Rampion 2 Wind Farm

Category 6: Environmental Statement

Volume 4, Appendix 11.1: Marine mammal baseline technical report

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Executive summary

This report has been produced for the purpose of characterising the marine mammal baseline environment for the Rampion 2 project and surrounding area. The consideration of marine mammals for Rampion 2 has been discussed with consultees through the Rampion 2 Evidence Plan process and has been compiled through a combination of a literature reviews and data obtained from site-specific surveys. The marine mammal chapter of the Rampion 2 Scoping Report scoped in six species of marine mammal: harbour porpoise, bottlenose dolphin, white-beaked dolphin, common dolphin, minke whale, harbour seal and grey seal (RED, 2020). However upon consideration of the data sources, this baseline characterisation recommends that white-beaked dolphins are scoped out of assessment due to their rarity at the Rampion 2 site.

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1. Introduction

1.1.1 SMRU Consulting was commissioned by the Applicant to undertake a characterisation of the marine mammal baseline environment of the Rampion 2 project and surrounding area.

1.1.2 The consideration of marine mammals for Rampion 2 has been discussed with consultees through the Rampion 2 Evidence Plan (EP) process; specifically with the Marine Mammal Evidence Plan Technical Panel (hereafter EP Technical Panel) of which Natural England, the Marine Management Organisation (MMO), Cefas, and The Wildlife Trusts (TWT).

1.1.3 The purpose of this document is to provide a characterisation of the baseline environment to understand the range of species, and the abundance and density of marine mammals that could potentially be impacted by Rampion 2. The baseline data have been compiled through a combination of a literature reviews and data obtained from site-specific surveys.

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2. Methodology

2.1 Context

2.1.1 The Scoping report identified the seven marine mammal species as being present in the Rampion 2 area: harbour porpoise, bottlenose dolphin, white-beaked dolphin, common dolphin, minke whale, harbour seal and grey seal. Baseline information was gathered by a combination of desk-based review of existing data sources and consideration of site-specific-survey data. The existing sources reviewed, and the surveys carried out are described in detail below.

2.2 Study Area

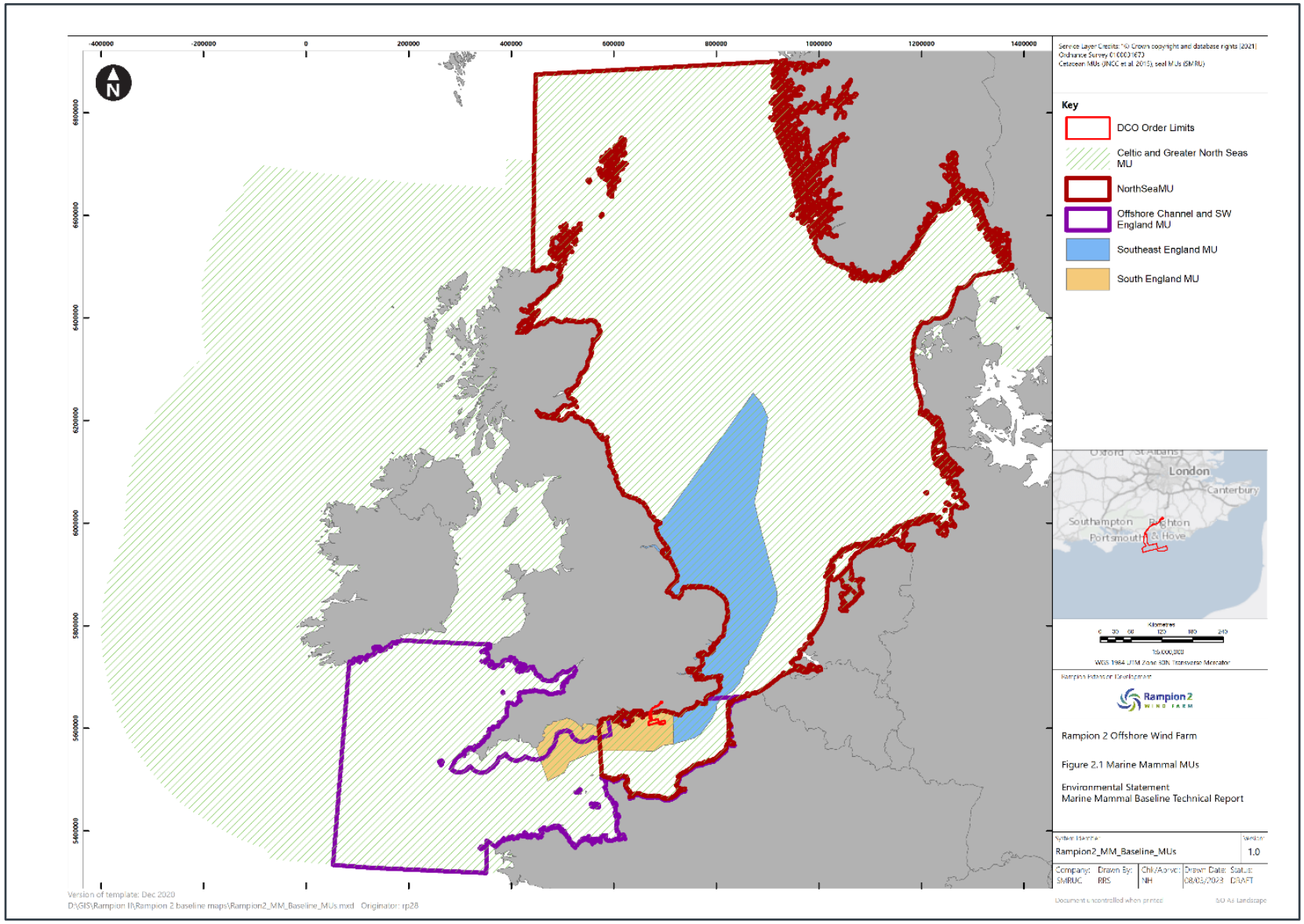
2.2.1 The marine mammal study area varies depending on the species, considering individual species ecology and behaviour. For all species, the study area covers the Rampion 2 array area and offshore Export Cable Corridor (ECC) and is extended over an appropriate area considering the scale of movement and population structure for each species. For each species, the area considered in the assessment is largely defined by the appropriate species Management Unit (MU). The study area for marine mammals has been defined at two spatial scales: the MU scale for species specific population units and the marine mammal survey areas for an indication of the local densities of each species. Details of the MU size and extent are provided in **Table 2-1** and **Figure 2.1**.

- At the MU scale, Rampion 2 is located within the following species specific MUs:
  - Harbour porpoise: North Sea MU
  - Bottlenose dolphin: Offshore Channel and SW England MU
  - White-beaked dolphin: Celtic and Greater North Seas MU
  - Common dolphin: Celtic and Greater North Seas MU
  - Minke whale: Celtic and Greater North Seas MU
  - Harbour seals: South and Southeast England MUs combined
  - Grey seals: South and Southeast England MUs combined
- The marine mammal survey area encompasses the Rampion 2 array area plus 4 km buffer in order to provide more temporal and spatial fine scale local data (**Figure 2.3**).

Table 2-1 Management unit abundance estimates for the marine mammal species in the Rampion 2 area.

Species	MU	Abundance	Source
Harbour porpoise	North Sea	346,601 95% CI: 289,498 – 419,967	IAMMWG (2021)
Bottlenose dolphin	Offshore Channel and SW England	10,947 95% CI: 6,727 – 17,814	IAMMWG (2021)
White-beaked dolphin	Celtic and Greater North Seas	43,951 95% CI: 28,439 – 67,924	IAMMWG (2021)
Common dolphin	Celtic and Greater North Seas	102,656 95% CI: 58,932 – 178,822	IAMMWG (2021)
Minke whale	Celtic and Greater North Seas	20,118 95% CI: 14,061 – 28,786	IAMMWG (2021)
Harbour seal	South and South-east England MUs combined	Count: 3,752 (SE) + 40 (S)	SMRU 2019 count data
Grey seal	South and South-east England MUs combined	Count: 8,667 (SE) + 25 (S)	SMRU 2019 count data

Figure 2.1 Marine mammal Management Units



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2.3 Conservation status

2.3.1 The Joint Nature Conservation Committee (JNCC) provides the UK report on the conservation status of species. The latest assessments were conducted in 2019 and were submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive. Overall, most species have an unknown conservation status, apart from harbour seals, which have an unfavourable-inadequate status and grey seals which have a favourable status (**Table 2-2**).

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Table 2-2 Conservation status of the marine mammals present in the Rampion 2 area

Species	Range	Population	Habitat	Future prospects	Conservation Status	Overall trend	Reference
Harbour porpoise	FV	XX	XX	FV	XX	XX	JNCC (2019c)
Bottlenose dolphin	FV	XX	XX	XX	XX	XX	JNCC (2019a)
White-beaked dolphin	FV	XX	XX	XX	XX	XX	JNCC (2019f)
Common dolphin	FV	XX	XX	XX	XX	XX	JNCC (2019b)
Minke whale	FV	XX	XX	XX	XX	XX	JNCC (2019g)
Harbour seal	FV	U1	XX	U1	U1	XX	JNCC (2019e)
Grey seal	FV	FV	FV	FV	FV	+	JNCC (2019d)

FV = Favourable, U1 = Unfavourable-Inadequate, XX = Unknown, + = Improving

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2.4 Protected areas

2.4.1 In order to conserve biodiversity, by maintaining or restoring Annex II species to a Favourable Conservation Status (FCS), the Habitats Directive requires the designation of Special Areas of Conservation (SACs) for the harbour porpoise, bottlenose dolphins the harbour seal and the grey seal.

2.4.2 Within the North Sea MU there is one SAC for harbour porpoise: The Southern North Sea SAC.

2.4.3 There are no harbour seal SACs in the South England MU. The closest harbour seal SAC is the Wash and North Norfolk Coast SAC which is located in the Southeast England MU >300 km from the survey area.

2.4.4 There are no grey seal SACs in the South England MU. The closest grey seal SAC is the Humber Estuary SAC which is located in the Southeast England MU >300 km from the survey area.

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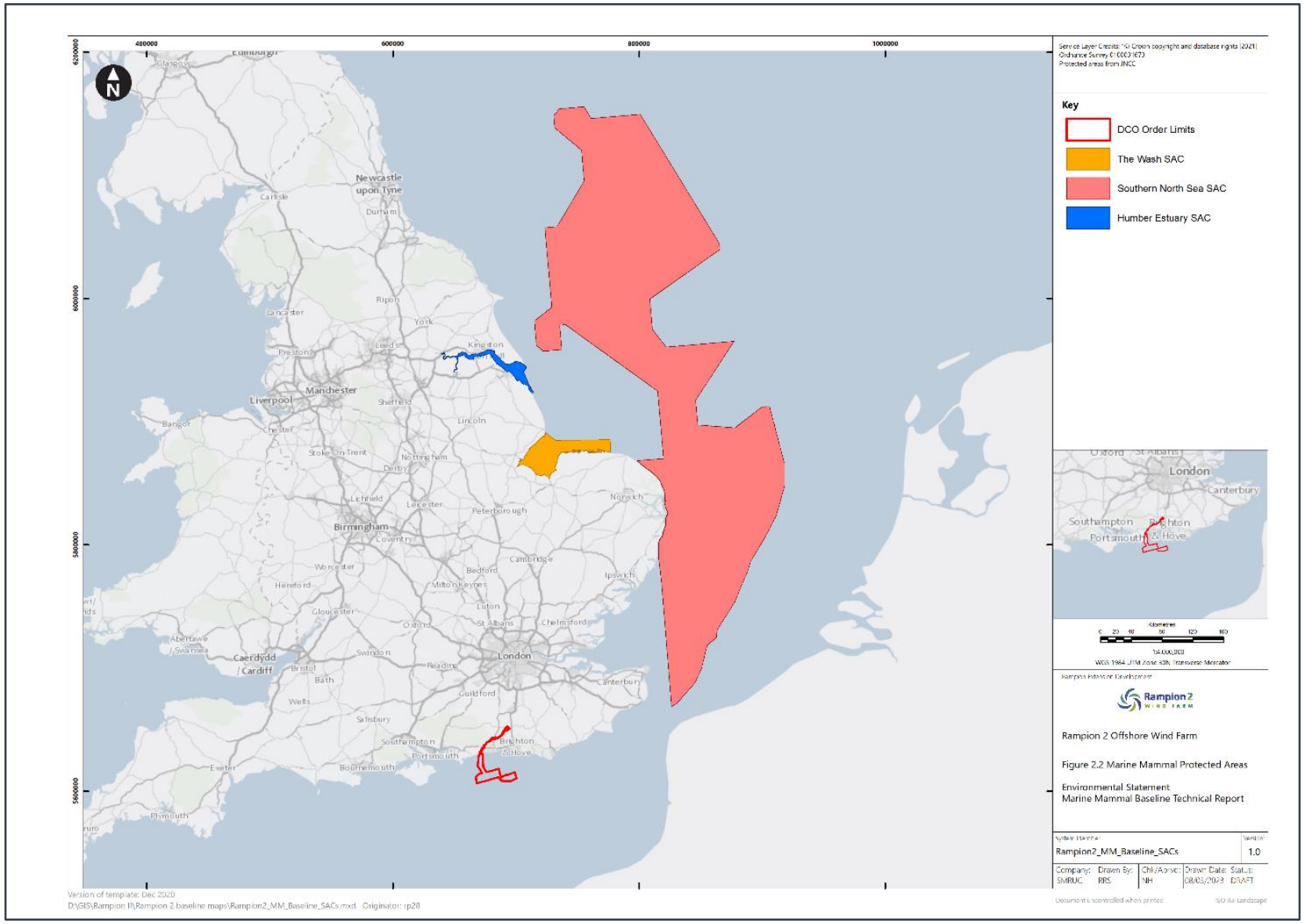
Figure 2.2 Marine mammal protected areas (Special Areas of Conservation) within the Study Area



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2.5 Data sources

2.5.1 **Table 2-3** and the following sections provide detail on the key data sources used to characterise the baseline Study Area for marine mammals in relation to Rampion 2. This section details the survey and analysis methodology implemented in each study and the potential limitations associated with these. The actual results of the surveys in terms of the species presence is detailed subsequent species specific sections (**Section 3** Harbour porpoise baseline, **Section 4** Bottlenose dolphin baseline, **Section 5** White-beaked dolphin baseline, **Section 6** Common dolphin baseline, **Section 7** Minke whale baseline, **Section 8** Harbour seal baseline and **Section 9** Grey seal baseline).

Table 2-3 Summary of the marine mammal data sources used for baseline characterisation

Data Source	Date	Summary	Coverage
Rampion 2 surveys	Apr 2019 – Mar 2021	Digital aerial surveys	Rampion 2 + buffer
Rampion 1 surveys	Mar 2010 – Feb 2012	Boat based visual surveys	Rampion 1 + buffer
SCANS III (Hammond et al., 2021)	July 2016	Abundance estimates for small cetacean populations	UK wide
JCP Phase III (Paxton et al., 2016)	1994-2010	Estimations of spatial and temporal abundance patterns	UK wide
JCP Phase III Data Analysis Product	1994 and 2010	JCP dataset: 38 sources, totalling over 1.05 million km from a variety of platforms	UK wide. Specific estimates provided for Hastings and IOW
Heinänen and Skov (2015)	1991-2011 (Summer: Apr-Sep, Winter: Oct-Mar)	Density surface maps produced from the JCP dataset.	UK wide
MERP Cetacean distribution maps (Waggitt et al., 2020)	1980-2018	Species distribution maps available at monthly and 10 km2 density scale	UK wide
Sea Watch Foundation	2007 - 2019	Sightings distribution maps	Waters around the Isle of Wight

Data Source	Date	Summary	Coverage
sightings (Castles, 2020)			
ORCA sightings	2011-2020	Sightings and effort data from opportunistic ferry surveys.	Ferry route between Portsmouth and Caen
Seal haul-out counts (provided by SMRU)	August counts: 1996-2020 (harbour and grey seal) Autumn counts: 1989-2020 (grey seal pups)	Haul-out count data for population estimates	UK wide
Seal telemetry (provided by SMRU)	1988-2018	Information on GPS location, track data and dive data	UK wide
Sea at-sea usage (Russell et al., 2017)	1991-2015	Average seal at-sea distribution estimates at a 5km grid resolution	UK wide
Seal at-sea density (Carter et al., 2020)	2005-2019	Density surface based on telemetry and count data	UK wide
The Solent Seal Project (Castles et al., 2021, Chesworth et al., 2010)	Counts: 1999-2019 Telemetry 2009	Annual august haul out counts of seals in the Solent. Telemetry data for 5 harbour seals tagged at Chichester and Langstone harbours	The Solent Sea
SAMM surveys (Laran et al., 2017)	Nov 2011 – Aug 2012	Large scale aerial surveys	English Chanel and the Bay of Biscay
French seal data (Vincent et al., 2017)	1999-2014	45 grey and 28 harbour seals tagged	English Channel and French coast
Sussex Biodiversity Record Centre	1848-2020	Opportunistic sightings	Sussex

Rampion 2 surveys

2.5.2 Monthly digital aerial surveys were conducted by APEM Ltd. They commenced in April 2019 and concluded in March 2021, resulting in 24 surveys. The survey design consisted of nine transect lines within the survey area. Images were captured at points located approx. 3 km apart (**Figure 2.3**). Data collected were 2 cm GSD digital still images. This resulted in coverage of 10.84-12.24% of the Rampion 2 Survey Area, mostly in Douglas sea states between 0 and 3.

