

European Offshore Wind Deployment Centre Environmental Statement

Chapter 10: Ornithology

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10 ORNITHOLOGY

10.1 Introduction

- 1 The Ornithological Baseline and Impact Assessment report provides a detailed assessment of the potential impacts and possible effects on the birds present within the proposed European Offshore Wind Deployment Centre (EOWDC) area. The assessment is based on the findings from site specific bird surveys undertaken to help inform the impact assessment along with desk-based studies using published data from existing offshore wind farms.
- 2 This chapter provides a condensed summary of the findings presented in the Ornithological Baseline Impact Assessment report, which should be referred to for further information. Genesis Oil and Gas Consultants carried out the ornithological assessment.

10.2 Data Information and Sources

- 3 Three different types of surveys have been undertaken since 2005 in order to obtain a representative sample of bird data to inform the EIA and, if required, a Habitats Regulations Appraisal.
- 4 Monthly boat-based surveys were undertaken between February 2007 and April 2008 and an additional 12 months of surveys commenced in August 2010. In addition to the boat-based surveys, two years of Vantage Point surveys were undertaken from March and October 2005 and from April 2006 to March 2008 and three radar surveys were carried out in October 2005, April 2006 and April 2010.
- 5 The data obtained from these surveys along with additional information from other offshore wind farms have been used to help inform the Environmental Impact Assessment (EIA).

10.2.1 Boat-based Surveys

- 6 There have been two periods of boat-based bird surveys undertaken in support of the proposed development.
- 7 Between February 2007 and April 2008 boat-based surveys were undertaken on a monthly basis. Each survey covered an area of 101.6 km², which included the then proposed development site plus a buffer zone and a control survey area located immediately to the north (Figure 10.1). The control survey area of 50.8 km² was the same size as the then proposed development site (including the buffer zone). The site proposed at the time the surveys were being undertaken represented 12 % of the total area surveyed, and 24 % of the proposed EOWDC survey area. The distance of the shoreline to the proposed EOWDC survey area varied between 0.6 km to 7 km and the control survey area between 0.5 km to 6 km. The control survey area was positioned in an area exhibiting similar physical attributes (bathymetry and seabed type) to that of the then development site (IECS 2008).

- 8 Following the completion of the Year 1 bird surveys (February 2007 – April 2008), the location and size of the proposed development was revised. Although the original boat-based surveys did cover the revised location, the potential for future monitoring was improved by using an alternative survey strategy designed for the surveys undertaken since August 2010 (Figure 10.1). Three blocks have been surveyed each month out to 25 km from the shoreline, allowing a gradient approach of potential impact areas to be used (SMRU 2011). The total area surveyed each month was 339 km², comprising of three strata: 150.8 km² (north), 82.8 km² (south) and 105.2 km² (offshore).

10.2.2 Vantage Point Surveys

- 9 Vantage Point (VP) surveys have been undertaken from a total of six sites (four in any one year) within Aberdeen Bay over a period of three years between March 2005 and October 2005 and April 2006 and March 2008 (Figure 10.2) (EnviroCentre 2007; Alba Ecology 2008).
- 10 Watches were conducted by a single observer with binoculars and telescope for one to two hours from each VP site. Observations were carried out during daylight hours and in conditions of good visibility. Up to four surveys per month were undertaken.
- 11 A total of 294 VP surveys and 582 hours of surveys have been undertaken over a period of three years across six different areas of Aberdeen Bay (Table 10.1).

Site	No. of VP surveys	No. of Hours
Drums	55	114
Balmedie	52	102
Blackdog	84	167
Murcar *	10	16
Donmouth	83	163
Promenade *	10	20
Total	294	582

