

# Humber Gateway Offshore Wind Farm

## Marine Mammal Survey Report

### ISSUE 2

---

Prepared by:  
RPS Planning Transport & Environment, Oxford

Author	Technical Reviewer	Issue Date
Dr Barry Shepherd	Dr Keith Jones	15/12/05

#### **RPS Planning Transport & Environment**

Mallams Court  
18 Milton Park  
Abingdon  
Oxon  
OX14 4RP

**Tel** 01235 821888  
**Fax** 01235 820351  
**Email** [rpsox@rpsplc.co.uk](mailto:rpsox@rpsplc.co.uk)

---

# Contents

---

	Page No
<b>Summary</b>	
<b>1 Introduction</b>	<b>2</b>
<b>2 Method</b>	<b>4</b>
<b>3 Results</b>	<b>7</b>
<b>4 Conclusions</b>	<b>13</b>

# Figures & Appendices

---

## Tables

Table 1.1 Existing sightings indices (No animals km<sup>-1</sup>) for common seal, grey seal and harbour porpoise

Table 3.1 Dates on which aerial surveys were conducted and the conditions during the survey

Table 3.2 Dates on which the vessel surveys were conducted and the conditions recorded

Table 3.3 Dates and sea conditions on which the marine mammal survey was conducted

Table 3.4 Comparison of sighting rates between bird surveyors and a dedicated marine mammal surveyor during 3 of the 4 marine mammal surveys.

Table 3.5 Overall sighting summary and sightings indices for grey seals

Table 3.6 Relative abundance indices for grey seal across seasons

Table 3.7 Overall sighting summary and sightings indices for harbour porpoises

Table 3.8 Relative abundance indices for harbour porpoise across seasons

## Figures

Figure 2.1 Vessel Transects

Figure 2.2 Aerial Transects

Figure 3.1 Common seal, Seal spp and Dolphin spp Sightings

Figure 3.2 Unidentified Seals

Figure 3.3 Grey Seal Sighting Plots

Figure 3.4 Grey Seal Relative Abundance Aerial Survey Data

Figure 3.5 Grey Seal Relative Abundance Autumn Survey Data

Figure 3.6 Grey Seal Relative Abundance Winter Survey Data

Figure 3.7 Grey Seal Relative Abundance Spring Survey Data

Figure 3.8 Grey Seal Relative Abundance Summer Survey Data

Figure 3.9 Grey Seal Relative Abundance All Vessel-Based Bird Data

Figure 3.10 Harbour Porpoise Relative Abundance Aerial Survey Data

Figure 3.11 Harbour Porpoise Relative Abundance Autumn Survey Data

Figure 3.12 Harbour Porpoise Relative Abundance Winter Survey Data

Figure 3.13 Harbour Porpoise Relative Abundance Spring Survey Data

Figure 3.14 Harbour Porpoise Relative Abundance Summer Survey Data

Figure 3.15 Harbour Porpoise Relative Abundance Marine Mammal Survey Data

## **Appendices**

### **Appendix 1 Relevant Legislation**

## Summary

---

- S.1 RPS was commissioned by the Institute of Estuarine and Coastal Studies (IECS) to conduct a survey for marine mammals off the Holderness coast for the proposed Humber Gateway offshore wind farm and to report on the results. Data from aerial and vessel-based bird surveys were also supplied, analysed and discussed.
- S.2 Two species of Pinnipedia - common seal and grey seal, and one species of cetacean - harbour porpoise were confirmed present in the survey area throughout the year. One other cetacean species was seen but not confidently identified.
- S.3 The species occurred in the following descending order of abundance: harbour porpoise, grey seal and common seal. Very few common seals were seen. The aerial survey produced 30 sightings of unidentified seals many of which were probably grey seal. Grey seal may therefore be slightly more abundant over time than harbour porpoise but the numbers of these two species overall were very similar.
- S.4 Seasonal trends were distinct for grey seals with the lowest relative numbers observed in the winter and highest in summer and autumn. This coincides with the pupping season (November-December inclusive) when most grey seals move to within close proximity of the birthing grounds (rookeries) the nearest of which is the south shore of the Humber Estuary. Other major east coast rookeries are the Farne Islands and Holy Island to the north.
- S.5 The different survey methods returned different seasonal patterns in relative numbers of harbour porpoise. The surveys conducted most regularly (aerial and vessel-based bird survey) indicated that peaks occurred in summer and autumn. The dedicated marine mammal surveys were conducted only once in summer and autumn and twice in spring, and were less useful in determining seasonal trends. These surveys were also affected by poor conditions in the summer and autumn.
- S.6 The records of common seals were too few to draw conclusions on seasonal patterns. Overall numbers of common seal off the Holderness coast are considered to be low for English waters.
- S.7 Grey seal and harbour porpoise numbers in the study area are considered to be low to moderate in terms of other areas of the English coastline. Seasonal peaks in numbers also need to be considered in the assessment of the proposed wind farm on these two species.