2.5.3 Population estimates for each survey month were extracted by multiplying the mean number of animals per image, by the total number of images covering the study area. Using non-parametric, bootstrap methods, species-specific monthly abundance estimates were calculated from the raw count data, with upper and lower confidence limits included. Where appropriate, precision was also presented for each estimate. Dividing these estimates by the size of the area covered, generated the associated density estimates for all species.

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Figure 2.3 Transect lines of the aerial digital still imagery at Rampion Offshore Wind Farm and Rampion 2 Survey Area

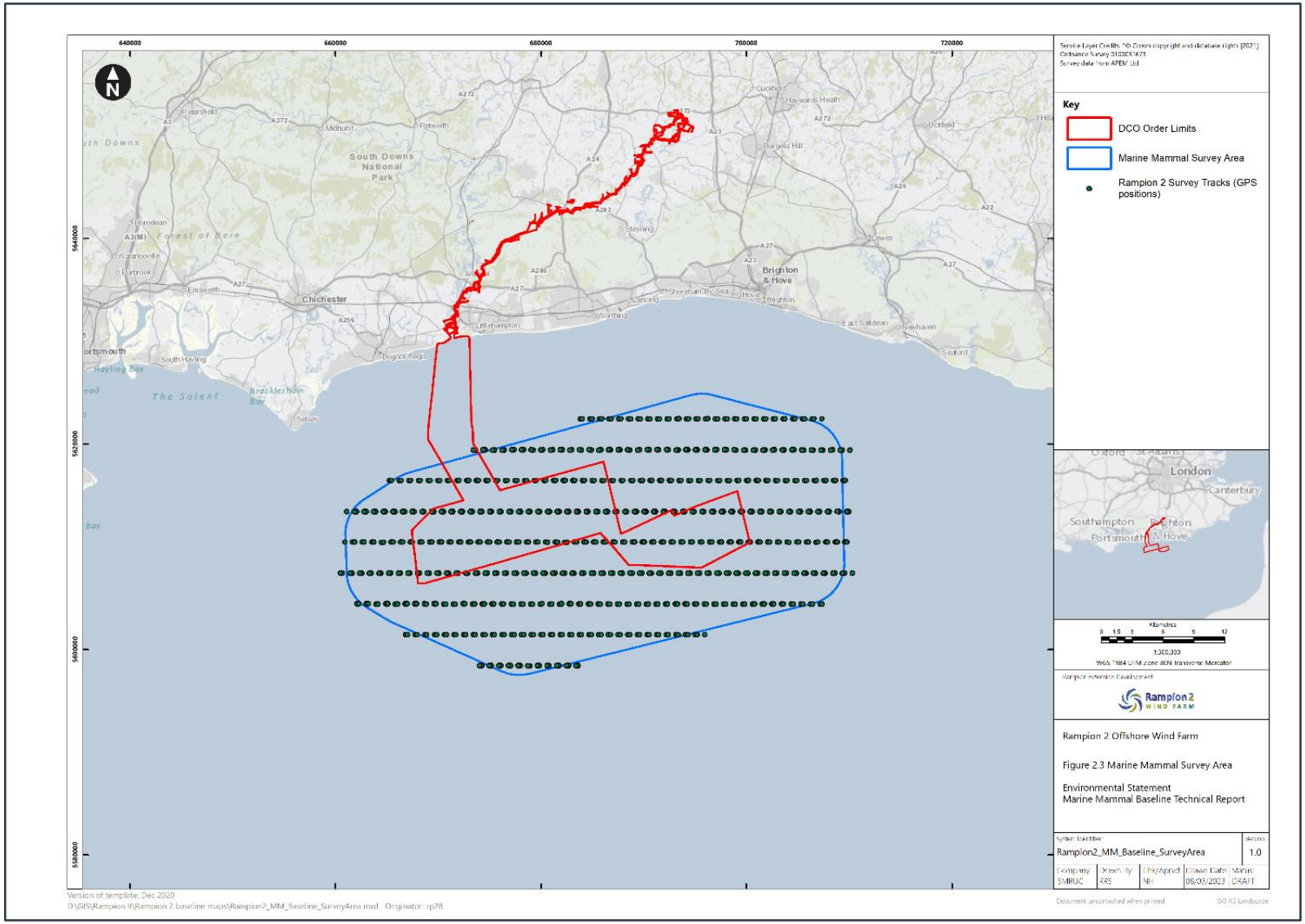

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Table 2-4 Details of the monthly aerial surveys for Rampion 2

Survey number	Date	Douglas Sea State	Turbidity	# Images	% coverage
1	26/04/2019	2	1	2058	11.58
2	14/05/2019	3-4	2	2061	11.59
3	14/06/2019	1	0	2061	11.59
4	09/07/2019	1	0	2151	12.1
5	05/08/2019	3	2-3	2163	12.17
6	02/09/2019	1-2	1-2	2175	12.24
7	02/10/2019	1	1	2175	12.24
8	01/12/2019	1-2	1-2	2175	12.24
9	22/12/2019	3	2	2172	12.22
10	15/01/2020	1-2	2	2175	12.24
11	07/02/2020	1-2	0	2175	12.24
12	09/03/2020	1-2	1	2175	12.24
13	26/03/2020	1	1	2164	11.16
14	29/05/2020	1	0-1	2103	10.84
15	13/06/2020	2	1	2174	11.2
16	14/07/2020	1	0	2174	11.2
17	05/08/2020	0-2	0-1	2168	11.18
18	01/09/2020	1	1-2	2172	11.19
19	19/10/2020	3	2	2172	11.21
20	11/11/2020	3	2-3	2175	11.21
21	02/12/2020	0	1	2061	10.62
22	18/01/2021	1	2	2061	10.62
23	26/02/2021	0	0	2061	10.62
24	08/03/2021	0	3	2061	10.62

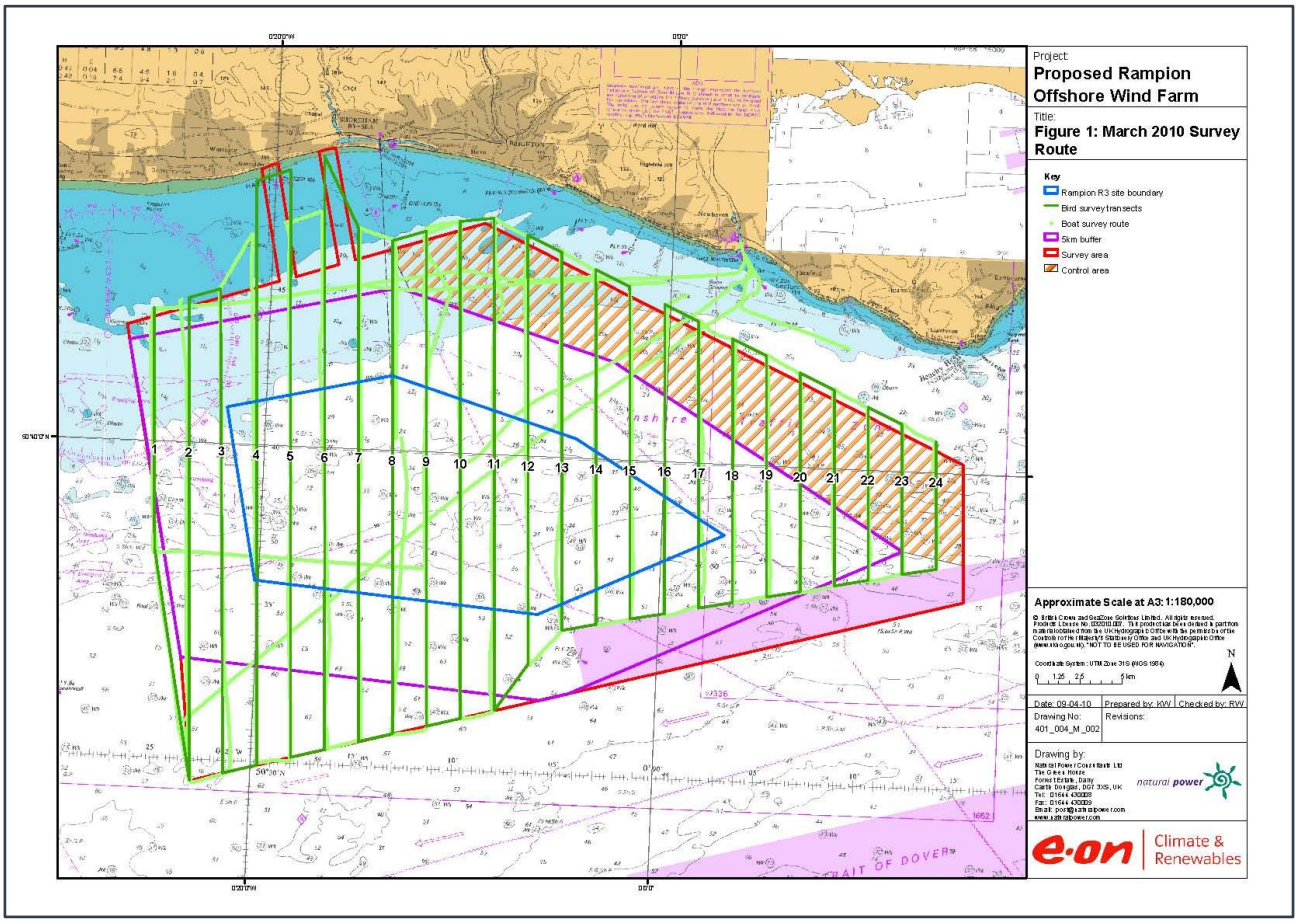
Survey number	Date	Douglas Sea State	Turbidity	# Images	% coverage

Douglas Sea State: 0 = Calm (Glassy); 1 = Calm (Rippled); 2 = Smooth; 3 = Slightly Moderate; 4 = Moderate
Turbidity scale: 0 = Clear; 1 = Slightly Turbid; 2 = Moderately Turbid; 3 = Highly Turbid

Rampion 1 surveys

2.5.4 Between March 2010 and February 2012 boat-based surveys were undertaken to characterise the marine mammal baseline for Rampion 1. The survey area (red line **Figure 2.4**) was sub-divided to include the Rampion Round 3 site (blue line **Figure 2.4**), with a 5 km buffer zone (purple line **Figure 2.4**), control areas (red hatch **Figure 2.4**) and the proposed export cable corridor. The survey design consisted of 30 transects. A total of 30 surveys were completed over 93 survey days equating to 788 hours of effort. Marine mammals were surveyed concurrently with the surveys for marine ornithology. The data were analysed to provide sightings rates per hour, uncorrected density estimates and partially corrected density estimates.

Figure 2.4 Rampion 1 survey area



SCANS III

2.5.5 The main objective of the SCANS surveys was to estimate small cetacean abundance and density in the North Sea and European Atlantic continental shelf waters. The SCANS I surveys were completed in 1994, SCANS II in July 2005 and SCANS III in July 2016 and all comprised of a combination of vessel and aerial surveys. Both aerial and boat-based survey methodologies were designed to correct for availability and detection bias and allow the estimation of absolute abundance (Hammond et al., 2017, revised Hammond et al., 2021). The aerial surveys involved a single aircraft method using circle-backs (or race-track) methods whereas the boat-based surveys involved a double platform 'primary' and 'secondary' tracker methodology. Rampion 2 is located in the SCANS III survey block C which covers an area of 81,297 km^2, of which 2,834.2 km was surveyed on primary search effort.

2.5.6 While the SCANS surveys provide sightings, density and abundance estimates at a wide spatial scale, the surveys are conducted during a single month, every 11 years and therefore do not provide any fine scale temporal or spatial information on species abundance and distribution. Furthermore, due to the change in survey blocks used across the SCANS surveys direct comparison between the surveys for abundance and density information is not possible.

JCP data

2.5.7 The JCP Phase III analysis included datasets from 38 sources, totalling over 1.05 million km of survey effort between 1994 and 2010 from a variety of platforms (Paxton et al., 2016). The JCP Phase III analysis was conducted to combine these data sources to estimate spatial and temporal patterns of abundance for seven species of cetaceans (harbour porpoise, minke whales, bottlenose dolphins, common dolphins, Risso's dolphins, white-beaked dolphins and white-sided dolphins). The JCP Phase III analysis provided abundance estimates for specific areas of interest for offshore development, including Hastings (region to the south of Sussex in which Rampion 2 is located) and IOW (region to the west of the Isle of Wight).

2.5.8 The JCP Phase III Data Analysis Product has been provided by JNCC to extract abundance estimates averaged for summer 2007-2010 and scaled to the SCANS III estimates for user specified areas[1]. In order to extract data in relation to Rampion 2, the user specified area was defined as approx. a 26 km buffer around the survey area.

2.5.9 It should be noted that there are significant limitations to the estimates provided by the JCP Phase III analysis. The authors state that the JCP database provides relatively poor spatial and temporal coverage, that the results should be considered indicative rather than an accurate representation of species distribution, and that due to the patchy distribution of data, the estimates are less reliable than those obtained from SCANS surveys. In addition, the authors categorically state that the JCP Phase III outputs cannot be used to provide

[1] Joint Cetacean Protocol Phase III Data Analysis Product available here: https://hub.jncc.gov.uk/assets/01adfabd-e75f-48ba-9643-2d594983201e

baseline data to infer abundance at a finer scale than 1,000 km^2 because of issues relating to standardizing the data (such as corrections for undetected animals and potential biases) from so many different platforms/methodologies and the strong assumptions that had to be made when calculating detection probability. The data included in the analysis are now between 10 and 26 years old and may not be representative of current cetacean distribution and densities. Finally, the density estimates obtained from the Data Analysis Tool are an averaged density estimate for the summer 2007-2010 and are therefore not representative of densities at other times of the year.

Porpoise high density areas

2.5.10 Heinänen and Skov (2015) conducted a detailed analysis of 18 years of survey data on harbour porpoise around the UK between 1994 and 2011 held in the Joint Cetacean Protocol (JCP) database. The goal of this analysis was to try to identify "*discrete and persistent areas of high density*" that might be considered important for harbour porpoise with the ultimate goal of determining SACs for the species. The analysis grouped data into three subsets: 1994-1999, 2000-2005 and 2006-2011 to account for patchy survey effort and analysed summer (April-September) and winter (October- March) data separately to explore whether distribution patterns were different between seasons and to examine the degree of persistence between the subsets. The authors note that "*due to the uneven survey effort over the modelled period, the uncertainty in modelled distributions vary to a large extent*". In addition, the authors stated that "*model uncertainties are particularly high during winter*". The uncertainties in the modelled distributions were taken into account when designating the draft SACs so that only areas with high confidence were retained (IAMMWG, 2015).

MERP cetacean distribution maps

2.5.11 The aim of the MERP project (Marine Ecosystems Research Programme) was to produce species distribution maps of cetaceans and seabirds at basin and monthly scales for the purposes of conservation and marine management. A total of 2.68 million km of survey data in the Northeast Atlantic between 1980 and 2018 were collated and standardized. Only aerial and vessel survey data were included where there were dedicated observers and where data on effort, survey area and transect design were available. The area covered by Waggitt et al. (2020) comprised an area spanning between Norway and Iberia on a north-south axis, and Rockall to the Skagerrak on an east-west axis.

2.5.12 Waggitt et al. (2020) predicted monthly and 10 km^2 densities for each species (animals/km^2) and estimated the probability of encountering animals using a binomial model (presence-absence model) and estimated the density of animals if encountered using a Poisson model (count model). The product of these two components were used to present final density estimations (Barry and Welsh, 2002). The outputs of this modelling were monthly predicted density surfaces for 12 cetacean species at a 10 km resolution. There is no indication of whether the more recent sightings data are weighted more heavily than older data, which limits interpretation of how predictive the maps are to current distribution patterns. Therefore, while the density estimates obtained from these maps are

representative of relative density compared to other sites around the UK, they are not considered to be suitable density estimates for use in quantitative impact assessment and are provided in this baseline characterisation for illustrative purposes only.

Navitus Bay surveys

2.5.13 The Navitus Bay Wind Park was refused planning permission in 2015, however the baseline characterisation surveys (Lacey and Cox, 2014) conducted to inform the ES chapter are relevant to Rampion 2 given the proximity of the Navitus Bay Survey Area (located on the west side of the Isle of Wight). Site-specific surveys conducted at Navitus Bay included 23 boat-based surveys of the offshore development area between December 2009 and November 2011 (**Table 2-4**). Initially, surveys were primarily aimed at collating bird data, however marine mammal sightings were also recorded; then in April 2011 dedicated marine mammal observers were included in the surveys. These surveys covered between 252 km and 478 km of effort per survey, totalling 9,923 km over 23 surveys. Marine mammal sightings during these surveys included: harbour porpoise, common dolphin, grey seal and unknown small cetacean. Encounter rates were calculated (# sightings/km) but no density estimates were calculated.

2.5.14 In addition to this, four aerial surveys were conducted by WWT Consulting on behalf of The Crown Estate between November 2009 and February 2010 that covered the Round 3 Offshore wind leasing area zone 7 (which contained the Navitus Bay site). Visual aerial surveys were conducted at 80 m height along transects 2 km apart (**Table 2-4**). These surveys recorded the following marine mammal species: harbour porpoise, grey seals and unknown (cetacean, seal or shark). Additionally three digital aerial surveys were conducted by HiDef between January and March 2011 (**Figure 2.7**). The HiDef surveys recorded small cetacean and unknown (cetacean, seal or shark), with no sightings identified to species level. Encounter rates were calculated (# sightings/km) but no density estimates were calculated.

2.5.15 The applicability of these data is limited given that the survey areas did not overlap with Rampion 2, the data are now relatively old and because of the lack of dedicated marine mammal surveyors on most of the surveys. However, they do provide an insight into the species present in the general area.