* = Data collected between March and October 2005 only

10.2.3 Bird Detection Radar Surveys

- 12 Bird Detection radar has been used on three occasions during periods predicted to be of high migration in Aberdeen Bay: October 2005, April 2006 and April 2010. Original surveys were undertaken at Easter Hatton and Drums, but later moved to Blackdog, closer to the proposed development area. The survey areas of the radar surveys are shown on Figure 10.2
- 13 Bird movements were tracked continuously up to a range of 11 km, including during periods of darkness or poor weather conditions. The radar could detect bird movements, their flight trajectory, flight speed and altitude to a height of 1.4 km.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Bird Detection Radar	2005												
	2006												
	2007												
	2008												
	2009												
	2010												
Boat- based	2007												
	2008												
	2009												
	2010												
	2011												
Vantage Point	2005												
	2006												
	2007												
	2008												

Diagram 10.1 Ornithological surveys undertaken in Aberdeen Bay 2005 – 2011

- 14 Diagram 10.1 outlines the survey coverage to date.
- 15 A summary of the main survey reports and studies used in the EIA for birds is presented below:

- Alba Ecology (2008a). Preliminary Vantage Point species accounts of seabird movements at the proposed Aberdeen Bay offshore wind farm: April – September 2007. Report for AMEC Wind Energy
- Alba Ecology (2008b) Preliminary Vantage Point species accounts of seabird movements at the proposed Aberdeen Bay offshore wind farm: October 2007 – March 2008. Report for AMEC Wind Energy
- EnviroCentre (2007) Preliminary vantage point species accounts of seabird movements at the proposed Aberdeen Bay offshore wind farm: April – September 2006. Report for Amex Wind Energy February 2007
- Forrester, R.W., Andrews, I.J., McInerny, C.J., Murray, R.D., McGowan, R.Y., Zonfrillo, B., Betts, M.W., Jardine, D.C. & Grundy, D.S. (eds) (2007). The Birds of Scotland. The Scottish Ornithologists' Club, Aberlady
- IECS (2008). Aberdeen Offshore Wind Farm: Ship Based Seabird Survey Results Year 1 – February 2007 to January 2008. Report to AMEC Wind Energy. Institute of Estuarine and Coastal Studies. University of Hull
- Lewis, M., Wilson, I.J. Söhle, I., Dean, B.J. & Reid, J.B. (2008). Wintering sea ducks, divers and grebes in the UK inshore areas: Aerial surveys and shore-based counts 2006/07. JNCC Report No. 414
- Maclean, I.M.D, Wright, L.J., Showler, D.A. and Rehfisch, M.M. (2009) A Review of Assessment Methodologies for Offshore Windfarms. British Trust for Ornithology Report Commissioned by Cowrie Ltd
- NESBR – North-east Scotland Bird Reports. 1980 to 1997
- Percival, S.M., Band, B. and Leeming, T. (1999). Assessing the ornithological effects of Windfarms: developing a standard methodology. Proceedings of the 21st British Wind Energy Association Conference, 161-166

- Plonczkier, P. & Simms, I.C. (2010). Aberdeen Offshore Wind Deployment Centre bird detection radar survey. Wildlife Management Programme, report by Food and Environmental Research Agency. York
- Quick, N and Macleod, K. (2009). Aberdeen Wind Farm Data Review. Final Report prepared by SMRU Ltd for Vattenfall, Aberdeen, UK. 22pp
- Roos, S., Humphreys, L., Wernham, C. & Burton, N. (2010). Informing Appropriate Assessment of the Pentland Firth Strategic Area leasing Round. Ornithological scoping Report. BTO. Thetford
- Simms, I.C., Dale, M. S., Plonczkier, P., Budgey, R., Eassom, A. & Jowerr, A. (2007). A further study using Bird detection Radar for the monitoring of bird movements at the proposed Aberdeen Offshore Wind Farm. Report Commissioned by AMEC Wind.. CSL. York
- SMRU (2011a). Aberdeen Wind Farm Year 1 Data Analysis. SMRU Ltd
- SMRU (2011b). Aberdeen MMO and PAM boat surveys. SMRU report for Vattenfall
- Söhle, I., Wilson, L.J., Dean, B.J., O'Brien, S.H., Webb, A. and Reid, J.B. (2006). Wintering sea ducks, divers and grebes in UK inshore areas: Aerial surveys and shore-based counts 2005/06. JNCC Report, No. 392
- Travers, S., Thomson, S. and Mander, L. (2008). Aberdeen Offshore Wind Farm – ship-based Marine Mammal Survey Results (February 07- January 08). Final Report ZBB706 –F- 2008. Institute of Estuarine & Coastal Studies, University of Hull. 68pp
- Walls, R.J. Brown, M.D., Plonczkier, P. & Parnell, M. (2006). Section1: A preliminary study using Bird detection radar for the remote monitoring of bird movements at the proposed Aberdeen Offshore Wind Farm. Report Commissioned by AMEC Wind

