Net Zero Teesside – Environmental Statement

Planning Inspectorate Reference: EN010103

Volume III – Appendices

Appendix 14C: Marine Mammal Survey Report

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended)

Prepared by: AECOM

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14C. Marine Mammal Ecology Baseline

14.1 Introduction

Project Introduction

14.1.1 Net Zero Teesside Power Limited (NZT Power) and Net Zero North Sea Storage Limited (NZNS Storage), together the Applicants are seeking Development Consent for the construction, operation, maintenance and decommissioning of the Net Zero Teesside (NZT) Carbon Capture, Usage and Storage (CCUS) Project (the Proposed Development). The Proposed Development comprises the construction, operation and decommissioning of a CCUS facility comprising a gas-fired generating station with an electrical output of up to 860 MWe, together with equipment required for the capture and compression of carbon dioxide (CO_2) emissions from the power generating station. In addition, there is a need for the provision of supporting infrastructure and connections to support the power generating station and to facilitate the development of a wider industrial carbon capture network on Teesside, the construction of which also forms part of the Proposed Development. The Proposed Development also includes high-pressure compression of CO_2 and the onshore section of a pipeline to export the captured CO_2 for off-shore storage.

14.1.2 The Proposed Development forms the onshore part of the wider NZT Project; further details related to this are provided in Chapter 4: Proposed Development (ES Volume I, Document Ref 6.2).

Aims and Objectives

14.1.3 The study aims to provide a detailed baseline description of marine mammal populations within the coastal marine environment in the absence of the Proposed Development. The objective is to enable identification of potentially important marine mammal features within the Zone of Influence (ZoI) of the Proposed Development.

14.1.4 This report presents the results of a desk study carried out to date, the objective of which was to provide:

- A description of legislation related to the protection of marine mammal species in the UK;
- An overview of marine mammal populations around the British Isles;
- Identification of the key marine mammal receptors requiring further consideration within the relevant environmental assessments; and
- An overview of publicly available information related to the key marine mammal receptors considered relevant to the various applications and assessments required for Proposed Development.

14.1.5 It should be noted that this report does not cover small mammals associated with aquatic environments such as otter and water voles and refers the

reader to Appendix 12G: Water Vole and Otter Report (ES Volume III, Document Ref. 6.4).

Structure of Report

14.1.6 This report is structured as follows:

- **Section 14.2 (Methodology**) – summarises the methodology for undertaking the marine mammal baseline study and includes: an outline of the legislative and policy context, definition of the Study Area and a description of the key data sources;
- **Section 14.3 (Marine Mammal Baseline Overview)** – provides an overview of marine mammal populations within the Study Area and introduces the various species-specific management units considered within the baseline;
- **Section 14.4 (Key Marine Mammal Receptors**) – identifies the key marine mammal receptors (species and designated sites) relevant to the various applications and assessments required for Proposed Development; and provides a detailed description of baseline conditions for these species;
- **Section 14.5: (Baseline Evolution)** – summarises how the marine mammal baseline conditions may change during the consenting process and over the lifetime of the Proposed Development; and
- **Section 14.6 (Summary of Findings)** – provides a summary of the findings of the desk study and identifies the key marine mammal receptors which require consideration within the relevant environmental assessments.

14.2 Methodology

Legislative Context

14.2.1 Cetaceans (i.e. dolphins, porpoises and whales) and pinnipeds (i.e. seals), referred to collectively within this report as ‘marine mammals’, that have a natural range which includes areas of Great Britain, are afforded conservation protection by various pieces of European and national legislation.

14.2.2 All cetaceans are listed under Annex IV of the EU Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) as European Protected Species (EPS) requiring strict protection. The Habitats Directive is transposed into UK law by the Conservation of Habitats and Species Regulations 2017 (hereafter referred to as the Habitats Regulations), making it an offence to:

- deliberately capture, injure or kill an EPS (including all cetaceans);
- deliberately disturb an EPS; or
- damage or destroy a breeding site or resting place of an EPS.

14.2.3 Disturbance is defined as an activity which impairs the ability of the EPS to survive, breed, rear/nurture their young, to migrate or an activity which significantly affects the local distribution or abundance of the species.

14.2.4 If the risk of injury or significant disturbance cannot be reduced to negligible levels with mitigation, then an EPS licence is required. In the UK, EPS licensing is conducted through Natural England. Licences are granted under the following circumstances:

- The reason for the licence relates to one of the specified purposes listed in the Habitats Regulations, which includes renewable energy purposes;
- There is no alternative way to reduce injury or disturbance risk; and
- The action covered under the licence is not of detriment to the 'favourable conservation status' of the species.

14.2.5 In addition, harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), grey seal (*Halichoerus grypus*) and the harbour seal (*Phoca vitulina*) are afforded protection under Annex II of the Habitats Directive as species of Community Interest whose conservation requires the designation of Special Areas of Conservation (SACs) which should be managed in accordance with the ecological needs of the designated species.

14.2.6 Grey seal and harbour seal are also listed under Annex V of the Habitats Directive meaning member states much ensure that their exploitation and taking in the wild is compatible with maintaining them in a favourable conservation status.

14.2.7 The Habitats Directive defines when the conservation status of listed species is to be considered as favourable. The definitions it uses for this are specific to the Directive and require that the range and population of the listed species should be at least maintained at their status when the Directive came into force in 1994 or, where the 1994 status was not viable in the long term, to be restored to a position where it would be viable. The assessment of conservation status does not only relate to that component of the species population to be found in SACs, but to the totality of the species throughout the UK. The 2007 Article 17 report (JNCC, 2019a) prepared under the Habitats Directive reported on the conservation status of the listed species. When assessing the conservation status of species, the parameters are range, population, habitat (extent and condition) and future prospects. Each of these parameters is assessed as being in one of the following conditions: Favourable (FV), Unfavourable-Inadequate (UI), Unfavourable-Bad (UB), or Unknown (-).

14.2.8 The Agreement on the Conservation of Small Cetaceans in the Baltic and North Seas (ASCOBANS) was concluded in 1991 and came into force in 1994. An extension to the agreement came into force in February 2008 to include the Northeast Atlantic and Irish Seas as well as the North and Baltic Seas (ASCOBANS, 2015). The aim of the Agreement is to promote close co-operation amongst Parties with a view to achieving and maintaining a favourable conservation status for small cetaceans. ASCOBANS is applied in all UK waters in accordance with existing statutory protection for cetacean

species. It also forms part of the Bonn Convention (1979) (also known as the Convention on the Conservation of Migratory Species of Wild Animals) which is a global convention which aims to conserve migratory species throughout their range, with species that need, or would benefit from, international co-operation listed in Appendix II.

14.2.9 The Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS) is a cooperative tool for the conservation of marine biodiversity and requires member states to implement a comprehensive Conservation Plan. It is founded on legislation banning the deliberate capture of cetaceans in fishing zones, on measures for minimising incidental capture and finally, on the creation of protected zones to safeguard areas important for feeding, breeding and rearing of cetaceans (JNCC, 2019b).

14.2.10 The Bern Convention, which is delivered through the Habitats Directive, is intended to promote cooperation between Contracting Parties in order to conserve wild flora and fauna and their natural habitats and to protect endangered migratory species.

14.2.11 EU Council Regulation 338/97 contains provisions to prohibit or restrict imports of species which are considered to be a threat to native EU flora and fauna. This legislation effectively treats species as Appendix I species under the Convention on International Trade in Endangered Species (IAMMWG *et al*., 2015).

14.2.12 Several other domestic pieces of legislation afford similar protection to all cetaceans and pinnipeds in addition to the Habitats Regulations. For example, *the Wildlife and Countryside Act 1981* makes “deliberate disturbance” of cetaceans and pinnipeds an offence within the 12 nautical mile (nm) limit of territorial waters. Parts 2 and 6 of the *Nature Conservation Act 2004* provide amendments to the Wildlife and Countryside Act by strengthening the protection of threatened species (including cetaceans) to include “reckless” acts that could disturb protected animals.

14.2.13 Pinnipeds are also protected under the *Conservation of Seals Act 1970* section 1 which protects all seals out to 12 nm and which prohibits the killing/taking of seals by certain methods and during closed seasons. The *Conservation of Seals Act 1970* prohibits the following methods of killing or taking seals without a licence:

- Use of any poisonous substance; and
- Use of any firearm other than a rifle with specified ammunition.

14.2.14 There is a closed season for grey seals from 1 September to 31 December, and for harbour seals from 1 June to 31 August. It is an offence to take or kill a seal during the closed season. There are certain exceptions under this legislation, which are not considered offences and for which a licence is not required:

- Taking/attempting to take a disabled seal for the purposes of tending and releasing it;
- Unavoidable killing/injuring as an incidental result of a lawful operation; and

- Killing/attempted killing of a seal to prevent it causing damage to a fishing net/tackle, or to fish held in the net, if the seal is in the vicinity of the net/tackle.

Study Area

14.2.15 The ZoI of potential effects to marine mammals, from the Proposed Development, is predicted to occur predominately within the immediate vicinity of the Site, encompassing the lower reaches of the Tees River and the coastal waters around the entrance to the estuary and to the south, between South Gare and around Coatham Rocks. For the purpose of the baseline characterisation, this area is referred to as the 'immediate Study Area'.

14.2.16 Almost all marine mammal species found in UK waters are wide-ranging and are likely to form part of biological populations whose ranges extend into waters of other European States and/or the High Seas.

14.2.17 Recognising the highly mobile and transient nature of marine mammals and the potential implications of local impacts on wider populations, the Study Area is considered to include the Greater North Sea Ecoregion (North Sea, English Channel, Skagerrak and Kattegat) but with a focus on the area defined by the International Council Exploration of the Sea (ICES) as IVb area (Figure 14C- 1:). This extent also takes into consideration (where available) species-specific Management Units published by the Inter-Agency Marine Mammal Working Group (IAMMWG) (IAMMWG, 2015) and is referred to in this report as the 'wider Study Area'.

Data Sources

14.2.18 This study comprises a detailed desk-based review of publicly available information relevant to the Study Area. This includes information from the following sources.

- General:
  - Atlas of Cetacean Distribution in north-west European Waters (Reid *et al*., 2003);
  - UK Cetacean Status Review (Evans *et al*., 2003);
  - Sea Watch Foundation (https://www.seawatchfoundation.org.uk/);
  - Sea Mammal Research Unit (SMRU) (http://www.smru.st-andrews.ac.uk/); and
  - UK Cetacean Stranding Investigation Programme (http://ukstrandings.org/csip-publications/); and
  - Published Environmental Statements and survey reports produced for large infrastructure projects in the vicinity of the Proposed Development (Gardline Environmental, 2012; Forewind 2014).
- Data sets:

- Small Cetaceans in European Atlantic waters and the North Sea (SCANS) I, II and III data (Hammond *et al*., 2002; 2013 and 2017);
- Wildfowl and Wetlands Trust (WWT) data (WWT Consultancy, 2009); and
- Tees Seals Research Programme (TSRP) data (INCA, 2018; 2019).

SCANS Data (1994, 2005 and 2016)

14.2.19 In 1994, the SCANS project was initiated to estimate the abundance of small cetaceans across the North Sea (Hammond *et al*., 2002). This involved standard boat-based line transect surveys and aerial transect surveys based on the specific methods of Hiby and Lovell (1998) to estimate, for the first time, the abundance of various cetacean species in the North Sea and Celtic Sea. This programme has evolved and was repeated in 2005 (Hammond *et al*., 2013) (i.e. SCANS-II) and again in 2016 (Hammond *et al*., 2017) (i.e. SCANS-III).

14.2.20 Delineation of the survey area for the SCANS-III is shown in Figure 14C- 2; the Proposed Development falls within Block O. Estimates of abundance for each species have been derived for each survey block and for the total survey area. In addition, estimates for harbour porpoise are also presented for the ICES Assessment Units (AU). The Proposed Development falls within the North Sea AU which encompasses Block L – V, including P1 and the eastern portion of Block C.