Figure 2.5 From Lacey and Cox (2014): Track lines sailed during the December 2010 survey of the Navitus Bay wind park site

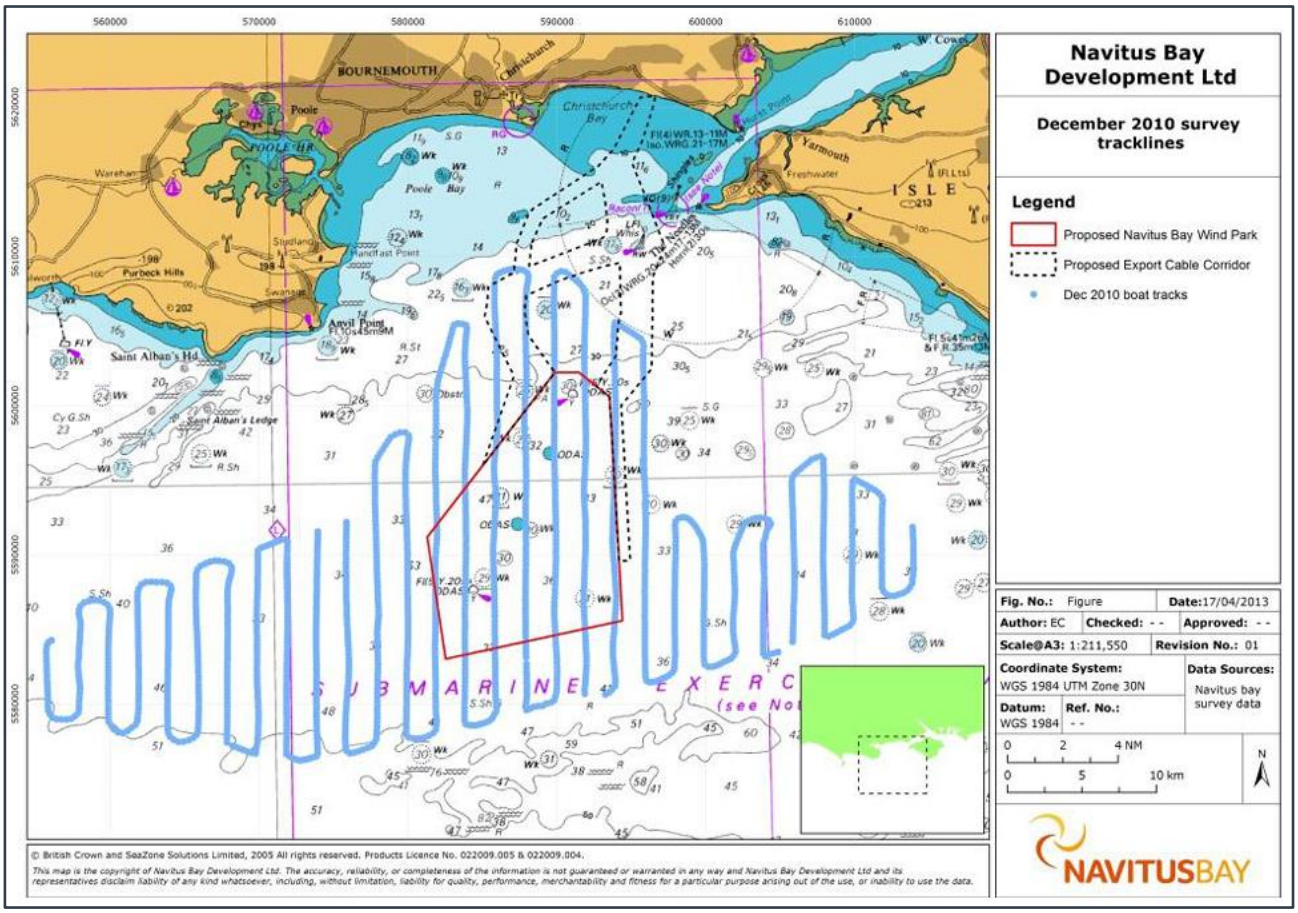
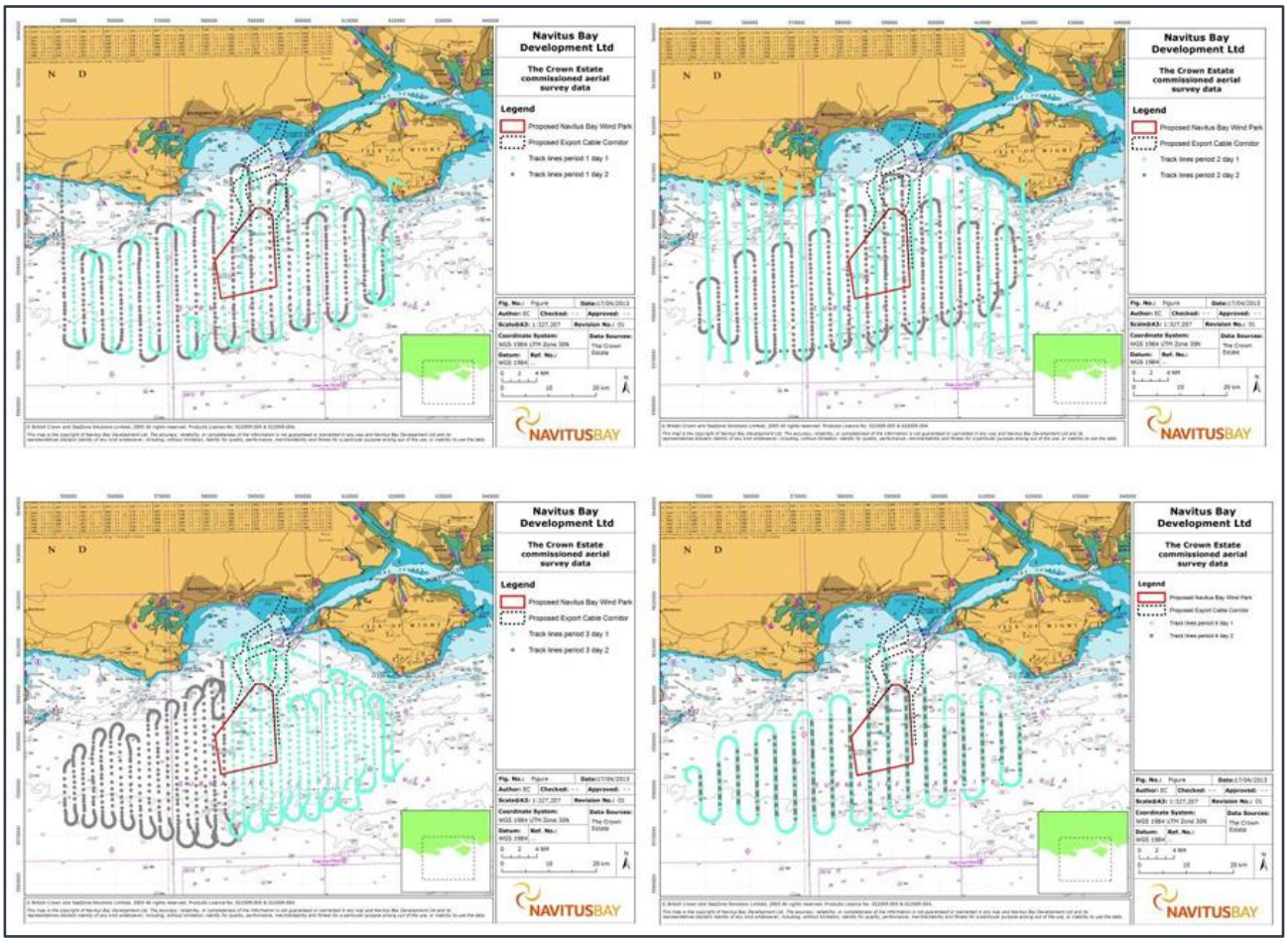
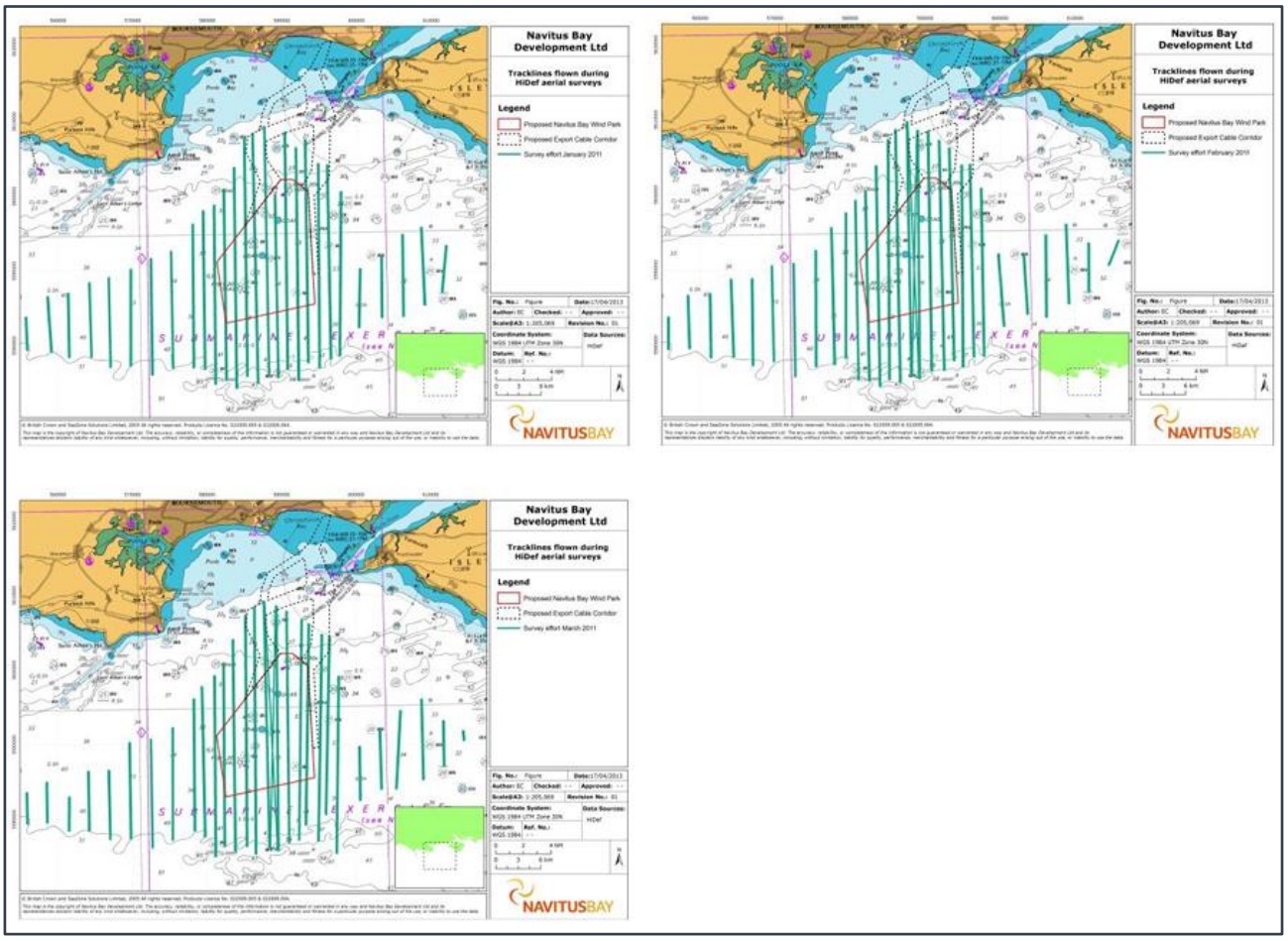


Figure 2.6 From Lacey and Cox (2014): Arial track lines flown during The Crown Estate commissioned surveys of the Navitus Bay wind park site



Four surveys were conducted in all, each over two days. Surveys were conducted during November 2009 (top left), December 2009 (top right), January 2010 (bottom left) and February 2010 (bottom right).

Figure 2.7 From Lacey and Cox (2014): Track lines flown during HiDef surveys of the Navitus Bay wind park site



Three surveys were conducted during January 2011 (top left), February 2011 (top right), and March 2011 (bottom left).

Sea Watch Foundation sightings

2.5.16 The Sea Watch Foundation maintains a national sightings database. Rampion 2 is located in Sea Watch Foundation region 17 which is part of the Southern England Area (which includes Hampshire, west Sussex, east Sussex and Kent. In the Southern England area between 7th March 2018 and 30th August 2020, a total of 135 cetacean sightings events have been reported[2], consisting of the following species:

- Harbour porpoise (180 individuals over 71 encounters)
- Bottlenose dolphin (265 individuals over 31 encounters)
- Common dolphin (205 individuals over 13 encounters)
- White-beaked dolphin (9 individuals over 2 encounters)
- Long-finned pilot whale (18 individuals over 2 encounters)

[2] https://seawatchfoundation.org.uk/legacy_tools/region.php?output_region=7

- Humpback whale (1 individual over 1 encounter)
- Dolphin species (111 individuals over 11 encounters)
- Cetacean species (78 individuals over 4 encounters).

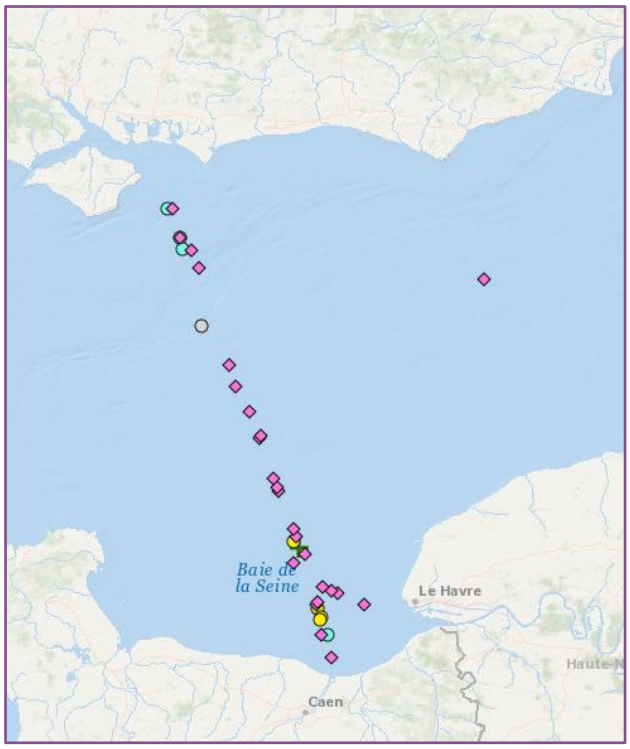
2.5.17 Records from the Sea Watch Foundation for cetaceans sighted around the Isle of Wight (114 sightings) since 2007 were collated and analysed by Castles (2020) to investigate spatio-temporal trends in the sightings. The dataset consisted of three cetacean species: bottlenose dolphin, harbour porpoise and common dolphin, as well as unidentified cetacean and unidentified dolphins.

ORCA sightings

2.5.18 ORCA conduct visual surveys from ferry platforms, using observers who have completed the ORCA Marine Mammal Surveyor course. The closest ferry route to Rampion 2 is the Portsmouth-Caen ferry route, run by Brittany Ferries, consisting of day sailing only (no nights). There are map data available on the ORCA website that shows sightings along this route in 2011, 2015 and 2016 (**Figure 2.8**), and additionally there are recent survey reports for this route between 2018-2020 (**Table 2-5**). Data have shown that the following species have been sighted along this route: harbour porpoise, bottlenose dolphin and common dolphin (as well as unidentified dolphins, unidentified small cetaceans and unidentified seals). While this opportunistic data source provides useful information on the sightings of different species in the area, density estimates have not been provided, and as such they are only illustrate of the species seen.

2.5.19 Data from ORCA surveys in 2009 and 2010 are included in the Joint Cetacean Protocol Database (Paxton et al., 2016). ORCA data collected between 2006 to 2015 were also one of the data sources incorporated into the modelling to produce species distribution maps presented by Waggitt et al. (2020).

Figure 2.8 Marine mammal sightings on the Portsmouth-Caen ferry route (2011, 2015 and 2016)[3]



Harbour porpoise = pink diamond, yellow circle = common dolphin, grey circle = bottlenose dolphin, turquoise circle = unidentified dolphin, green plus = small cetacean.