10.2.4 Consultation

- 16 Consultation with key stakeholders, specifically SNH, JNCC and Marine Scotland occurred at an early stage of the project in 2006 and continued throughout the scoping stage of the EOWDC. Key issues raised were the potential impacts upon birds, specifically red-throated diver and common scoter and also the potential adverse effects to birds from Special Protection Areas (SPAs).

10.3 Impact Assessment Methodology

- 17 Potential impacts on birds arising from the proposed development have been identified based on site specific data from Aberdeen Bay. Other published information on the birds likely to be present in the area has also been drawn upon.
- 18 Whenever possible, additional information from existing offshore wind farms
- 19 Three potentially significant impacts on birds have been identified:
- Collision risk: Birds are at risk of colliding with wind turbines. The level of collision depends on the location and size of the development and the species present. Species such as Auks, Divers and Scoter, fly predominantly below rotor height, whereas other species such as Gulls may fly more frequently at rotor height and therefore be at a greater risk.

- Displacement: Birds that would otherwise use an area may avoid entering the wind farm and therefore be displaced. Birds may be also be displaced if the availability of their prey is reduced or if they are disturbed by vessels associated with the proposed development. The significance of any displacement is largely dependent on the scale and duration of the impact and whether other suitable sites are available to which the birds may go should they be displaced
 - Barrier effects: Birds may avoid flying through the proposed EOWDC and select to fly either over or around it. Should this occur then this might entail the birds flying further than would otherwise have been the case. Many species of bird have been recorded avoiding offshore wind farms, often by altering course at a distance of 1 km or more, eg wildfowl and gannets
- 20 The impact assessment has been based on the above potential effects.
- 21 There are four main phases in the development of the proposed programme that have been considered whilst undertaking the impact assessment.
- pre-construction
 - construction
 - operation
 - decommissioning
- 22 For the purposes of this EIA an evidence based approach has been used to determine potential impacts as well as expert judgement based on the baseline information and results from other offshore wind farms. Impact specific matrices have been used to provide a structure and consistency of approach and also as tool to help inform the impact assessment. The structure and content of the tables are based on those originally developed by Percival et al. (1999) and developed further by Maclean et al. (2009). However, the results from the impact matrices have not been considered to be definitive, nor in isolation. The assessment is ultimately based on the latest published data available on potential impacts, ie wherever possible an evidence based approach has been adopted.
- 23 A species specific sensitivity assessment has been undertaken in line with recommendations made in Maclean et al. (2009). Sensitivities of species groups to particular impacts are ranked and combined with the non-impact sensitivities to give an overall sensitivity.
- 24 By combining the overall sensitivity of a species with the potential magnitude of the impact, an indicative overall sensitivity of the species to the potential impact is obtained (Table 10.2). However, it is recognised that this is only an indicative sensitivity and evidence from existing wind farms and consequently expert judgement is used to determine whether the potential impact is likely to be significant or adverse.

Table 10.2 Potential Significance of Impact				
Magnitude	Overall Sensitivity of Receptor			
	Very High	High	Medium	Low
Very High	Major	Major	Major	Moderate
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Minor
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

10.3.1 Initial Screening Results

- 25 The results from the initial impact indicated that the following species were at a potentially moderate or major risk of:
- collision mortality: gannet , kittiwake, herring gull, lesser black-backed gull, great black-backed gull, common tern and Arctic tern
 - barrier effects: pink-footed goose, barnacle goose, common eider, common scoter, velvet scoter and red-throated diver
 - displacement and disturbance: common eider, long-tailed duck, common scoter, velvet scoter, red-breasted merganser, red-throated diver, cormorant and shag

10.3.2 Designated Sites

- 26 Although the proposed site does not lie within a designated area, there are a number of SPAs along the east coast of Scotland that have the potential to be impacted by the proposed development. For the purposes of the EIA, qualifying species from SPAs 74 km to the north between Troup, Pennan and Lion's Head and the Forth Islands SPA approximately 134 km to the south, have been considered and assessed against the relevant Conservation Objectives. The selection of sites is based largely on the potential foraging areas or known passage routes of the species recorded during surveys undertaken within the proposed development area (Roos 2010).

