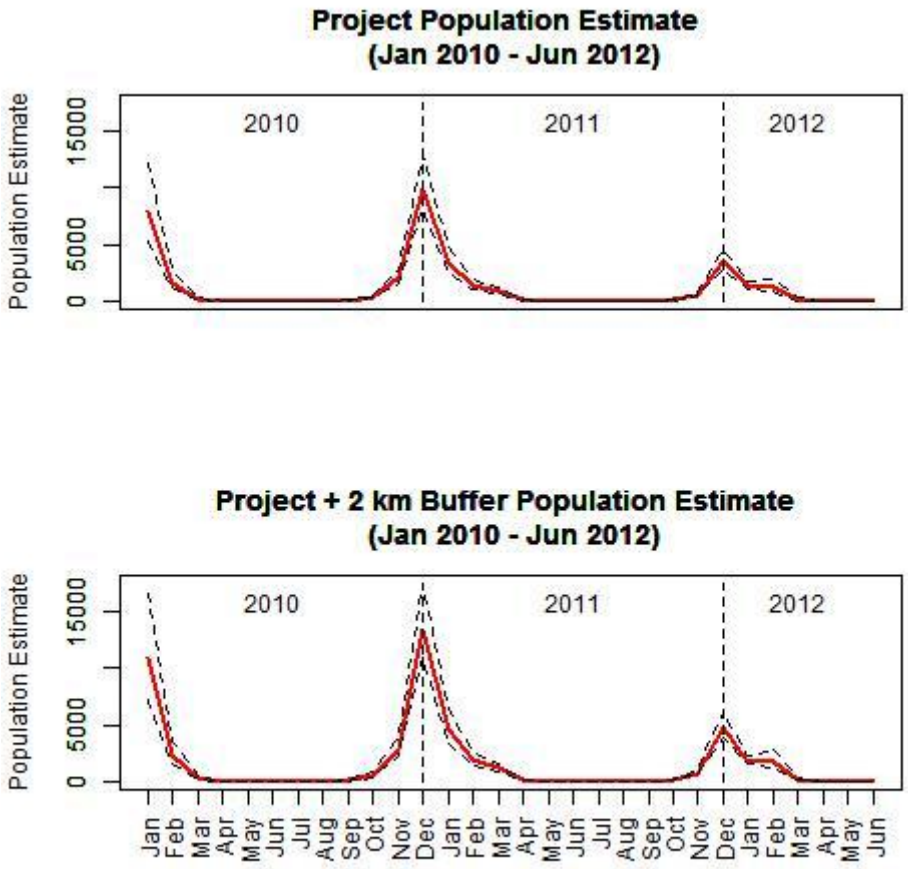

Figure A11.10 Baseline monthly population estimates (and 90% confidence limits) for little auk for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D , and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

***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 surrounding 0-1km and 1-2km buffers, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