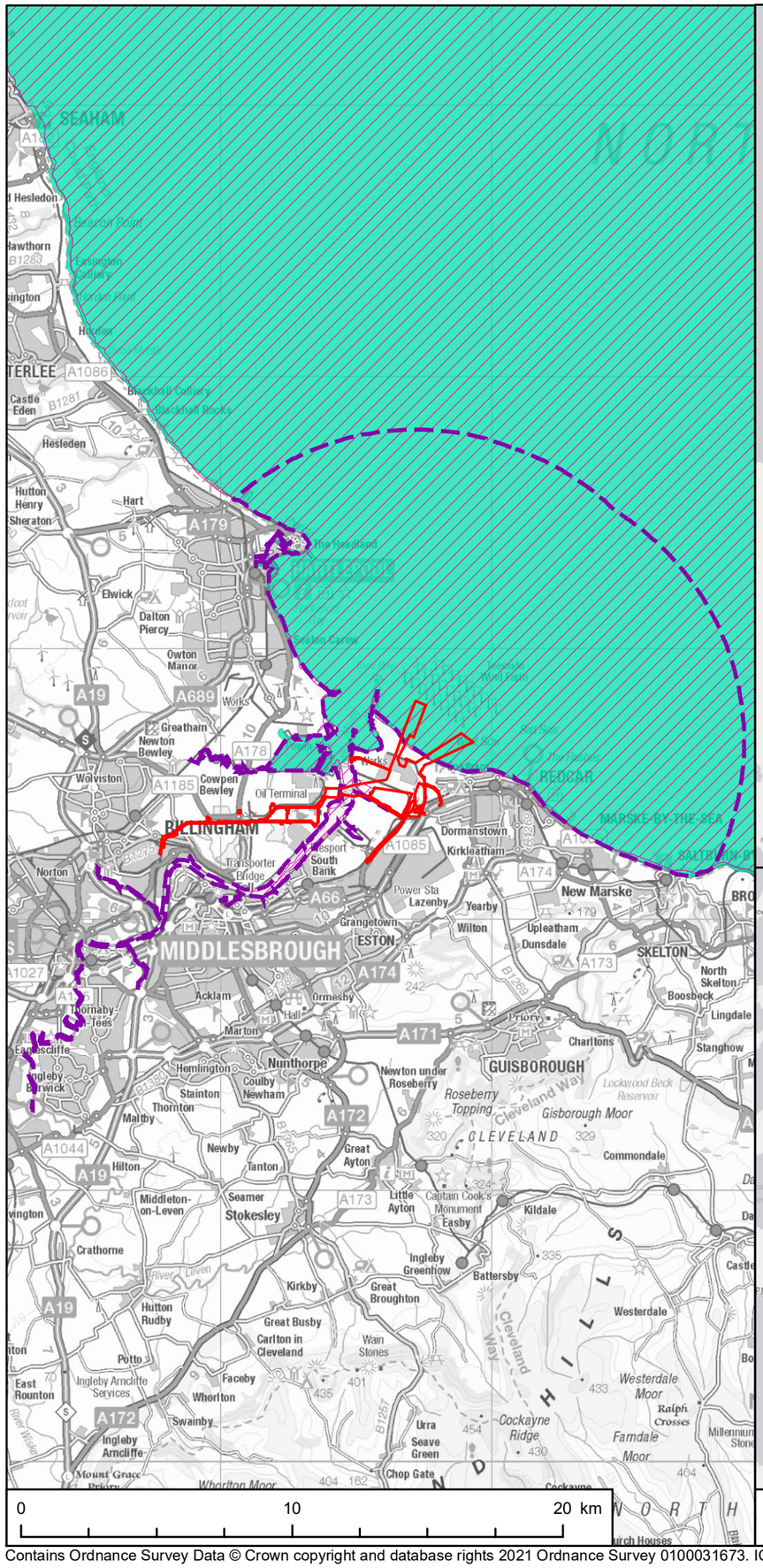
14.2.21 Although the exact same area was not always sampled in each of the three SCANS monitoring years, some inference of temporal trends can be made from the data. This information can also be used to predict the potential evolution of baseline conditions for marine mammals within the Study Area.

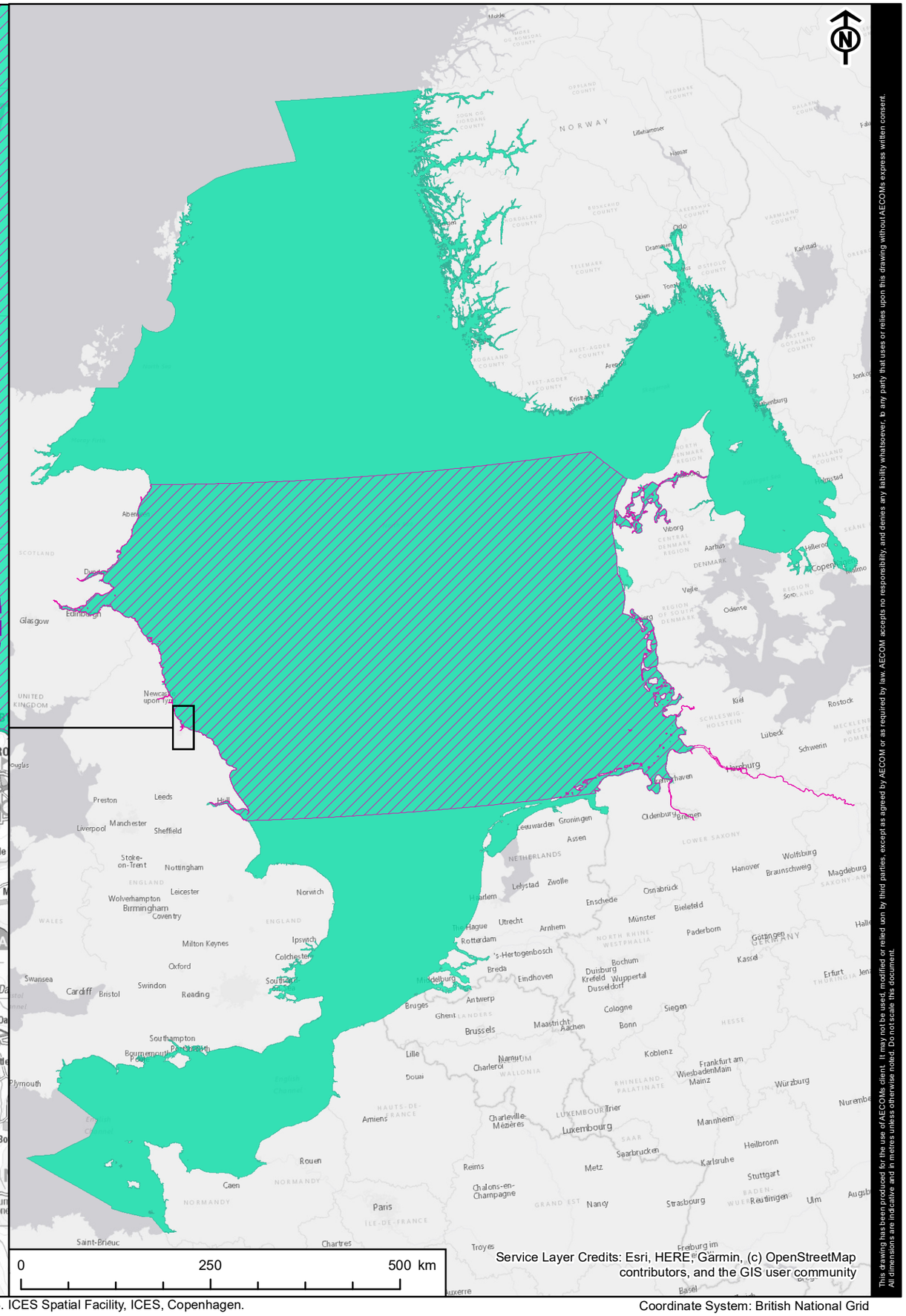
WWT Data (2001 – 2008)

Between 2001 and 2008, WWT Consulting carried out aerial surveys for waterbirds. Opportunistic sightings of cetaceans, seals, turtles, sharks and ocean sunfish were also recorded and reported in WWT Consulting (2009). This data provides information about the distribution and abundance of these taxa around the British Isles and provides valuable supplement to the SCANS data.

Figure 14C- 1: Immediate and wider Study Area for the marine mammal baseline

Project Management Initials: RL Designer: LC Checked: AR Approved: RG





Scale @ A3 1:200,000 / 1:6,000,000

Coordinate System: British National Grid

AECOM

PROJECT
NET ZERO TEESSIDE PROJECT

Net Zero Teesside

APPLICANTS
NZT POWER LTD. AND NZNS STORAGE LTD.

KEY
- Site Boundary
- Immediate Study Area
- Wider Study Area
- ICES Divisions IVb
- Greater North Sea Ecoregion

TITLE
FIGURE 14C-1
IMMEDIATE AND WIDER STUDY AREA FOR THE MARINE MAMMAL BASELINE

REFERENCE
NZT_210511_MMB_14C-1_v5

SHEET NUMBER
1 of 1

DATE
11/05/2021

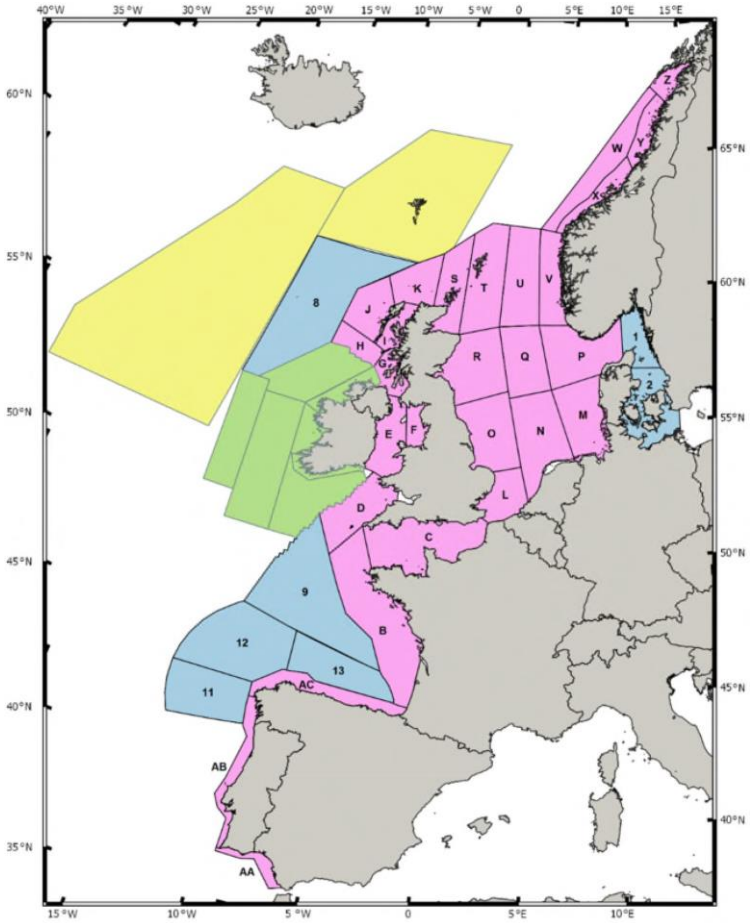


Figure 14C- 2: Area covered by SCANS-III and adjacent surveys (Source: Hammond et al., 2017)

TSRP Data (1989 – 2019)

14.2.22 Since the turn of the 19th Century there has been a seal population at Teesmouth. However, populations crashed in the mid-1800s due to increased shipping, dredging, water pollution associated with industrialisation of the area and by 1930 seals were absent all together. Since the 1960s, seals have returned, and numbers of both grey and harbour seals have been increasing although birth rates for the breeding population of harbour seal remain relatively low.

14.2.23 The TSRP was initiated by the Teesside Development Corporation to monitor the effects of the 1988 phocine distemper virus outbreak within the population of grey and harbour seals resident in the Tees Estuary (INCA, 2019). Since 1992 the programme has been managed by Industry Nature Conservation Association (INCA) in order to monitor the status of the seal population in the Tees Estuary as a general indicator of the health of the River Tees and its intertidal area (INCA, 2018).