10.3.3 Implications of Significance

- 27 Where the potential significance is identified as being negligible or minor this is considered to be of limited or no concern. Moderate significance is of concern but may be tolerable depending on the causes that give rise to the potential impact. Major concerns are considered to be a potentially significant effect.

10.3.4 Determining Potential Adverse Effects

- 28 To determine potential adverse effects the assessment is based on the Conservation Objectives and qualifying species of the site.
- 29 To identify whether an impact is potentially adverse with respect to potential impacts on population levels a measure based upon the 1 % of baseline mortality rate has been used as a guide. It is not considered to be a definitive

'cut-off' but a tool to indicate whether the potential impact could cause an adverse effect.

10.3.5 Assessment of Cumulative Impacts

- 30 The cumulative impact assessment considers all other industries which have the potential to impact on the birds that may be present at the proposed development location, these include:
- offshore wind farms
 - shipping
 - aggregates
 - dredging
 - oil & gas
- 31 Offshore renewable projects that have been identified as having the potential for a cumulative effect include two developments in the Moray Firth and three in the Firth of Forth. The sites in the Moray Firth are approximately 150 km to the north and those in the Firth of Forth approximately 120 km to the south of the proposed development.
- 32 The construction of the proposed EOWDC may overlap with construction activities being undertaken at other planned developments. However, given the stage of development of the renewable projects yet to be constructed and the uncertainty as to the types of foundations and wind turbines that will be used, there is sparse information available to incorporate into any impact assessment, which limits the effectiveness of cumulative assessments considering conceptual projects yet to be subject to a formal consent application and for which no environmental or design data are currently available.
- 33 Therefore, the cumulative impact assessment can only be undertaken with data available from the currently operating Beatrice demonstrator project in the Moray Firth. Although, the assessment does wherever possible consider potential cumulative impacts from other yet unconsented renewable projects.
- 34 Shipping associated with the harbour which has been undertaken in Aberdeen Bay over many centuries with currently approximately 16,000 vessel movements per year. There are no known plans that are likely to cause a significant increase in the level of shipping currently being undertaken in Aberdeen Bay and any impacts shipping may currently be having on the birds within Aberdeen Bay will be part of the baseline.
- 35 There are no aggregates activities within Aberdeen Bay. There are no licensed dredging sites within Aberdeen Bay but occasional dredging of the harbour may occur, with the next dredging scheduled for 2012.
- 36 Aside from shipping there are no oil and gas related activities within Aberdeen Bay.

10.3.6 Assessment of In-combination Impacts

- 37 The Conservation (Natural Habitats, & c.) Regulations 1994 (as amended) require that a Habitats Regulations Appraisal (HRA) must be conducted by a competent authority. The HRA considers the implications for European sites in view of the European sites conservation objectives, in respect of any plan or project which is not directly connected with or necessary to the management of the European site for conservation purposes and which is likely to have a significant effect on the European site either alone or in-combination with other plans or projects.
- 38 Therefore the term 'in-combination' will be used when considering the impacts of the proposals with other plans or projects on European sites.
- 39 The main industries considered for potential in-combination impacts are proposed offshore wind farms, aggregate industry, dredging, oil and gas and shipping. Of these, proposed offshore wind farms and shipping are the only activities identified for which there is a potential for an in-combination impact.