	2010				2010/11			2011/12			Mean			
Month	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**	**Project**	**0-1km**	**1-2km**	**Month**	**Project**	**0-1km**	**1-2km**
Jan	1,107 (759-1,570)	199 (136-285)	202 (138-287)	Jul	154 (113-202)	28 (20-37)	29 (21-39)	198 (155-250)	36 (28-46)	37 (29-47)	Jul	176 (134-226)	32 (24-42)	33 (25-43)
Feb	1,554 (1,206-1,990)	282 (218-359)	284 (220-364)	Aug	145 (105-191)	27 (19-35)	28 (20-36)	109 (85-140)	20 (15-26)	21 (16-27)	Aug	127 (95-166)	23 (17-31)	24 (18-32)
Mar	1,606 (1,337-1,974)	290 (241-357)	294 (245-361)	Sep	2,747 (2,227-3,450)	510 (412-645)	533 (433-672)	748 (604-913)	140 (113-171)	147 (118-179)	Sep	1,748 (1,416-2,182)	325 (262-408)	340 (276-425)
Apr	485 (392-611)	89 (72-110)	91 (74-114)	Oct	3,635 (3,018-4,502)	677 (562-847)	709 (589-886)	529 (415-642)	98 (77-119)	102 (81-125)	Oct	2,082 (1,717-2,572)	388 (320-483)	406 (335-506)
May	382 (316-477)	70 (57-86)	72 (59-89)	Nov	1,577 (1,300-1,872)	287 (237-341)	293 (243-348)	170 (124-207)	31 (22-37)	32 (23-38)	Nov	873 (712-1,039)	159 (130-189)	162 (133-193)
Jun	254 (197-328)	46 (36-61)	47 (37-63)	Dec	2,961 (2,509-3,479)	534 (454-626)	543 (462-639)	361 (277-428)	65 (50-77)	67 (51-79)	Dec	1,661 (1,393-1,953)	300 (252-351)	305 (256-359)
Jul	154 (113-202)	28 (20-37)	29 (21-39)	Jan	2,619 (2,125-3,270)	471 (381-590)	482 (390-605)	457 (364-537)	83 (66-97)	84 (67-100)	Jan	1,394 (1,083-1,792)	251 (194-324)	256 (199-331)
Aug	145 (105-191)	27 (19-35)	28 (20-36)	Feb	2,987 (2,480-3,660)	537 (445-662)	550 (457-679)	1,053 (878-1,239)	189 (159-223)	194 (162-228)	Feb	1,864 (1,521-2,296)	336 (274-415)	343 (280-424)
Sep	2,747 (2,227-3,450)	510 (412-645)	533 (433-672)	Mar	4,119 (3,699-4,734)	742 (665-853)	762 (682-875)	1,157 (996-1,380)	209 (180-250)	213 (183-254)	Mar	2,294 (2,011-2,696)	414 (362-486)	423 (370-497)
Oct	3,635 (3,018-4,502)	677 (562-847)	709 (589-886)	Apr	1,431 (1,230-1,661)	262 (225-304)	271 (232-315)	433 (350-525)	79 (63-96)	82 (66-99)	Apr	783 (657-932)	143 (120-170)	148 (124-176)
Nov	1,577 (1,300-1,872)	287 (237-341)	293 (243-348)	May	793 (685-929)	144 (125-169)	149 (129-175)	395 (321-476)	72 (58-87)	75 (61-90)	May	523 (441-627)	95 (80-114)	99 (83-118)
Dec	2,961 (2,509-3,479)	534 (454-626)	543 (462-639)	Jun	405 (337-499)	74 (61-91)	76 (63-94)	275 (227-352)	50 (41-64)	51 (43-66)	Jun	311 (254-393)	56 (46-72)	58 (48-74)

