

# Forewind overview

**Gareth Lewis**  
**Head of Development**  
**21 April 2010 - Hull**



# The next half hour



- Who are Forewind?
- A short video about Forewind
- Why develop Offshore Wind
- Dogger Bank Facts
- Zone Appraisal
- Site Selection
- Overview of Development Challenges



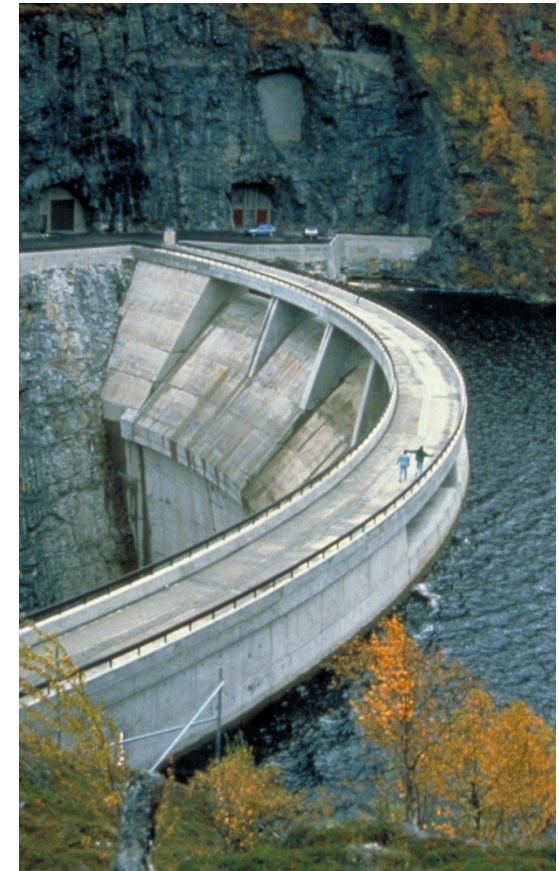
- A world leading offshore oil and gas operator
- An integrated technology-based international energy company primarily focused on upstream oil and gas operations.
- Headquarters in Norway,
- More than 30 years of experience from the Norwegian continental shelf,
- Pioneering complex offshore projects under the toughest conditions.
- 29,500 employees in 40 countries,
- Aims to deliver long-term growth and continue to develop technologies and manage projects that will meet the world's energy and climate challenges in a sustainable way.
- Renewable energy is one of Statoil's major focus areas.
- The UK offshore wind market is key to ambition to utilise its extensive experience from complex offshore oil and gas projects to generate value from offshore wind.



- Statkraft is Europe's largest generator of renewable energy,
- Total installed capacity of more than 14,800 MW.
- The company develops and generates hydropower, wind power, gas power, solar power and district heating
- A major player on the European energy exchanges.
- Statkraft opened its first wind farm in 2002 and now owns and operates three onshore wind farms in Norway with a total installed capacity of 244 MW.
- In the UK, Statkraft has one hydropower plant in operation in Wales, one wind farm under construction in Wales and planning consent for another in Scotland.
- The company has around 3000 staff in more than 20 countries, and is wholly owned by the Norwegian state.
- The world needs pure energy and this is what Statkraft delivers – every day
- A partner in the Sheringham Shoal project



## Statkraft





- One of the largest energy companies in the UK
- Involved in the generation, transmission, distribution and supply of electricity;
- Storage, distribution and supply of gas; telecommunications; contracting; and other energy services.
- As well as being the second largest supplier of energy in the UK with 9 million customers,
- Leading renewable energy company in the UK, with a total operating portfolio of renewable energy of 2000MW.
- Portfolio shows its commitment, past, present and future, to tackling climate change and delivering secure energy supplies.



## Scottish and Southern Energy



# RWE NPOWER RENEWABLES



- RWE npower renewables is the UK subsidiary of RWE Innogy
- Strong diversified position in renewables with significant ambition for growth
- RWE Innogy is the renewable energy company of RWE, one of Europe's five largest utility companies.
- RWE Innogy plans, builds and operates renewable power generation facilities and is committed to investing at least €1 billion in renewables every year until 2012 in the UK and Continental Europe.
- The expansion of onshore and offshore wind power is a key driver behind RWE Innogy's goal to have 4,500 MW in operation or construction by 2012.

**RWE**  
npower renewables



## Video presentation



# Why develop offshore wind ?



- **Government policy**
- **Security of supply to the UK**
- **National industry development – new jobs**
- **Climate change**

# Strategic Environmental Assessment



- Government Strategic Environmental Assessment (SEA) of the UK waters
  - explored the potential to provide up to 33GW of offshore wind energy.
  - the SEA identifies certain areas which are most appropriate for offshore wind farm development.
- 24<sup>th</sup> June 2009 announcement
  - no overriding environmental considerations to prevent the achievement of the draft plan/programme of leasing for offshore wind ..., if mitigation measures are implemented to prevent, reduce and offset significant adverse effects.
  - Monitoring the potentially significant environmental effects identified within the SEA will be undertaken using existing mechanisms and those to be set up under the auspices of the Infrastructure Planning Commission (IPC) and Marine Management Organisation (MMO).
  - ... the Crown Estate is the leasing authority and can now proceed with offshore wind leasing competition.

- TCE owns seabed to 12 nm and has a licence to award offshore wind farm zones in and beyond this area
- There have been 3 such licencing rounds so far:
  - Round 1 – 2000 - 18 projects, 6 operating ~ 1GW capacity
  - Round 2 – 2003 - 15 sites >7GW capacity
  - Round 3 – 2010 – 9 sites ~ 33 GW capacity
- Government SEA information used to identify zones in the Round 3 competitive tendering process.
- Dogger Bank was one of the Round 3 zones identified
- Forewind were awarded an exclusivity agreement in early 2010 for Dogger Bank
- Forewind will work with The Crown Estate and Stakeholders to identify suitable wind farm sites within the Dogger Bank zone and thereafter focus on addressing delivery of specific sites

Chart 43: Current and Expected Development of UK Offshore Wind



- |   |                                       |
|---|---------------------------------------|
| ■ Round One Sites Operational                     | ■ Round One & Two Sites               |
| ■ Round One Sites - Generating/Under Construction | ■ Round Two Sites                     |
| ■ Round One Sites                                 | ■ Potential Round 3 Development Zones |
| ■ Scottish Wind Farms                             |                                       |