# 1 Introduction

---

## Background

- 1.1 The site for the proposed Humber Gateway Offshore Wind Farm is located some 7.7 km off the Holderness Coast of South Yorkshire on the east coast of England. The proposed array site covers approximately 35 km<sup>2</sup>.
- 1.2 A twice -monthly seabird survey has been in progress since October 2003 using aerial and vessel-based platforms. Incidental marine mammal sightings were recorded during these surveys. Additionally, a dedicated marine mammal surveyor was used on the vessel on 4 separate occasions to augment the incidental records.
- 1.3 Data for cetaceans and pinnipeds for this area are summarised in:
- *Small Cetacean Assessment for the North Sea (SCANS)* (Hammond *et al.*, 1995);
  - *“Porpoises, Dolphins and Whales on the Holderness Coast, the Humber Estuary and its tributaries: a Catalogue and Bibliography* (Howes 2000a);
  - *A Historical Review of Seals in the Humber Region* (Howes 2000b);
  - *Atlas of Cetacean Distribution in north-west European waters* (Reid *et al.*, 2003);
  - *Southern North Sea Marine Natural Area* (Jones *et al.*, 2004).
- 1.4 The southern and central North Sea is known to support 2 regularly occurring Pinnipedia (seals): common seal *Phoca vitulina vitulina* and grey seal *Halichoerus grypus*. Common seals are resident throughout the area for most of the year but generally move to pupping grounds to give birth and breed between June to August, principally in the Wash and Norfolk Coast. Teesside and Holy Island in the north also provide pupping grounds for common seals. The grey seal is also resident and breeds in the area at an established birthing ground (rookery) on the south bank of the Humber Estuary. Other east coast rookeries supporting significant numbers of grey seals are located at the Farne Islands and Holy Island to the north. Other pinnipeds have been recorded in the North Sea but are extremely rare.
- 1.5 Four species of Cetacea (whales, dolphins and porpoises) are commonly reported in the central North Sea: harbour porpoise *Phocoena phocoena*, white-beaked dolphin *Lagenorhynchus albirostris*, bottlenose dolphin *Tursiops truncatus* and Minke whale *Balaenoptera acutorostrata*. The harbour porpoise is the only cetacean shown to be resident all year round.

- 1.6 Several other species of cetacean have been recorded in the area but are considered to be rare visitors or vagrants. These include long-finned pilot whale *Globicephala melas*, killer whale *Orcinus orca*, sperm whale *Physeter macrocephalus*, humpback whale *Megaptera novaeangliae*, fin whale *Balaenoptera physalus*, short-beaked common dolphin *Delphinus delphis* and Atlantic white-sided dolphin *Lagenorhynchus acutus*.
- 1.7 All cetaceans are listed on Annex IV of the European Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 92/43/EEC (the Habitats Directive) and are strictly protected. Harbour porpoise, bottlenose dolphin, grey seal and common seal are listed on Annex II of the Habitats Directive and as such member states are required to designate protected areas (Special Areas of Conservation) in which significant populations are found.
- 1.8 All cetaceans are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are given full protection. The harbour porpoise is a UK Biodiversity Action Plan (BAP) priority species and all cetaceans are listed on a group BAP. All UK BAP priority species are listed on Section 74 of the Wildlife and Countryside Act 2000.
- 1.9 Both resident seals are partially protected during close seasons by the Conservation of Seals Act 1970. The close season for the common seal is 1<sup>st</sup> June to 31<sup>st</sup> August and 1<sup>st</sup> September to 31<sup>st</sup> December for the grey seal.
- 1.10 Further details on relevant legislation is detailed in Appendix A.
- 1.11 Certain forms of anthropogenic noise sources such as those created during seismic survey, use of demolition explosives and pile driving are capable of causing pressure waves that can cause damage to marine animal tissue and disrupt the behaviour and hearing ability of marine animals. Care must therefore be taken to ensure that the distribution of marine mammals in and around the proposed array site is adequately described for a sufficient assessment to be made for the EIA.
- 1.12 Previous systematic surveys have provided the sightings indices for harbour porpoises listed in Table 1.1 and are referred to for comparison with the results obtained in this study. Unfortunately seals are not generally surveyed in the same way as cetaceans. Instead populations are estimated based on the number of pups counted at birthing locations. The EIA for the London Array Offshore Wind Farm did calculate sighting indices for common seal and grey seal and these are included in Table 1.1.
- 1.13 Northridge *et al.* (1995) reported a UK mean estimate of sightings frequency of 0.0045 Harbour porpoises km<sup>-1</sup> based on data acquired through the SCANS project. The SCANS project estimated numbers of animals per km<sup>2</sup> and is not compatible with data acquired for this project. Estimates for the southern North Sea range between 0.01 and 0.09 Harbour porpoises km<sup>-1</sup> (Barne *et al.*, 1998). The Atlas reported a peak value of 105 Harbour porpoises hr<sup>-1</sup> found within the Belt Sea east of Denmark and in the north west North Sea.