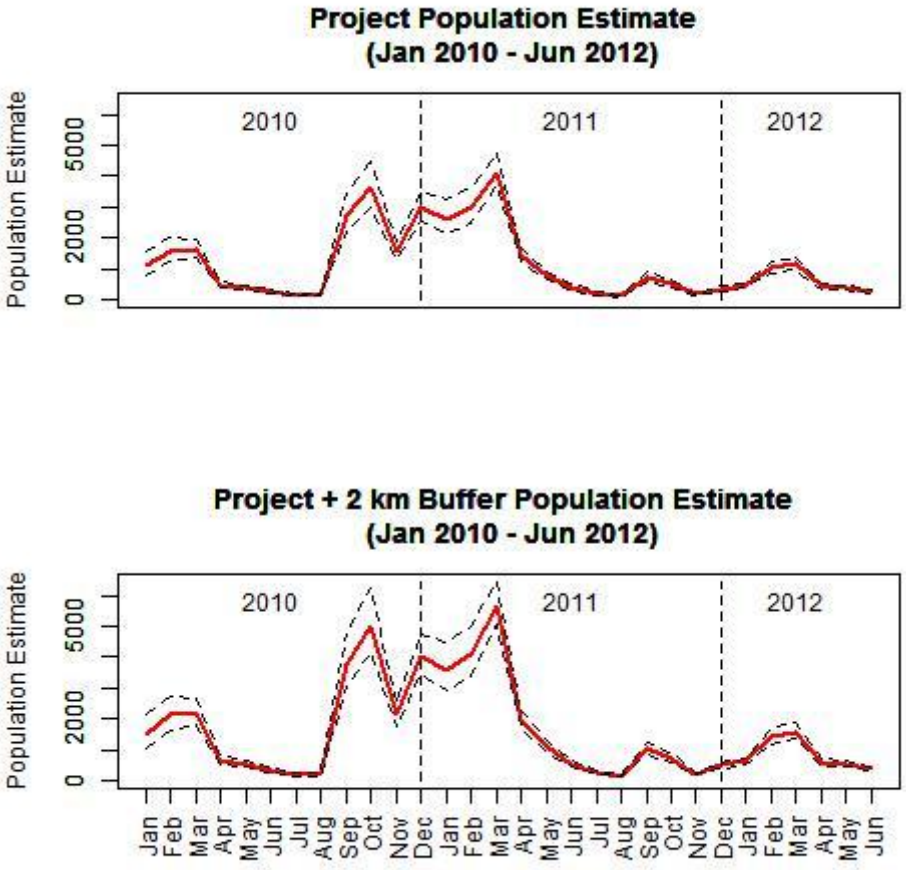

Figure A11.11 Baseline monthly population estimates (and 90% confidence limits) for Atlantic puffin for Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B and Dogger Bank Teesside C and D, and the projects with a 2km buffer, within the Dogger Bank Zone in 2010, 2010/11 and 2011/12.

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. Models were run using option 3 of the Band model, which corrects for variable risk within the rotor-swept area of the turbine.

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)

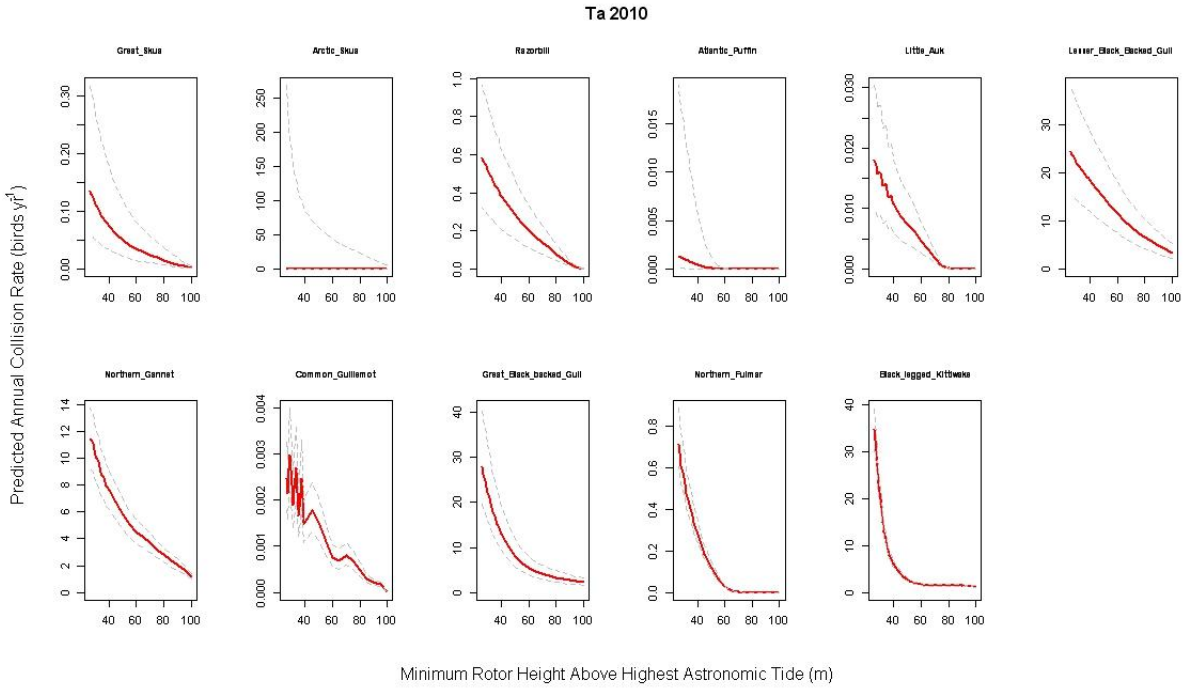

Figure A12.1 Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside A in 2010.