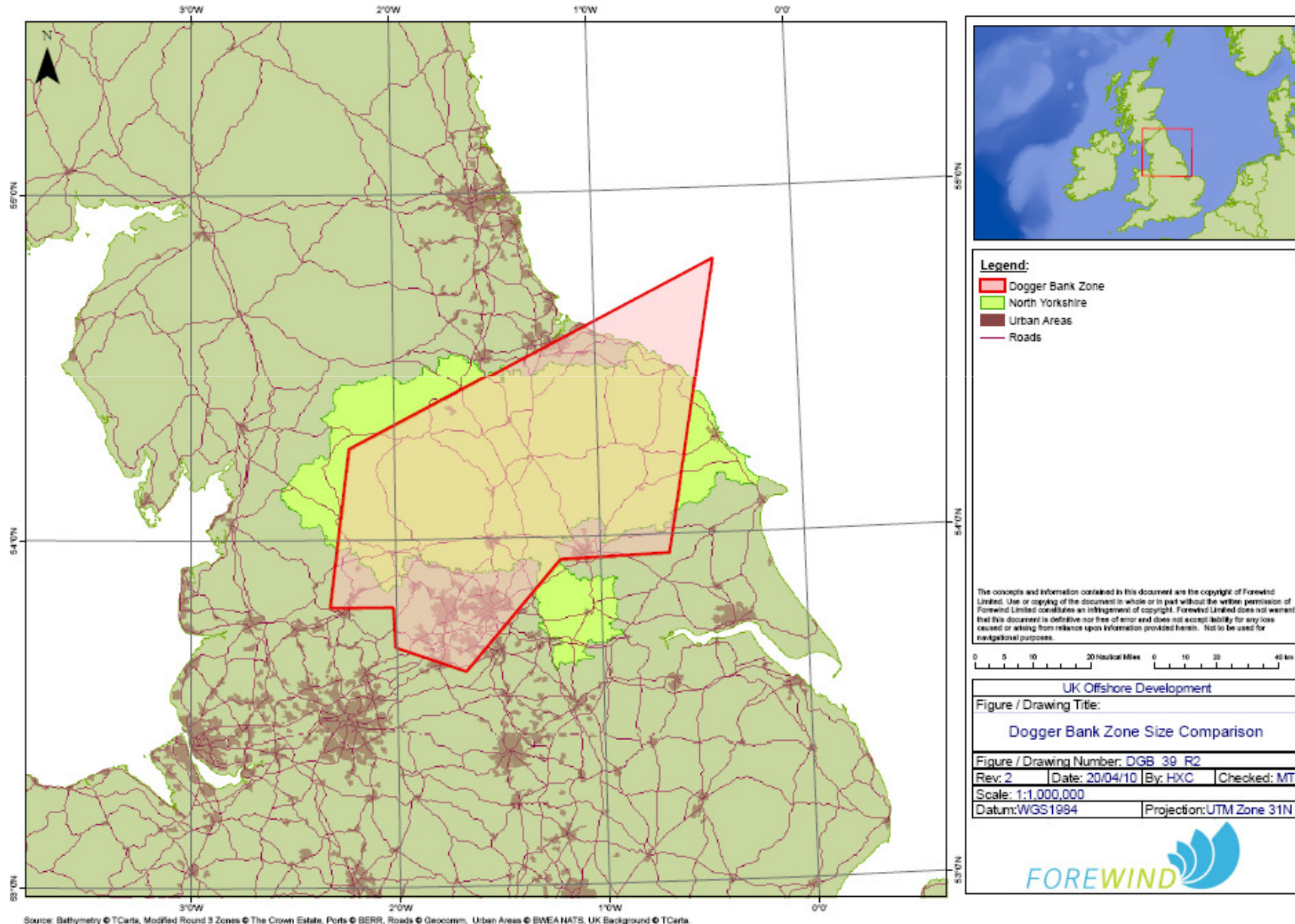
# Dogger Bank Zone - facts



- Its Windy!
- Largest of Round 3 zones
- Equivalent to size of North Yorkshire (8660km<sup>2</sup> / 3343 sq.miles)



# Dogger Bank



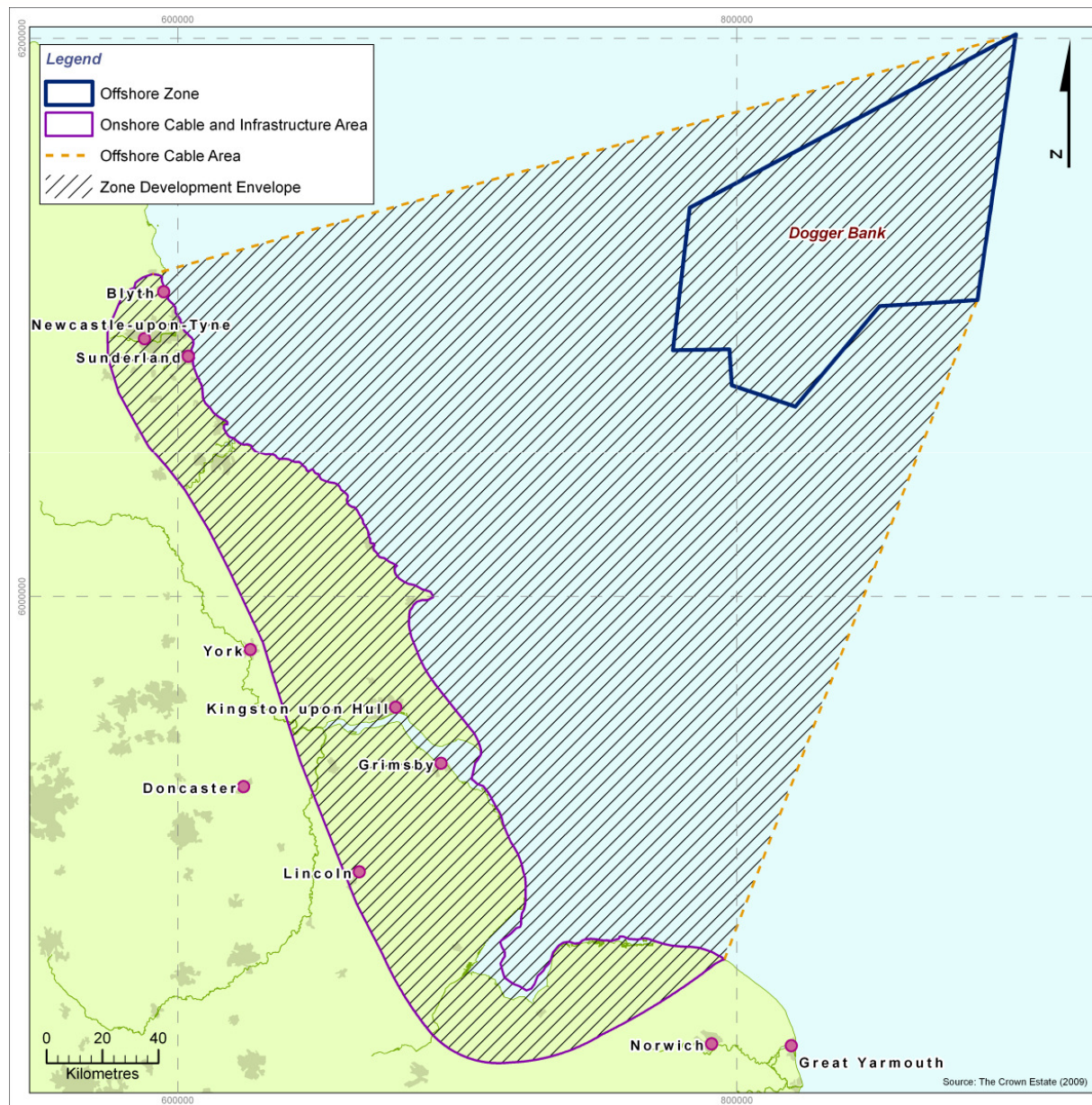
# Dogger Bank Zone - facts



- Distance from shore 125 to 290 kilometres
- Water Depth 18 – 63 metres (59 to 206 feet)
- Estimated Zone Capacity = 9GW by 2020 (potential for ~13GW)
- At 13 GW developed it would equate to 10 per cent of total UK electricity requirements