Table 1.1 Existing sightings indices (No animals km<sup>-1</sup>) for common seal, grey seal and harbour porpoise

<b>Species</b>	<b>LAL ES (2005)</b>	<b>Northridge <i>et al.</i>, (1995)</b>	<b>JNCC (1998)</b>
Common seal	0.021		
Grey seal	0.017		
Harbour porpoise	0.047	0.0045	0.01-0.09

- 1.14 Common seal numbers for the Greater Thames as reported in the London Array Offshore Wind Farm ES were considered to be low to moderate for the English coast. Grey seal numbers were relatively low and the relative abundance of the harbour porpoise was considered to be moderate but with a large peak in winter months.



## 2 Method

---

- 2.1 Boat and aerial bird surveys were conducted during which incidental sightings of marine mammals were recorded. In addition, a dedicated marine mammal surveyor was used during four of the vessel-based survey trips. The following terms are used to describe the survey methods:
- Aerial survey;
  - Vessel-based bird survey;
  - Marine mammal survey.
- 2.2 The survey site and transect routes for the vessel-based surveys covered the proposed array and a control site (see Figure 2.1). The transect design for the vessel-based survey was changed midway through the sampling programme but both sets of transects cover the proposed array site.
- 2.3 The aerial survey covered a large area around the proposed array site (see Figure 2.2) to ensure adequate coverage for control data, but was also changed midway through the sampling period. Both sets of transects overlap substantially and both cover a much larger area than the proposed array site.
- 2.4 Differences in the visual cues between bird and marine mammal survey are likely to result in undersampling of marine mammals during bird surveys in comparison to dedicated marine mammal surveys. An investigation of these differences was therefore conducted during the marine mammal survey. Marine mammal data were acquired independently by bird surveyors and the marine mammal surveyor at the same time and compared after the survey had ended. Any differences found could be used to adjust the results of the surveys conducted by bird surveyors only.
- 2.5 The chances of sighting marine mammals (sightability) are reduced by increasing sea state. The sightability of small, slow swimming cetaceans such as harbour porpoises and seals are especially affected by high sea states, and Evans and Hammond (2004) recommended that surveys are not conducted when the sea state is greater than 2. In practice this is often unfeasible due to availability of vessels and data are collected often up to sea state 4. Data should therefore be carefully inspected before being used in analysis.
- 2.6 The aerial survey collected data in a way that was compatible with the Cetacean Atlas (Reid *et al.*, 2003) and Northridge *et al.* (1995). In order to account for effort intensity the sightings were indexed against distance travelled during the survey. Indices of sightings are therefore reported as animals km<sup>-1</sup> to allow comparisons between different areas or periods of time.

Interpretation of these indices requires knowledge of the overall effort intensity and typical group size of the species.

## **Aerial Survey Method**

- 2.7 Aerial surveys were scheduled to occur approximately once per month over a two year period and were conducted in accordance with the method given in Camphuysen *et al* (2003). A series of transects were flown at an altitude of 80m (250 feet), and at a speed of 185km/hr (100kt), with two observers looking down and ahead out of each side of the aircraft. In addition to bird sighting records, any marine mammal sightings were recorded. Both observers used dictaphones to record sightings, with each record identified by a time reference to the nearest second. Prior to the survey commencing, all watches were synchronised to the DGPS to allow accurate cross-referencing during the data analysis stages.
- 2.8 Initially, surveys were conducted in conditions up to sea state 4, in order to ensure that data were collected during all the winter months (when COWRIE guidelines preferred conditions of a maximum of sea state 3 may not occur for several weeks at a time). However, on the recommendation of English Nature, surveys during the second half of 2004 and into 2005 were not carried out in conditions above sea state 3, with a reduced frequency requirement of surveys during the winter months allowing for more leeway in survey timing, and a greater potential for programme completion.