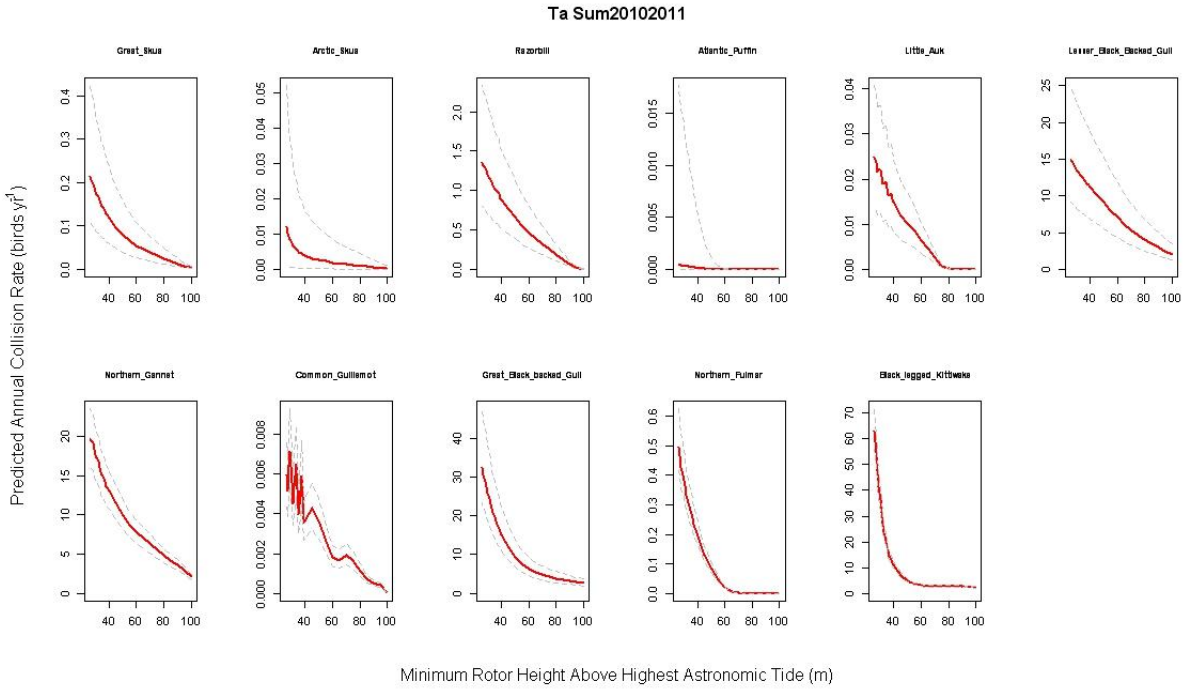

Figure A12.2 Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside A between July 2010 and June 2011.