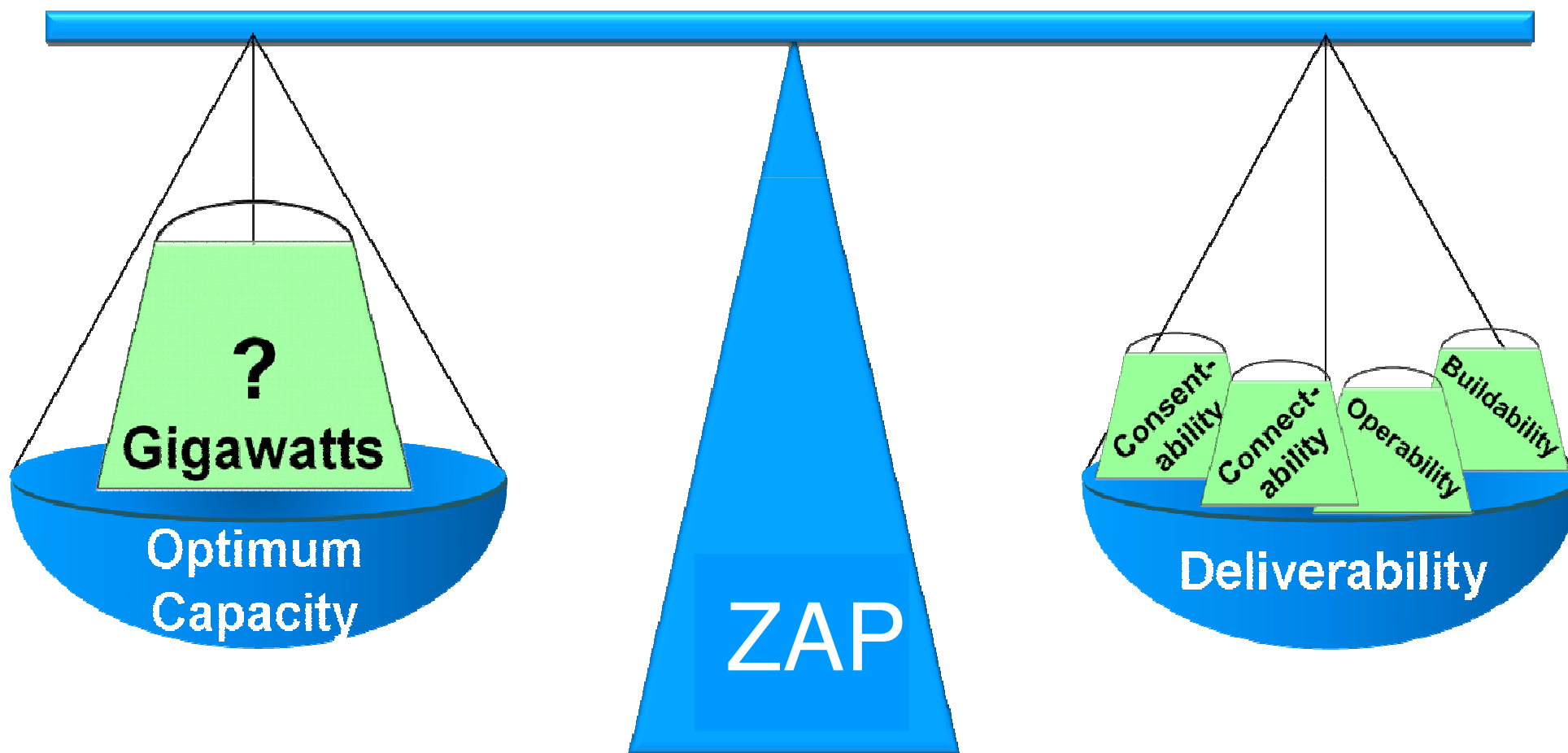
*Zone Appraisal needed to inform wind farm locations and cable corridors and onshore infrastructure*