## **Vessel Based Survey Method**

- 2.9 The vessel MV Riverman was used for all of the vessel-based surveys and provided a suitable platform, although the vessel pitched and yawed actively in seas above sea state 4. The deck above the wheelhouse (Monkey Island) of the tug boat was used for all survey effort and gave an eye-height of around 8 m above sea level. A GPS logger unit accurate to < 1 m was used to record position at maximum 2-minute intervals.
- 2.10 The seabird survey method followed that of Camphuysen *et al* (2003) and was conducted on a monthly basis. Vessel-based bird surveys would only be conducted if the conditions were predicted better than sea state 5 and wind speed less than force 6 of the Beaufort scale. This was to suit the less exacting requirements of the bird survey rather than marine mammal survey requirements. The bird surveyors collected marine mammal records incidentally to the bird records. Two bird surveyors were used for all surveys. The species and number of animals were recorded and placed within distance and port/starboard bands as for the birds. The distance and bearing to the animals were not recorded. All survey data collected whilst wind speed or sea state was in excess of 3 were ignored in the analyses to remove significant undersampling.

## Marine Mammal Survey

- 2.11 During four survey trips between May 2004 and April 2005 a marine mammal surveyor, dedicated to spotting and recording marine mammals, was present on the vessel. During these trips the environmental conditions recorded include sea state, wind speed and visibility. A sea state of less than 3 and good visibility was specified for the marine mammal survey trips to maximise the chances of seeing marine mammals and in particular harbour porpoises and seals. However, economic considerations of the vessel charter often make this pre-requisite unfeasible and when weather conditions at sea became sub-optimal, data were collected regardless and inspected for suitability prior to analyses.
- 2.12 Observations were conducted by alternate scanning with the naked eye and binoculars. Signs indicating the presence of animals e.g. spray, dark shapes or regular splashes were checked using binoculars. Range to sightings can be estimated by eye but checked using radar targets. The time of the sightings of marine mammals was recorded and position obtained from the GPS logger after the survey. Species, numbers of animals and whether calves, pups or immature animals were present were also recorded.
- 2.13 During three of the survey trips the marine mammal surveyor and bird surveyors recorded marine mammal sightings independently of each other to obtain an index for adjustment of the records when only bird surveyors were present.

## Analytical Treatment

- 2.14 Depending on the results, three treatments were applied to the data. Several forms of analyses were then used to describe the data acquired from visual survey.
- 2.15 The simplest form of treatment is the plotting of sightings to provide an overall distribution of the animals.
- 2.16 If the amount of time spent sampling or the distance travelled (effort) is recorded, sightings indices can be calculated to indicate relative abundance. A sightings index is the number of animals spotted corrected for either distance travelled in the survey (number of animals per kilometre) or the amount of time spent watching (number of animals per hour) and provides a relative value for comparison with other areas or periods. Sightings indices are calculated to remove the bias inherent in data collected over differing effort intensities. If few animals are seen during each survey, the data from two or more surveys can be combined to obtain an overall sightings index for each species.
- 2.17 Sea state was incorporated into the Generalised Likelihood Model (GLM) analyses for abundance estimation from the SCANS survey data. Northridge *et al.* (1995) adjusted the sightings rates by multiplication factors of the effort. These factors were derived from dual-

platform data, and a similar approach was adopted in the Cetacean Atlas (Reid *et al.*, 2003). Approximate values can be used where indices are not calculated specifically for the vessel.

- 2.18 The above two procedures were applied to those species recorded and conducted in ESRI ArcGIS v 9.0. Small numbers of sightings provide no more than overall distribution even if sightings indices are calculated.
- 2.19 Distance sampling (Buckland *et al.*, 1993) can be applied in cases where the conditions are good and high numbers of animals are spotted. This method can provide information on the distribution of the animals and make an estimate of the population in the study area. Low numbers of animals render the error margins of the population estimate too large for an estimate to be meaningful. Failure to conform to the main assumptions invalidates any population estimate. One of these assumptions is that all animals on the transect line are spotted to ensure that  $g(0)=1$ .

### 3 Results

---

#### General

- 3.1 Aerial surveys were conducted on the dates shown in Table 3.1 and are listed with the environmental conditions.