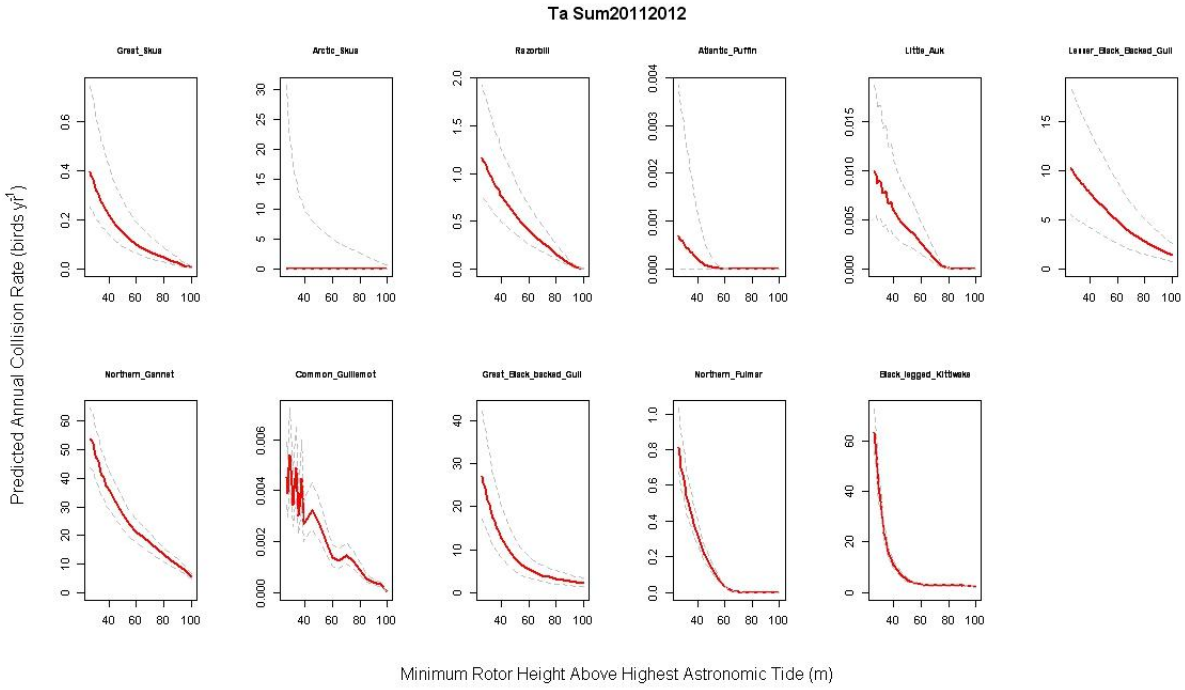

Figure A12.3 Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside A between July 2011 and June 2012.

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)

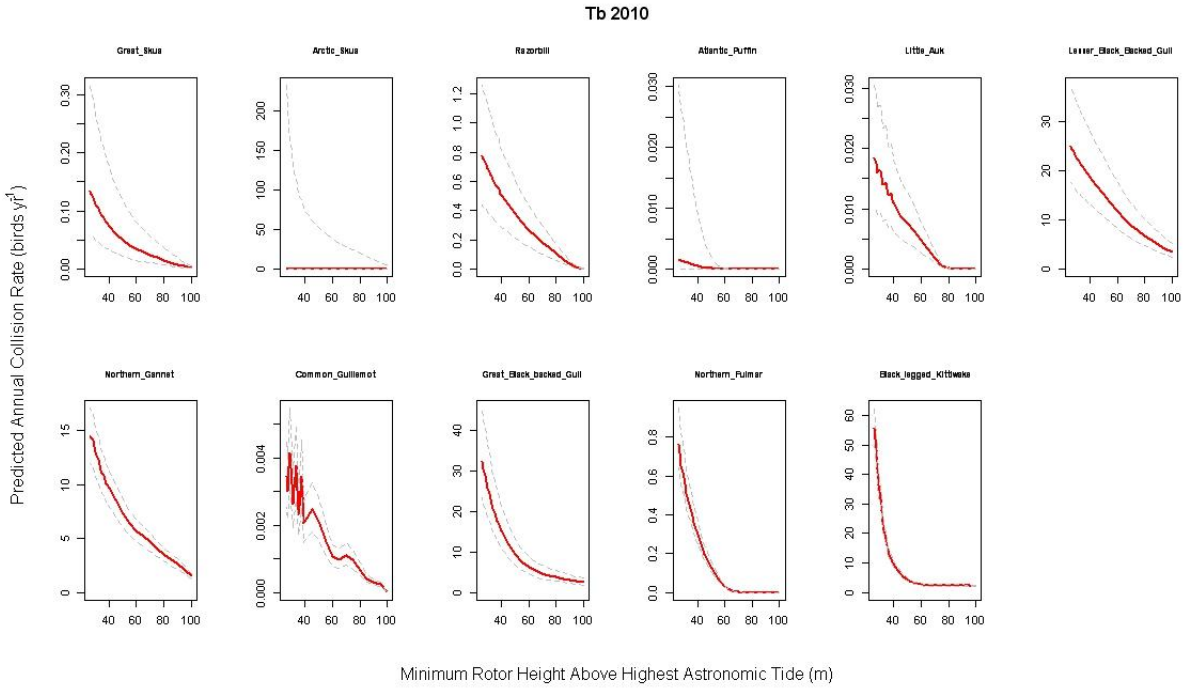

Figure A12.4 Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside B in 2010.