# Zone Development Envelope



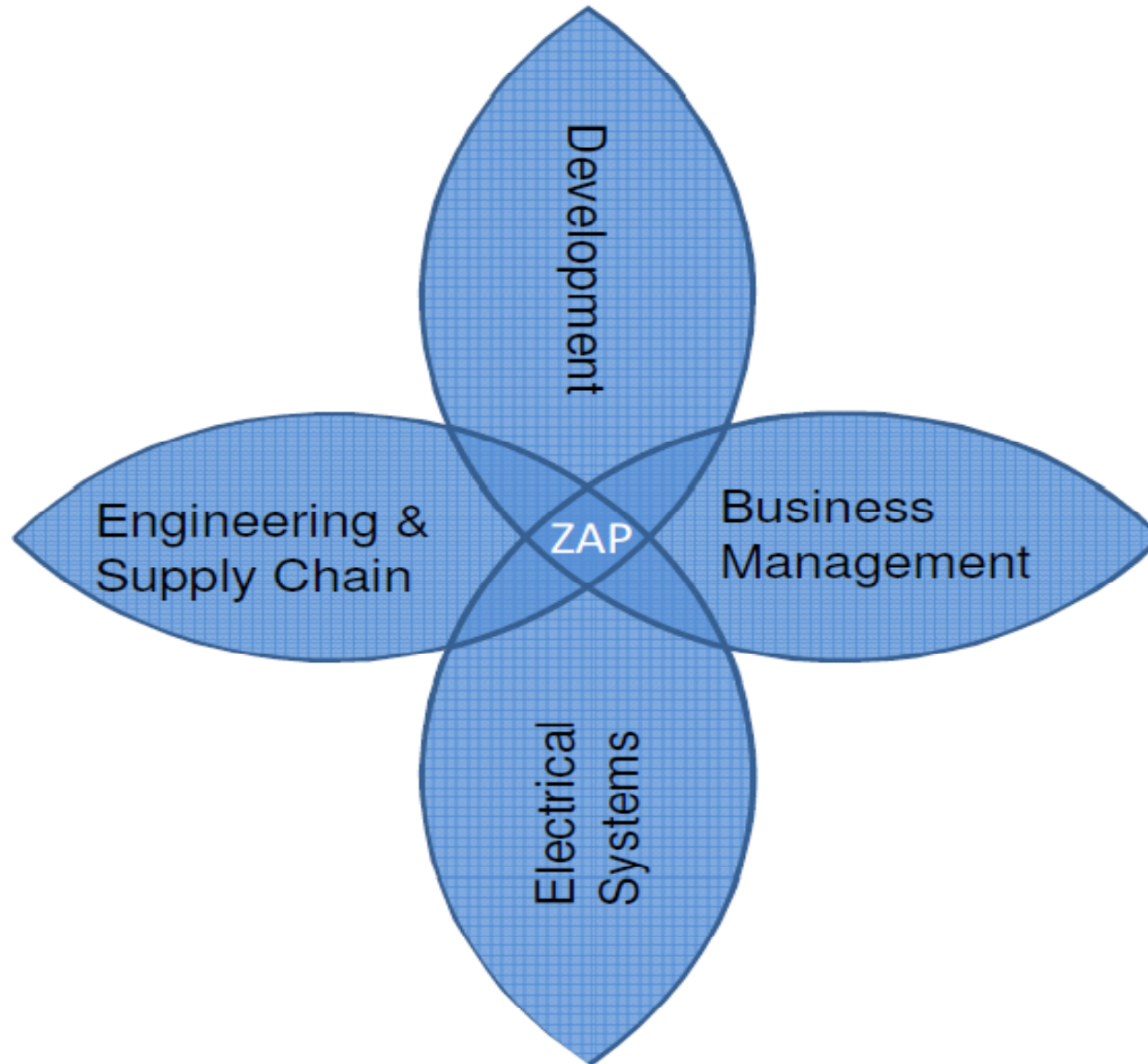
## Commercial Venture

capacity optimisation is in direct balance with the deliverability of a project



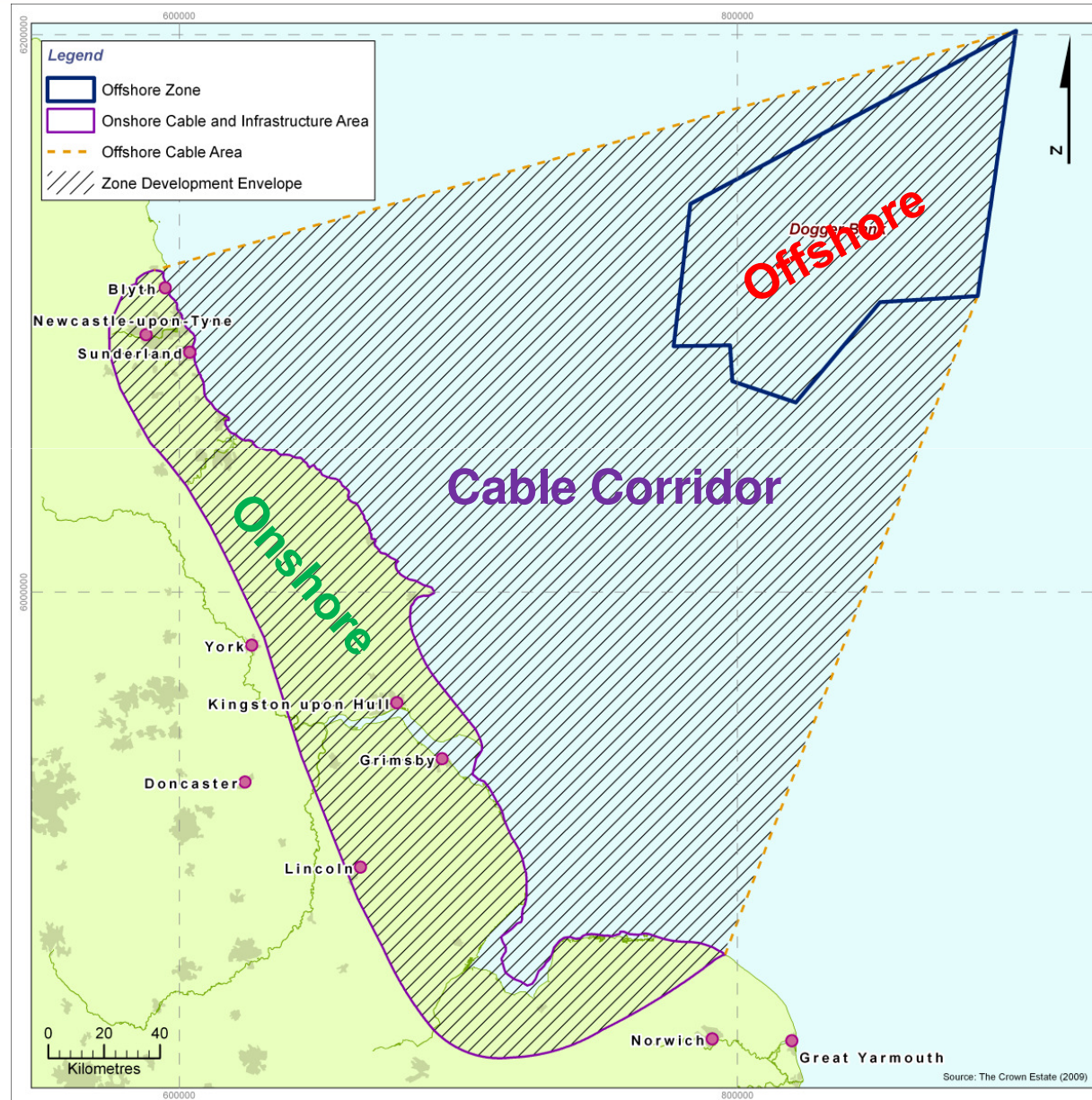


# How Forewind is organised?





# Development team organised



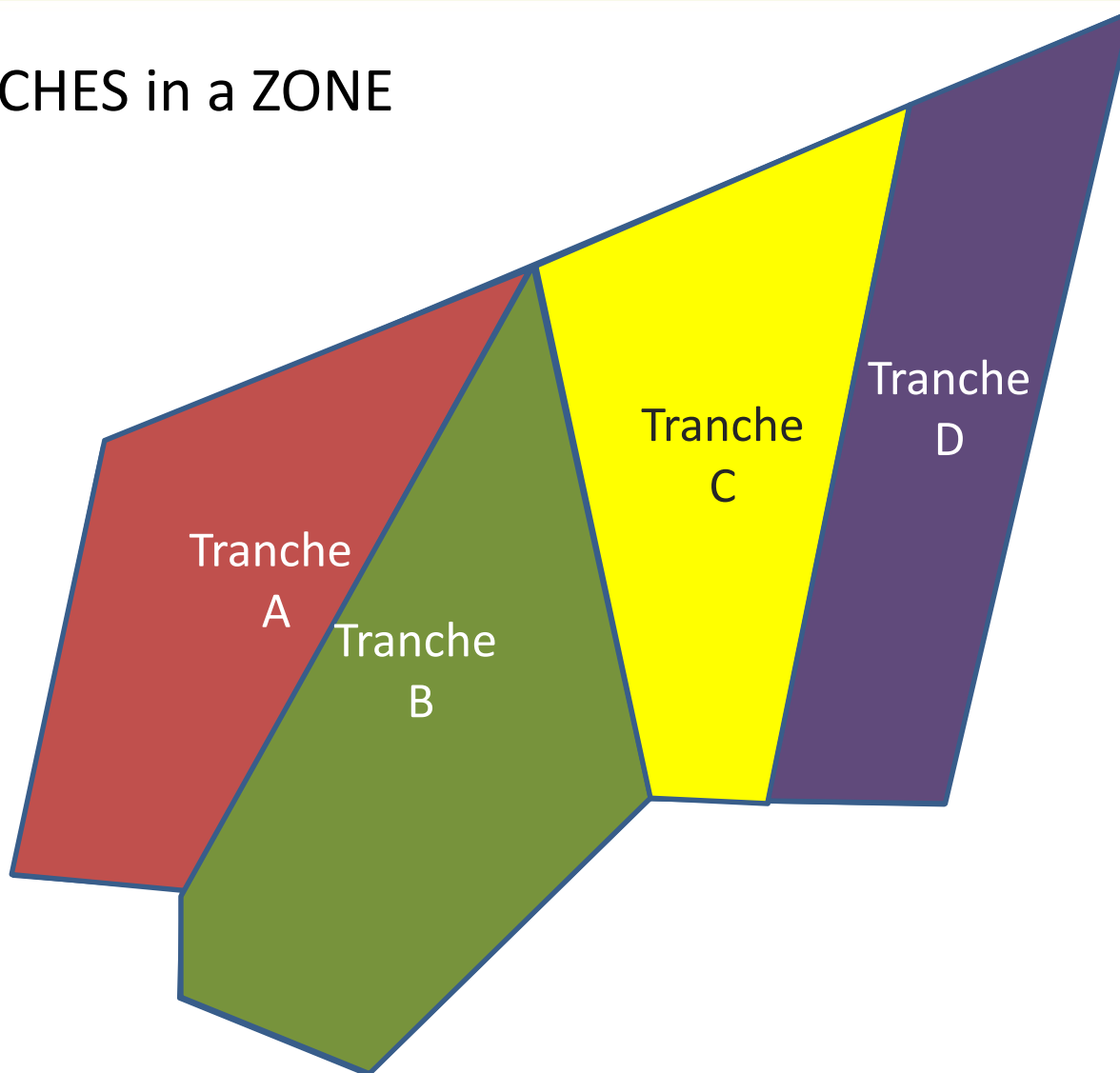
# Zones, Tranches & Projects

The wind farm ZONE



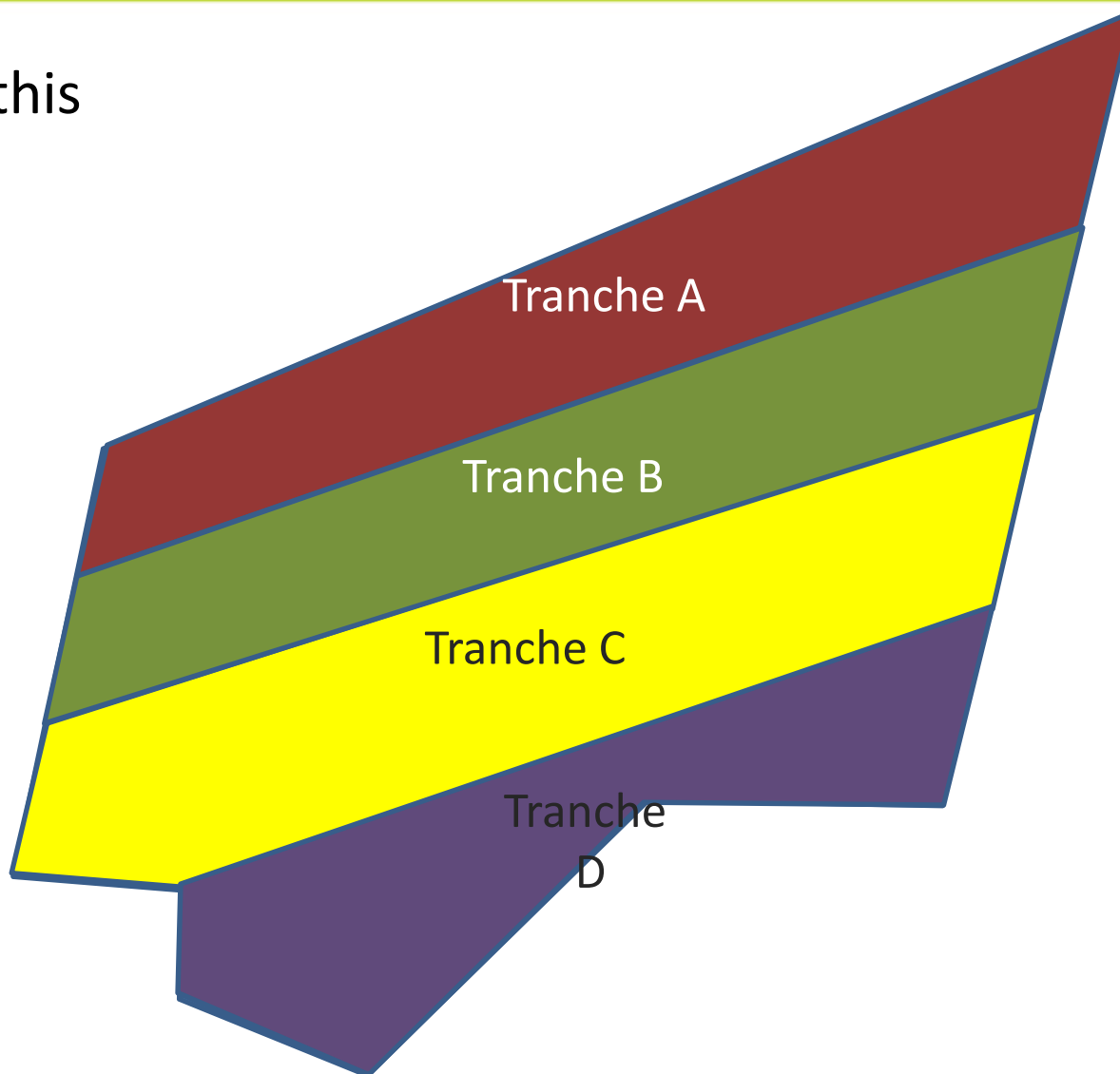
# Zones, Tranches & Projects

4 TRANCHES in a ZONE



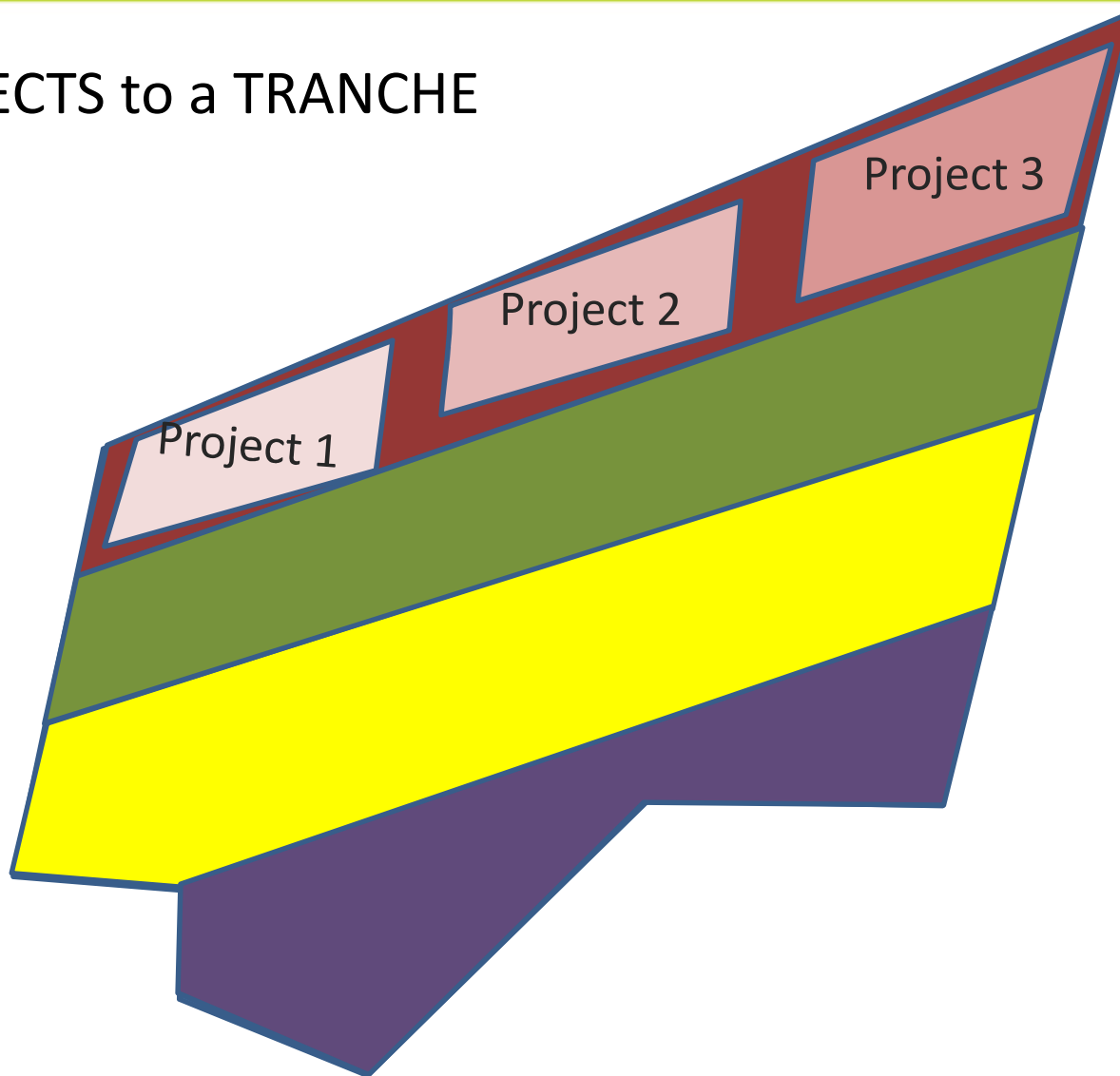
# Zones, Tranches & Projects

Or like this

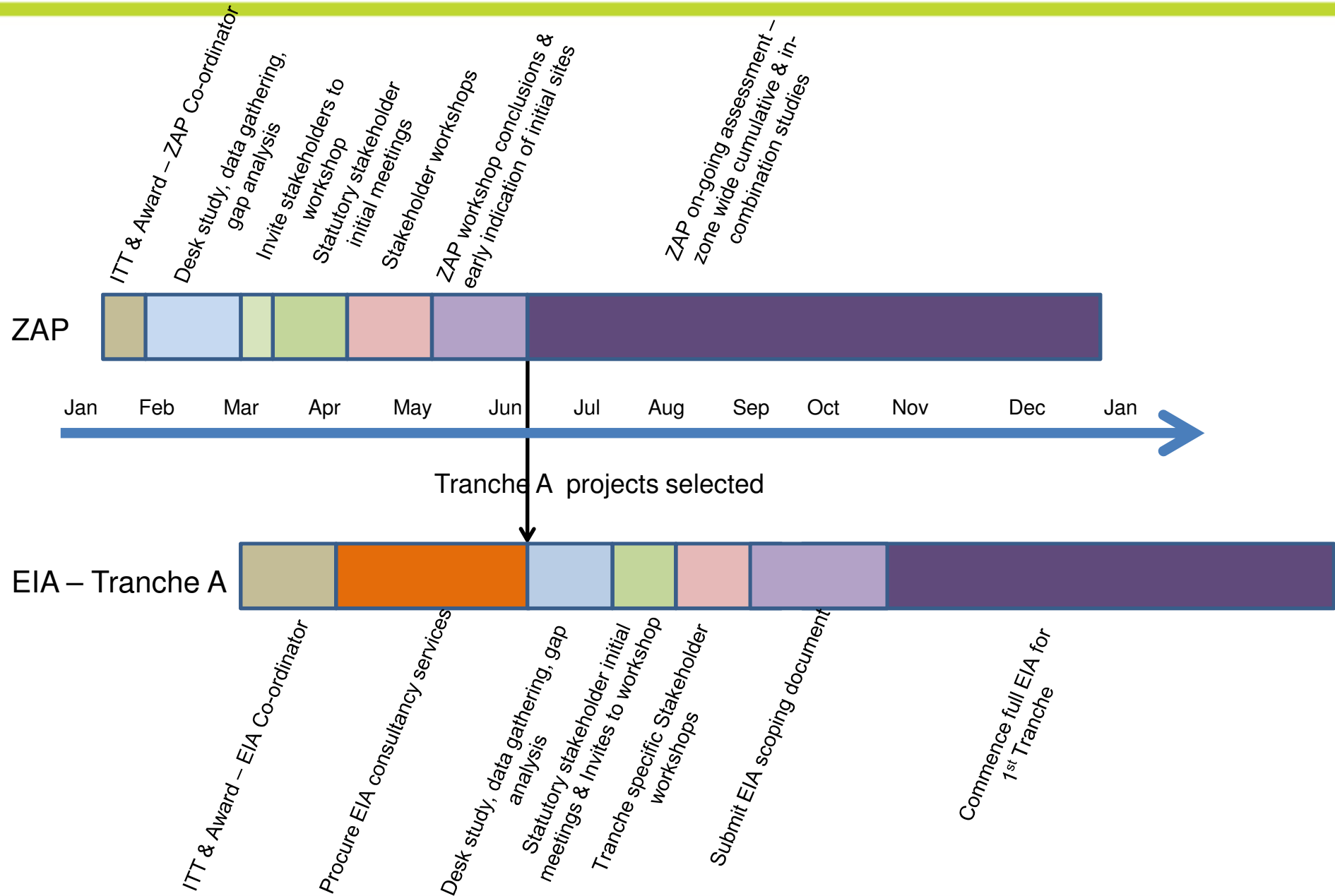


# Zones, Tranches & Projects

3 PROJECTS to a TRANCHE







- Tranche A
  - identified by July this year