14.2.24 Historically, the TSRP has concentrated on harbour seal (*Phoca vitulina*), hence surveys take place from mid-June to mid-September to coincide with the breeding and moulting periods for this species. However, information on grey seal (*Halichoerus grypus*) numbers has also been systematically collected since 2005 (INCA, 2019).

14.2.25 Data collected as part of the TSRP between 1989 and 2019 has been used as the primary resource, to ascertain the current status of both harbour and grey seal populations in the Tees Estuary.

Limitations

14.2.26 There are limitations associated with the data sets used to inform the baseline due to the highly mobile nature of marine mammals which can lead to large variations in their spatial and temporal distribution. The limitations of the three key data sets outlined above are described in detail within the source references (Hammond *et al.*, 2002; 2013 and 2017; WWT Consulting, 2009; and INCA, 2019). However, in summary, uncertainty in abundance estimates typically arise from variations in survey method, effort and conditions (i.e. sea state) which can all lead to under and over-reporting.

14.2.27 Where available Coefficients of Variation (CV) and lower and upper 95% Confidence Limits (CL) have been reported alongside abundance estimates to provide an indication of the potential variability within the data sets. The CV is the ratio of the standard deviation to the mean and is a measure of relative variability. The higher the coefficient of variation, the greater the level of dispersion around the mean. The CLs denote the upper and lower value within which there is 95% confidence that the true value will fall.

14.3 Marine Mammal Baseline Overview

14.3.1 Within the Greater North Sea Ecoregion, four cetacean species occur commonly or are resident, including harbour porpoise (*Phocoena phocoena*), minke whale (*Baleanoptera acutorostrata*), bottlenose dolphin (*Tursiops truncates*) and white-beaked dolphin (*Lagenorhynchus albirostris*) (ICES, 2019). A further five cetaceans, the short-beaked common dolphin (*Delphinus delphis*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), long-finned pilot whale (*Globicephala melas*), killer whale (*Orcinus orca*), and Risso's dolphin (*Grampus griseus*) occur regularly but are less common. Two seal species live and breed in UK waters: grey seal and harbour (or common) seal (SCOS, 2018).

14.3.2 The IAMMWG has defined species Management Units (MUs) for a total of seven species. These include all those listed above with the exception of long-finned pilot whale and killer whale. The long-finned pilot whale is a deep-water species (>200 m), rarely sighted in the shallower waters around the northern Scotland, the northern North Sea and the Channel (Reid *et al.*, 2003). In UK waters, killer whales are most common off northern and western Scotland and to a lesser extent west and south of Ireland, but they are rarely observed in the central and southern North Sea (Reid *et al.*, 2003).

14.3.3 This baseline characterisation focuses on the key marine mammal receptors including the four cetacean species considered by ICES to be common to the Study Area and for which MUs have been defined (harbour porpoise, minke whale, bottlenose dolphin and white-beaked dolphin), as well as the two seal species present (harbour and grey seal). Consideration has been given to the less common and vagrant cetacean species where appropriate (i.e. Section 14.6: Baseline Evolution). The information presented includes

details of each species' ecology including distribution, abundance, life history characteristics, feeding ecology and conservation and threats.

Relevant Marine Designated Sites

14.3.4 The Proposed Development and immediate Study Area do not overlap with any protected sites designated for marine mammals. However, sites are present within the wider Study Area. These include:

- **Berwickshire and North Northumberland Coast SAC** – located 86 km to the north of the Proposed Development, designated for grey seal;
- **Southern North Sea SAC** – located 102 km to the southeast of the Proposed Development, designated for harbour porpoise;
- **Humber Estuary SAC** – located 152 km to the south of the Proposed Development, designated for grey seal;
- **Isle of May SAC** – located 198 km to the north of the Proposed Development, designated for grey seal; and
- **The Wash and North Norfolk Coast SAC** – located 211 km to the south of the Proposed Development, designated for harbour seal.

14.3.5 These sites have been discussed in further detail below in relation to the key marine mammal species for which they are designated.

14.4 Key Marine Mammal Receptors

14.4.1 In accordance with the legislation outlined in Section 14.2, a summary of the conservation protection afforded to each key marine mammal receptor is provided in Table 14C-1 below.

Table 14C-1: Summary of protection measures in place for marine mammals likely to occur around the British Isles

Common name	Latin name	Wildlife and Countryside Act, 1981	EC Habitats Directive (Annex)	Bonn Convention (Appendix)	Bern Convention (Appendix)	EU Council Regulation 338/97	ASCOBANS	ACCOBAMS
Cetaceans								
Harbour porpoise	*Phocoena*	✓	II, IV	II[1]	II	II	✓	✓
Bottlenose dolphin	*Tursiops truncatus*	✓	II, IV	II[2]	II	II	✓	✓
White-beaked dolphin	*Lagenorhynchus albirostris*	✓	IV	II[3]	II	II	✓	✓
Minke whale	*Balaenoptera acutorostrata*	✓	IV	-	II	I	-	✓
Pinnipeds								
Harbour seal	*Phoca vitulina*	✓	II, V	-	III	✓	-	-

Common name	Latin name	Wildlife and Countryside Act, 1981	EC Habitats Directive (Annex)	Bonn Convention (Appendix)	Bern Convention (Appendix)	EU Council Regulation 338/97	ASCOBANS	ACCOBAMS
Grey seal	*Halichoerus grypus*	✓	II, V	-	III	✓	-	-

[1] North and Baltic Sea, western North Atlantic, Black Sea and North West African populations
[2] North and Baltic Sea populations
[3] Only North and Baltic Sea populations

Harbour porpoise

14.4.2 The harbour porpoise is one of the smallest and most common marine mammal species recorded in north-western European shelf waters (Reid *et al*., 2003) and in the North Sea (Hammond *et al*., 2017). Between 1980 and 2002, this species was the most frequently sighted marine mammal, representing 53% of all cetacean sightings recorded in UK waters and adjacent seas (Evans *et al*., 2003).

14.4.3 The marine mammal Study Area encompasses the North Sea MU for harbour porpoise which includes the entire North Sea, Skagerrak and northern Kattegat (Figure 14C- 3) (IAMMWG, 2015). The North Sea MU also aligns with the ICES North Sea AU for harbour porpoise (ICES, 2014).

14.4.4 Harbour porpoise rarely occur in waters exceeding 200 m, with the highest densities observed in waters <100 m deep (Evans *et al*., 2003).

Distribution and abundance

14.4.5 Harbour porpoise are typically observed in small groups of one to three animals. Occasionally large aggregations are observed but these are not considered to be coordinated schools, and probably result from many small groups and individuals concentrating in the same place at the same time to exploit good feeding resources (Hoek, 1992). In 2016, the mean group size observed during the SCANS-III survey of Block O was 1.31 with an average of 1.35 for the survey area as a whole (Hammond *et al*., 2017).

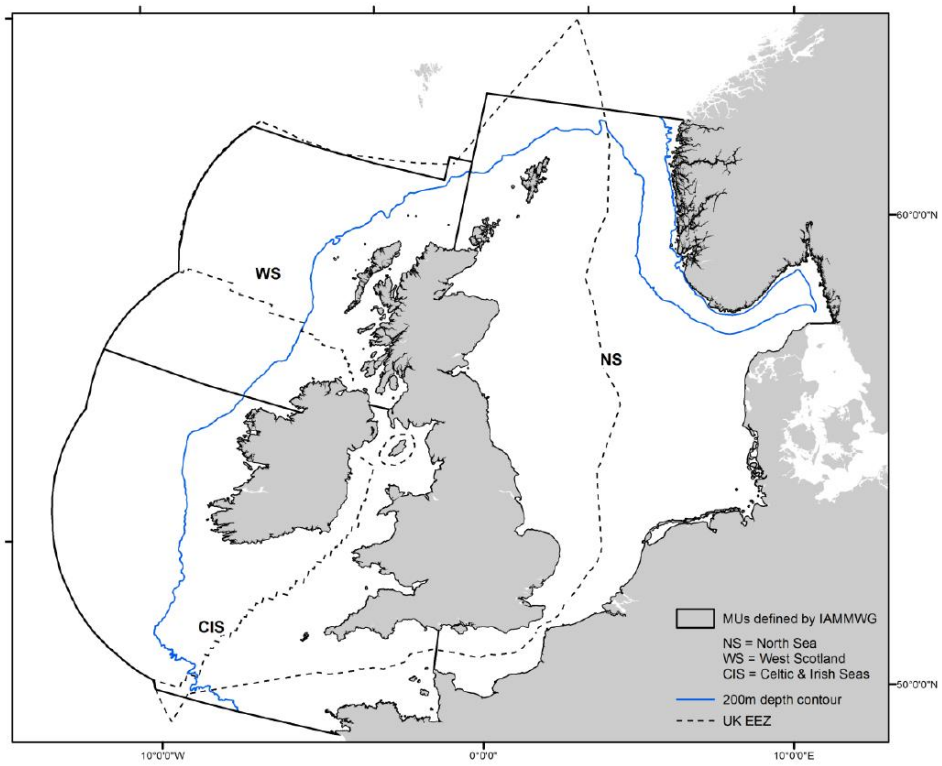


Figure 14C- 3: Harbour porpoise MUs. (Source: IAMMWG, 2015)

14.4.6 Off the north east coast of England, harbour porpoise are present throughout the year, with numbers peaking from mid-summer to early winter (July – October) (Sea Watch Foundation, 2012a). Sightings are predominately concentrated off the Northumberland coast, particularly around the Farnes and Holy Island (Sea Watch Foundation, 2012a). Boat-based surveys within the vicinity of the Dogger Bank Teesside A & B Wind Farm found relatively high numbers of harbour porpoise within the area, particularly during early summer and autumn (Gardline Environmental, 2012). Aerial surveys made similar observations with harbour porpoise found to be abundant in May and June (Forewind, 2014).

14.4.7 The SCANS-III data showed that in 2016, an estimated 345,373 (CV = 0.18; CL range = 246,525 – 495,752) harbour porpoise were recorded within the North Sea AU, representing an average density of 0.52 animals/km^2 (Hammond *et al*., 2017). This represented the highest abundance estimate from all the ICES AUs in the north-eastern Atlantic and the second highest density, with fewer individuals (abundance = 42,324) but more tightly aggregated populations observed in the Kattegat and Belt Seas (density = 1.04 individuals/km^2).

14.4.8 Within Block O alone, which encompasses the Proposed Development (see Figure 14C- 2 for location of block), an estimated abundance of 53,485 (CV = 0.21; CL range = 37,413 – 81,695) harbour porpoise, with a density of 1.31 animals/km^2 were recorded in 2016 (Hammond *et al*., 2017) (**Error! Reference source not found.**).

14.4.9 SCANS data from 1994 and 2005 showed a shift in the distribution of harbour porpoise in the North Sea to the south (Figure 14C- 5) (Hammond *et al*., 2013). Historical data from aerial surveys carried out between 2001 and

2008 also observed much larger numbers of harbour porpoise in the southern North Sea compared to that observed by SCANS-I in 1994 (WWT Consultancy, 2009). Hammond *et al*. (2013) attributed this shift to potential changes in prey distribution.

14.4.10 The distribution of harbour porpoise observed in 2016 was similar to that observed in 2005 although an increased number of sightings were recorded in the English Channel suggesting further expansion in the distribution of this species to the south, particularly during the summer months (Hammond, *et al*., 2017).

14.4.11 Based on an analysis of all three SCANS data sets (I, II and III), Hammond *et al*. (2017) concluded that there has been no obvious trend in the abundance of harbour porpoise in the North Sea since the mid-1990s.