Table 2-5 Marine mammal sightings during the Portsmouth-Caen ferry trips 2018-2020[4]

Ferry route	Marine mammal sightings
2020-02-10 - Portsmouth-Caen	None
2020-02-06 - Portsmouth-Caen	None
2020-01-31 - Portsmouth-Caen	None
2019-09-27 - Portsmouth-Caen	2 incidental unidentified dolphins
2019-08-02 - Portsmouth-Caen	Bottlenose Dolphin x 3 Common Dolphin x 50 Harbour Porpoise x 2 Unidentified Dolphin x 1

[3] Obtained from the ORCA interactive map on 07/12/2020: https://www.orcaweb.org.uk/species-sightings/sightings-map
[4] Obtained from the ORCA survey reports on 07/12/2020: https://www.orcaweb.org.uk/species-sightings/survey-reports/route-portsmouth-caen

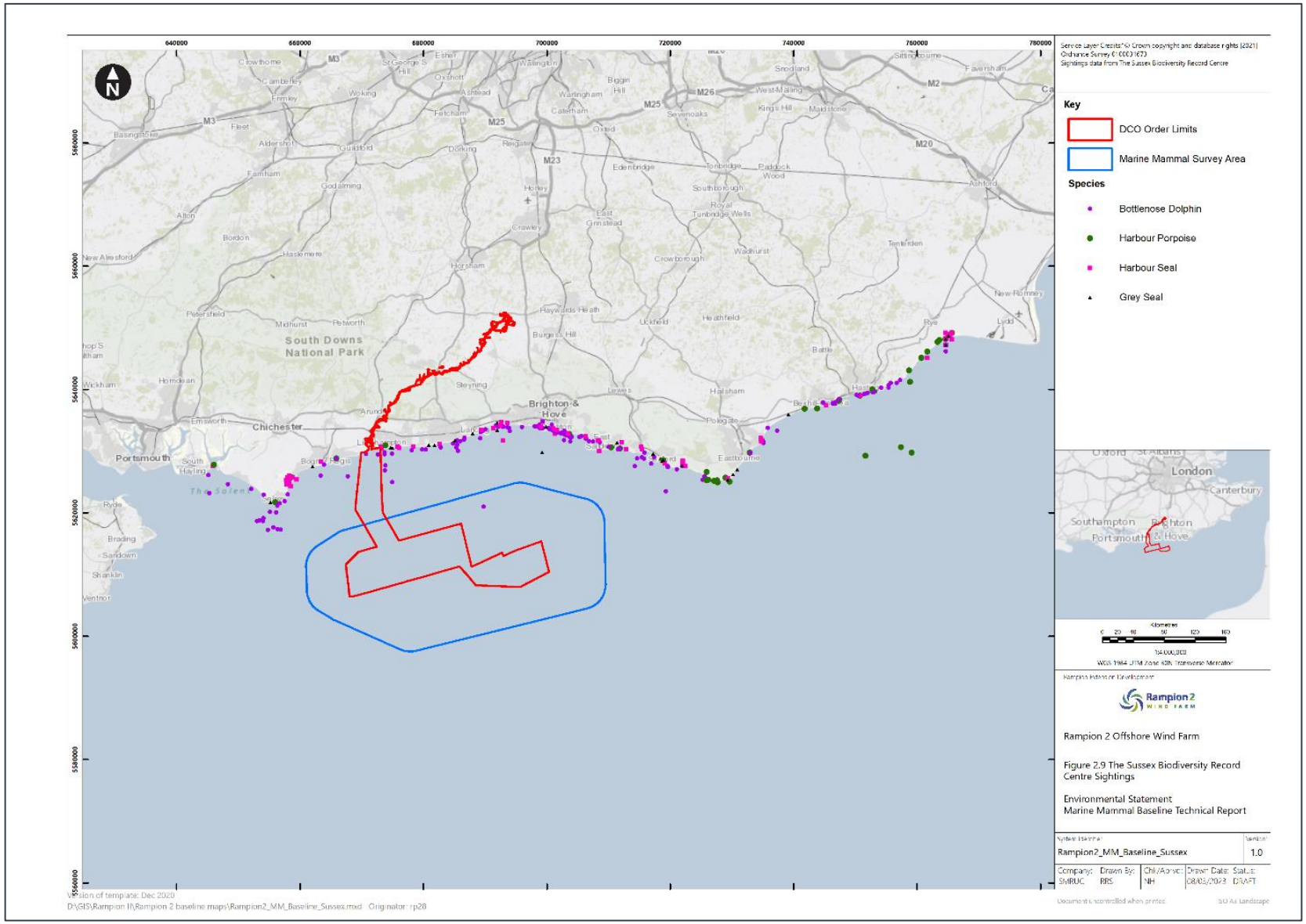
Ferry route	Marine mammal sightings
2019-07-26 - Portsmouth-Caen	12 Harbour Porpoises 1 Unidentified Dolphin
2019-06-28 - Portsmouth-Caen	2x Unidentified dolphins
2019-05-24 - Portsmouth-Caen	None
2019-04-26 - Portsmouth-Caen	Harbour Porpoise x 1
2019-03-29 - Portsmouth-Caen	5 Bottlenose dolphins
2018-10-05 - Portsmouth-Caen	17 Bottlenose Dolphins 2 Harbour Porpoise 1 unidentified seal
2018-09-21 - Portsmouth-Caen	None
2018-08-03 - Portsmouth-Caen	Harbour porpoise – 8 sightings – 16 individuals Unidentified dolphin – 3 sightings – 14 individuals
2018-07-20 - Portsmouth-Caen	Harbour Porpoise x 1
2018-06-22 - Portsmouth-Caen	Harbour Porpoise x 1
2018-05-25 - Portsmouth-Caen	1 incidental harbour porpoise
2018-04-27 - Portsmouth-Caen	Harbour Porpoise x 1
2018-03-30 - Portsmouth-Caen	unidentified small cetacean

Sussex Biodiversity Record Centre

2.5.20 The Sussex Biodiversity Record Centre[5] is managed as a partnership project, hosted by the Sussex Wildlife Trust, and holds sightings data reported by the public and local groups of biological recorders. A data request was submitted to the Sussex Biodiversity Record Centre for all marine mammal sightings recorded in the area. A total of 479 sightings records are within the database of records between 1848 and 2020 (most records were reported since 1990) (**Figure 2.9**). The sightings records were dominated by bottlenose dolphins (38.8% of the records) and harbour seals (37.4% of the records), with some sightings of grey seals (10.6%) and harbour porpoise (9.6%). Rare species (<1% of the records) reported included: long-finned pilot whales, common dolphins, Risso's dolphins, fin whales, striped dolphins, a white-sided dolphin, a northern bottlenose whale, a killer whale, a northern right whale and a white-beaked dolphin.

[5] https://sxbrc.org.uk/recording/localGroups.php

Figure 2.9 Locations of marine mammal sightings in the Sussex Biodiversity Record Centre database



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SCOS reports

2.5.21 Under the Conservation of Seals Act 1970 (in England) and the Marine (Scotland) Act 2010, the Natural Environment Research Council (NERC) (now part of UK Research and Innovation) provides scientific advice to government on matters related to the management of UK seal populations through the advice provided by the Special Committee on Seals (SCOS). The Sea Mammal Research Unit (SMRU) provides this advice to SCOS on an annual basis through meetings and an annual report. The report includes advice on matters related to the management of seal populations, including general information on British seals, information on their current status and addresses specific questions raised by regulators and stakeholders.

SMRU Seal haul-out counts

Harbour seals

2.5.22 Surveys of harbour seals are carried out during the summer months. The main population surveys are carried out when harbour seals are moulting, during the first three weeks of August, as this is the time of year when the largest numbers of seals are ashore. The counts obtained represent the number of seals that were onshore at the time of the survey and are an estimate of the minimum size of the population. They do not represent the total size of the local population since a number of seals would have been at sea at the time of the survey. However, telemetry data from tagged seals are used to scale this estimate to take account of the proportion of animals at sea at the time of survey. It is noted that these data refer to the numbers of seals found within the surveyed areas only at the time of the survey; numbers and distribution may differ at other times of the year.

Grey seals

2.5.23 Grey seals are also counted on all harbour seal surveys, although these data do not necessarily provide a reliable index of population size. Grey seals aggregate in the autumn to breed at traditional colonies, therefore their distribution during the breeding season can be very different to their distribution at other times of the year. SMRU's main surveys of grey seals are designed to estimate the numbers of pups born at the main breeding colonies around Scotland. Breeding grey seals are surveyed biennially between mid-September and late November using large-format vertical photography from a fixed-wing aircraft. The SMRU grey seal pup counts round the UK are augmented by surveys conducted by SNH, The National Trust, Lincolnshire Wildlife Trust and Friends of Horsey Seals.

SMRU Seal telemetry

2.5.24 SMRU has deployed telemetry tags on grey seals and harbour seals in the UK since 1988 and 2001, respectively. These tags transmit data on seal locations with the tag duration (number of days) varying between individual deployments. There are two types of telemetry tag which differ by their data transmission methods.

Data transmission can be through the Argos satellite system (Argos tags) or mobile phone network (phone tags). Both types of transmission result in location fixes, but data from phone tags comprise better quality and more frequent locations. The telemetry data were used to illustrate the distribution of seals at sea and to investigate the degree of connectivity between Rampion 2 and seal haul-out sites and SACs.

Seal at-sea usage and habitat preference

2.5.25 The seal at-sea usage maps were created in order to predict the at-sea density of seals in order to inform impact assessments and marine spatial planning. The original SMRU seal density maps were produced as a deliverable of Scottish Government Marine Mammal Scientific Support Research Programme (MMSS/001/01) and were published in Jones et al. (2015). These have since been revised to include new seal telemetry and haul-out count data and modifications have been made to the modelling process (Russell et al., 2017). The analysis uses telemetry data from 270 grey seals and 330 harbour seals tagged in the UK between 1991 – 2015, and haul-out count data from 1996 - 2015 to produce UK-wide maps of estimated at-sea density with associated uncertainty. The combined at-sea usage and haul-out data were scaled to the population size estimate from 2015.

2.5.26 A key limitation of the at-sea usage maps is that there was a lot of “null usage” in the data, where only a subset of all available haul-out sites were visited by a tagged animal. For haul-out sites where no animal had been tagged, or where no tagged animal had visited, it had to be assumed that usage declined monotonically with distance from the haul-out which meant that potential hotspots around these haul-outs will have been missed.

2.5.27 Given the limitations of the at-sea usage maps, and the fact that the grey seal at-sea usage maps were informed mainly by old, low resolution tracking data, BEIS funded a large-scale deployment of high resolution GPS telemetry tags on grey seals around the UK, and analyses to create up-to-date estimates of the at-sea distribution for both seal species (Carter et al., 2020). Telemetry data from 114 grey seals and 239 harbour seals were included in the analysis (**Figure 2.10**). To estimate the at-sea distribution, a habitat modelling approach was used, matching seal telemetry data to habitat variables (such as water depth, seabed topography, sea surface temperature) to understand the species-environment relationships that drive seal distribution. Haul-out count data (**Figure 2.11**) were then used to generate predictions of seal distribution at sea from all known haul-out sites in the British Isles. This resulted in predicted distribution maps on a 5x5 km grid.

2.5.28 The estimated density surface gives the percentage of the British Isles at-sea population (excluding hauled-out animals) estimated to be present in each grid cell at any one time during the main foraging season.

2.5.29 It is estimated that grey seals spent 77% of their time at sea on average, therefore, using the current best estimate of the grey seal population size in the British Isles (SCOS, 2020), the total at-sea population size for the British Isles is estimated to be ~150,700 individuals (Carter et al., 2020).

2.5.30 It is estimated that harbour seals spend 83.4% of their time at sea on average (Russell et al., 2015), therefore, using the current best estimate of the harbour seal population size in the British Isles (SCOS, 2020), the total at-sea population size for the British Isles is estimated to be ~42,800 individual harbour seals (Carter et al., 2020).

2.5.31 The main limitation of this dataset is that only seals tagged in the British Isles were included in the analysis. Therefore the habitat preference maps may underestimate the number of seals present in each grid cell as it does not account for those seals from haul-outs along the French coast or the Wadden Sea. In addition, there have been no tagging studies of grey seals in the south-England MU, and therefore the predicted at-sea distributions in this MU may not be representative of the true at-sea distribution.

Figure 2.10 From Carter et al. (2020): GPS tracking data for (a) grey and (b) harbour seals available for habitat preference models

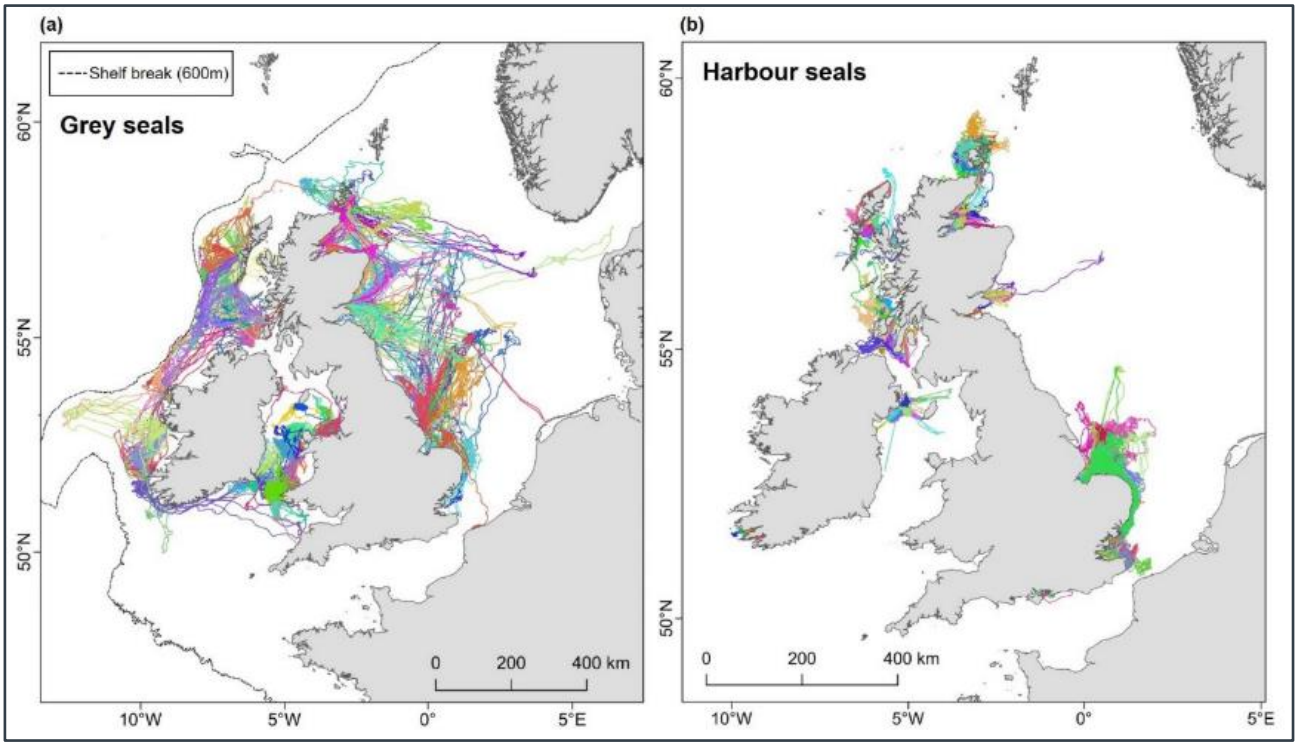
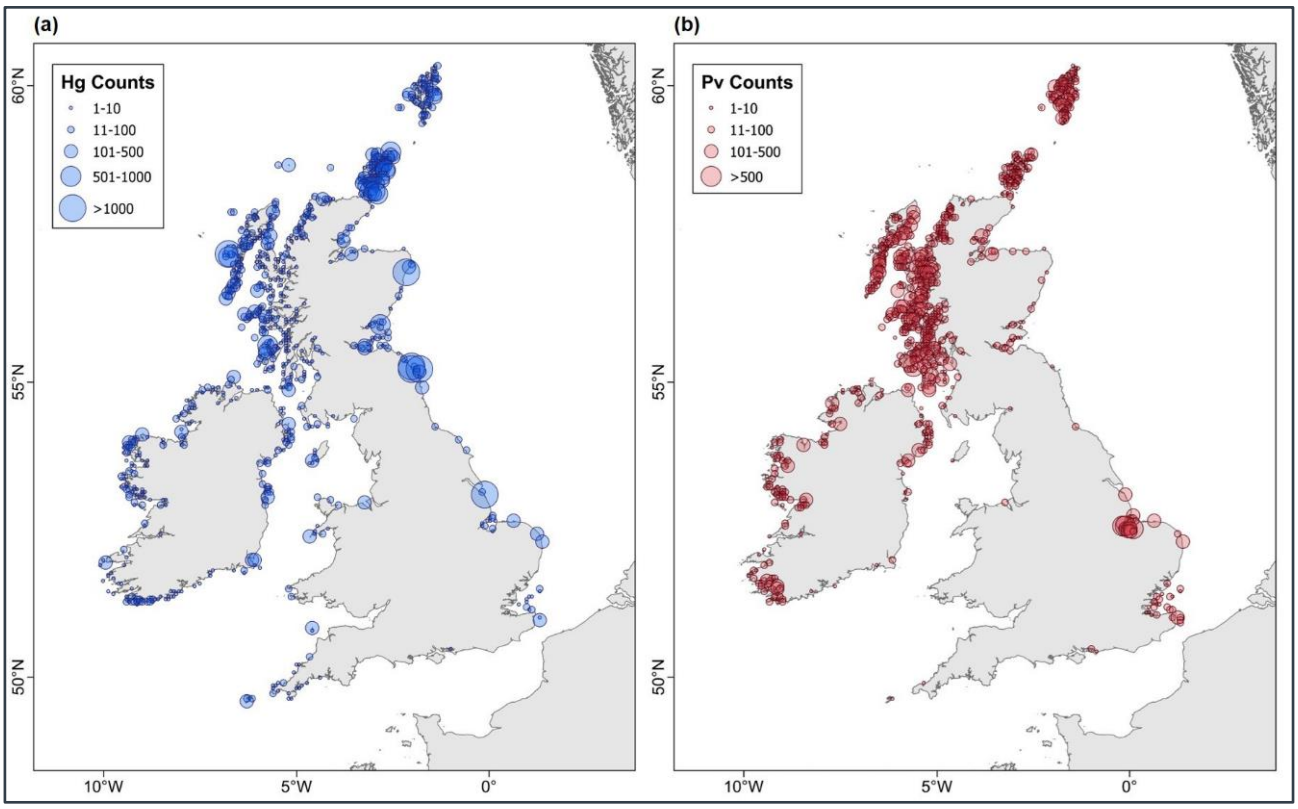


Figure 2.11 From Carter et al. (2020): Most recent available August count data for (a) grey and (b) harbour seals per 5 km x 5 km haul-out cell used in the distribution analysis



The Solent Seal Project

2.5.32 Chichester Harbour Conservancy, Langstone Harbour Board and the Hampshire and Isle of Wight Wildlife Trust have been monitoring the Solent seal population since 1994, conducting annual aerial surveys during the August moult. In 2017 the areas surveyed included: Langstone Harbour, Chichester Harbour, Portsmouth Harbour, Ryde sand banks, Beaulieu and Newtown Creek (**Figure 2.12**). Additionally, visual surveys have been conducted since 1999 at Chichester harbour and since 2009 at Langstone harbour using both vessel and shore-based methods by Portsmouth Outdoor Education Centre and the Langstone Harbour Board have submitted records for Langstone Harbour and Chichester Harbour Conservancy and the National Trust. In total 270 surveys were conducted between 1999 and 2019 (182 at Chichester and 88 at Langstone).

