



Foraging ranges of northern gannets *Morus bassanus* in relation to proposed offshore wind farms in the UK 2010-2012 – Completed Project

A project undertaken by the Royal Society for the Protection of Birds (RSPB), funded by the Department of Energy and Climate Change (DECC) Offshore Energy Strategic Environmental Assessment (OESEA) programme. For further information, contact the Project Coordinator at sml@hartleyanderson.com

Context

Britain and Ireland are of outstanding international importance for their breeding seabirds for which they host a high proportion of the biogeographical populations of several species, one of which is the northern gannet (*Morus bassanus*). The UK hosts approximately 59% of the world population of gannets at colonies distributed mainly around the western and northern coasts of Britain. The only gannet colony in England is at Flamborough Head and Bempton Cliffs, a Special Protection Area (SPA) that includes gannet as part of the breeding seabird assemblage that forms a qualifying feature of the site. Studies from the Bass Rock colony indicate regular foraging ranges for gannets in excess of 100km, suggesting that several proposed offshore wind energy development zones could lie within the expected foraging range of breeding gannets from the Flamborough Head and Bempton Cliffs SPA.



Gannets may be vulnerable to collision with offshore wind turbines; they have poor manoeuvrability and their long, narrow wings and high wing-loading (wing loading is the ratio of weight to wing area) are adaptations to using the wind to assist fast flight. The risk with wind farms is unclear, with it depending on levels of flight activity within the wind farm footprints and within the rotor swept area and extent of avoidance behaviour. It is known that gannets fly at and plunge-dive from, elevations within rotor swept height.

Breeding gannets are centrally placed foragers, consequently their foraging ranges are likely to be most constrained when provisioning growing chicks, although they can still cover large distances during this period. Flight activity, within a given area, may increase as a result of feeding aggregations e.g. individuals commuting to the same foraging locations and it is anticipated that any risk is likely to be increased during chick-rearing as breeding gannets are constrained by the need to return to the nest.

An essential part of both Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA), for offshore development, including for offshore wind farms, is to determine the bird populations that might be affected and in particular to assess the risk of adverse impact on relevant SPAs and their interest features. No information on gannet foraging ranges from the Bempton colony was known prior to the start of the study in 2010.

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Project Objectives & Scope

Study objectives were to:

- Determine foraging ranges, flight directions and foraging destinations of adult gannets from the breeding colony at Bempton Cliffs;
- Determine whether adult gannets from Bempton Cliffs forage within or pass through, on their way to foraging locations, areas of the North Sea proposed for wind energy development;
- Obtain a measure of relative importance of the sea areas used.

Figure 1 - Fitting a PTT to a gannet



The project tagged gannets at the Staple Newk section of the Flamborough Head and Bempton Cliffs colony (hereafter, Bempton Cliffs), using Platform Transmitter Terminals (PTTs) to investigate their foraging ranges during chick-rearing and early post breeding periods. PTTs were used rather than GPS data loggers as these would have required recapture or close approach, with clear line of sight, to remotely download data. The PTTs were mounted on the tail feathers (Figure 1) with birds expected to shed the tags at least when moulting, if not sooner.

Project Outcomes & Outputs

Preliminary results from the first two years of the study (2010 and 2011) were reported previously ([Langston & Boggio 2011](#), [Langston & Teuten 2012](#)), with the final report (Langston *et al.* 2013) providing a comprehensive analysis of the data from all three years.

Forty two breeding adult gannets, tracked via satellite PTTs, from Bempton Cliffs in 2010, 2011 and 2012, yielded information about their foraging ranges during chick-rearing, and the extent of overlap of their foraging trips with potential development zones for offshore wind energy generation in the North Sea. Distance to colony had the over-riding influence on foraging range. Most foraging trips were within 150km of Bempton Cliffs (*ca.* 70% of foraging trips were within 50km of the cliffs), and considerable overlap during chick-rearing was noted in particular with the Hornsea Round 3 development zone. Some information was obtained for the early post-breeding period in each year, indicating variability in dispersal and migration away from Bempton Cliffs, and the potential for interaction with several different wind farms at this stage of the gannet's annual cycle. In particular, increased numbers of locations were recorded in the East Anglia zone in the post-breeding period, contrasting with few locations during chick-rearing. Relatively few locations were recorded within the Dogger Bank zone during chick-rearing but there were more post-breeding.