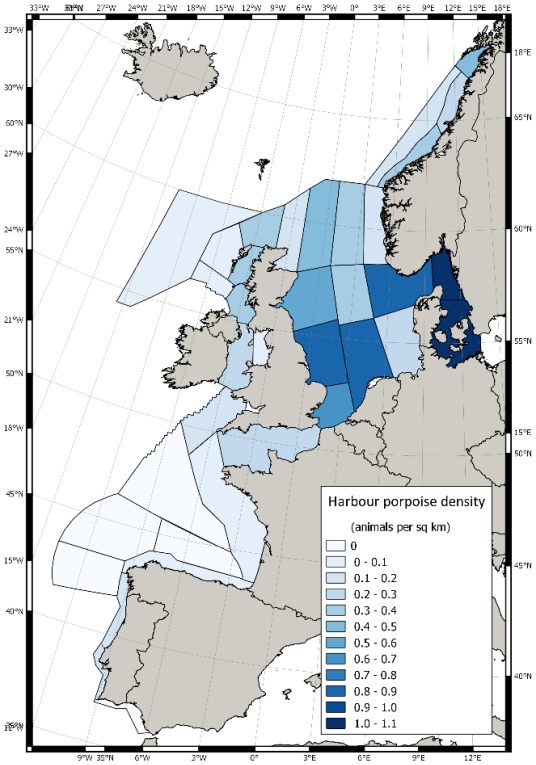


Figure 14C- 4: Estimated density of harbour porpoise for each block surveyed during SCANS III (July 2016) (Source: Hammond *et al*., 2017)

Life cycle

14.4.12 Female harbour porpoise reach sexual maturity at around three years of age (Santos, 2002). The main mating season is the summer and females remain pregnant for approximately 10.5 months. As reproduction generally occurs annually, females are often lactating whilst also being pregnant. The nursing period for harbour porpoise is very short (usually less than one year). Off the coast of the British Isles and in adjacent seas, calves are generally observed between February and September, particularly during May to August. Harbour porpoise have a relatively short life span, usually no more than 15 years (Sea Watch Foundation, 2012b).

Feeding ecology

14.4.13 Harbour porpoise are known to be a generalist feeder consuming a wide variety of fish and cephalopod species. Small schooling fish including herring and sprat (Clupeidae), sandeel (Ammodytidae) and members of the cod family (Gadidae) are important food sources in UK and Irish waters (Pierpoint, 2008). There is considerable geographical variation in dominant prey with individuals in Scottish waters found to take primarily whiting (*Merlangius merlangus*), sandeel (*Ammodytes* spp.) and herring (*Clupea harengus*) when sandeel abundance is low (Santos and Pierce, 2003). In comparison, individuals in Dutch coastal waters have been found to consume predominately gadoids such as cod (*Gadus morhua*) and whiting, gobies (Gobiidae), sandeels and clupeids like sprat (*Sprattus sprattus*) and herring (Leopold, 2015). This regional variability in prey species is due to several factors including availability of preferred prey, variation between adults and juveniles and declines in targeted species.

Conservation and threats

14.4.14 Bycatch is the primary anthropogenic related threat to harbour porpoises in north western Europe (IAMMWG, 2015). Of the cetacean species recorded during independent monitoring of UK fisheries the harbour porpoise is the most common bycatch species (Northridge *et al*., 2012 cited in IAMMWG, 2015).

14.4.15 This species is considered a ‘threatened and declining’ marine mammal in the Greater North Sea by the OSPAR commission however, in the UK, the range and future prospect of harbour porpoise is considered to be of ‘favourable’ conservation status (JNCC, 2019a). Globally this species is considered of ‘least concern’ as indicated by the International Union of Conservation of Nature (IUCN) (IUCN, 2019).

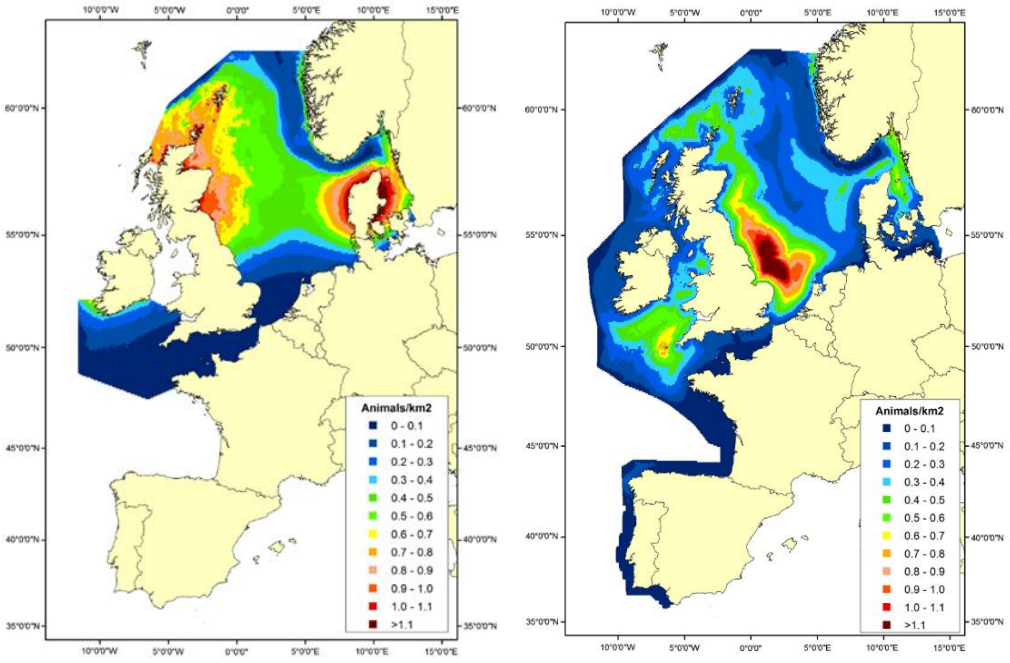


Figure 14C- 5: Predicted density distribution of harbour porpoise in 1994 (left) and 2005 (right) (Source: Hammond *et al*., 2013) Bottlenose dolphin

14.4.16 The bottlenose dolphin is a large species reaching 2.5 m – 3.0 m in length and weighing up to 275 kg (Sea Watch Foundation, 2012). Between 1980 and 2002, bottlenose dolphin represented the second most frequently observed marine mammal species, accounting for 20% of all cetacean sightings recorded in UK waters and the adjacent seas (Evans *et al*., 2003).

14.4.17 The marine mammal immediate Study Area falls within the Greater North Sea MU for bottlenose dolphin and aligns with ICES Area IV (excluding coastal east Scotland and ICES Area IIIa).

Distribution and abundance

14.4.18 In the northeast Atlantic bottlenose dolphins are predominately concentrated off the west coast of Ireland and in small pockets in northern France. They occur in the greatest numbers generally between July and October (with a secondary peak in some localities in March-April), although some animals are present near-shore all year round (Wilson *et al*., 1997). This species is largely absent from the southern North Sea and is only occasionally sighted off the south coast of the UK in the summer (Sea Watch Foundation, 2012).

14.4.19 Very few animals are observed within the Greater North Sea MU. In terms of abundance, the closest hotspot to the Proposed Development is centred on the Moray Firth Special Area of Conservation (SAC), in northeast Scotland (Thompson *et al*., 2011). This area hosts a predominantly coastal resident population. The latest population estimate for the SAC was taken in 2016 where 103 individuals were recorded (95% Confidence Interval (CI) = 93 – 115). Although inter-annual variability has been observed, the number of bottlenose dolphins using the SAC has remained stable (Cheney *et al*., 2018).

14.4.20 During the SCANS III survey in 2016, no bottlenose dolphin was recorded in Block O (Hammond *et al*., 2017). Within Block R, which includes the Moray Firth SAC, a total of 1,924 animals (CV = 0.86; CL range = 0 – 5,048) with a density of 0.03 animals/km^2 were observed (**Error! Reference source not found.**). Pods of bottlenose dolphin within Block R had a mean group size of 5.25 (Hammond *et al*., 2017).

14.4.21 Similar results were observed in 2005 with an absence of bottlenose dolphin from Block O. However, abundance in Block R was lower, with only 313 animals (CV = 0.81) recorded at a density of 0.008. Mean group sizes were also smaller at 2.71 (Hammond *et al*., 2013).

Life cycle

14.4.22 Bottlenose dolphins can live to a considerable age in the wild; females have been reported to live in excess of 50 years (Sea Watch Foundation, 2012c). Sexual maturity varies amongst populations but females in the North Sea generally reach sexual maturity at five years of age with a minimum age of six at first reproduction (Robinson *et al*., 2017). Unlike other marine mammal species such as the killer whale, bottlenose dolphins are reproductively receptive throughout their life and there is no indication of senescence in this species (Ridgeway and Harrison, 1981). Females are pregnant for around

12 months and produce just one calf (for British populations). The lactation period for calves is also variable amongst populations but generally this last between 18 – 20 months (Sea Watch Foundation, 2012c).

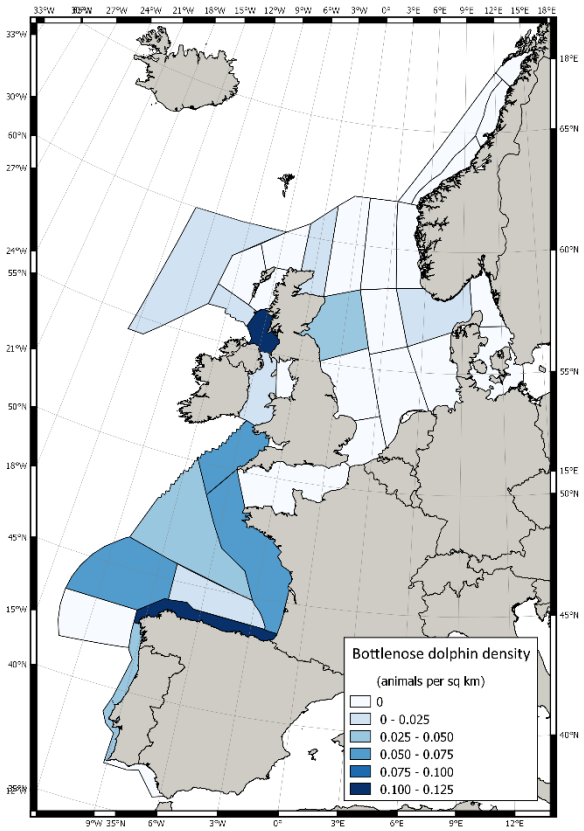


Figure 14C- 6: Estimated density of bottlenose dolphin for each block surveyed during SCANS III (July 2016) (Source: Hammond *et al.*, 2017)

Feeding ecology

14.4.23 Bottlenose dolphins feed on a variety of fauna including pelagic and demersal fish species, cephalopods and crustaceans (Santos *et al.*, 2001). The variety of fauna consumed suggests that bottlenose dolphins are opportunistic predators, that exploit seasonally and locally abundant prey items (Santos *et al.*, 2001). Stomach contents from ten bottlenose dolphins stranded in Scotland found that cod, saithe (*Pollachius virens*) and whiting formed the majority of the bottlenose dolphins' diet, although other fish species such as Atlantic salmon (*Salmo salar*) and haddock (*Melanogrammus aeglefinus*) were also found (Santos *et al.*, 2001).

Conservation and threats

14.4.24 The population of bottlenose dolphins in European waters has significantly reduced in the last century, largely in response to following activities: seismic exploration, dredging, pollutant discharge, an increase in shipping activity and direct and indirect fisheries (Sini *et al.*, 2005). Now only small isolated pockets exist along the coasts of continental Europe and the UK and Ireland.

14.4.25 The range of bottlenose dolphin is considered to be at 'favourable' conservation status in UK waters (JNCC, 2019a) and is of 'least concern' globally (IUCN, 2019).

White-beaked dolphin

14.4.26 The white-beaked dolphin is restricted to temperate and sub-Arctic seas of the North Atlantic and is frequently recorded in the western section of the central and northern North Sea. It is usually found over the continental shelf in waters of 50 –100 m depth (Reid *et al*., 2003).

14.4.27 In the UK white-beaked dolphins are often sighted in small groups of 5 – 10 individuals but have been observed in the summer in much larger groups of 20 – 100 individuals (Sea Watch Foundation, 2012d). Between 1980 and 2002, white-beaked dolphin represented the sixth most frequently sighted marine mammal species, representing just 2.4% of all cetacean sightings recorded in UK waters and the adjacent seas (Evans *et al*., 2003).

14.4.28 The marine mammal Study Area falls within the Celtic and Greater North Sea MU for white-beaked dolphin which encompasses the entire UK coastal waters including the Celtic Sea, Irish Sea, North Sea, Skagerrak and northern Kattegat (IAMMWG, 2015).