10.4 Baseline Assessment

- 40 The ornithological environmental baseline draws upon results from project specific surveys undertaken to inform the EIA and existing published information on the birds present in the wider area.
- 41 A total of 79 species of bird have been recorded from site specific surveys, of which 37 species are either a qualifying species for a SPA or were recorded in numbers that could be of concern should there be an impact and were therefore further assessed.
- 42 *Wildfowl:* The most frequently recorded wildfowl were common eider and common scoter, both of which were recorded in relatively large numbers particularly during the winter and summer months. Peak counts of eider from boat-based surveys were obtained during the winter months with up to 556 birds being recorded. For common scoter the peak recorded was 1,157 birds counts during the spring and summer months. Evidence from other sources indicated that up to approximately 3,000 of each species may occur in Aberdeen Bay during the summer months. Other species of potential concern included pink-footed goose and barnacle goose, both of which were recorded flying through the area during the spring and autumn.
- 43 *Divers:* The red-throated diver was the only species of diver frequently recorded during the surveys. They were recorded throughout the survey area in water depths of less than 20 m. Peak numbers occurred during the winter and spring with up to 25 birds recorded within the EOWDC area during May.
- 44 *Seabirds:* A total of 20 species of seabird were recorded during the surveys undertaken in Aberdeen Bay.
- **Fulmars** were widespread throughout the area during most of the year. Highest densities were recorded during September and December
 - **Gannets** were recorded throughout the area and throughout the year with peak numbers during August and September. The majority of

sightings were between 2-3 km offshore and most were recorded flying below turbine height

- **Cormorant and shags** were recorded regularly during site specific surveys predominantly within 2 km of the coast. All those recorded in flight were below turbine height
- **Skuas.** Both great skua and Arctic skua were recorded in low numbers between April and November with the majority of sightings during the autumn
- **Gulls.** Kittiwakes were the most frequently recorded gull. Birds were present throughout the year but peak numbers occurred in June and July when over 2,000 kittiwakes were in the whole of the surveyed areas. Of those recorded in flight, 22 % were at rotor height and therefore at risk of potential collision. Other species of Gull recorded included black-headed, common, lesser black-backed, herring and great black-backed
- **Terns.** Four species of Tern were recorded during surveys. The most frequently recorded species was Sandwich tern with peak numbers between May and August with up to 43 birds recorded. The majority of sightings were of birds within 2 km from shore but 44 % were at rotor height. There were fewer records of little, common and Arctic terns with the majority of sightings within 2 km of the coast and relatively few within the proposed development area
- **Auks.** Puffins, guillemots and razorbills were frequently recorded throughout the surveyed area. Peak numbers occurred during the summer and early autumn when up to 80 birds/km² and an estimated abundance of approximately 4,000 birds present to the north of the proposed development area
- **Other species.** A total of 43 other species of bird were recorded in low numbers from all the surveys undertaken. Due to the low numbers recorded they were not considered to be at risk of a likely significant impact or an adverse effect

10.5 Impact Assessment

TABLE 10.3 Summary of Impact Assessments									
Impact	Environmental effect	Probability of effect occurring	Magnitude	Duration	Spatial extent	Significance level	Mitigation	Residual impacts	Monitoring
Construction									
Disturbance	Displacement away from the area by presence of construction vessels	High	Negligible to Medium for more sensitive species, e.g. red-throated diver.	Temporary	Species dependent. Potentially up to 2 km for some species such as red-throated diver and common scoter	Negligible to Moderate for red-throated diver	Minimise vessel movements and use existing shipping routes as far as practicable.	Localised temporary displacement	Reporting protocol
Sound (piling)	Reduction in availability of prey species due to displacement away from sound source or increased mortality	High	Negligible to Medium for Terns and Divers	Temporary	Species dependent. Local.	Negligible to Moderate	Minimise as far as practicable significant piling operations during periods of high seabird sensitivity	Displacement away from construction area.	Tern breeding colony monitoring and boat-based bird surveys.
Operation									
Collision with turbines	Increased mortality	Negligible to Low	Negligible to minor for some Gulls,	Long-term	Local	Minor	None	Possible collision mortality	If practicable, possible