Langston *et al.* (2013), illustrated that the core foraging range (based on the 50% density contour, darkest blue on Figure 2 below) extended further east within the Hornsea zone in 2012, utilising more of this zone, compared with earlier years. The core foraging range extended to 2,547km² in 2010, 3,371km² in 2011, and 4,570km² in 2012. The areas of active use (represented by the 95% density contours, lightest blue on Figure 2) in 2010 and 2011 incorporated clusters of locations within the periphery of the Greater Wash, whereas in 2012 one individual made repeated forays into the Wash. The areas of active use extended to 18,002km² in 2010, 15,852km² in 2011 and 17,744km² in 2012 and indicated a more continuous distribution of activity further eastwards in 2012 than in 2010 and 2011. This was likely due to variability between individual foraging trips or birds rather than a significant difference between years.

The observations at Bempton Cliffs fit with the theories of intraspecific competition and colony size, whereby birds from larger colonies have to forage further afield because of intraspecific competition and prey depletion (Lewis *et al.* 2001). This is also likely to suppress foraging extent to the north of Bempton Cliffs, especially as there is pronounced spatial segregation of foraging areas used by gannets from different breeding colonies (Wakefield *et al.* 2013). There were an estimated 3,940

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DECC Offshore Energy SEA

The SEA process aims to help inform licensing and leasing decisions by considering the environmental implications of a plan/programme and the activities which could result from its implementation. Since 1999, DECC has conducted a series of offshore energy SEAs, the latest covering wind, tidal stream and range, CO₂ and hydrocarbon gas storage, and oil & gas – see right.

Since the first SEA, the associated research programme has targeted key information gaps on the marine environment and potential industrial impacts, to inform the SEA process, developers, consenting bodies and others. Research priorities are discussed with the SEA Steering Group and a range of other stakeholders.

For more information on the OESEA programme, visit the offshore SEA web pages on <https://www.gov.uk/> or email oop@decc.gsi.gov.uk

A data portal for previous SEA reports and data is at <http://www.bgs.ac.uk/data/sea>

	Area	Sector
SEA 1	The deep water area along the UK and Faroese boundary	Oil & Gas (19 th Licensing Round, 2001)
SEA 2	The central spine of the North Sea which contains the majority of existing UK oil and gas fields	Oil & Gas (20 th Licensing Round, 2002)
SEA 2 Extension	Outer Moray Firth	Oil & Gas (20 th Licensing Round, 2002)
SEA 3	The remaining parts of the southern North Sea	Oil & Gas (21 st Licensing Round, 2003)
R2	Three strategic regions off the coasts of England and Wales in relation to a second round of offshore wind leasing	Offshore wind (R2 of Leasing, 2003)
SEA 4	The offshore areas to the north and west of Shetland and Orkney	Oil & Gas (22 nd Licensing Round, 2004)
SEA 5	Parts of the northern and central North Sea to the east of the Scottish mainland, Orkney and Shetland	Oil & Gas (23 rd Licensing Round, 2005)
SEA 6	Parts of the Irish Sea	Oil & Gas (24 th Licensing Round, 2006)
SEA 7	The offshore areas to the west of Scotland	Oil & Gas (25 th Licensing Round, 2008)
OESEA	UK offshore waters*	Oil & Gas (26 th Licensing Round, 2009) Gas storage Offshore wind (R3 of Leasing, 2009)
OESEA2	UK offshore waters*	Oil & Gas (27 th Licensing Round, 2012) Gas storage Carbon dioxide transport and storage Offshore wind, wave and tidal energy

*For renewable energy included potential leasing in the UK Renewable Energy Zone (REZ) and the territorial waters of England and Wales but not the Scottish Renewable Energy Zone and Northern Irish waters within the 12 nautical mile territorial sea limit