Distribution and abundance

14.4.29 Although present year-round in nearshore UK waters, the white-beaked dolphin has been observed most frequently between June and October (Evans 1992; Northridge *et al*., 1995). The main concentrations of this species in the UK are around northern Scotland, Inner/Outer Hebrides, the Orkney Isles and the Shetland Islands (Ridgeway and Harrison, 1981).

14.4.30 The most recent estimate of white-beaked dolphin abundance in the Celtic and Greater North Sea MU is 15,895 animals (CV = 029; 95% CL range = 9,107 – 27,743); of these animals 11,694 (CV = 0.30, 95% CL range = 6,578 – 20,790) are thought to occur within the UK EEZ (IAMMWG, 2015).

14.4.31 Sightings are frequent throughout the year off the north east coast of England, primarily around in the Farne Deep which is thought to be an important overwintering ground for white-beaked dolphin. During the SCANS III survey, the highest estimated densities were in inshore waters west of Scotland and in the northern North Sea (Hammond *et al*., 2017) (Figure 14C-7). In Block O which encompasses the Proposed Development, a total of 143 white-beaked dolphin (CV = 0.88; CL range = 0 – 490) with a density of 0.002 individuals/km^2 were recorded in 2016 (Hammond *et al*., 2017).

14.4.32 The observed distribution and abundance of white-beaked dolphins in 2016 is similar to that observed in SCANS-II in 2005 (Hammond *et al*., 2013) and in SCANS in 1994 (Hammond *et al*., 2002). Based on an analysis of all three SCANS data sets (I, II and III), Hammond *et al*. (2017) concluded that there has been no obvious trend in the abundance of white-beaked dolphin in the North Sea since the mid-1990s.

14.4.33 Boat-based and aerial surveys carried for the Dogger Bank Teesside A & B Wind Farm found white-beaked dolphin to be occasionally present but in low numbers. Most sightings were recorded in spring and early summer whilst

very few sightings were recorded between July and October (Forewind, 2014).

Life cycle

14.4.34 White-beaked dolphin reach sexual maturity anywhere between 6 – 10 years in females with males reaching sexual maturity two years later (Galatius and Kinze, 2015). The gestation period is just short of 12 months and the litter consists of one calf. Strandings of young calves (<130 cm in size) in the UK between June and September suggest that white-beaked dolphin give birth during this period (Galatius and Kinze, 2015).

Feeding ecology

14.4.35 Analyses of stomach contents of white-beaked dolphins from various parts of the North Sea and from Newfoundland have revealed cod, whiting and hake (*Merluccius merluccius*) as predominant prey species (Santos Vázquez *et al.*, 1994; Kinze *et al.*, 1997). Results from necropsies conducted on 16 individuals stranded in Scotland confirmed that gadoids make up a significant part of this species diet with haddock and whiting making up more than > 60% of the stomach contents (Tetley and Dolman, 2013).

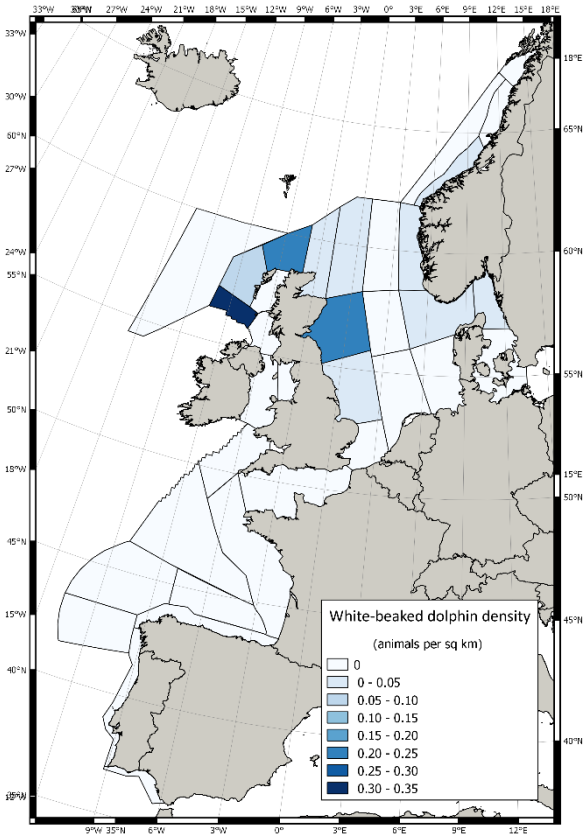


Figure 14C- 7: Estimated density of white-beaked dolphin for each block surveyed during SCANS III (July 2016) (Source: Hammond *et al.*, 2017)

Conservation and threats

14.4.36 White-beaked dolphins are susceptible to a number of anthropogenic induced pressures, including underwater noise, incidental fishing (by-catch), unsustainable fishing, bio-contaminants and climate change (Tetley and

Dolman, 2013). The spatial distribution both on a regional and local scale seems to be positively correlated with sea temperature (Tetley and Dolman, 2013). One of the implications of climate change is rising sea temperatures which could displace populations further north in potentially unsuitable habitat (Tetley and Dolman, 2013).

14.4.37 The range of this species is considered to have a 'favourable' conservation status in UK waters (JNCC, 2019a) and globally it is of 'least concern' (IUCN, 2019).

Minke whale

14.4.38 The minke whale is widely distributed throughout the northeast Atlantic, occurring mainly on the continental shelf in water depths of 200 m or less (Reid *et al.*, 2003). It is also a common species, representing 5% of all cetacean sightings recorded in UK waters and the adjacent seas between 1980 and 2002 (Evans *et al*., 2003).

14.4.39 The marine mammal Study Area falls within the Celtic and Greater North Sea MU for minke whale which encompasses the entire UK coastal waters including the Celtic Sea, Irish Sea, North Sea, Skagerrak and northern Kattegat (IAMMWG, 2015).

Distribution and abundance

14.4.40 In UK waters minke whales are largely distributed around Scotland and in the northern and central portions of the North Sea, off Flamborough Head (Yorkshire) and the north Humberside coast. Individuals are occasionally spotted in the Western English Channel and in the Irish Sea (Anderwald and Evans 2008). This species can often be seen close to land, where individuals sometimes enter estuaries, bays or inlets (Reid *et al*., 2003).

14.4.41 Although this species occurs year-round most sightings in coastal waters around the UK are made between May and September, with peak numbers in July and September depending on the region (Evans *et al*., 2003). Boat-based and aerial surveys for the Dogger Bank Teesside A & B Wind Farm found minke whale to be present in the area in low abundance from March through to October with peak abundance occurring between April and June (Gardline Environmental, 2012).

14.4.42 The most recent estimate of minke whale abundance in the Celtic and Greater North Sea MU is 23,538 animals (CV = 027; 95% CL range = 13,989 – 39,572); of these animals 12,295 (CV = 0.28, 95% CL range = 7,176 – 21,066) are thought to occur within the UK EEZ (IAMMWG, 2015). These values, derived from SCANS-II (Hammond *et al*., 2013) and CODA (Macleod *et al*., 2009), are believed to be underestimates as the data sets had not been corrected for various sources of bias. In the North Sea alone, the SCANS-II survey estimated the minke population to be 10,786 individuals, with the majority of the observed sightings around the central North Sea region (Hammond *et al*., 2013).

14.4.43 In 2016, the SCANS-III survey recorded 603 minke whale (CV = 0.76, CL range = 109 – 1,670) within Block O which encompasses the Proposed Development (Figure 14C- 8). The population density was estimated to be 0.01 individuals/km^2. Just north in Block R, abundances peaked at 2,498

animals (CV = 0.61, CL range = 604 – 6,791), with a population density of 0.04 individuals/km^2. The average group size was 1.18 (Hammond *et al*., 2017).

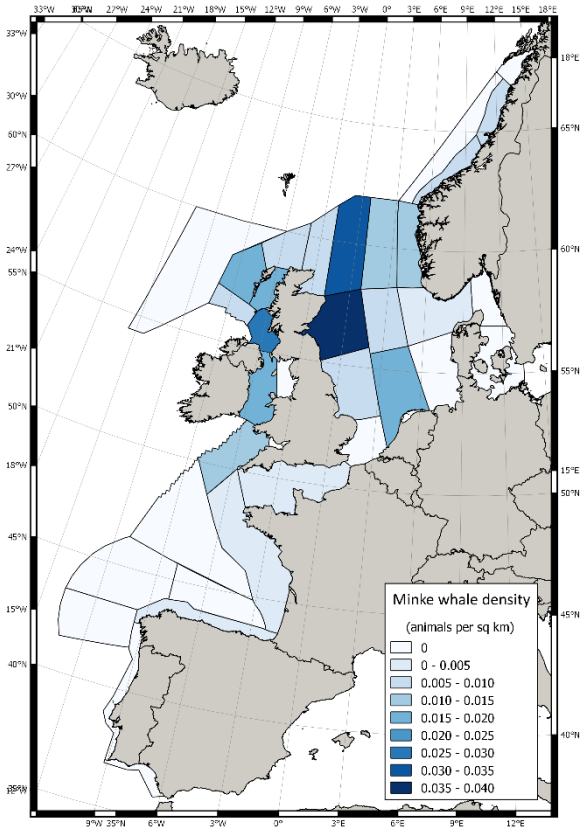


Figure 14C- 8: Estimated density of minke whale for each block surveyed during SCANS III (July 2016) (Source: Hammond *et al*., 2017)

14.4.44 Comparison between 1994 and 2005 SCANS data suggested that the distribution of minke whale in the North Sea had shifted to the south (Figure 14C- 9) (Hammond *et al*., 2013). However, no further change was observed in 2016 with the distribution of minke whale in the North Sea similar to that observed in 2005 (Hammond *et al*., 2017). There is also no evidence of a trend in the abundance of minke whale within the North Sea since the mid-1990s.

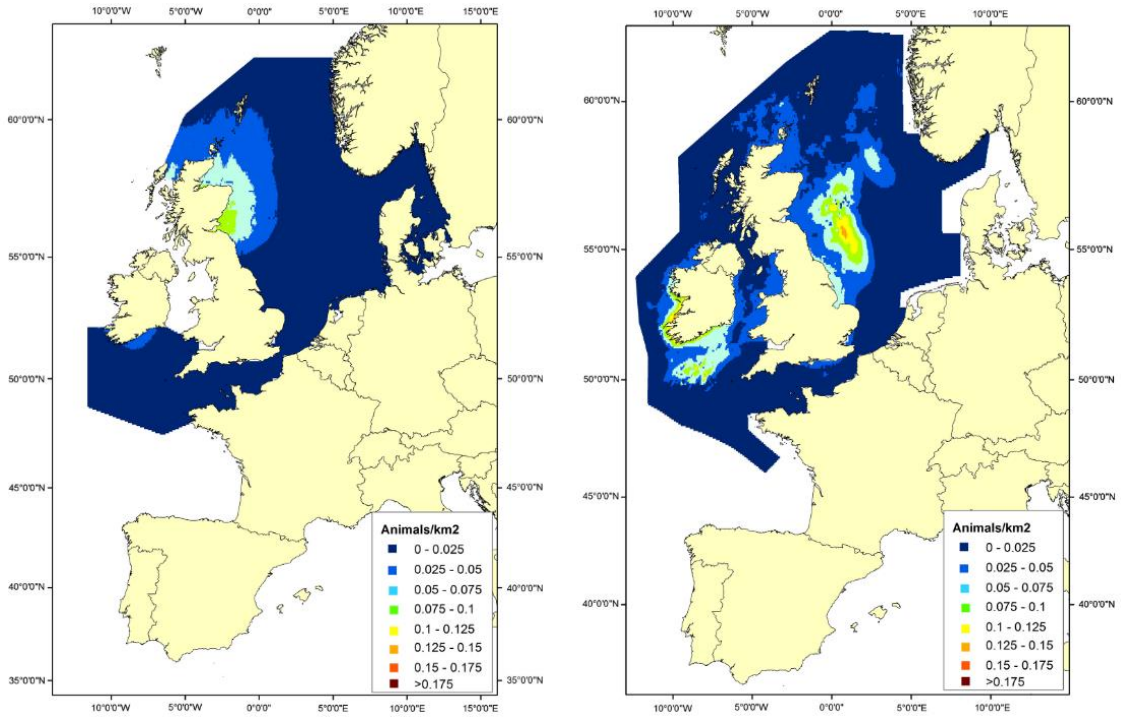


Figure 14C- 9: Predicted density distribution of minke whale in 1994 (left) and 2005 (right) (Source: Hammond *et al*., 2013)

Life cycle

14.4.45 Minke whales are thought to live to between 40 and 50 years (Sea Watch Foundation, 2012). Female become sexually mature at an age of 6 – 8 years whilst males can become sexually mature as young as five years old (Sea Watch Foundation, 2012e). Within the northeast Atlantic, mating usually takes place between October and March. The gestation period is approximately 10 months with females usually giving birth to one calf, although twins and triplets are occasionally produced (Sea Watch Foundation, 2012e). The lactation period generally lasts between 4 and 6 months (Kavanagh *et al.,* 2018).