2.5.33 In March 2009 the Solent Seal Tagging Project was undertaken by the Hampshire & Isle of Wight Wildlife Trust in collaboration with Chichester Harbour Authority and the Sea Mammal Research Unit where five harbour seals (four adult males and one juvenile female) were tagged with GPS tags at Chichester and Langstone harbours. In total 520 days of data was collected with an average of ~3.5 months per seal. In addition to this, the Hampshire & Isle of Wight Wildlife Trust maintain an online public sightings scheme.

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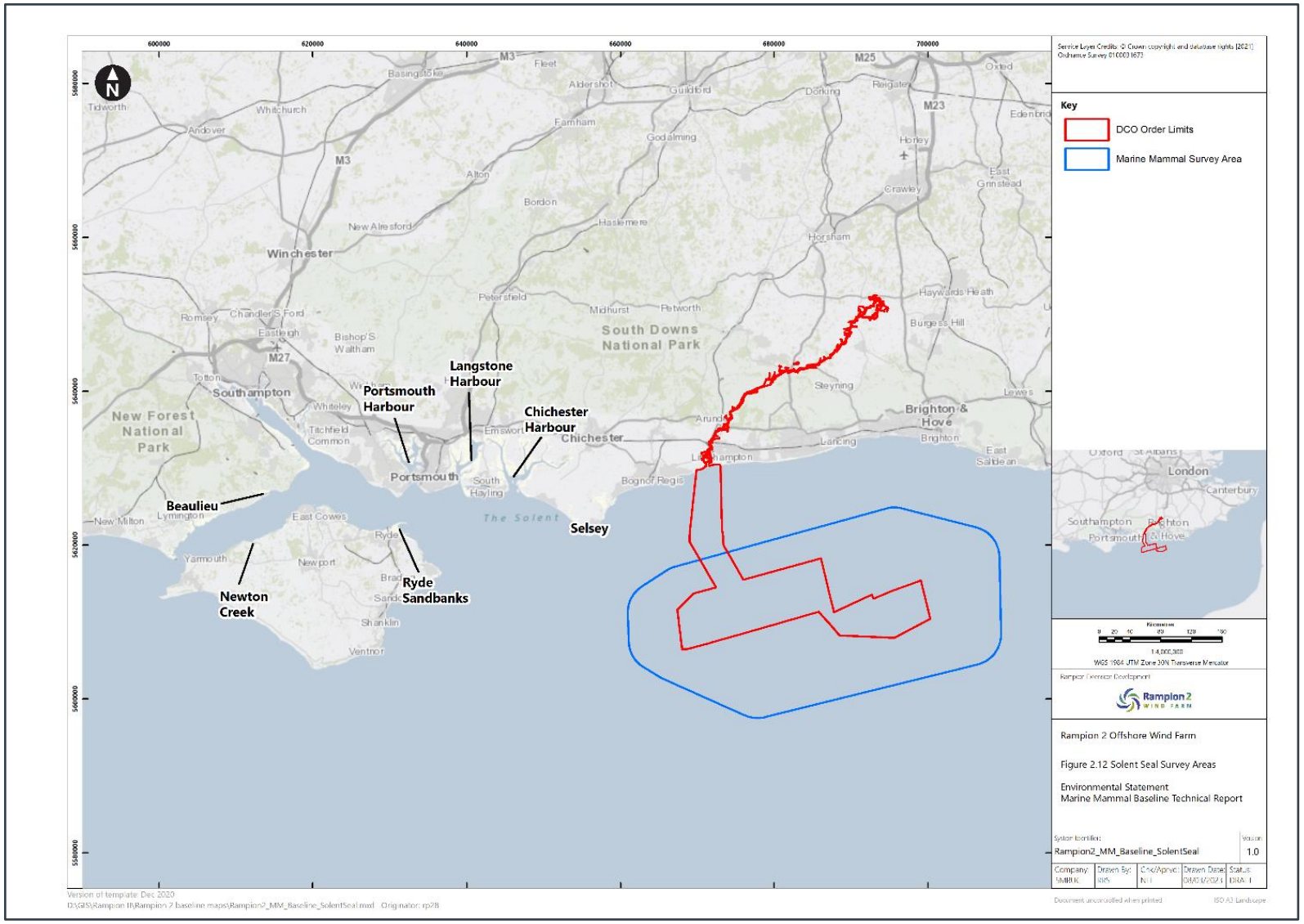
Figure 2.12 Locations surveyed by the Solent Seal Project in August 2017



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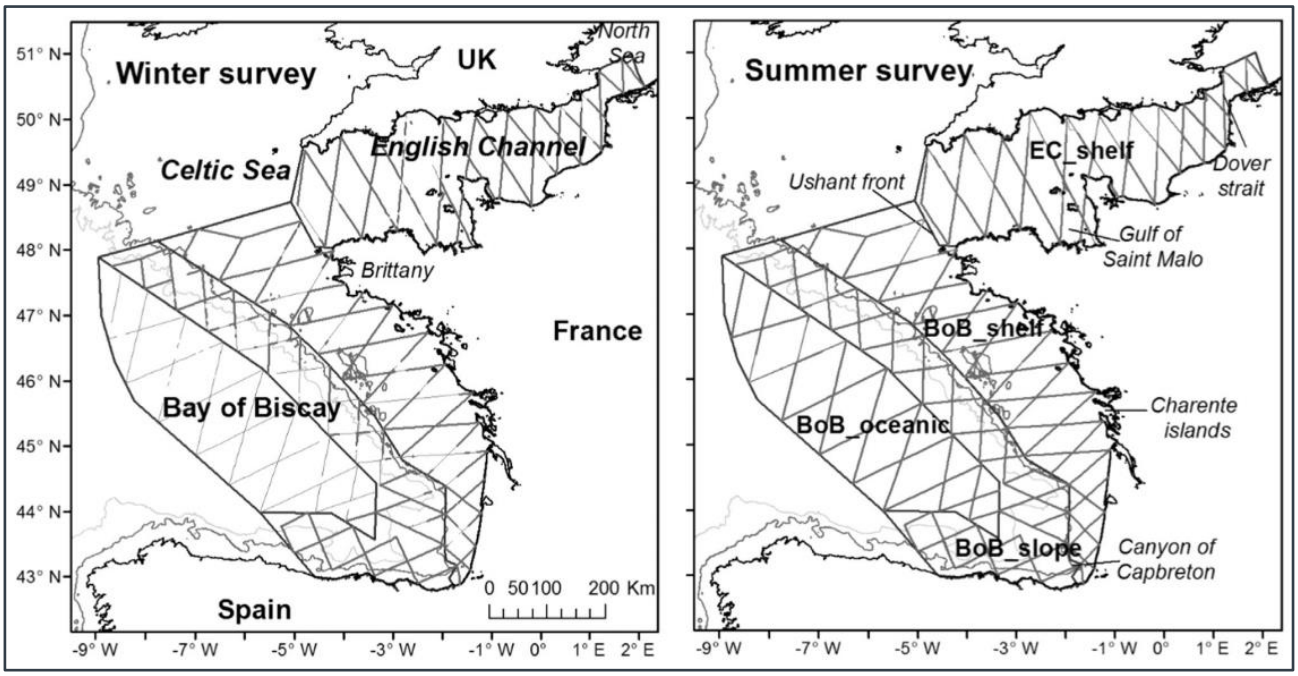
SAMM surveys

2.5.34 The SAMM (Suivi Aérien de la Megafaune Marine; aerial survey for marine megafauna) surveys were conducted in the English Channel and the Bay of Biscay in winter (Nov 2011 – Feb 2012) and summer (May-Aug 2012) using a systematic zig-zag survey design (Laran et al., 2017) (**Figure 2.13**). A total of 23,512 km was surveyed in the winter surveys and 25,111 km in the summer. Density estimates were calculated using correction factors from similar aerial surveys to account for availability bias. In the English Channel part of the survey region the following species were identified: harbour porpoise, common dolphins, bottlenose dolphins, Risso's dolphins, striped/common dolphins and minke whales.

Figure 2.13 From Laran et al. (2017): Survey blocks with bathymetric strata and effort conducted during the winter survey (left) and summer (right) in good condition (selected for analyses: with sea state ≤3 Beaufort and subjective condition greater than medium)



French seal data

2.5.35 Vincent et al. (2017) provide data on haul-outs and telemetry data for both harbour and grey seals along the French coast of the English Channel. Between 1999 and 2014 a total of 45 grey seals and 28 harbour seals were tagged and tracked for more than a month (**Table 2-6** and **Figure 2.14**).

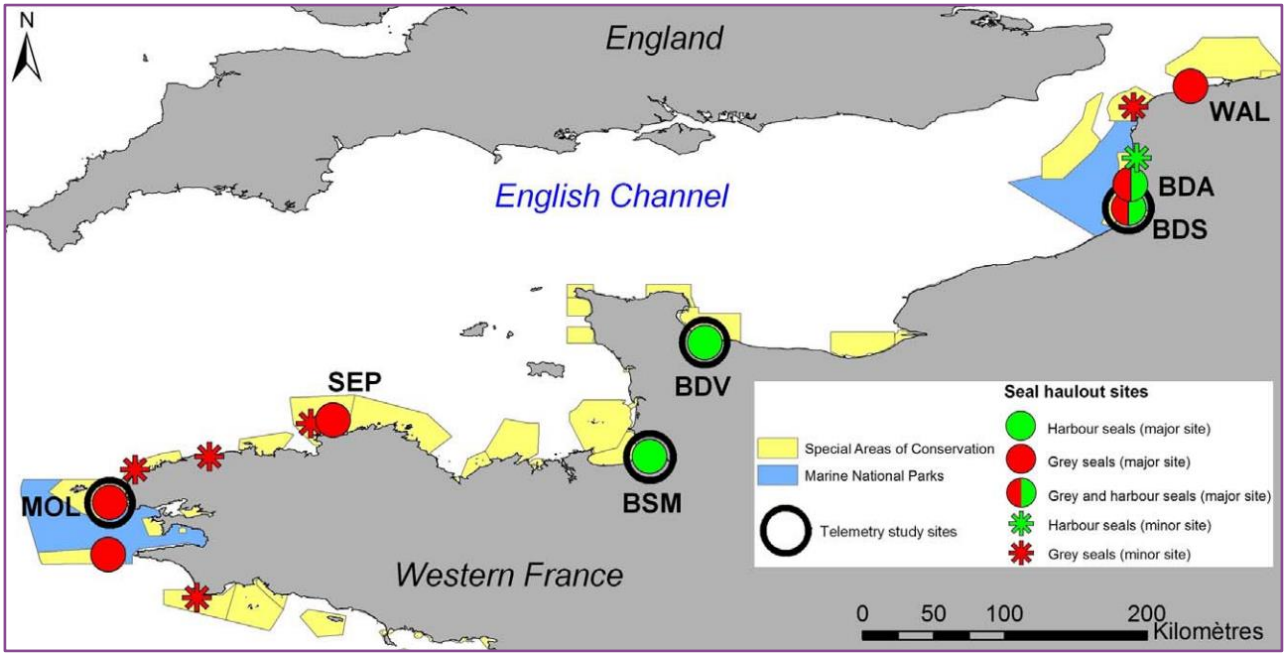
2.5.36 Measures were taken in order to avoid issues of over-estimation amongst coastal locations, created due to seals spending reduced amounts of time underwater at these locations, potentially transmitting GPS and Argos transmissions more frequently. The measures included that for each density map, only locations within a 20-minute interval were interpolated from the raw data. These maps were

generated using the at-sea distribution of individuals, interpolated locations within 0.1° grids which encompassed both the entire English Channel area and the southern Celtic Sea. All of these locations were weighted separately for grey and harbour seals by capture site. This took into account the abundance of days in which tracking data of seals was recorded for each study site. However, this did not involve the size of the haul-out sites which were estimated from on-shore count data.

Table 2-6 From Vincent et al. (2017): Number of seals tagged by species, sex, location and year, with deployment details (tag type and mean tracking duration)

Year of deployment	Species	Tag type	Number of tags	Sex ratio (M:F)	Mean tag lifespan (days)	Tagging locations	
						Full name	Code
1999	grey seals	SRDL	5	3:2	89	Molene archipelago	MOL
2002	grey seals	SRDL	8	6:2	119	Molene archipelago	MOL
2003	grey seals	SRDL	2	0:2	128	Molene archipelago	MOL
2006	harbour seals	GPS/GSM	4	2:2	68	Baie du Mont Saint-Michel	BSM
2007	harbour seals	GPS/GSM	2	1:1	148	Baie du Mont Saint-Michel	BSM
2007	harbour seals	GPS/GSM	7	4:3	142	Baie des Veys	BDV
2008	harbour seals	GPS/GSM	5	5:0	132	Baie des Veys	BDV
2008	harbour seals	GPS/GSM	10	9:1	134	Baie de Somme	BDS
2010	grey seals	GPS/GSM	2	2:0	57	Molene archipelago	MOL
2011	grey seals	GPS/GSM	8	6:2	182	Molene archipelago	MOL
2012	grey seals	GPS/GSM	2	2:0	184	Molene archipelago	MOL
2012	grey seals	GPS/GSM	11	11:0	161	Baie de Somme	BDS
2013	grey seals	GPS/GSM	7	6:1	196	Molene archipelago	MOL

Figure 2.14 From Vincent et al. (2017): Map of all grey seal (red) and harbour seal (green) haul-out sites in metropolitan France



2.5.37 In **Figure 2.14**, circles indicate haulout sites where the seasonal maximum number of seals exceeds 50 individuals. Stars indicate smaller haulout sites used by fewer seals, not detailed in this study. Symbols surrounded by thick, black circles show the seal colonies where telemetry was conducted. Marine Protected Areas are also shown, including Special Areas of Conservation and Marine National Parks. Nature Reserves are not visible but also encompass some haulout sites, in SEP, BDS and BDV for instance. Haulout sites are:

- Molene archipelago (MOL);
- Sept iles archipelago (SEP);
- baie du Mont-Saint-Michel (BSM);
- baie des Veys (BDV);
- baie de Somme (BDS);
- baie d'Authie (BDA); and
- Walde (WAL).

3. Harbour porpoise baseline

3.1 Rampion 2

3.1.1 Harbour porpoises were the most commonly recorded marine mammal species during the Rampion 2 site-specific surveys (**Table 3-1**). Overall, these surveys recorded very few harbour porpoise, with porpoise recorded in only eight of the 24 surveys. This resulted in a maximum density estimate of 0.05 porpoise/km^2 within the Survey Area (Rampion 2 array area + 4 km buffer) and an average density across all 24 surveys of 0.01 porpoise/km^2 (**Table 3-1**), with no evidence of a spatial pattern in the distribution of sightings (**Figure 3.1**).

3.1.2 These surveys also reported a number of sightings of unknown small cetaceans, speculated to be either dolphin or porpoise species, in 10 of the survey months. This resulted in a maximum dolphin/porpoise density estimate of 0.08 dolphin/porpoise/km^2 within the Survey Area (Rampion 2 array area + 4 km buffer) and an average density across all 24 surveys of 0.01 dolphin/porpoise/km^2 (**Table 3-2**), with no evidence of a spatial pattern in the distribution of sightings (**Figure 3.1**).