  - 2 years of comprehensive stakeholder engagement , surveys and studies
  - Apply for consent end of 2012
  - Consent decision end of 2013
  - Commence pre construction work thereafter
- Tranche B
  - Identified by July next year
- Tranche C
  - Identified by July 2012
- Tranche D
  - Identified by July 2013

# Issues influencing zonal development

Issue		
Bathymetry (historic and current)	Archaeology	Shoreline constructions
Historic shoreline evolution	Wrecks	Nature designations
Historic wind climate	Oil	Birds
Wave heights	Gas	Bats
Wave period	Subsurface Infrastructure	Marine mammals
Tidal data	Recreation	Commercial fisheries – landings
Tidal range	Ports	Commercial fisheries - surveillance
Current velocities	Grid connection	Shellfish / aquaculture
Tidal surge data	Navigation	Recreational fisheries
Fog	Aggregates	Fish resources
Cloud	Disposal sites	Benthic habitats
Seabed characteristics	National Limits	coastal / inter-tidal habitats
Sediment type	Underwater noise	Other Offshore Wind Farms
Bedform mobility	Visual Impacts (land elevation)	Aviation
Sediment transport regime	Shipping	Radar
Geology	MOD	Helicopters
Quaternary geology	Cables	Pipelines
Earthquake		

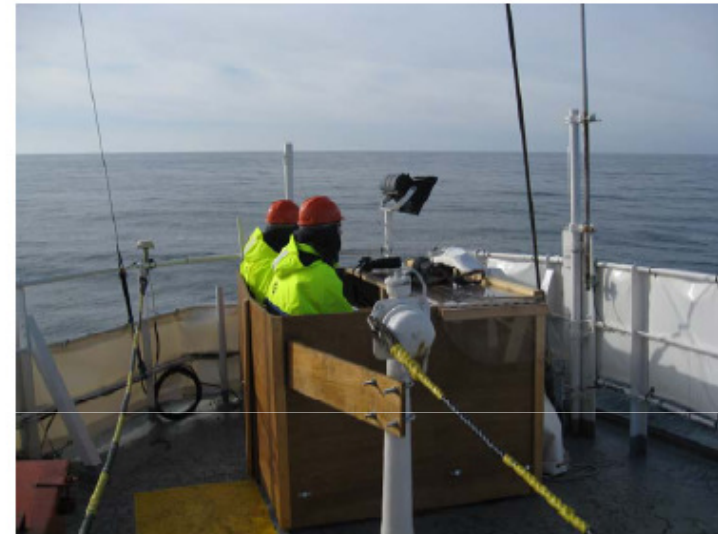
# MV Sea Profiler – chartered 2 years



Length O.A.	65.80m
Breadth	11.04m
Gross Tonnage	1082t
Main Engine	MAN 1000hp
Bow Thruster	240 hp



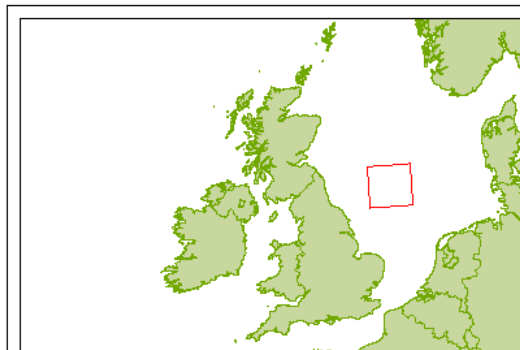
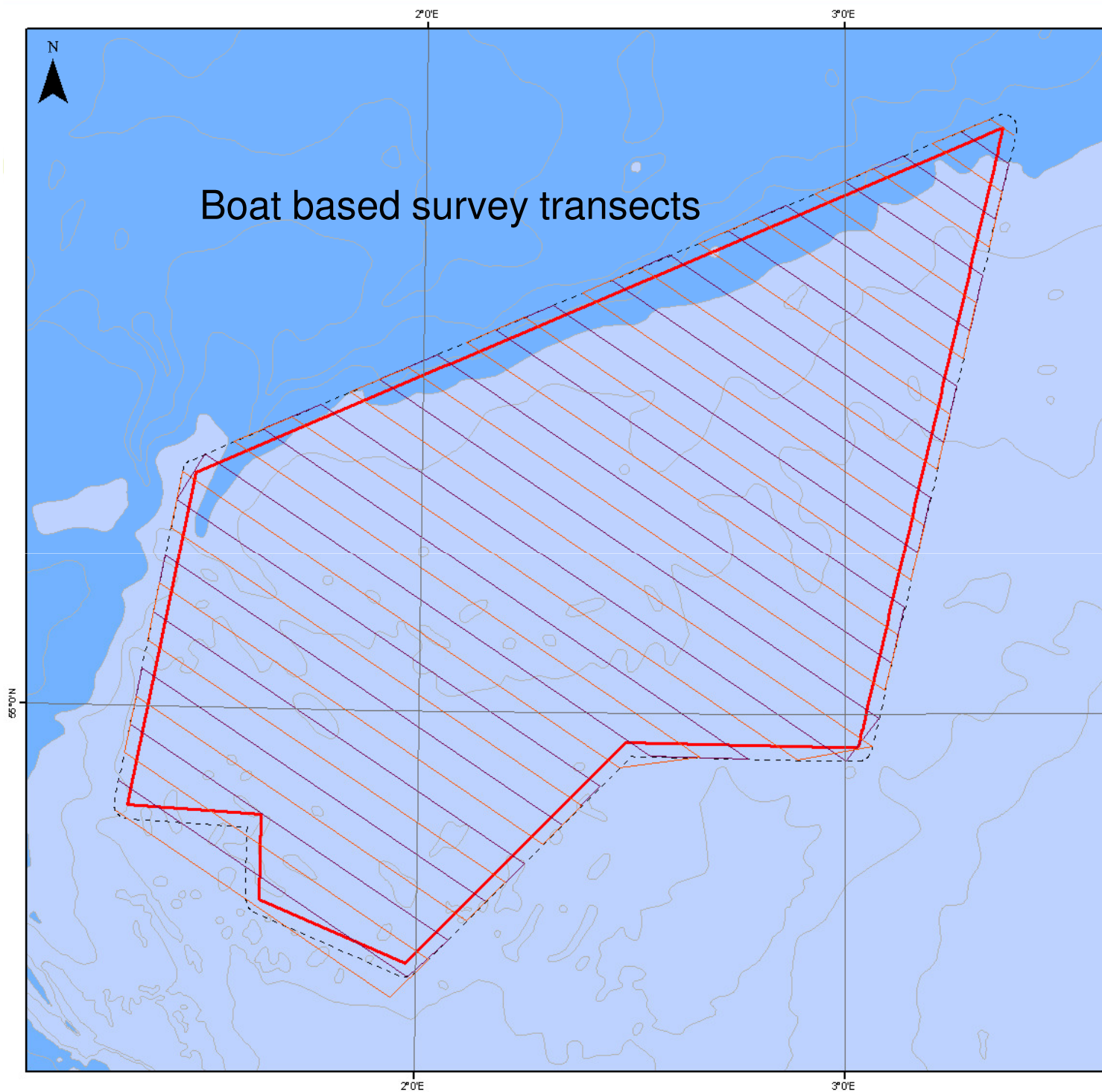
# Bird monitoring shelters