Feeding ecology

14.4.46 The north Atlantic population of minke whales feed on a variety of fish including herring, cod, capelin (*Mallotus villosus*), haddock, saithe and sandeel as well as euphausiids and pteropods (Haug *et al*., 1995; Nordøy *et al*., 1995). Visual observations and stomach contents analysis of minke whales from the North Sea has shown sandeel (*Ammodytes* spp.) forms the largest component of their diet by weight (86.7 %) followed by Atlantic mackerel (*Scomber scombrus*) (9.3%), whiting (2.4%), herring (1.1%) and Norway pout (*Trisopterus esmarkii*) (0.5%); whereas whales examined from the Norwegian Sea fed entirety on herring (Olsen and Holst, 2001).

Conservation and threats

14.4.47 Despite the commercial whaling moratorium in 1986 (cessation of all commercially whaling activity) Japan, Norway, Iceland and small aboriginal communities in Greenland still actively exploit minke whales, albeit on a lot smaller scale. However, the biggest threat to minkes in the continental

waters off the UK is likely to be entanglement from passive fishing gear. Northridge *et al.* (2010) concluded that minke whale deaths due to entanglement in fishing gear, principally in creel lines represent the single most frequently documented cause of anthropogenic mortality in Scottish and UK waters.

14.4.48 The range of this species is considered to have a 'favourable' conservation status in UK waters (JNCC, 2019a) and is of 'least concern' globally (IUCN, 2019).

Harbour seals

14.4.49 The harbour seal is the most widely distributed pinniped, inhabiting temperate and subarctic coastal areas on both sides of the north Atlantic and north Pacific Oceans. Five separate sub-species are known to exist including the European harbour sea (also known as the common seal) (Seal Conservation Society, 2011). Approximately 30% of European harbour seals are found in the UK (SCOS, 2018).

14.4.50 Harbour seals are gregarious animals. They gather at shore sites (known as 'haul-out' sites) to give birth, nurse their pups, to moult and, at any time of the year, to rest. Many different types of habitat are used for hauling out, including rocky shores, reefs, sand and gravel beaches, intertidal mud and sand bars, piers, and, in some places, drifting ice floes. Suitable characteristics for a haul-out site include adequate protection from land predators, direct access to deep water, proximity to food resources, and protection from strong wind and waves (Seal Conservation Society, 2011).

14.4.51 The species' haul-out patterns tend to be strongly influenced by tidal cycles and many seals haul-out on the falling tide in areas below the high tide mark. The highest numbers of seals are usually hauled out during the breeding season and subsequent moult, although numbers may remain high year-round in areas with suitable foraging grounds available locally (Härkönen, 1987; Wilson, 2001). Foraging areas are thought to extend 40 – 50 km from haul-out sites (SCOS, 2018).

Distribution and abundance

14.4.52 Harbours seals occur most commonly around the west coastal of Scotland and throughout the Hebrides and Northern Isles although they also occur on the east coast, with populations centred around the major estuaries (e.g. Thames, Mersey and the Wash) (SCOS, 2018). The estimated total population of harbour seals for the UK from most recent counts (2008 – 2017) is 32,600,100 (SCOS, 2018).

14.4.53 Populations along the English east coast from Kent to the Scottish border have generally increased in recent decades however, periodic declines have been observed due major outbreaks of phocine distemper virus (PDV). During outbreaks in 1998 and 2002 populations were reduced by 52% and 22%, respectively (SCOS, 2018). Recovery following the most recent outbreak wasn't observed until 2006. Since 2012, populations have remained relatively constant.

14.4.54 A small population of harbour seals is present at the mouth of the River Tees and haul-out on an intertidal mudflat area known as Seal Sands. A few

individuals are also known to occur in Greatham Creek and Bailey Bridge (Figure 14C- 10).

14.4.55 The Site and the local population of harbour seal in the River Tees fall within the NE England Seal MU. This MU also includes harbour seals found at Holy Island. Counts reported by SCOS (2018) indicate the wider population in the NE England MU is relatively stable.

14.4.56 Figure 14C- 10 shows the maximum number of harbour seal recorded in Teesmouth between 1989 and 2019 (INCA, 2019). The annual estimate represents the maximum number of seals hauled-out at any one time over the entire survey period. Surveying was carried out on an annual basis between June and September and generally encompassed the pupping period and a proportion of the moulting period.

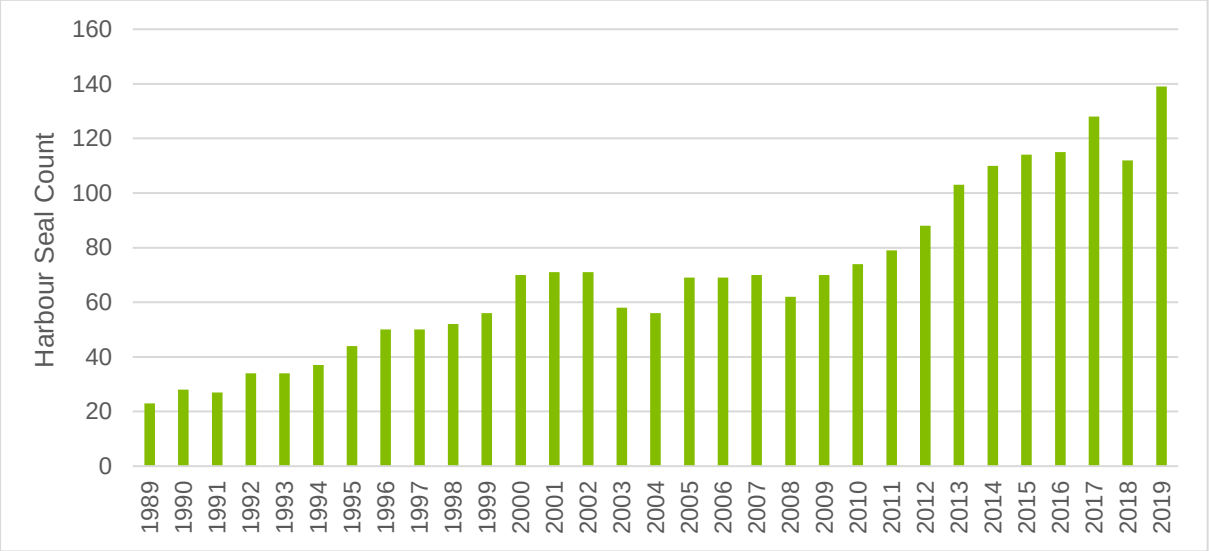
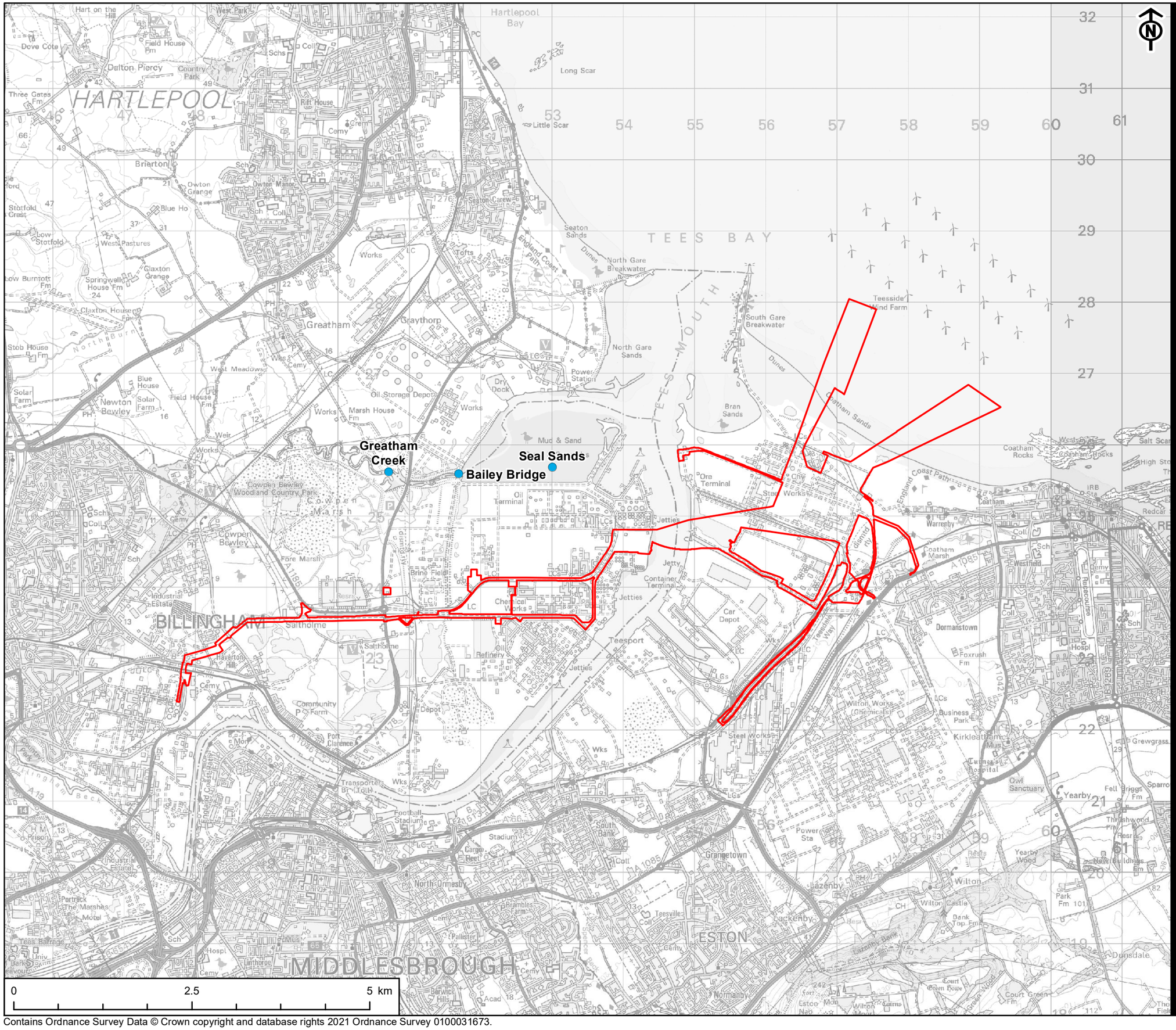


Figure 14C- 10: Maximum number of harbour seals counted at Teesmouth (Source: INCA, 2019)

14.4.57 As shown, the maximum number of harbour seal at Teesmouth has increased since 2010. The highest estimate recorded to date was observed in 2019 with 139 individuals recorded on 10th July. This number included 24 pups, the highest ever recorded at Teesmouth (INCA, 2019). No pup deaths were observed by INCA during the monitoring period although the British Divers Marine Life Rescue (BDMLR) recorded unprecedented levels of pup mortality along the northeast coastline with as many as 15 pups having died. In most cases, the cause was thought to be an unknown infection. BDMLR do not regularly report pup mortality to INCA and so the 2019 results are not directly comparable to previous monitoring years. Generally, pup mortality during most-weaning periods is thought to be relatively high most years.