Table 3.1 Dates on which aerial surveys were conducted and the conditions during the surveys

Date	Sea state	Wind force (Beaufort wind scale)
Survey Area 1		
27/10/2003	1-2	W1-2/SW 2-3
28/11/2003	1-2	SW 2-3
09/01/2004	3-4	W 3-4
29/01/2004	3-4	NW 4-5
25/02/2004	3-4	NE 3-4
18/03/2004	2	W 3-4
23/06/2004	1-2	W 2-3
Survey Area 2		
27/07/2004	1-2	NE 1-2
26/08/2004	2-3	NW 2-3
23/09/2004	3-4	NW 5-6
18/10/2004	3	SW 3-4
16/11/2004	3	W 3
09/02/2005	2-3	SW 5-6

3.2 Vessel-base surveys were conducted on the dates shown in Table 3.2.

Table 3.2 Dates on which the vessel surveys were conducted and the conditions recorded

Date	Sea state	Wind force (Beaufort wind scale)
Survey Area 1		
30/09/2003	2	SE 2-3
28/10/2003	1-2	SW 3-4
25/11/2003	3	SE 4-5
09/12/2003	2	S 2
22/01/2004	3	SW 3-4
03/03/2004	3	S 4-5
23/04/2004	1	SW 1-2
16/06/2004	2	W 2
13/07/2004	3	WNW 2
16/09/2004	2	S 4-5
26/10/2004	3	WNW 4
24/11/2004	2-3	S 2-3
09/12/2004	1-3	SW 1-2 & S 3-4
26/01/2005	2-3	NW 2
17/02/2005	3	NW 2-3
19/03/2005	1	SE 1
12/04/2005	1-2	SW 1-2
12/05/2005	2	SE 2

3.3 Table 3.3 contains the dates and sea conditions on which the marine mammal survey was conducted.

Table 3.3 Dates and sea conditions on which the marine mammal survey was conducted

Date	Sea state	Wind force (Beaufort wind scale)
Survey Area 1		
19/05/2004	1-2	W1-2/SW 2-3
27/08/2004	1-2	SW 2-3
24/11/2004	3-4	W 3-4
12/04/2005	3-4	NW 4-5

3.4 An assessment of the weather forecasts were carried out prior to the survey dates and several scheduled dates were aborted when fog or heavy seas were forecasted. Two aerial surveys, 1 vessel and two marine mammal surveys were conducted in seas greater than 3. Data from these surveys was assessed prior to inclusion in the analyses.

3.5 Analyses using Distance software was not conducted due to the low number of individual species recorded in any one survey. The method could be applied to the data but would have resulted in error intervals too large to provide useful information.

3.6 Common seals, grey seals and harbour porpoises were confidently identified during the vessel-based surveys whilst only grey seal and harbour porpoise were confidently identified

during the aerial survey. The aerial survey recorded many sightings of unidentified seal species and a single record of an unidentified dolphin species was made during the bird survey on the vessel. A total of 88 harbour porpoises were recorded, 78 grey seals and 8 common seals. The unidentified dolphin record consisted of a group of 3 animals whilst a total of 30 unidentified seals was recorded, the majority of which were probably grey seals given the results from the vessel surveys. For the locations of the unidentified species and common seal records see Figure 3.1.

- 3.7 It is apparent that difficulties occurred in identifying seal species from the air given the low number of seal records allocated to species. The unidentified seal sightings recorded during the aerial survey were plotted as indices of animals km<sup>-1</sup> and these are shown in Figure 3.2. These sightings were distributed across the two survey areas. Seals were recorded frequently in the south east where the effort and indices were high but they were also recorded regularly in the northern half of the site. Effort was lower in the north and therefore these results are slightly less robust. The site of the proposed array is used by relatively low numbers of seals, but these values should be read in conjunction with the distribution of the grey and common seals.
- 3.8 The sighting efficiencies of aerial and both vessel-based survey methods were clearly different and therefore data from the individual surveys could not be grouped together. Instead, where data numbers were high enough to produce abundance index maps, these were conducted separately for aerial survey, vessel-based bird survey and marine mammal survey.
- 3.9 The comparison of sightings between bird surveyors and marine mammal surveyors found that between 20% and 50% more marine mammals were recorded by a single marine mammal surveyor than 2 bird surveyors. The results of this are shown in Table 3.4.

Table 3.4 Comparison of sighting rates between bird surveyors and a dedicated marine mammal surveyor during 3 of the 4 marine mammal surveys.

Survey:	1 (27/08/04)		2 (24/11/04)		3 (12/04/05)	
Surveyor	Seal	H Porp	Seal	H Porp	H Porp	Seal
Bird surveyor	3	0	3	0	4	5
Marine mammal surveyor	6	0	3	1	5	9
Percent missed	50%		0	100%	20%	44%

## **Common Seal**

- 3.10 During the vessel-based surveys 8 records of common seal were obtained. None were recorded during the aerial survey perhaps due to difficulties of identification from the air. The records spanned the vessel study area from north to south and east to west and thus are occasionally present in or around the proposed array site (see Figure 3.1).
- 3.11 Common seals were only recorded singly and although three were recorded during one winter survey, this was too few to suggest any seasonal trends. Two were recorded during the summer and one in the spring. The number of common seal records did not suffice for relative abundance maps.
- 3.12 The study area does not contain exposed sandbanks and so common seal are not able to pup inside the array site. Suitable sandbanks exist on Spurn Head peninsula but it is not recognised as a common seal pupping beach.