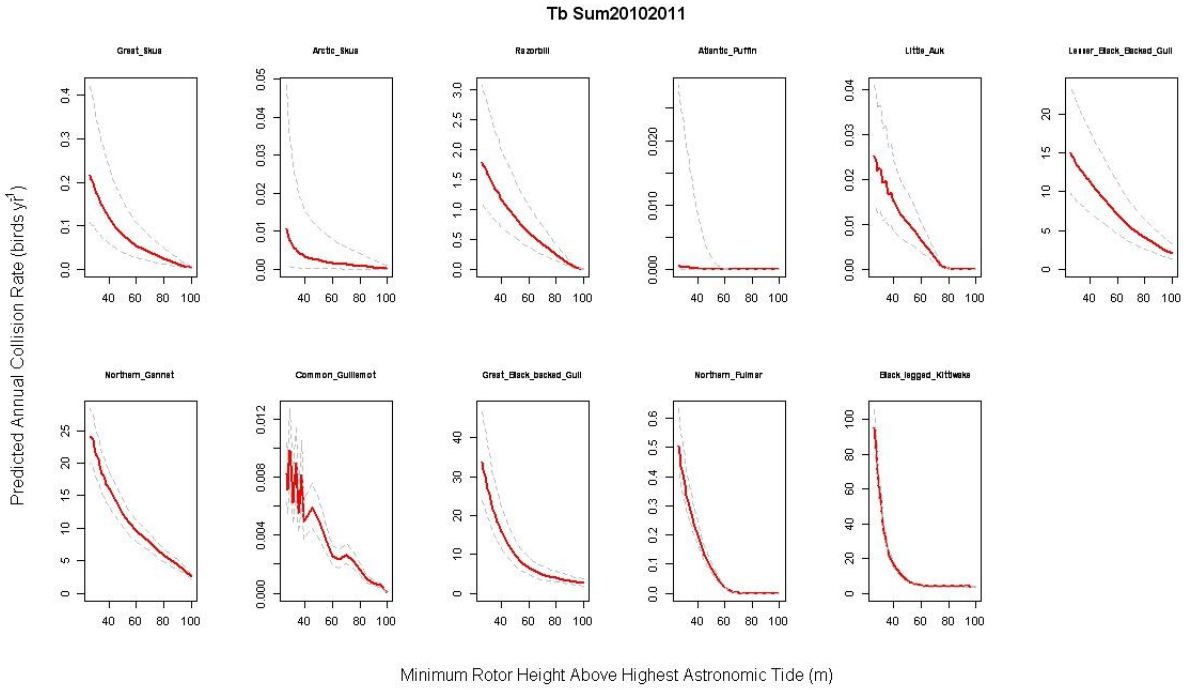

Figure A12.5 Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside B between July 2010 and June 2011.