Figure 14C-11: Location or Project Site in relation to localise Seal Haul out sites

Project Management Initials: RL Designer: LC Checked: AR Approved: RG



Scale @ A3 1:50,000

AECOM

PROJECT
NET ZERO TEESSIDE PROJECT

Net Zero Teesside

APPLICANTS
NZT POWER LTD. AND NZNS STORAGE LTD.

KEY
- Site Boundary
- Seal Haul Out Site

TITLE
FIGURE 14C-2
LOCATION OF PROJECT SITE IN RELATION TO LOCALISED SEAL HAUL OUT SITES

REFERENCE
NZT_210511_MMB_14C-2_v6

SHEET NUMBER
1 of 1

DATE
11/05/21

14.4.58 Although harbour seals are present within the vicinity of the Proposed Development and are likely to use the adjacent sea area for foraging, in the context of wider populations in the North Sea, the immediate Study Area is not considered to be heavily used by this species (Figure 14C- 12). Boat-based and aerial survey for the Dogger Bank Teesside A & B Wind Farm recorded a total of 10 and five individuals, respectively. The survey period for boat-based surveys ran from January 2010 to June 2012, whilst aerial surveys encompassed a 31-month period (Gardline Environmental, 2012).

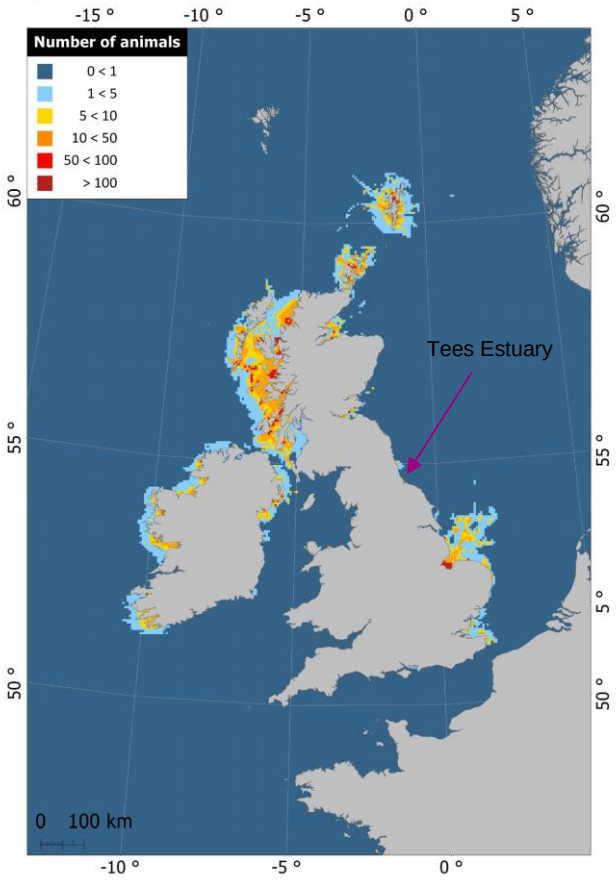


Figure 14C- 12: Harbour seal mean total usage reflecting the combined estimate of abundance on land and at-sea determined from data collected between 1996 and 2015 (Source: Russell *et al.*, 2017)

Life cycle

14.4.59 Harbour seals are long-lived, typically reaching 20 – 30 years old. Female harbour seals become sexually mature at about 4 – 5 years whilst male harbour seals mature at an age of 6 – 7 years (Härkönen and Heide-Jørgensen, 1990). Within the Tees Estuary, pupping almost exclusively takes place at Seal Sands (INCA, 2018). The pupping season at the Tees typically occurs during late June and lasts for about three weeks into late July which is typical of other populations in the north east Atlantic (INCA, 2018).

14.4.60 The moulting season follows pupping and usually lasts for about 4 – 5 weeks (Thompson and Rothery, 1987). Individuals spend a significant proportion of time out of the water during this period to conserve heat and avoid excess energy loss whilst their fur is shed and regrown. The mating season follows

soon after this in September and the gestation period lasts for approximately nine months.

Feeding ecology

14.4.61 Harbour seals are generalist feeders that take a wide variety of fish, cephalopods, and crustaceans obtained from surface, mid-water, and benthic habitats (Härkönen 1987, Pierce *et al*., 1991). Prey type is often determined by the immediate environment and the availability of certain species around the haul out sites (Wilson and Hammond, 2016). To the north of the Study Area within the southeast of Scotland, the dominant fish prey types for harbour seal include flatfish, sandeel and gadoids. An adult harbour seal consumes around 3 – 5 kg per day depending on the prey species (SCOS, 2018).

Conservation and threats

14.4.62 Haul out sites and foraging areas are generally in close proximity to human populations which makes harbour seals susceptible to contaminant exposure from diffuse pollution sources (i.e. agriculture run-off and storm water discharge), noise and disturbance from onshore and offshore construction activities, entanglement from discarded fishing gear and other anthropogenic related pressures. Periodic outbreaks of PDV also lead to short-term population declines.

14.4.63 A study by Wilson (2001), who examined population growth, reproductive rate and neo-natal morbidity within the Teesmouth harbour seal population between 1989 and 1997, found that poor reproductive performance could be attributable to elevated polychlorinated biphenyl compounds within prey species (e.g. periwinkles, shrimps, crabs, mussels, herring, saithe and founder (*Platichthys flesus*)).

14.4.64 As an Annex II species of the EU Habitats Directive, a total of 16 SACs have been designated in the UK specifically for harbour seals. Only two of these occur within the North Sea including the Firth of Tay and Eden Estuary SAC in eastern Scotland and the Wash and North Norfolk Coast SAC in East Anglia, Lincolnshire. Both SACs support nationally important breeding colonies of harbour seal (~7% of the total UK population). These sites are located 227 km and 211 km from the Proposed Development, respectively.

14.4.65 Although the abundance of harbour seal within the Teesmouth area has increased in recent years, there has been a decrease in other parts of the UK, particularly in Scotland (SCOS, 2018). Whilst the range of this species is considered to be at a 'favourable' conservation status, its overall conservation status is considered to be 'unfavourable – inadequate'. However, this is a positive change from 'unfavourable – bad' since the last reporting round in 2013 due to an overall increase in the abundance of harbour seal in the UK (JNCC, 2019a). The global conservations status of harbour seal is of 'least concern' (IUCN, 2019).

Grey seals

14.4.66 Grey seals only occur in the North Atlantic, the Barents Sea and the Baltic Sea, although they are most populous on the east coast of Canada and the USA, and north-west Europe. Approximately 36% of the world's grey seals

breed in the UK and about 90% of these breed at colonies in Scotland with the main concentrations in the Inner and Outer Hebrides and in Orkney (Duck, 2010).

14.4.67 The grey seal is the larger of the two resident UK species with adult males capable of reaching over 300 kg (Duck, 2010). Like harbour seals, grey seals forage in the open sea and return regularly to haul-out on land where they rest, moult and breed. They may range widely to forage and frequently travel over 100 km from their haul-out sites (SCOS, 2018).

Distribution and abundance

14.4.68 The SCOS (2018) estimated there to be approximately 150,000 (95% CI 131,000 – 171,600) grey seals in the UK in 2017. The Teesmouth area is encompassed within the North Sea/East of England region and lies between major colonies to the north (Isle of May, Fast Castle, Farne Islands) and south (Donna Nook, Blakeney Point and Horsey/Winterton) (Figure 14C-13). However, formally the Project Site and Teesmouth area falls within the Northeast England Seal MU.

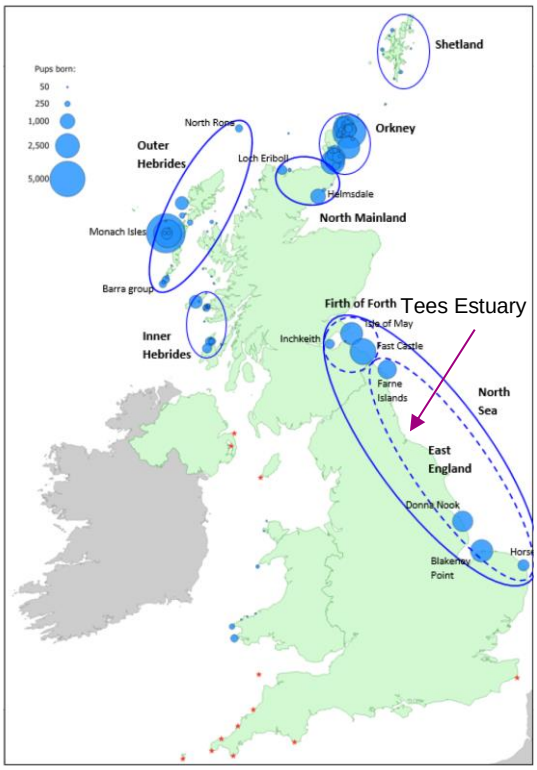


Figure 14C- 13: Distribution and size of the main grey seal breeding colonies. Blue ovals indicate groups of colonies within each region whilst red stars denote less frequently surveys colonies in England, Northern Ireland and the Isle of Man (Source: SCOS, 2018)

14.4.69 The regional estimate for North Sea colonies (including Isle of May, Fast Castle, Farne Islands, Donna Nook, Blakeney Point and Horsey/Winterton) is 14,600 ((95% CI = 12,700 – 16,900). Pup production at these colonises continued to increase rapidly up to 2016 with an annual average increase of 10.9% between 2014 and 2016. Most of the increase in the North Sea has

been due to the continued rapid expansion of newer colonies on the mainland coasts in Berkwickshire, Lincolnshire, Norfolk and Suffolk.

14.4.70 Within the Northeast England Seal MU, grey seal counts have also increased with 7,004 individuals hauled out during August between 2008 and 2017 (SCOS, 2018).

14.4.71 There are no reported breeding sites for grey seals in the Teesmouth area although the Seal Sands site on the River Tees is an important haul-out site for this species.

14.4.72 Figure 14C- 14 shows the maximum number of grey seals recorded in Teesmouth between 1989 and 2019. Peak abundance during the monitoring period is shown to occur in 2017 with 71 individuals recorded. This was followed by a decline in 2018 however, the maximum number of grey seals increased again in 2019 to 56+ individuals recorded in August (INCA, 2019).

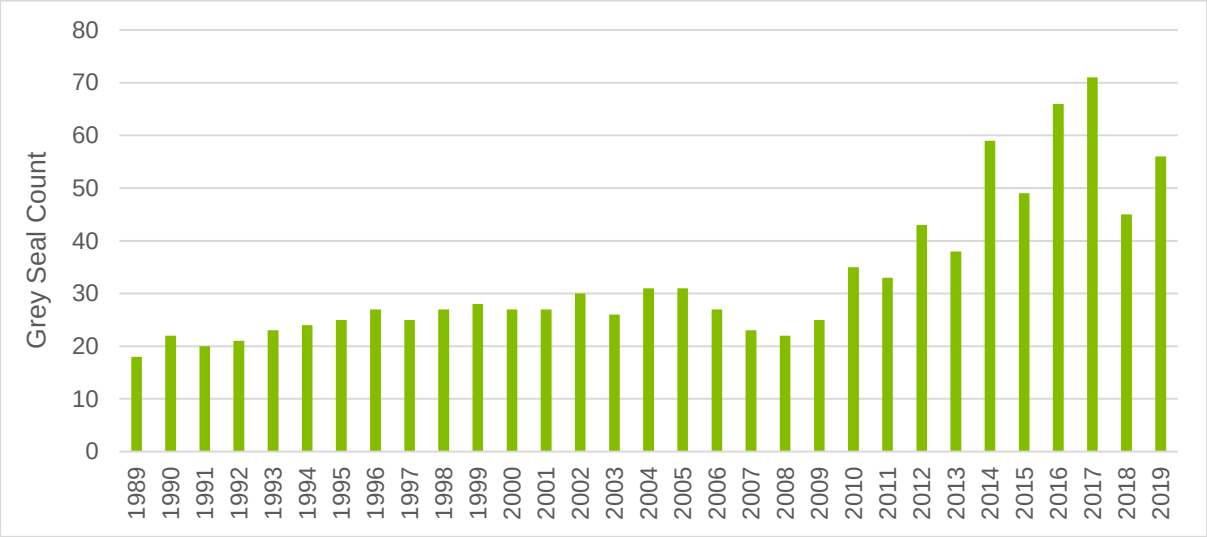


Figure 14C- 14: Maximum number of grey seals counted at Teesmouth (Source: INCA, 2019)

14.4.73 Although grey seals are present within the vicinity of the Proposed Development and are likely to use the adjacent sea area for foraging, in the context of wider populations in the North Sea, the immediate Study Area is not considered to be heavily used by this species. This is shown in Figure 14C- 15. This is supported by historical boat-based surveys in the vicinity of the Dogger Bank Teesside A & B Wind Farm which recorded relatively few sightings of grey seal (<20 per sampling month) (January 2010 to June 2012) (Gardline Environmental, 2012). The average absolute density estimated for the survey period was 0.02131 (95% CI = 0.016 – 0.033) with a peak density of 0.5 seals per km^2.