## **Grey Seal**

- 3.13 The grey seal was the most common pinniped species recorded in the study area with a total of 78 animals from 74 sightings. Many of the unidentified seal records taken from the air were probably grey seal as well given the higher numbers recorded during the vessel-based surveys. Grey seals were distributed widely across the study site and were found in both control areas of the vessel survey. Figure 3.3 shows the overall distribution of grey seal, which indicates a concentration within and around the proposed array site. This is an anomaly however due to the lack of confident records taken during the aerial survey.
- 3.14 Distribution of relative abundance indices for data recorded in the aerial survey is shown in Figure 3.4. The sightings indices for grey seal calculated from the data collected during the vessel based bird survey are shown in Figures 3.5 to 3.8 and are summarised in Figure 3.9. These images clearly show grey seals use the whole study area throughout the year with no seasonal change in distribution.
- 3.15 Average sightings indices for the grey seal obtained during the three surveys are summarised in Table 3.5, whilst the same data are divided seasonally in Table 3.6.



Table 3.5 Overall sighting summary and sightings indices for grey seals. Note: survey data for sea state greater than 3 have been omitted from the vessel bird survey and aerial survey but included in the marine mammal survey.

Survey	Distance travelled (km)	Number animals	Sightings index (no km <sup>-1</sup> )	Abundance
Vessel bird survey	2020	45	0.022	Low
Aerial survey	6372	12	0.0018	Low
Marine mammal survey	366	21	0.057	Moderate

3.16 Grey seal relative abundance for the study area ranges from low to moderate in terms of the abundance indices cited in Table 1.1. The results of the marine mammal survey indicate that the numbers of grey seal are higher than indicated by the other survey methods.

Table 3.6 Relative abundance indices for grey seal across seasons.

Season	Aerial Survey Data			Vessel Bird Survey Data			Marine Mammal Survey Data		
	Dist (km)	Number animals	Index No km <sup>-1</sup>	Dist (km)	Number animals	Index No km <sup>-1</sup>	Dist (km)	Number animals	Index No km <sup>-1</sup>
Spring	748.6	1	0.0013	503	5	0.01	178.1	10	0.056
Summer	210	9	0.043	260	18	0.69	100.4	4	0.04
Autumn	352.4	2	0.0057	625	16	0.026	87.2	7	0.08
Winter	217.3	0	0	633	6	0.0095	0	-	-

3.17 Seasonal changes in grey seal numbers and distribution are apparent from the effort related abundance indices in Table 3.6. The aerial and vessel-based bird surveys were conducted on more occasions than the marine mammal survey and therefore produce the most reliable results over the time period. These data show relative peaks in the summer and autumn and the marine mammal survey data show a small peak in the autumn.

3.18 Grey seals are present in the site of the proposed array, study areas and controls throughout the year. The numbers are considered to be moderate for the English coast. The only comparison with other indices are those taken during the baseline surveys for London Array Wind Farm given in Table 1.1. The number of grey seals recorded at Holderness is higher than those obtained in the Greater Thames which were considered low for the coasts of England. The sightings obtained during the marine mammal survey indicate that numbers of grey seals are higher than the numbers recorded during the vessel-based bird survey.

3.19 The resident status of the grey seal, and the moderate numbers present, is expected given the presence of a major rookery on the south bank of the Humber Estuary.

## Harbour Porpoise

- 3.20 The harbour porpoise was the most common cetacean and the only one that was confidently identified to species. Their overall relative abundance distribution is shown in Figures 3.10 and 3.15. These data clearly show a wide distribution across the study area and common occurrence in and around the proposed array site.
- 3.21 Seasonal relative abundance of harbour porpoise is shown in Figures 3.11 to 3.14. No apparent change in distribution occurs through the seasons.
- 3.22 The sightings for harbour porpoises are summarised in Table 3.7. Seasonal summaries are shown in Table 3.8 for the vessel-based bird survey data.

Table 3.7 Overall sighting summary and sightings indices for harbour porpoises. Note: survey data for sea state greater than 3 have been omitted from the vessel bird survey and aerial survey.

Survey	Distance travelled (km)	Number animals	Sightings index (no km <sup>-1</sup> )	Abundance
Vessel bird survey	2020	19	0.009	Low
Aerial survey	6372	55	0.009	Low
Marine mammal survey	366	10	0.027	Low - moderate

Table 3.8 Relative abundance indices for harbour porpoise across seasons using all data collected during sea state of 3 or less.