Table 3-1 Harbour porpoise sightings count and estimated abundance and density (Rampion 2 array area + 4 km buffer)

Survey number	Date	Count	Abundance	Lower CI	Upper CI	Precision	Density
1	Apr-19	1	10	1	29	1.00	0.02
2	May-19	1	10	1	29	1.00	0.02
3	Jun-19	0	0	0	0	0.00	0.00
4	Jul-19	1	9	1	26	1.00	0.01
5	Aug-19	0	0	0	0	0.00	0.00
6	Sep-19	0	0	0	0	0.00	0.00
7	Oct-19	1	8	1	25	1.00	0.01
8	Nov-19	0	0	0	0	0.00	0.00
9	Dec-19	0	0	0	0	0.00	0.00
10	Jan-20	0	0	0	0	0.00	0.00
11	Feb-20	0	0	0	0	0.00	0.00
12	Mar-20	0	0	0	0	0.00	0.00

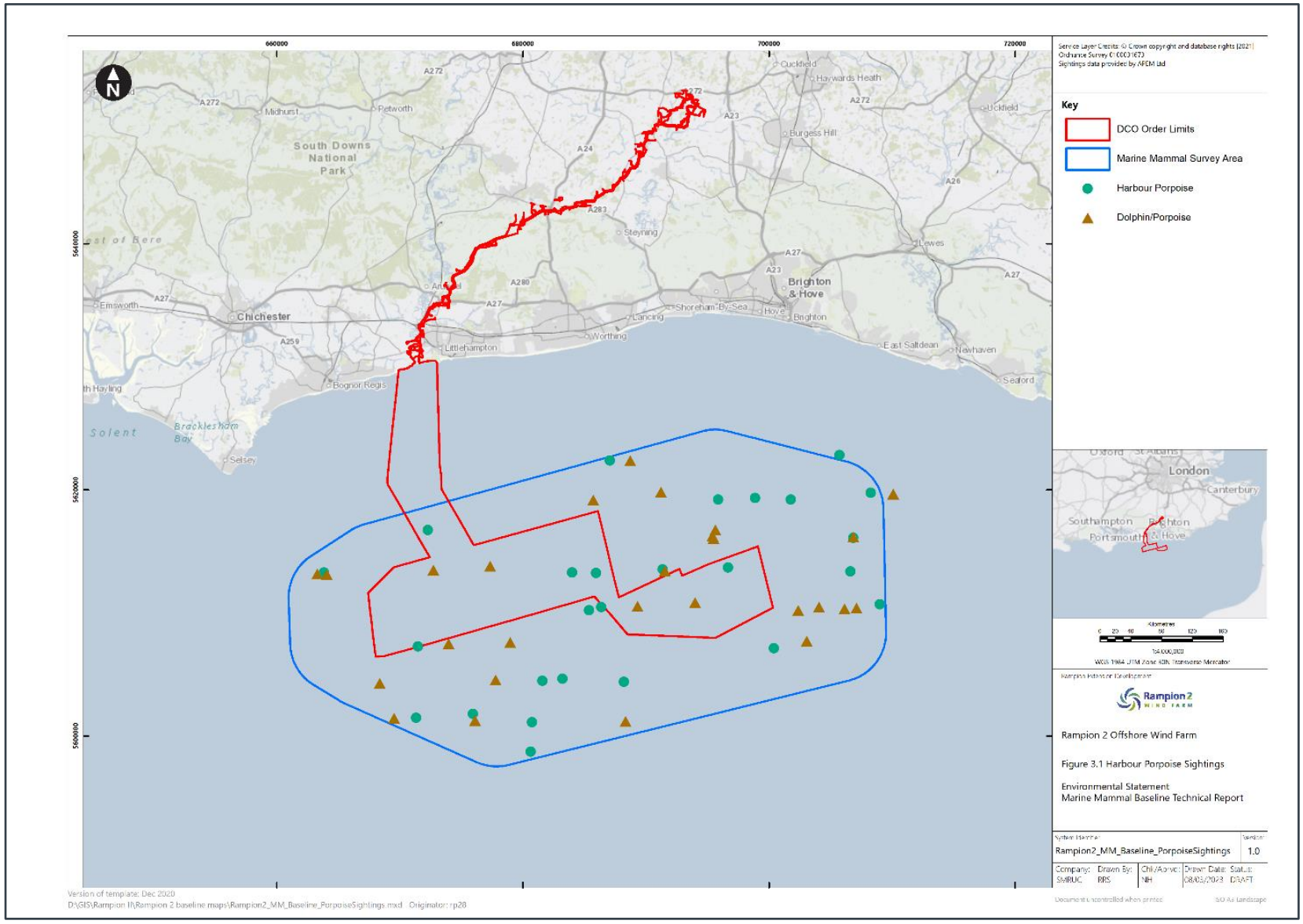
Survey number	Date	Count	Abundance	Lower CI	Upper CI	Precision	Density
13	Apr-20	0	0	0	0	0.00	0.00
14	May-20	0	0	0	0	0.00	0.00
15	Jun-20	0	0	0	0	0.00	0.00
16	Jul-20	0	0	0	0	0.00	0.00
17	Aug-20	5	49	5	127	0.45	0.05
18	Sep-20	1	10	1	29	1.00	0.01
19	Oct-20	0	0	0	0	0.00	0.00
20	Nov-20	0	0	0	0	0.00	0.00
21	Dec-20	0	0	0	0	0.00	0.00
22	Jan-21	0	0	0	0	0.00	0.00
23	Feb-21	14	119	60	196	0.27	0.12
24	Mar-21	1	9	1	26	1.00	0.01

Table 3-2 Dolphin/porpoise sightings count and estimated abundance and density (Rampion 2 array area + 4 km buffer)

Survey number	Date	Count	Abundance	Lower CI	Upper CI	Precision	Density
1	Apr-19	0	0	0	0	0.00	0.00
2	May-19	1	10	1	38	1.00	0.02
3	Jun-19	0	0	0	0	0.00	0.00
4	Jul-19	1	9	1	26	1.00	0.01
5	Aug-19	0	0	0	0	0.00	0.00
6	Sep-19	6	54	9	116	0.41	0.08
7	Oct-19	0	0	0	0	0.00	0.00
8	Nov-19	0	0	0	0	0.00	0.00
9	Dec-19	0	0	0	0	0.00	0.00

Survey number	Date	Count	Abundance	Lower CI	Upper CI	Precision	Density
10	Jan-20	0	0	0	0	0.00	0.00
11	Feb-20	2	18	2	45	0.71	0.03
12	Mar-20	2	17	2	42	0.71	0.03
13	Apr-20	3	29	3	79	0.58	0.03
14	May-20	0	0	0	0	0.00	0.00
15	Jun-20	0	0	0	0	0.00	0.00
16	Jul-20	1	10	1	29	1.00	0.01
17	Aug-20	0	0	0	0	0.00	0.00
18	Sep-20	0	0	0	0	0.00	0.00
19	Oct-20	1	10	1	29	1.00	0.01
20	Nov-20	1	10	1	29	1.00	0.01
21	Dec-20	5	43	5	102	0.45	0.05
22	Jan-21	0	0	0	0	0.00	0.00
23	Feb-21	0	0	0	0	0.00	0.00
24	Mar-21	0	0	0	0	0.00	0.00

Figure 3.1 Sightings of harbour porpoise and dolphin/porpoise during site-specific surveys at Rampion 2



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3.2 Rampion 1

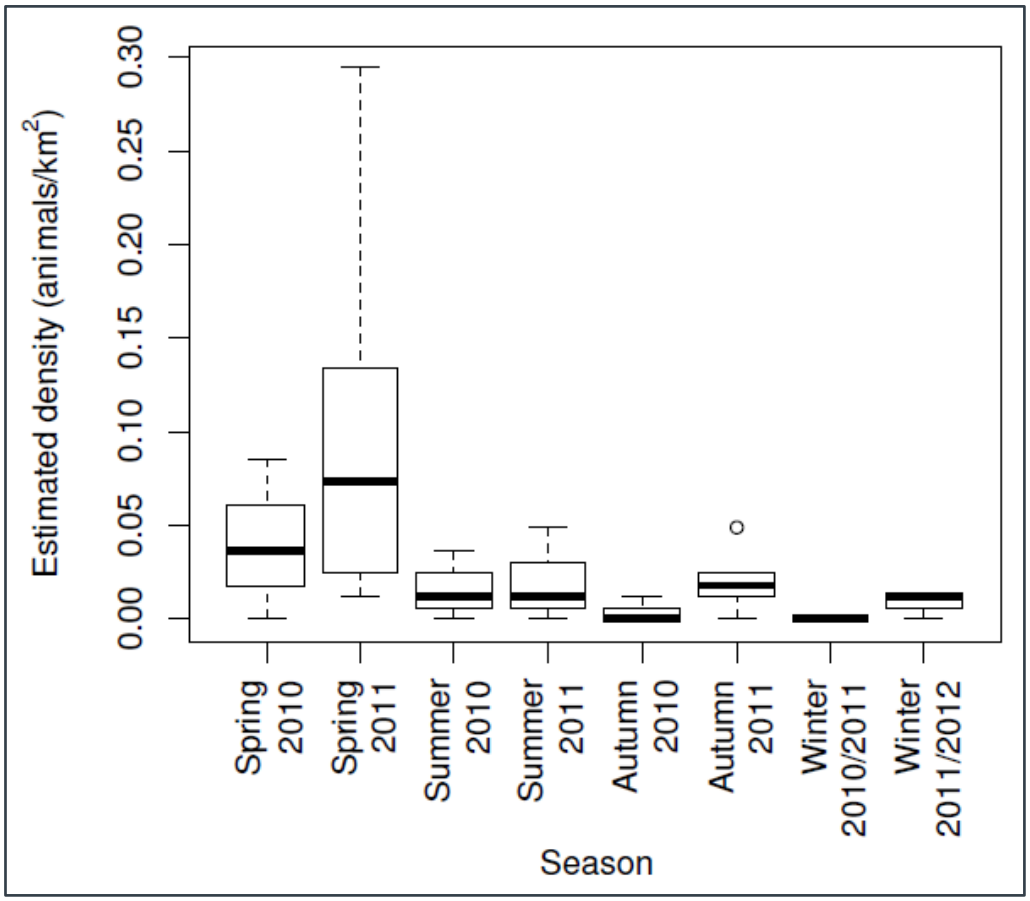
3.2.1 Surveys conducted as part of Rampion 1 surveys between 2010 and 2012 reported a total of 115 sightings for harbour porpoises within the survey area (**Table 3-3**). It is important to note for the results of these surveys, that when sightings are factored in at sea states of Beaufort scale 2 or less, only 43 sightings of harbour porpoises were recorded and included in subsequent analyses. Peak counts of harbour porpoises were reported in March 2011 which resulted in an estimated density of 0.073 porpoise/km^2 (Figure 3.1), compared to estimates of 0.036 porpoise/km^2 reported from March 2010 in which only one survey was conducted. The survey report concluded that it is highly likely that the March 2011 counts were the result of increased survey effort. The increased harbour porpoise sightings coincided with changes in the environmental conditions in the English Channel, in the form of an early spring phytoplankton bloom. This early bloom was the result of increased stormy weather in the area which caused nutrients in the water column to surface at an increased rate as a result of mixing, this was immediately followed by calm water conditions which facilitated a peak in phytoplankton reproduction rates in the area.

Table 3-3 Harbour porpoise count during the Rampion 1 surveys.

	J	F	M	A	M	J	J	A	S	O	N	D
2010			6	13	1	2	5	0	0	1	0	0
2011	0	0	2 (34)	9 (9)	7 (1)	1	1	4	6 (5)	1 (1)	2 (0)	2
2012	0	2										

Dark grey cell denotes no survey conducted. Numbers on brackets denote sightings count during the second survey conducted that month.

Figure 3.2 Approximate relative density of harbour porpoises in the Project site survey area with correction factor



Median values are shown as a thick line, minimum and maximum data values as whiskers, interquartile range as boxes, and outliers as dots.

3.3 SCANS III

3.3.1 Harbour porpoise were detected in SCANS III survey block C (**Figure 3.3**), resulting in a block-wide abundance estimate of 17,323 porpoise (95% CI: 8,853 - 29,970, CV: 0.303) with a density of 0.213 porpoise/km^2. The SCANS surveys have shown a southern shift in the distribution of harbour porpoise within the North Sea between SCANS I in 1994 and SCANS II in 2005 (**Figure 3.4**), and more sightings of harbour porpoise occurred in the English Channel in 2016 compared to 2005. However densities within the English Channel and in the vicinity of Rampion 2 are low in comparison to the rest of the southern North Sea where densities can reach 0.888 porpoise/km^2 (SCANS III block O).

Figure 3.3 From Hammond et al. (2017): Distribution of harbour porpoise sightings during the SCANS III surveys

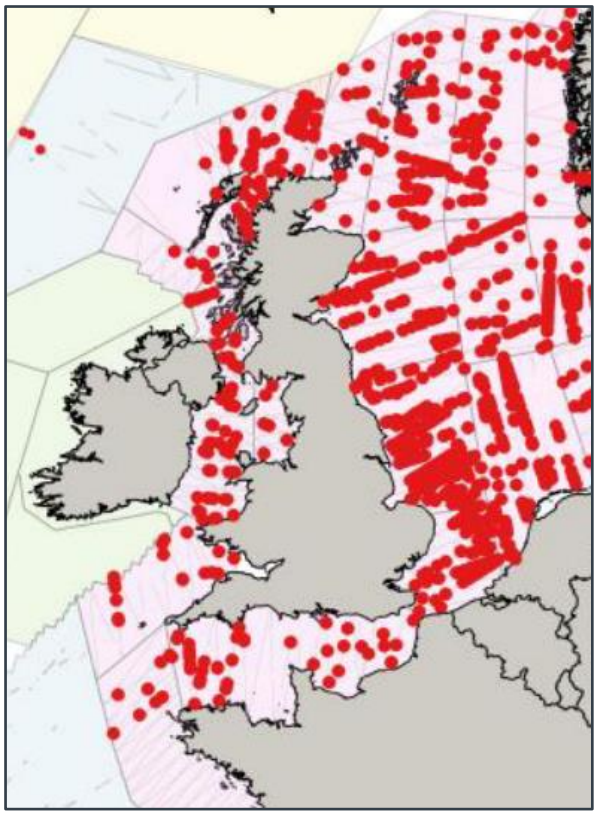
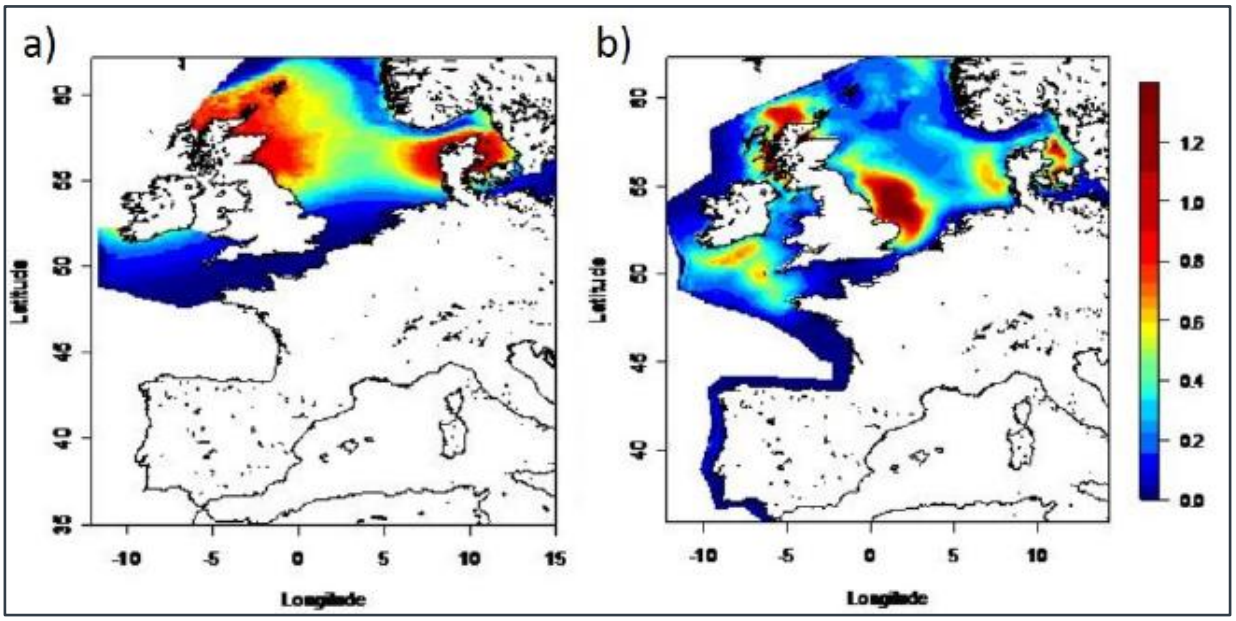


Figure 3.4 From Hammond et al. (2017): Harbour porpoise density estimates a) modelled density surface for SCANS-I 1994 data, b) modelled density surface for SCANS-II 2005 data



3.4 JCP

3.4.1 Density estimates provided for Hastings (region to the south of Sussex in which Rampion 2 is located) and IOW (region to the west of the Isle of Wight) showed that harbour porpoise density was higher in the winter months and reached an estimated maximum of 0.202 porpoise/km^2 (in 2010) (**Table 3-4**) (Paxton et al., 2016).

3.4.2 Utilising the JCP data analysis tool for the user specified area (**Figure 3.5**), harbour porpoises had a density point estimate of approximately 0.142 porpoises/km^2 averaged for summer 2007-2010 (95% CI 0.071-0.213 porpoises/km^2), which is not dissimilar to that estimated for the summer months in Hastings and IOW.

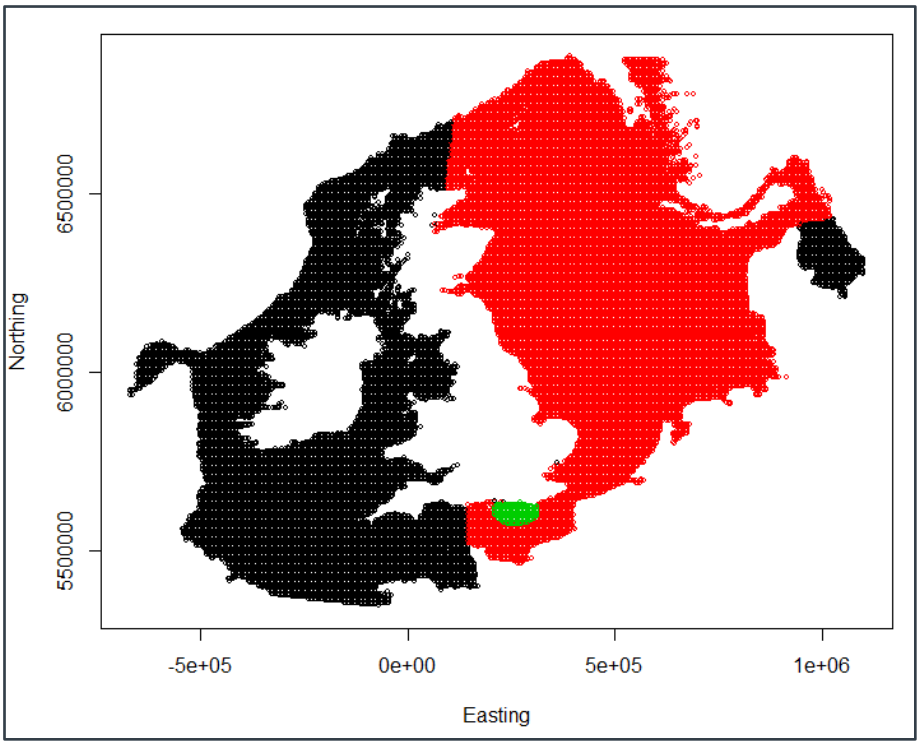
3.4.3 The analysis conducted by Heinänen and Skov (2015) showed that harbour porpoise density estimates in UK waters vary year to year and between summer and winter (**Figure 3.6**). There are high density estimates throughout parts of the North Sea in both summer and winter (>2 porpoise/km^2, which led to the designation of the southern North Sea SAC), however the density estimates in the English Channel and in the vicinity of Rampion 2 are significantly lower year-round and across all years, with estimated densities of only 0.01-0.1 porpoise/km^2.