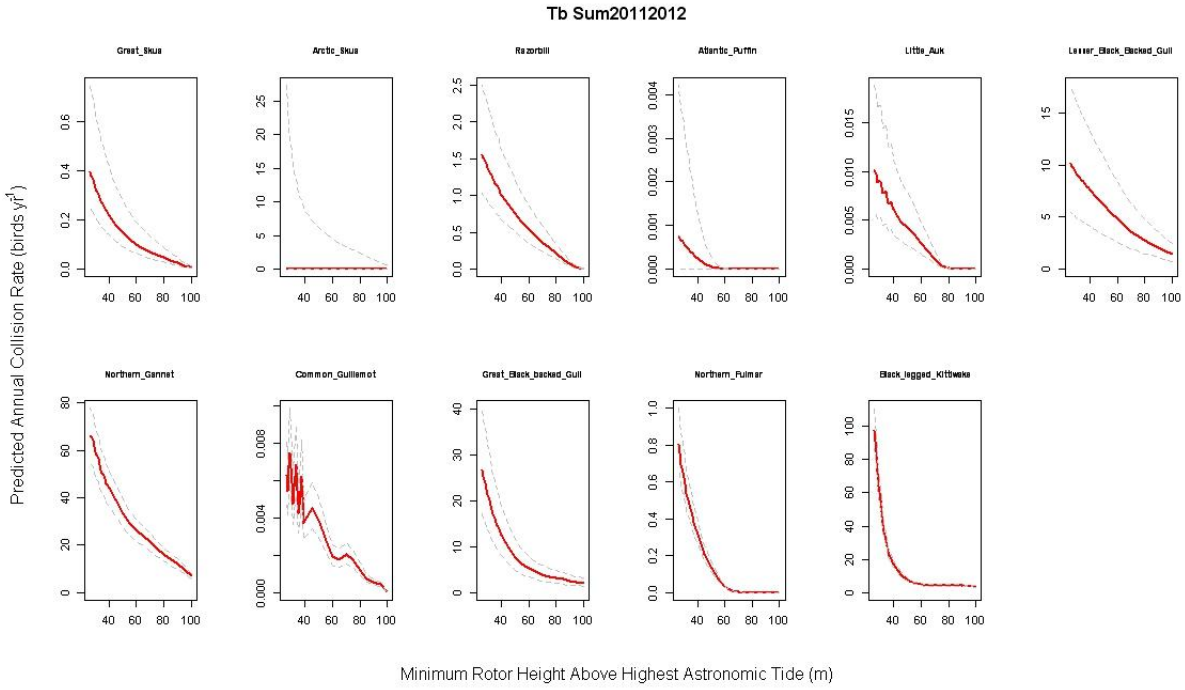

Figure A12.6 Change in predicted annual collision rate in relation to minimum lower tip height above highest astronomic tide at Dogger Bank Teesside B between July 2011 and June 2012.

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.

Disturbance / displacement

A13.2. Information was available from: the European Offshore Wind Development Centre (EOWDC), Firth of Forth Alpha and Bravo, Hornsea Project One and Neart na Gaoithe where impacts had been apportioned for displacement (and/or mortality), were available for seven SPAs: Flamborough Head and Bempton Cliffs, Coquet Island, Forth Islands, Farne Islands, St. Abb's Head to Fast Castle, 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 ("DBT AB + DBCB AB + DBT CD") the median value is presented. Absence of information is represented by blank cells.

Protected site	Project	Northern gannet		Common guillemot		Razorbill		Atlantic Puffin	
		No.	Prop lost	No.	Prop lost	No.	Prop lost	No.	Prop lost
Buchan Ness to Collieston Coast	EOWDC			298 (298)	1.5	99 (99)	2.3		
	Neart na Gaoithe			(<1)	0				
	Firth of Forth Alpha			94 (1)	0				
	Firth of Forth Bravo			111 (1)	0.01				
	DBT AB + DBCB AB + DBT CD			780 (39)	0.11				
Coquet	Hornsea Project One							(9)	0.05
	DBT AB + DBCB AB + DBT CD							60 (3)	0.01
Farne Islands	Hornsea Project One							(18)	0.04
	Neart na Gaoithe			50 (5)	0.01	(<1)	0.01		
	DBT AB + DBCB AB + DBT CD			2638 (132)	0.16	40 (2)	0.18	140 (7)	0.01
Flamborough Head & Bempton Cliffs	Hornsea Project One	(0)	0	(127)	0.15	(79)	0.4	(3)	0.3
	DBT AB + DBCB AB + DBT CD	341 (17)	0.09	4,880 (244)	0.25	1,260 (63)	0.23	2 (<1)	0.01
Forth Islands	Neart na Gaoithe	1,715 (34)	0.03	460 (46)	0.2	70 (7)	0.2	2,410 (241)	0.2
	Firth of Forth Alpha	1,132 (11)	0.01	329 (3)	0.02	83 (<1)	0.02	1,024 (10)	0.01
	Firth of Forth Bravo	726 (7)	0.01	388 (4)	0.02	35 (<1)	0.01	1,298 (13)	0.01
	DBT AB + DBCB AB + DBT CD	1,207 (60)	0.04	1001 (50)	0.13	296 (15)	0.16	236 (12)	0.01
Fowlsheugh	EOWDC			88 (88)	0.2	30 (30)	0.6		
	Neart na Gaoithe			80 (8)	0.01				
	Firth of Forth Alpha			1,664 (18)	0.04	280 (3)	0.05		
	Firth of Forth Bravo			2,182 (22)	0.05	108 (1)	0.02		
	DBT AB + DBCB AB + DBT CD			1,960 (98)	0.12	316 (16)	0.15		
St Abbs Head to Fast Castle	Neart na Gaoithe			170 (17)	0.05	10 (1)	0.04		
	Firth of Forth Alpha			249 (2)	0.01	23 (<1)	0.01		
	Firth of Forth Bravo			293 (3)	0.01	9 (<1)	0		
	DBT AB + DBCB AB + DBT CD			2146 (107)	0.14	205 (10)	0.17		
Buchan Ness to Collieston Coast				**(339)**	**1.62**				
Coquet								**(12)**	**0.06**
Farne Islands				**(137)**	**0.17**	**(2)**	**0.19**	**(25)**	**0.05**
Flamborough Head & Bempton Cliffs		**(17)**	**0.09**	**(371)**	**0.4**	**(142)**	**0.63**	**(3)**	**0.31**
Forth Islands		**(112)**	**0.09**	**(103)**	**0.37**	**(22)**	**0.39**	**(276)**	**0.23**
Fowlsheugh				**(234)**	**0.42**	**(50)**	**0.82**		
St Abb's Head to Fast Castle				**(129)**	**0.21**	**(11)**	**0.22**		