Season	Aerial Survey Data			Vessel Bird Survey Data			Marine Mammal Survey Data		
	Dist (km)	Number animals	Index No km <sup>-1</sup>	Dist (km)	Number animals	Index No km <sup>-1</sup>	Dist (km)	Number animals	Index No km <sup>-1</sup>
Spring	748.6	3	0.004	503	4	0.008	178.1	7	0.039
Summer	210	49	0.233	260	4	0.015	100.4	0	0
Autumn	352.4	4	0.011	625	5	0.008	87.2	1	0.012
Winter	217.3	0	0	633	7	0.011	0		

- 3.23 A peak in porpoise numbers occurred in the summer during the aerial and vessel-based bird surveys. The aerial and vessel-based bird surveys found relatively fewer porpoises during the spring whereas the marine mammal survey obtained relatively higher numbers than other months. No porpoises were seen in the summer during the marine mammal survey although only 1 survey was conducted and the conditions were sub-optimal. The results from the marine mammal surveys are likely to produce some anomalies because of the few surveys conducted and none were conducted during the winter months. They do however indicate that harbour porpoise numbers are likely to be higher than indicated by the other survey methods.

- 3.24 The data indicate that numbers of harbour porpoise are relatively low in comparison to previous studies reporting distance-based sightings indices. The marine mammal survey recorded relatively higher numbers of porpoises than the other two survey methods but with much less survey effort. Given the results of the sightings comparison study, the porpoise sightings taken by bird surveyors could be half the sightings taken by marine mammal observers. If this comparison is accepted as reliable, the overall abundance of porpoises should be classed as low-moderate depending on season.
- 3.25 Several calves or juveniles were observed during three sightings of this species indicating nursing females use the area. It is reported that porpoises give birth mainly in spring and summer but calves have been recorded throughout the year around the UK (pers. comm. C. Benson, Coast Watch).

## 4 Conclusions

---

- 4.1 The recording efficiency between survey methods varied and it was apparent that seals were difficult to identify to species from the air. Marine mammal survey produced more records per unit effort than the bird surveying but this was expected due to the difference in visual cues between survey targets. The higher relative numbers of animals obtained during the marine mammal surveys should be used to indicate the relative abundance in comparison to other areas of the UK. However the aerial and vessel-based bird survey data should be used to indicate overall distribution and seasonal differences as the surveys occurred more often and the efficiency is likely to have changed little between surveys.
- 4.2 Common seal, grey seal and harbour porpoise occurred in the study area throughout the year. Common seals were seen occasionally, whilst grey seals and harbour porpoises were recorded frequently. One other species of cetacean was seen but could not be identified to species.
- 4.3 The grey seal numbers peaked in the summer and autumn and were probably linked to the increased breeding activity during the winter in proximity to the rookery on the south coast of the Humber Estuary. Grey seal numbers in the array site and study area are of a low to moderate level in comparison to other parts of the UK.
- 4.4 Harbour porpoise numbers peak in the summer and autumn and are present in numbers considered to be low to moderate in comparison with other parts of the UK.

## References

---

- Barne, J.H., Robson, C.F., Kaznowska, S.S., Doody, J.P., Davidson, N.C., & Buck, A.L. (Eds.) (1998) *Coasts and Seas of the United Kingdom. Region 7 South-east England: Lowestoft to Dungeness*. Peterborough: Joint Nature Conservation Committee.
- Camphuysen, C.J., Fox, T.J., Leopold, M.F. & Petersen, I.K. (2003). *Towards standardised seabirds at sea census techniques in connection with environmental impact assessments for offshore wind farms in the U.K.* Report commissioned by the Collaborative Offshore Wind Research into the Environment (COWRIE). The Netherlands: Royal Netherlands Institute for Sea Research.
- Evans, P.G.H. & Hammond, P.S. (2004) *Monitoring cetaceans in European waters*. Mammal Review. **34**(1), pp 131-156.
- Jones, L.A., Coyle, M.D., Evans, D., Gilliland, P.M. & Murray, A.R. (2004) *Southern North Sea Marine Natural Area Profile: A contribution to regional planning and management of the seas around England*. Peterborough: English Nature.
- Hammond, P.S., Benke, H., Berggren, P., Borchers, D.L., Collet, A., Heide-Jørgensen, M.P., Heimlich-Boran, S., Hiby, A.R., Leopold, M.F. & Øien, N. (1995) *Distribution and Abundance of the Harbour Porpoise and other Small Cetaceans in the North Sea and Adjacent Waters*. EU LIFE Report Ref: LIFE 92-2/UK/027.
- Howes, C.A. (2000a). *Porpoises, Dolphins and Whales on the Holderness Coast, the Humber Estuary and its tributaries: a Catalogue and Bibliography*. Bulletin 34 Yorkshire Naturalists Union pp48-64. Leeds: The Yorkshire Naturalist Union.
- Howes, C.A.. (2000b). *A Historical Review of Seals in the Humber Region* Bulletin 34 Yorkshire Naturalists Union pp65-71. Leeds: The Yorkshire Naturalist Union.
- Northridge, S.P., Tasker, M.L., Webb, A. & William, J.M. (1995) *Distribution and relative abundance of harbour porpoises (*Phocoena phocoena* L.), white-beaked dolphins (*Lagenorhynchus albirostris* Gray), and minke whales (*Balaenoptera acutorostrata* Lacepede) around the British Isles*. ICES Journal of Marine Science, 52(1), pp 55-66.
- Reid, J.B., Evans, P.G.H. & Northridge, S.P. (2003) *Atlas of Cetacean Distribution in North-West European Waters*. Peterborough: Joint Nature Conservation Committee.