Life cycle

14.4.74 Grey seals are long-lived animals with males and females living until 20 and 30 years, respectively (SCOS, 2018). Sexual maturity is attained at around 10 years old in males and five years old in females.

14.4.75 In the UK grey seals breed in the autumn (SCOS, 2018). On the west coast of England, pupping occurs mainly between early November and mid-

December (Duck, 2010). Female grey seals give birth to a single pup which they suckle for anything between 17 to 23 days (SCOS, 2018). Unlike harbour seals which take to the water within the first few hours of birth, grey seal pups are unable to swim for the first few weeks and therefore remain on land within the breeding colony during this time. This is likely to be one of the principal reasons why grey seals do not breed in the Tees Estuary as the area known as Seal Sands becomes inundated at high tide (INCA, 2018).

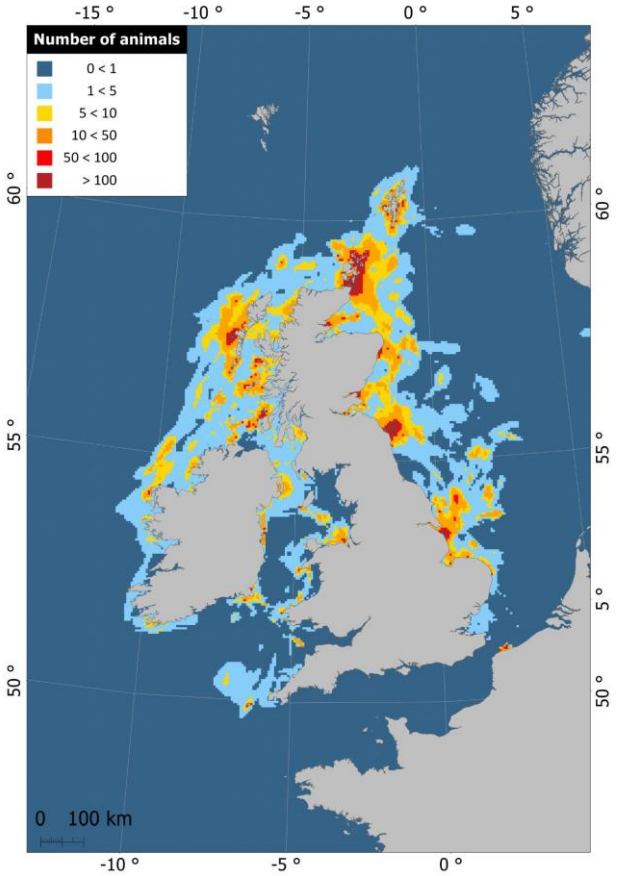


Figure 14C- 15: Grey seal mean total usage reflecting the combined estimate of abundance on land and at-sea determined from data collected between 1996 and 2015 (Source: Russell *et al*., 2017)

Feeding ecology

14.4.76 Grey seals are generalist feeders, foraging mainly at the seabed to depths of up to 100 m (SCOS, 2018). Thompson *et al.* (1996) found that the dietary composition of grey seals was remarkably similar to that of the harbour seal, with sandeels the primary prey item. The remainder of species included clupeids (herring), gadoids (cod, whiting, saithe, ling (*Molva molva*)), cephalopods (squids, octopus) and Pleuronectiforms (dab (*Limanda limanda*), flounder). These observations are supported by more recent studies by Hammond and Wilson (2016) which also found species such as plaice (*Pleuronectes platessa*). Locally, grey seals are thought to prey upon sandeel and sprat as well as benthic macrofauna such as mud snails, cockles and ragworm (SCOS, 2018). Food requirements depend on the size of the seal and fat content of the prey, but an average consumption estimate

of an adult is 4 to 7 kg per seal per day depending on the prey species (SCOS, 2018).

Conservation and threats

14.4.77 Entanglement by fishing gear is believed to be one of the principal threats to grey seal throughout its distribution in the North Atlantic. Data obtained from tagged seals in the UK estimate that out of 528 recorded deaths, 128 are attributable to fishing nets and between one and two percent of grey seal pups die in fishing gear (Woodley and Lavigne 1991). Other threats include collision risk with shipping traffic, introduction of underwater noise and exposure to contaminants.

14.4.78 As an Annex II species of the EU Habitats Directive, a total of 13 SACs have been designated in the UK specifically for grey seals. Only two of these occur within the North Sea including Isle of May SAC in eastern Scotland and the Berwickshire and North Northumberland Coast SAC. Both sites support important breeding colonies and are located 198 km and 86 km from the Proposed Development, respectively. Grey seal is also a qualifying feature of the Humber Estuary SAC which is located 152 km from the Proposed Development, although not a primary reason for designation.

14.4.79 The UK grey seal population is considered to be stable and increasing, particularly within the eastern England colonies which is supported by local observations in Teesmouth (SCOS, 2018; INCA, 2019). Overall, this species is at 'favourable' conservation status in the UK (JNCC, 2019a). Globally, populations are also considered to be increasing and therefore the conservation status of this species is of 'least concern' (IUCN, 2019).

14.5 Baseline Evolution

14.5.1 As outlined in Section 14.4, the distribution of harbour porpoise has exhibited a southern shift within the North Sea between 1994 and 2005 with evidence of further expansions during the summer months between 2005 and 2016 (Hammond *et al.*, 2017). However, other species (e.g. white-beaked dolphin and minke whale) which have also been surveyed as part of the SCANS programme have exhibited limited or no change in their abundance and distribution within the North Sea over the last 22 years (Hammond *et al.*, 2017).

14.5.2 Local seal populations within the Tees Estuary have generally remained relatively consistent or increased during the corresponding period (1990s to present) (INCA, 2019). More widely, changes in the abundance and distribution of both grey and harbour seals have been observed with increases in the North Sea due to rapid expansion of new colonies (SCOS, 2018).

14.5.3 Baseline conditions for marine mammals can be influenced by a variety of factors including, disease, severe weather events, increased human population (i.e. disturbance), coastal development, climate change and sea-level rise.

14.5.4 Abrupt declines in the reproductive success of seal populations have been linked to outbreaks of the PDV virus as well as severe storm events (SCOS,

2018), both of which are predicted to become more prevalent with climate change and sea ice melt (VanWormer *et al*., 2019; IPCC, 2019). Similarly, sea-level rise could lead to the loss of coastal areas which act as important haul out sites for seals to rest, give birth and nurse their pups.

14.5.5 Whilst marine mammals themselves are known to be reasonably resilient to changing ocean temperatures, their prey (i.e. shoaling fish) often exhibit a much narrower temperature preference and many species have been found to migrate to deeper cooler waters during warmer conditions (Heath *et al*., 2012). Thus, changes in prey availability and distribution has been found to drive shifts in marine mammal distribution with potential changes to marine food webs (Hammond *et al*., 2013).

14.5.6 Future UK Climate Projections 2018 (UKCP18) from the Met Office for the Stockton-on-Tees area (The Met Office, 2019), based on a 1981 – 2000 baseline[1], uses a range of possible scenarios, classified as Representative Concentration Pathways (RCPs), to inform different future emission trends. RCP 8.5 has been used for the purposes of this assessment as a worst-case scenario.

14.5.7 Based on RCP 8.5, there is a 50% probability that sea levels will have risen 8 cm by 2022 (commencement of construction) and 11 cm by 2026 (commencement of operation). By 2051 (i.e. the end of the Proposed Developments operational lifespan) this may increase further to 26 cm above 1981 – 2000 baseline.

14.5.8 Sea temperature change projections are more variable and less specific to the Teesside region. Under RCP 8.5 a rise in global sea surface temperatures of 1.5°C by 2050 is predicted, increasing to a 3.2°C rise by 2100 relative to 1870 – 1899 temperatures. In UK waters, mean annual sea temperatures have risen by 0.8°C since 1870 and have continued to show consistent warming trends since the 1970s (Genner *et al*., 2017). According to Lowe *et al*. (2009), the seas around the UK are projected to be 1.5 – 4 ºC warmer by 2100.

14.5.9 Based on these climate change predictions, there is potential for a decline in availability of suitable haul out sites for seals within the Tees Estuary due to sea-level rise either prior to or during construction and operation of the Proposed Development. A continued decrease in the abundance of harbour porpoise and an increased abundance of white-beaked dolphin within the Study Area is also possible (Evans and Børge, 2013). Furthermore, it is possible that sightings of more vagrant species such as short-beaked common dolphin, striped dolphin and Risso dolphin may become more frequent (Evans and Børge, 2013). This might be in response to the expanding range of fish species usually associated with warmer waters such as sardine and anchovy (ICES, 2008 cited Evans and Børge, 2013). However, the magnitude of potential changes to baseline conditions is difficult to predict with any certainty.

[1] This baseline has been selected as it provides projections for 20-year time periods (e.g. 2020 – 2039).

14.6 Summary of Findings

14.6.1 There are known to be nine cetacean and two pinniped species which occur within the Greater North Sea Ecoregion. The marine mammal baseline focussed on those species which were regarded as common or resident and includes harbour porpoise, minke whale, bottlenose dolphin, white-beaked dolphin, grey seal and harbour seal.

14.6.2 The Proposed Development and immediate Study Area do not overlap with any protected sites designated for marine mammals. However, four SACs are located within the wider Study Area; one is designated for harbour porpoise, two are designated for grey seal; and one is designated for harbour seal. These SACs are located between 86 km and 211 km from the Proposed Development.

14.6.3 SCANS-III survey data has shown the immediate and wider Study Area to be important for harbour porpoise whilst comparatively, of low or very low importance for species such as white-beaked dolphin and bottlenose dolphin, respectively. Although minke whale are not thought to occur in the immediate Study Area, the wider Study Area (particularly to the north) is considered to be of importance for this species. All four cetacean species are recognised as being of 'favourable' conservation status (JNCC, 2019a) and of 'least concern' globally (IUCN, 2019).

14.6.4 The immediate Study Area is recognised as being of local importance for harbour seal on account of the presence of a breeding colony at Seal Sands. The area is also of local importance as a haul out site for grey seal. Tagging and observational studies have shown that despite a local presence, the coastal waters around the Proposed Development (i.e. within ~50 km) are not heavily used by either species. In terms of harbour seal, there is little evidence to suggest any interaction with SAC populations located within the wider Study Area.

14.6.5 The Proposed Development lies between major colonies for grey seal to the north (Isle of May, Fast Castle, Farne Islands) and south (Donna Nook, Blakeney Point and Horsey/Winterton), with visible interaction between the two areas. However, the grey seal has been found to migrate further offshore (>50 km), preferring to avoid the coastal waters along the northeast coast of England.

14.6.6 Whilst grey seal is considered to be of 'favourable' conservation status in the UK, harbour seal is 'unfavourable – inadequate' (JNCC, 2019a). However, globally both species are considered to be of 'least concern' (IUCN, 2019).

14.6.7 Based on the information present in this report, the following marine mammal species are considered to be important ecological features in relation to the Proposed Development: harbour porpoise, minke whale, harbour seal and grey seal.

14.6.8 Prior to and during the construction and operational phase of the Proposed Development, it is possible that the marine mammal baseline will evolve as a result of environmental changes such as sea level rise and temperature increase caused by climate change. Such environmental changes could influence the distribution and abundance of marine mammal species

although the magnitude of potential changes to baseline conditions is difficult to predict with any certainty.

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