Bird monitoring  
shelters







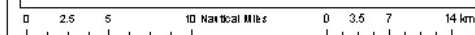
#### Legend:

- Primary 8km Transects
- Secondary Offset 8km Transects
- Dogger Bank Zone - Modified 10/08/2009
- - - Dogger Bank Bird Surveying Area - 2km buffer
- Contours (TCarta, 2009)

#### Bathymetry (TCarta, 2009)

##### Depth

- Shallower than 50m
- Deeper than 50m



#### UK Offshore Development

Figure / Drawing Title:

**Dogger Bank - Potential Boat Based Transect Locations**

Figure / Drawing Number: DGB\_11\_R6

Rev: 6 | Date: 11/12/09 | By: MM | Checked: JH

Scale: 1:550,000

Datum: WGS1984

Projection: UTM Zone 31N



# February bird and mammal data

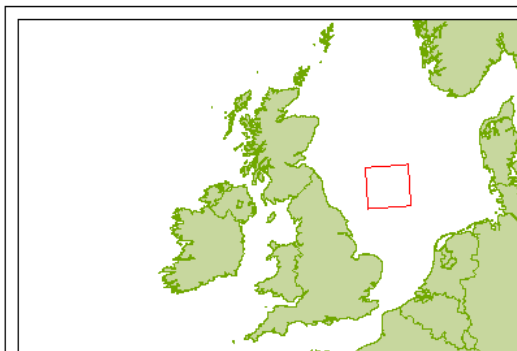
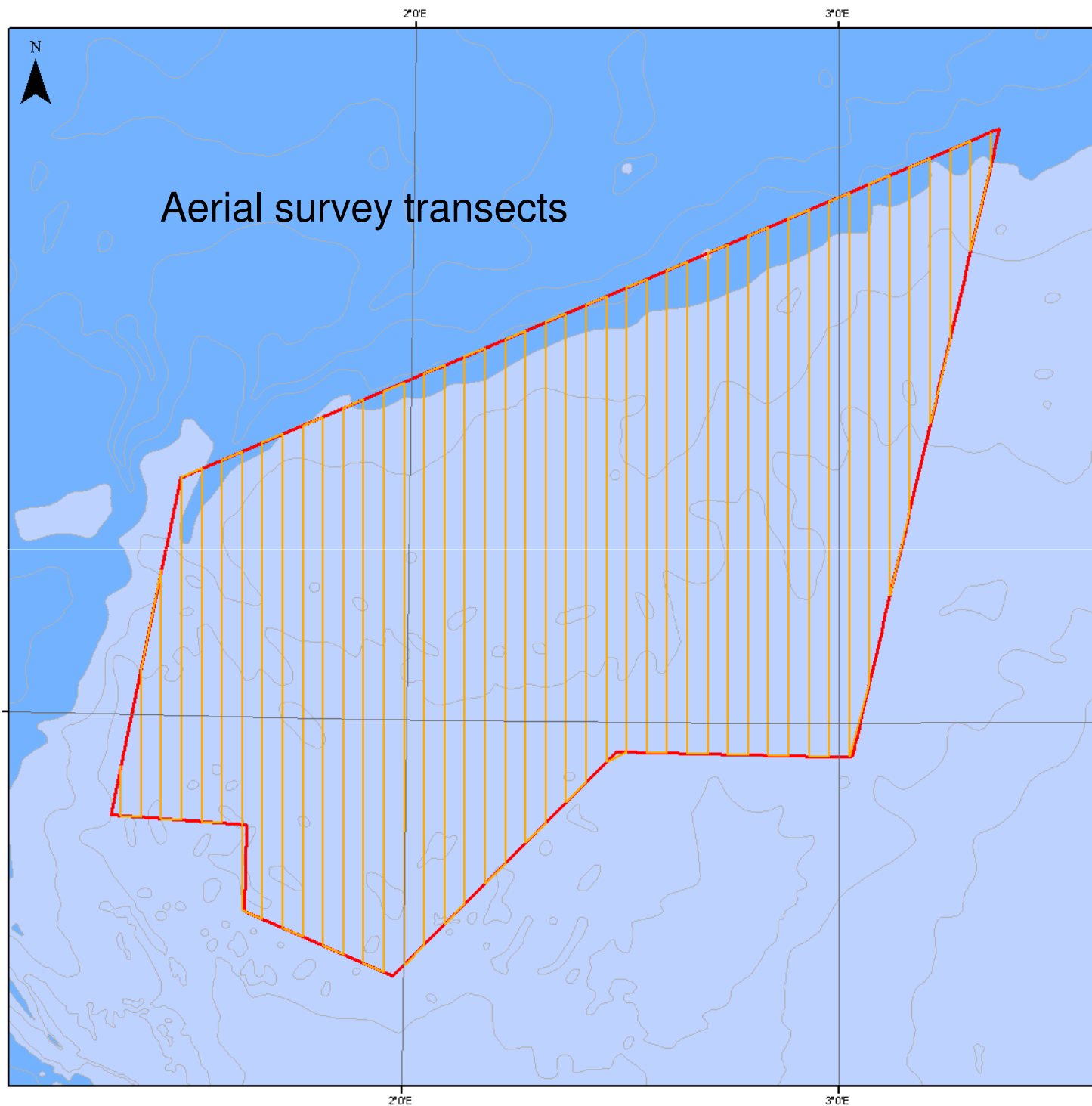
- 15 sea birds species including:
  - 640 fulmars, 518 gannets,
  - 2164 Kittiwakes, 2134 guillemots,
  - 750 razorbills
  - 1 White Billed Diver
- 10 migrant bird species including:
  - Woodcock, Waxwing, Wood Pigeon,
  - Pied wagtail, Fieldfare, Thrush, Song Thrush
- 6 cetacean sightings
  - White-beaked dolphin
  - Harbour porpoise
- 11 seal sightings including:
  - Grey seal
  - Common seal



Adult gannet 8/2/10



White beaked dolphin sighted 6/2/10



#### Legend:

- 3km Bird Survey Transects
- Dogger Bank Zone - Modified 10/08/2009
- Contours (TCarta, 2009)

#### Bathymetry (TCarta, 2009)

##### Depth

- Shallower than 50m
- Deeper than 50m

0 2.5 5 10 Nautical Miles 0 3.5 7 14 km

#### UK Offshore Development

Figure / Drawing Title:

**Dogger Bank - Potential Aerial Bird Transect Locations**

Figure / Drawing Number: DGB\_16\_R1

Rev: 1 Date: 11/12/09 By: MM Checked: JH

Scale: 1:550,000

Datum: WGS1984

Projection: UTM Zone 31N

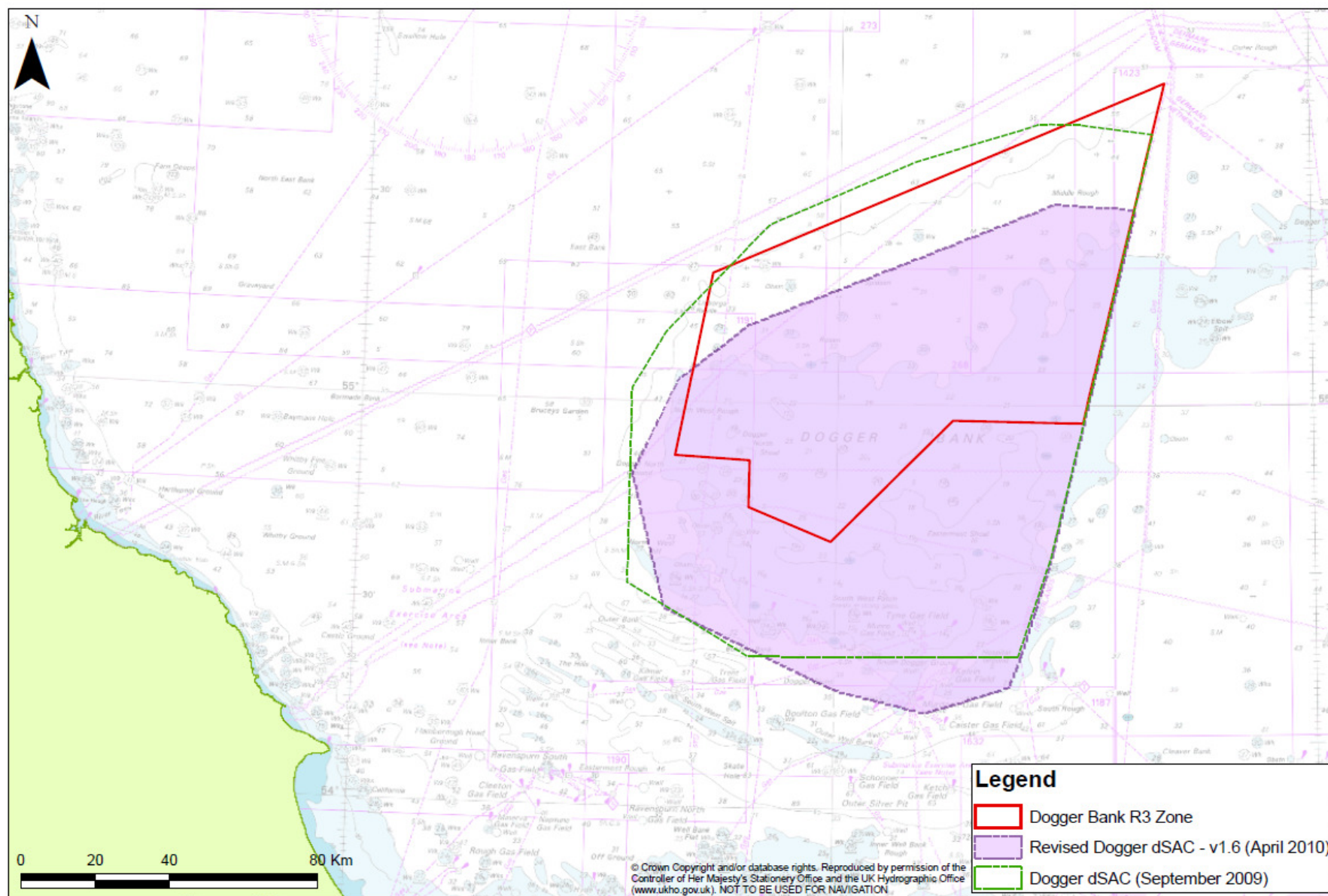


# Geophysics zone wide survey





# Zone in relation to dSAC

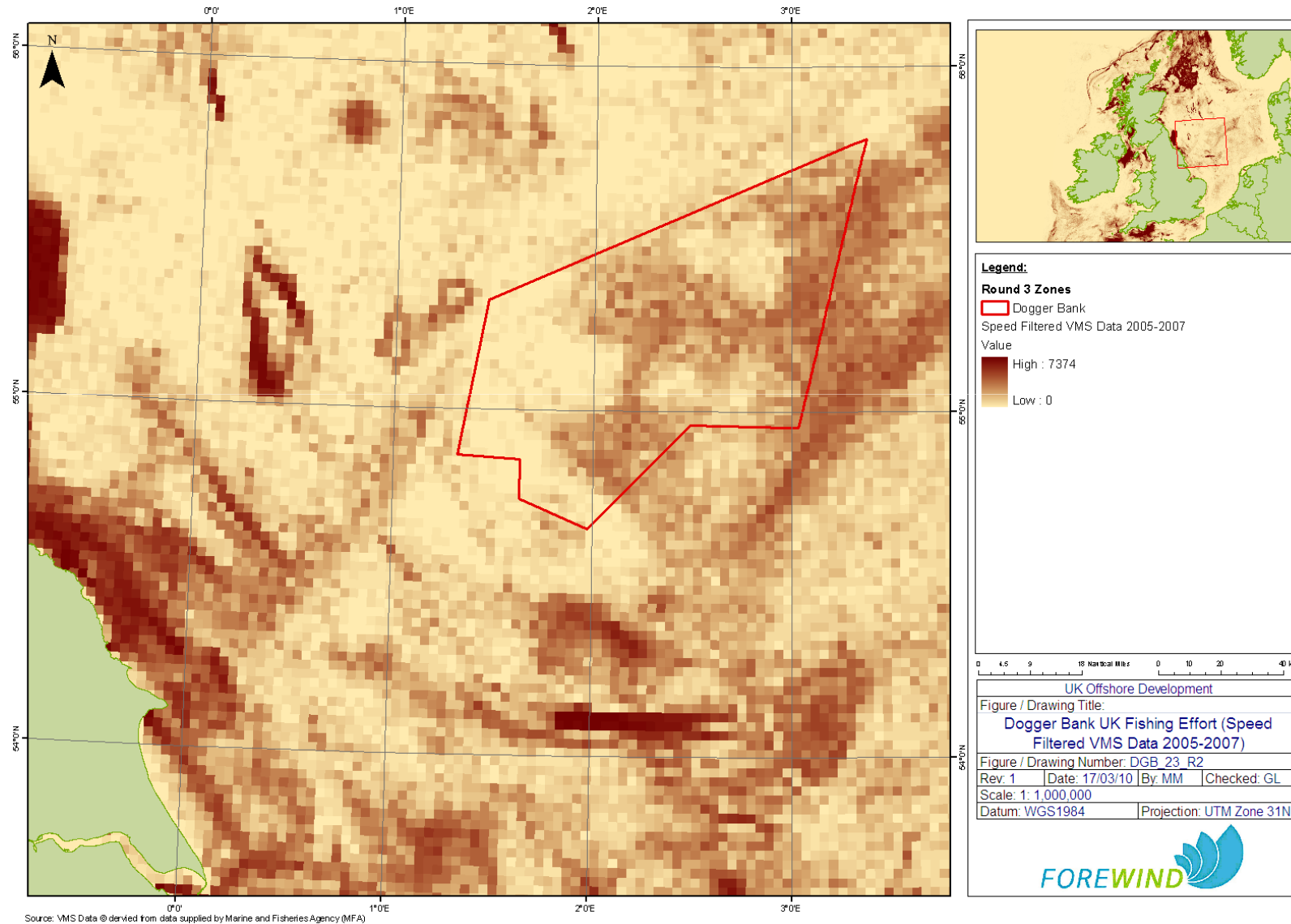


# Fisheries heritage



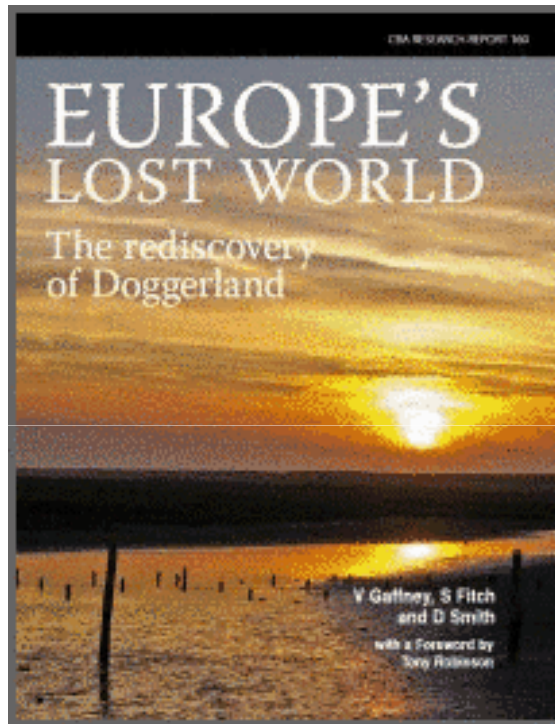
From "Norard of the Dogger" 1887

# Fisheries activity today – UK data





# Dogger Bank – Atlantis of the UK?



# Battles on Dogger Bank



- Battle of Dogger Bank 1781
- Battle of Dogger Bank World War 1

# Thank you







**Feedback from this morning**