3.4.4 All analysis of the JCP dataset have shown that density estimates in the English Channel and in the vicinity of Rampion 2 are low in comparison to other areas such as the southern North Sea, and as such, is not considered to be an important area for this species.

Table 3-4 JCP Phase III abundance and density estimates for harbour porpoise in 2010 (Paxton et al., 2016)

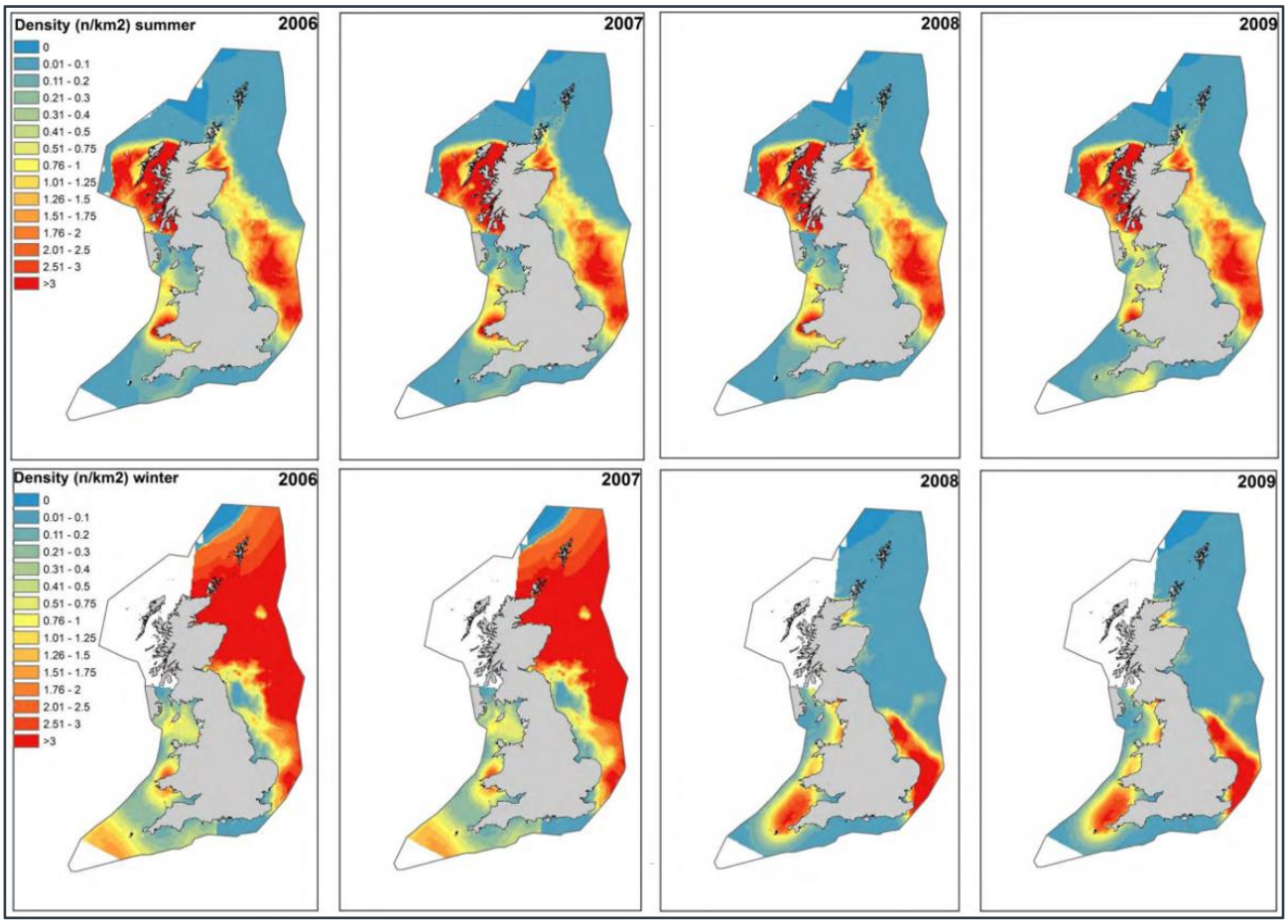
		Winter	Spring	Summer	Autumn
Hastings	Abundance point estimate	300	200	200	200
	Density Estimate (#/km^2)	0.121	0.080	0.080	0.080
IOW	Abundance point estimate	900	600	800	600
	Density Estimate (#/km^2)	0.202	0.135	0.179	0.135

Figure 3.5 The user specified area used to extract cetacean abundance and density estimates from the JCP III Data Analysis Product



The map shows the whole area under consideration (black), the harbour porpoise North Sea MU (red) and the specific area of interest (green)

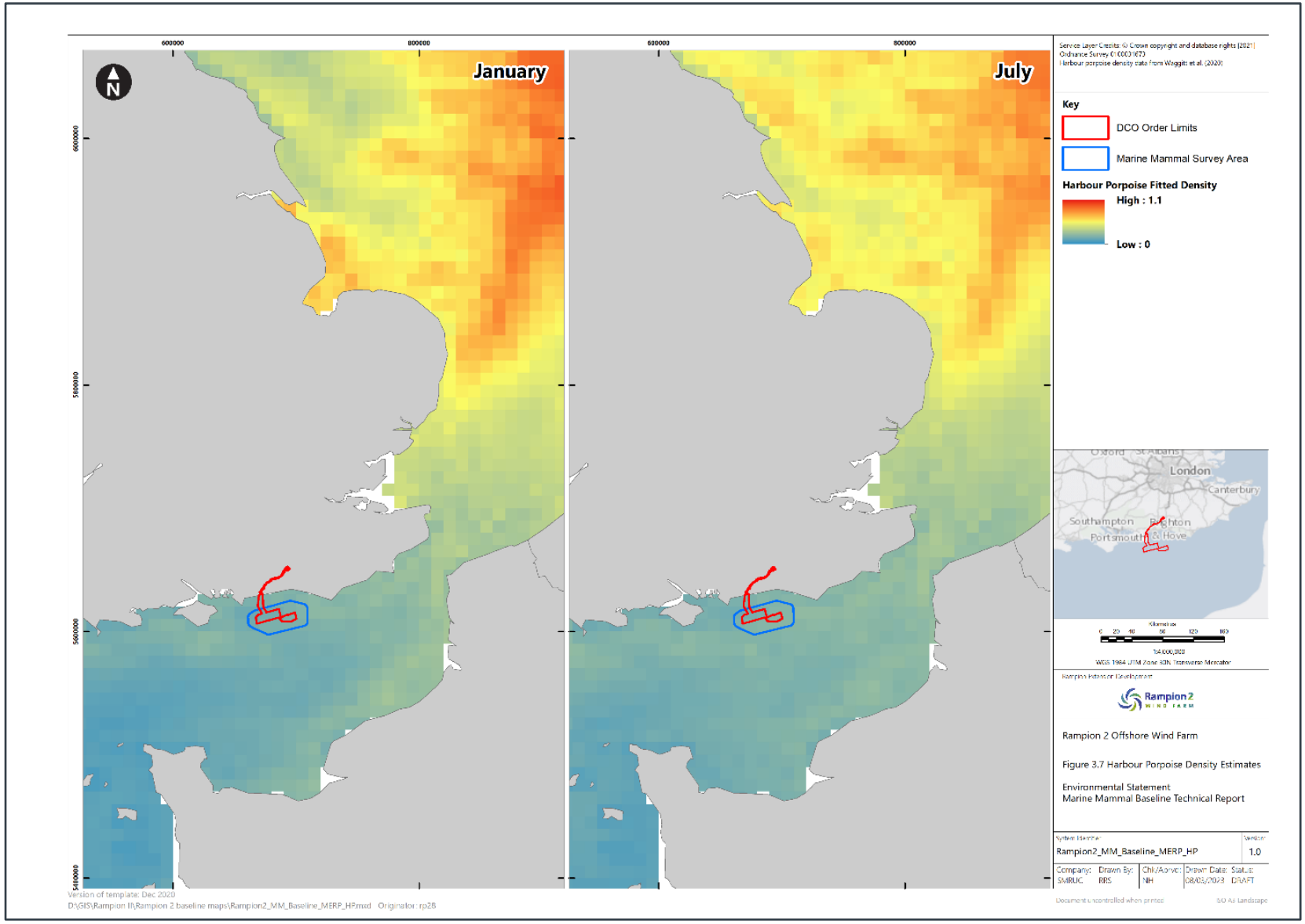
Figure 3.6 From Heinänen and Skov (2015): Harbour porpoise predicted mean density estimates summer (top) and winter (bottom) 2006-2009



3.5 MERP

3.5.1 As with the SCANS III and JCP datasets, the MERP analysis of porpoise distribution shows considerably lower density estimates in the English Channel and in the vicinity of Rampion 2 compared to the southern North Sea SAC area. Density estimates within the Rampion 2 survey area showed little seasonal variation between January and July (**Figure 3.7**). As outlined previously, the distribution maps are not considered to provide suitable density estimates for use in quantitative impact assessment and are provided in this baseline characterisation for illustrative purposes only to distribution levels relative to the rest of the southern North Sea and the English Channel.

Figure 3.7 Harbour porpoise fitted density (#/km^2) for January and July (Waggitt et al., 2020)



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3.6 Sea Watch Foundation

3.6.1 Castles (2020) used 29 harbour porpoise sightings from the Sea Watch Foundation data around the Isle of Wight to investigate spatio-temporal trends. Sightings were higher in the southeast of the Isle of Wight with significantly more sightings in the summer. No density estimate was provided for this dataset.

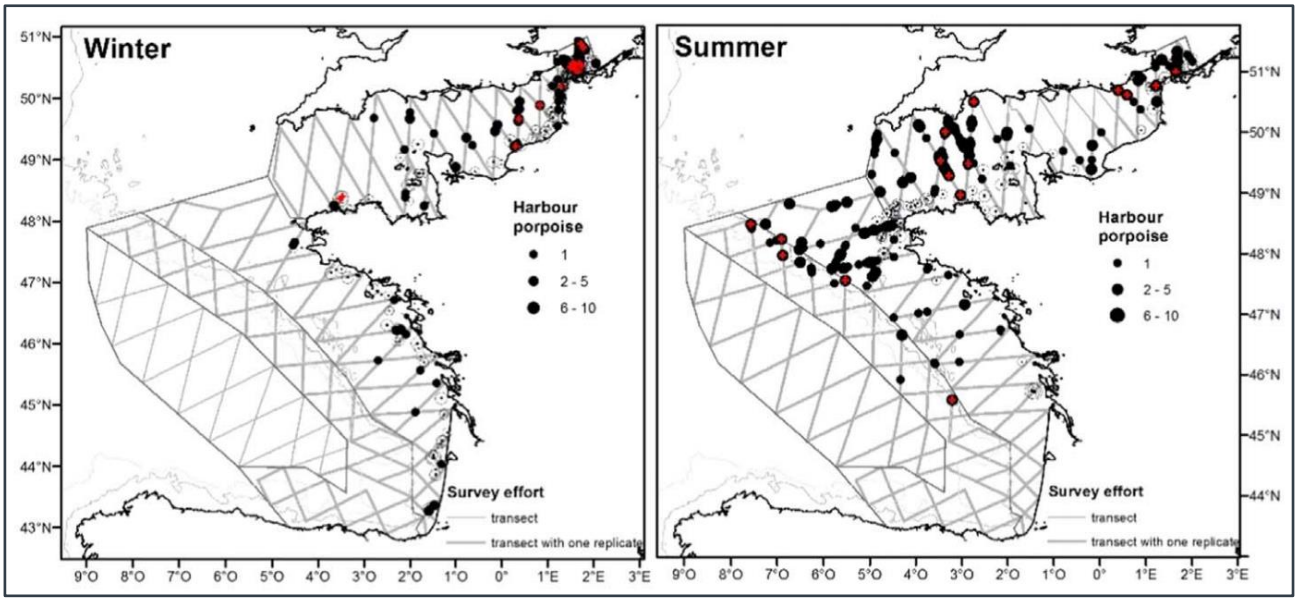
3.7 ORCA

3.7.1 Harbour porpoise was the main species sighted during the surveys conducted on the Portsmouth to Caen ferry route (**Figure 2.8**). No density estimate was provided for this dataset.

3.8 SAMM surveys

3.8.1 A total of 551 sightings of harbour porpoise occurred in the Eastern North Atlantic during the SAMM surveys (**Figure 3.8**). Harbour porpoises exhibited seasonal distributions, showing preference for coastal waters in the winter. In the summer months, harbour porpoise were sighted in both the coastal waters and waters further offshore. Despite the reported changes in harbour porpoise spatial distributions in the English Channel, there was no reported seasonal change in their abundance within the English Channel, with a winter density estimate (corrected for availability bias) of 0.192 porpoise/km^2 compared to a summer density of 0.198 porpoise/km^2. This resulted in an adjusted abundance estimate for the English Channel of 17,829 porpoise in the winter (95% CI: 11,340 – 28,031) and 18,429 porpoise in the summer (95% CI: 13,496 – 25,167) (Laran et al., 2017).

Figure 3.8 From Laran et al. (2017): Distribution of sightings and effort for winter and summer surveys for harbour porpoise (with red dot for calf/young occurrence)



3.9 Summary

3.9.1 In conclusion, harbour porpoise are expected to be present in the English Channel and in the vicinity of Rampion 2 year round, though with relatively low densities compared to areas such as the Southern North Sea. The Rampion 2 and surrounding area is reported to have estimated densities ranging between 0-0.213 porpoises/km^2 (**Table 3-5**). Given the range of density estimates available, it is considered precautionary to take forward the SCANS III density estimate for use in the quantitative impact assessment for Rampion 2.

Table 3-5 Harbour porpoise density estimates

Data source	Density Estimate (porpoise/km^2)
Rampion 2	0.00 – 0.02 (porpoise) 0.00 – 0.08 (dolphin/porpoise)
Rampion 1	0.000 - 0.073
SCANS III Block C	**0.213**
JCP Phase III Hastings	0.080 (spring, summer & autumn) 0.121 (winter)
JCP Phase III IOW	0.135 (spring & autumn) 0.179 (summer) 0.202 (winter)
JCP III Data Analysis Product	0.142
SAMM survey (English Channel)	0.086 (winter) 0.089 (summer)

4. Bottlenose dolphin baseline

4.1 Rampion 2

4.1.1 No bottlenose dolphins have been sighted during the 24 months of the Rampion 2 aerial surveys. There were, however, 2 sightings of unknown dolphins and some sightings of unknown small cetaceans which could have been either a dolphin species or a porpoise (**Figure 4.1**). If it is assumed that the unknown dolphin/porpoise were bottlenose dolphins then maximum density estimate is 0.08 dolphins/km^2 and an average density across all 24 surveys of 0.01 dolphin/porpoise/km^2 (**Table 3-2**).