TABLE 10.3 Summary of Impact Assessments									
Impact	Environmental effect	Probability of effect occurring	Magnitude	Duration	Spatial extent	Significance level	Mitigation	Residual impacts	Monitoring
			Terns and barnacle geese						land-based surveys.
Lighting of turbines	Passerines and other birds may be attracted to the turbines.	Negligible	Negligible	Long-term	Local	Negligible	Minimise use of lights as far as practicable	Possible collision mortality	None
Barrier effect	Increased distances flown causes increased energetic expenditure	High	Negligible to minor for some seaduck and cormorants	Long-term	Local	Minor	None	Potential increase in energetic expenditure	If practicable possible land based surveys.
Disturbance	Displacement away from the area by presence of maintenance vessels	High	Negligible to Medium	Long-term	Local	Negligible to Minor	Minimise vessel movements and use existing shipping routes as far as practicable.	Localised temporary displacement	Reporting protocol
Decommissioning									
Disturbance	Displacement away from the area by presence of decommissioning vessels	High	Negligible to Medium	Long-term	Local	Negligible to Minor	Minimise vessel movements and use existing shipping routes as far as practicable.	Localised temporary displacement	Reporting protocol

10.5.1 Mitigation and Monitoring

- 45 Detailed mitigation and monitoring measures would be further developed to avoid, remove or reduce any potentially significant impacts during consultation with the Regulator and their statutory advisors and other stakeholders.
- 46 The main potential impacts arising from the proposed development relate primarily to direct or indirect displacement effects on Divers and Terns. Mitigation measures that may be considered as measures to help avoid, remove or reduce them include:
- 47 *Minimising the proposed development area:* By reducing as far as practicable the overall area of the proposed development at the earlier design stage of the proposed EOWDC, the total area and consequently the total number of red-throated divers or other species that may be displaced has been minimised.
- 48 *Vessel management plans:* The potential disturbance of seaduck and Divers and other seabirds from the proposed development area by vessels may be reduced by minimising the number vessels used and by ensuring that all vessels, as far as practicable, use the existing shipping lanes.
- 49 *Foundation types:* The use of monopiles may require the use of pile-driving to install them. By selecting alternative foundation types, there is the potential to reduce the risk of an impact on the prey species and therefore reduce the possibility of a displacement effect being caused by construction activities.
- 50 *Timing and duration of installation:* The timing and duration of installation have still to be determined. Although it may not be possible to select a period for construction activities to take place that is of lower sensitivity. It would be taken into consideration when developing potential project schedules.
- 51 *Minimising aviation and navigation lighting:* Birds can be attracted to bright lights, e.g. lighthouses, particularly during poor weather conditions. In order to reduce the risk of birds being attracted to the proposed development all lighting would be kept as far as practicable to a minimum but still kept within the requirements to ensure safety.
- 52 It is essential that any monitoring undertaken is designed to address specific concerns or potential impacts identified during the EIA process. Poorly designed ad hoc monitoring is likely to be inefficient and not provide useful or meaningful results. It is therefore important that any monitoring programme is developed in collaboration with the Regulator and statutory advisors and takes note of key stakeholders comments arising from the consultation period.
- 53 A detailed monitoring programme aimed at specific issues or concerns would be developed with the Regulator and advisors should consent be granted.

10.6 Summary

- 54 Site specific boat-based and land based surveys undertaken in Aberdeen Bay identified a total of 80 species of bird, of which 36 species were considered as being at potential risk of being impacted by the proposed development. Three

possible impacts were identified: collision, displacement and barrier effects. A detailed impact assessment undertaken indicated that for most species the proposed EOWDC is only likely to have a negligible or at worst a minor effect on the species present. However, for red-throated diver and three species of tern (Sandwich, little and common terns), the possible effect was considered to be of potentially moderate significance due to displacement effects arising from disturbance or reduced prey availability, however this displacement effect is likely to be of a very temporary nature.

- 55 Further assessment based on evidence from other offshore wind farms indicates that potential effects are unlikely. A detailed monitoring programme would be developed in conjunction with the Regulator and statutory advisors.
- 56 Information to Inform a Habitats Regulations Appraisal (HRA) with respect to birds can be found in Appendix 29.1.