## Figures

---

## Appendices

---

## **Appendix A**

---

### **Relevant Legislation**



A.1 Legislation relevant to the marine mammal species commonly found in the southern and mid North Sea are shown in Table A1.

**Table A.1** contains the legislation and conservation initiatives under which cetaceans and seals are protected.

	Wildlife and Countryside Act	EC Habitats Directive (Annex)	Bonn Convention (Appendix)	Berne Convention (Appendix)	Conservation of Seals Act 1970	OSPAR (Annex)	ASCOBANS	Section 74 CRoW Act 2000	UK Biodiversity Action Plan
Minke whale	5	IV		III				•	Baleen whales grouped plan
Atlantic white-sided dolphin	5	IV	II	II			•	•	Small dolphins grouped plan
Bottlenose dolphin	5 & 6	II & IV	II	II			•	•	Small dolphins grouped plan
Killer whale	5	IV	II	II			•	•	Toothed whale s grouped plan
Long-finned pilot whale	5	IV	II	II			•	•	Toothed whales grouped plan
Short-beaked common dolphin	5 & 6	IV	II				•	•	Small dolphins grouped plan
White-beaked dolphin	5	IV	II	II			•	•	Small dolphins grouped plan
Harbour porpoise	5 & 6	II & IV	II	II		V	•	•	Harbour porpoise Priority Species
Common seal		II & V	II	II	•				
Grey seal		II & V	II	II	•				

## Habitats Directive

A.2 All cetacean species are listed on Annex IV of the European Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 92/43/EEC (the Habitats Directive). Species listed on Annex IV are strictly protected throughout their range and prohibits:

- All forms of deliberate capture or killing of specimens of these species in the wild (article 12(1)(a));
- Deliberate disturbance of these species, particularly during periods of breeding, rearing, hibernation and migration (Article 12(1)(b));
- Deterioration or destruction of breeding sites or resting places (Article 12(1)(d).

- A.2 The harbour porpoise, bottlenose dolphin, common seal and grey seal are listed on Annex II of the Habitats Directive and requires member states to designate special areas in which they are found in significant numbers, or areas that form an essential part of their range.

### **Wildlife and Countryside Act 1981 (as amended)**

- A.3 All cetacean species found within UK waters are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Section 9 of the act makes it an offence to intentionally kill, injure or take any wild animal listed in Schedule 5. Section 11 of the act protects the places of shelter or rest of those animals listed in Schedule 5, against intentional damage, obstruction or disturbance of the animals when using these places. The Countryside and Rights of Way Act 2000 amends the Wildlife and Countryside Act 1981 and gives protection of the places of shelter or rest of the animals against reckless as well as intentional damage or disturbance.

### **Conservation of Seals Act 1970**

- A.4 The Conservation of Seals Act 1970 provides for closed seasons in which killing is not permitted. This season coincides with the pupping periods of UK resident species and is from the 1<sup>st</sup> June to 31<sup>st</sup> August inclusive for Common seals and 1<sup>st</sup> September to 31<sup>st</sup> December inclusive for Grey seals. An Order was issued under the Act to extend the season throughout the year after the Common seal population was halved as a result of the phocine distemper virus (PDV) in 1988.

### **UK Biodiversity Action Plan**

- A.5 The Harbour porpoise is a priority action plan species of the UKBAP and all cetaceans are listed as a group in the UKBAP and Section 74: List of Habitats and Species of Principal Importance for the conservation of Biological Diversity in England (CRoW Act 2000).

### **ASCOBANS**

- A.6 Signatory states of the ASCOBANS agreement have agreed to work together in conservation, research, and public awareness of all toothed whales of the North Eastern Atlantic except the sperm whale *Physeter macrocephalus*.