Collision

A13.4. The numbers of birds apportioned to protected sites that are predicted to be killed due to collision are presented in Table A13.2. These numbers were fed through to 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, the information of numbers of birds apportioned to protected sites was available from nine additional projects: Beatrice, Dudgeon, East Anglia ONE, Firth of Forth Alpha and Bravo, Hornsea Project One, Moray Firth, Neart na Gaoithe and Triton Knoll. Protected sites where impacts had been apportioned for collision were available for nine SPAs: Alde-Ore Estuary, Buchan Ness to Collieston Coast, East Caithness Cliffs, Flamborough Head and Bempton Cliffs, Forth Islands, Fowlsheugh, North Caithness, St. Abb's Head to Fast Castle and Troup, Pennans and Lions Heads SPAs.

A13.6. For completion, the number of birds potentially lost 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 A13.2 Numbers of birds predicted to be lost from protected sites due to collision, combining information from other assessments with Dogger Bank Teesside A and B, Dogger Bank Creyke Beck A and B, and Dogger Bank Teesside C and D ("DBT AB + DBCB AB + DBT CD"), to assess the cumulative impact at the North Sea scale. Absence of information is represented by blank cells.

Site	Project	Northern fulmar	Northern gannet	Black-legged kittiwake	Lesser black-backed gull	Great black-backed gull	Common guillemot	Razorbill	Atlantic puffin
Alde-Ore Estuary	East Anglia ONE				16				
	DBT AB + DBCB AB + DBT CD				3				
Buchan Ness to Collieston Coast	Firth of Forth Alpha	<1		2					
	Firth of Forth Bravo	<1		2					
	DBT AB + DBCB AB + DBT CD	<1		13			<1		
East Caithness	Beatrice	5		21		18	27	1	
	Moray			36					
	DBT AB + DBCB AB + DBT CD	<1		42		1	<1	<1	
Flamborough Head and Bempton Cliffs	East Anglia ONE		24	80					
	Dudgeon		597						
	Hornsea Project One		6	**15**					
	Triton Knoll		129	158					
	DBT AB + DBCB AB + DBT CD	<1	35	285			<1	<1	<1
Forth Islands	Firth of Forth Alpha	<1	443	8	1				
	Firth of Forth Bravo	<1	276	11	1				
	Neart na Gaoithe		188	16	3				
	DBT AB + DBCB AB + DBT CD	<1	108	4	2		<1	<1	<1
Fowlsheugh	Firth of Forth Alpha	<1		13					
	Firth of Forth Bravo	<1		7					
	Neart na Gaoithe			2					
	DBT AB + DBCB AB + DBT CD	<1		10			<1	<1	
North Caithness	Moray			14		59			
	DBT AB + DBCB AB + DBT CD	<1		11			<1	<1	<1
St Abbs Head to Fast Castle	Firth of Forth Alpha			5					
	Firth of Forth Bravo			2					
	Neart na Gaoithe			6					
	DBT AB + DBCB AB + DBT CD			17			<1	<1	
Troup Pennans and Lions Heads	Moray		13	12					
	DBT AB + DBCB AB + DBT CD	<1		16			<1	<1	
Alde-Ore Estuary					**19**				
Buchan Ness to Collieston Coast		**<1**		**17**			**<1**		
East Caithness		**5**		**99**		**19**	**27**	**1**	
Flamborough Head and Bempton Cliffs			**791**	**538**			**<1**	**<1**	**<1**
Forth Islands		**<1**	**1015**	**39**	**7**		**<1**	**<1**	**<1**
Fowlsheugh		**<1**		**32**			**<1**	**<1**	
North Caithness		**<1**		**25**			**<1**	**<1**	**<1**
St Abbs Head to Fast Castle				**30**			**<1**	**<1**	
Troup, Lion and Pennans Heads		**<1**	-	**28**			**<1**	**<1**	