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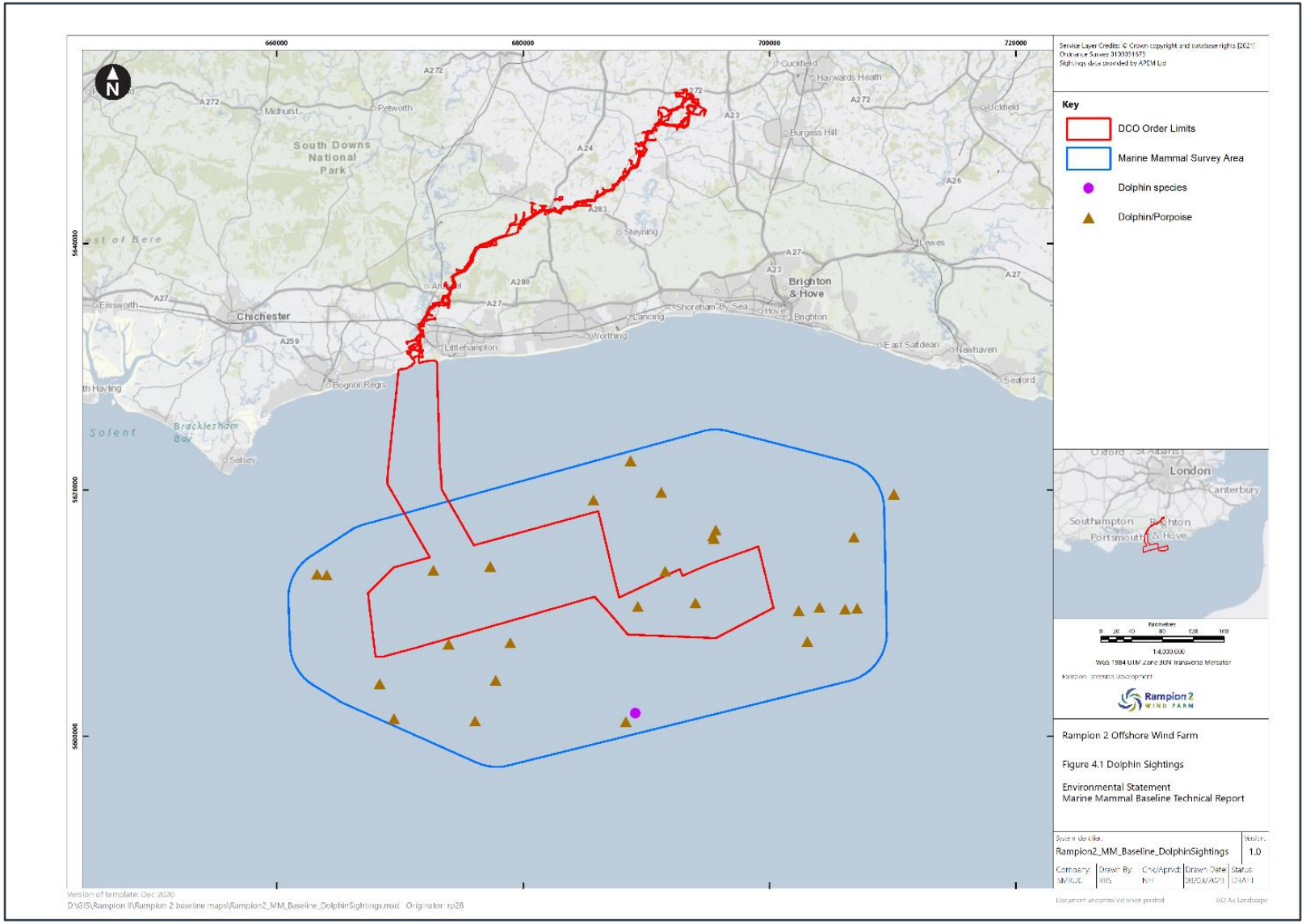
Figure 4.1 Sightings of unidentified dolphins and dolphin/porpoise during the site-specific surveys at Rampion 2



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4.2 Rampion 1

4.2.1 The surveys conducted for Rampion 1 reported several sightings of bottlenose dolphins, and found that when they were sighted, bottlenose dolphins were often in large groups. Encounters with bottlenose dolphins during surveys occurred at various times throughout the year, with peak counts of dolphins reported in July 2010 (**Table 4-1**). Some sightings had uncertainty for the species identification of the animal and were listed as 'probable bottlenose dolphin'. In total, the surveys reported a count of 65-71+ bottlenose dolphins and 15-22 probable bottlenose dolphins. No density estimate was calculated from these data, but the data do confirm the presence of bottlenose dolphins in the area, occasionally in large groups.

Table 4-1 Bottlenose dolphin count during the Rampion 1 surveys.

	J	F	M	A	M	J	J	A	S	O	N	D
Bottlenose dolphin												
2010			0	0	0	0	30+	0	0	0	17-18	0
2011	0	1	0 (0)	0 (0)	0 (0)	0	15-20	2	0 (0)	0 (0)	0 (0)	0
2012	0	0										
Probable bottlenose dolphin												
2010			0	4-5	4-5	0	0	0	0	0	5-10	0
2011	0	0	0 (0)	0 (0)	0 (0)	0	0	2	0 (0)	0 (0)	0 (0)	0
2012	0	0										

Dark grey cell denotes no survey conducted. Numbers on brackets denote sightings count during the second survey conducted that month.

4.3 SCANS III

4.3.1 No bottlenose dolphins were sighted in SCANS III survey block C, within which Rampion 2 is located.

4.4 JCP

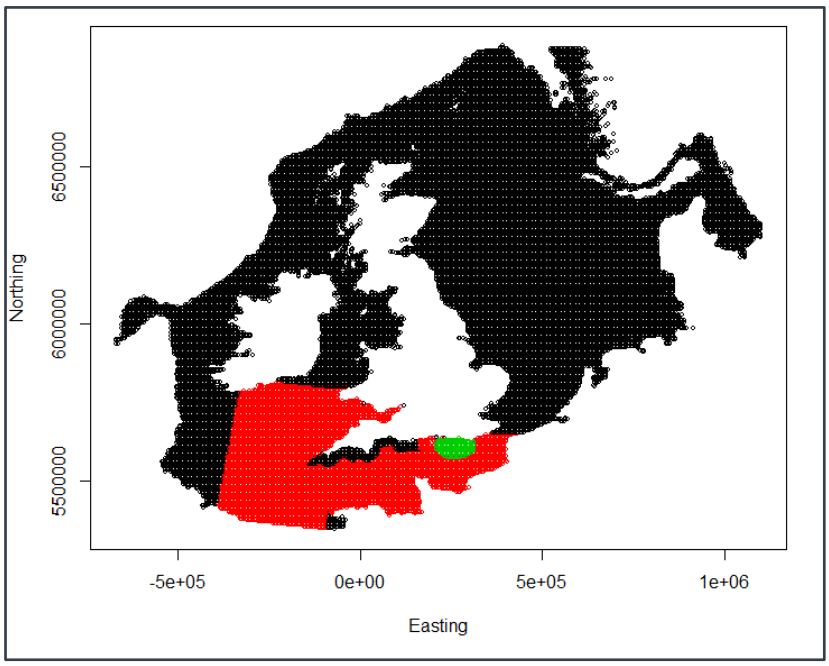
4.4.1 Density estimates provided for Hastings (region to the south of Sussex in which Rampion 2 is located) and IOW (region to the west of the Isle of Wight) showed that bottlenose dolphin density was higher in the summer months and reached an estimated maximum of 0.011 dolphins/km^2 (in 2010) (**Table 4-2**) (Paxton et al., 2016). Utilising the JCP data analysis tool for the user specified area, bottlenose

dolphins in the Rampion 2 area were reported to have a density point estimate of approximately 0.002 dolphins/km^2 (95% CI: 0.001-0.003 dolphins/km^2).

Table 4-2 JCP Phase III abundance and density estimates for bottlenose dolphins in 2010

		Winter	Spring	Summer	Autumn
Hastings	Abundance point estimate	0	0	10	2
	Density Estimate (#/km^2)	0.000	0.000	0.004	0.001
IOW	Abundance point estimate	30	40	50	20
	Density Estimate (#/km^2)	0.007	0.009	0.011	0.004

Figure 4.2 The user specified area used to extract cetacean abundance and density estimates from the JCP III Data Analysis Product

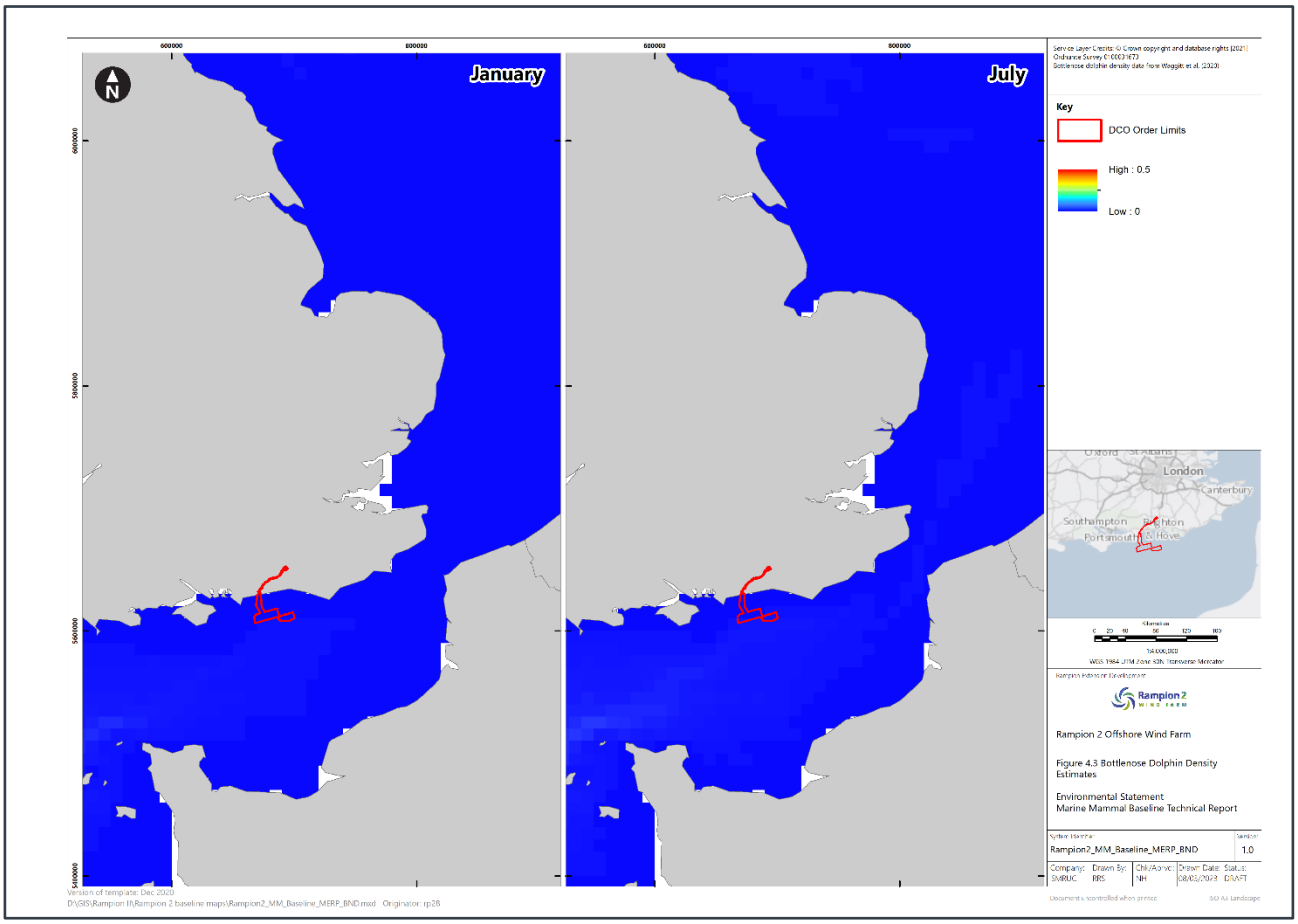


The map shows the whole area under consideration (black), the bottlenose dolphin MU (red) and the specific area of interest (green).

4.5 MERP

4.5.1 As with the SCANS III and JCP datasets, the MERP analysis of bottlenose distribution shows very low density estimates in the English Channel and in the vicinity of Rampion 2, with no evidence of seasonal variation (**Figure 4.3**). As outlined previously, the distribution maps are not considered to provide suitable density estimates for use in quantitative impact assessment and are provided in this baseline characterisation for illustrative purposes only to distribution levels relative to the rest of the southern North Sea and the English Channel.

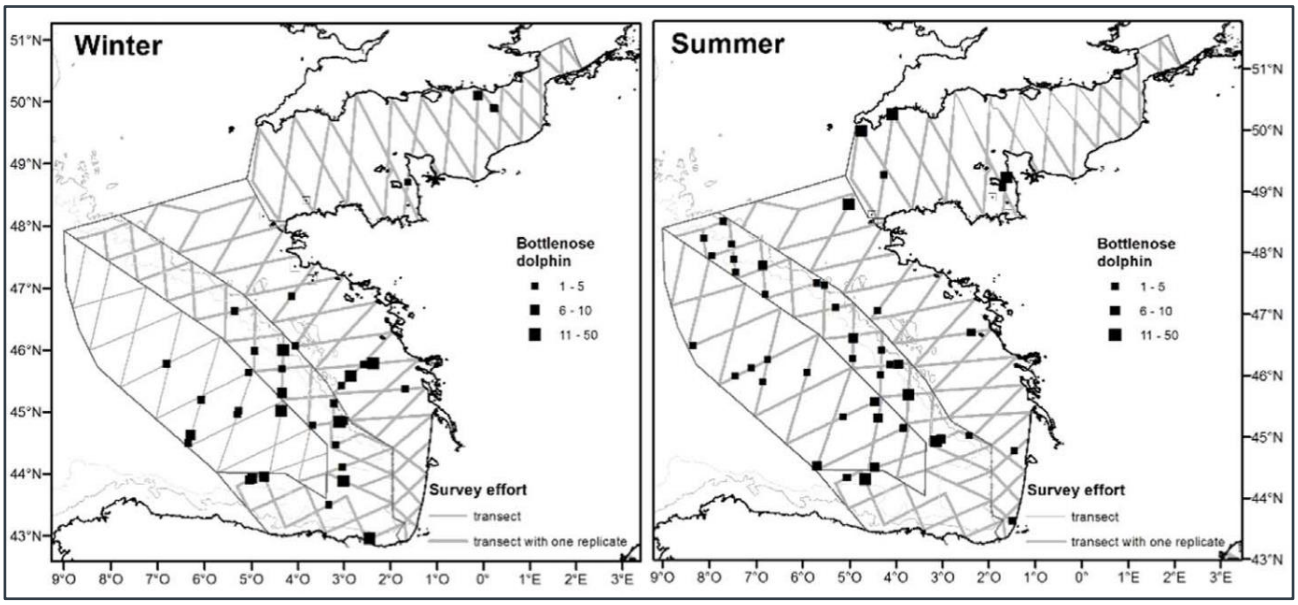
Figure 4.3 Bottlenose dolphin (offshore ecotype) fitted density (#/km^2) for January and July (Waggitt et al., 2020)



4.6 SAMM surveys

4.6.1 In total there were 111 sightings of bottlenose dolphins in the Eastern North Atlantic during the SAMM surveys. While most of these sightings were within the Bay of Biscay area, there were sightings of bottlenose dolphins in the English Channel and the Rampion 2 area in the winter surveys (**Figure 4.4**). Bottlenose dolphin mean school size varied across a range of 2.6 to 6.2 individuals. While estimated densities (corrected for availability bias) within the English Channel varied between 0.010 dolphins/km^2 in the winter, and 0.037 dolphins/km^2 in the summer, there was found to be no significant seasonal difference in bottlenose dolphin densities across the Eastern-North Atlantic survey area as a whole. Corrected abundances of individuals within the English Channel were 915 dolphins (95% CI: 323 – 2,589) in the winter and 3,544 dolphins (95% CI: 1,121-11,202) in the summer (Laran et al., 2017).

Figure 4.4 From Laran et al. (2017): Distribution of sightings and effort for winter and summer surveys for bottlenose dolphins



4.7 Sea Watch Foundation

4.7.1 Castles (2020) used 61 bottlenose dolphin sightings from the Sea Watch Foundation data around the Isle of Wight to investigate spatio-temporal trends. Most of the bottlenose dolphin sightings occurred in the northeast area of the Isle of Wight with significantly more sightings in the summer. No density estimate was calculated for this dataset.

4.8 ORCA

4.8.1 The ORCA surveys have reported bottlenose dolphin sightings along the Portsmouth-Caen ferry route (**Figure 2.8** and **Table 2-5**). No density estimate was calculated for this dataset.

4.9 Summary

4.9.1 The population of bottlenose dolphins in the Offshore Channel and SW England MU is not well studied in comparison to other UK MUs such as the Coastal East Scotland MU and the Irish Sea MU, which has resulted in wide confidence intervals for abundance estimates for this population. For example the IAMMWG (2021) abundance estimate for the Offshore Channel and SW England MU has confidence intervals of 6,727 – 17,814. In addition, there are few studies in the English Channel that have provided reliable density estimates. The data that are available from the JCP database and the SAMM surveys indicate that densities are higher in the English Channel in the summer months, with densities of up to 0.037 dolphins/km^2. Since there is a large degree of uncertainty associated with the bottlenose dolphin abundance and density estimates for this area (**Table 4-3**), it is precautionary to take forward the highest density estimate (0.037 dolphins/km^2) for use in the quantitative impact assessment for Rampion 2.

Table 4-3 Bottlenose dolphin density estimates

Data source	Density Estimate (dolphins/km^2)
Rampion 2	None
Rampion 1	Not estimated
SCANS III Block C	None
JCP Phase III Hastings	0.000 (winter & spring) 0.001 (autumn) 0.004 (summer)
JCP Phase III IOW	0.004 (autumn) 0.007 (winter) 0.009 (spring) 0.011 (summer)
MERP density map	0.000 – 0.004 (Jan) 0.001 – 0.008 (Jun)
SAMM survey (English Channel)	0.010 (winter) **0.037 (summer)**

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5. White-beaked dolphin baseline

5.1 Rampion 2

5.1.1 No white-beaked dolphins were sighted during the 24 months of the Rampion 2 aerial surveys.

5.2 Rampion 1

5.2.1 During the 30 surveys, only a single white-beaked dolphin was seen on one occasion at the site in November 2011.

5.3 SCANS III

5.3.1 No white-beaked dolphins were sighted in SCANS III survey block C.

5.4 JCP

5.4.1 No white-beaked dolphins were predicted to be in the Hastings of IOW areas of interest for offshore development in the JCP Phase III analysis.

5.4.2 No white-beaked dolphins were estimated to be within the user specified area using the JCP Phase III Data Analysis Product.

5.5 MERP

5.5.1 The MERP density surfaces for white-beaked dolphins also highlight the lack of data on this species in the English Channel. Density estimates were very low year round in the Rampion 2 area (**Figure 5.1**). As outlined previously, the distribution maps are not considered to provide suitable density estimates for use in quantitative impact assessment and are provided in this baseline characterisation for illustrative purposes only to distribution levels relative to the rest of the southern North Sea and the English Channel.

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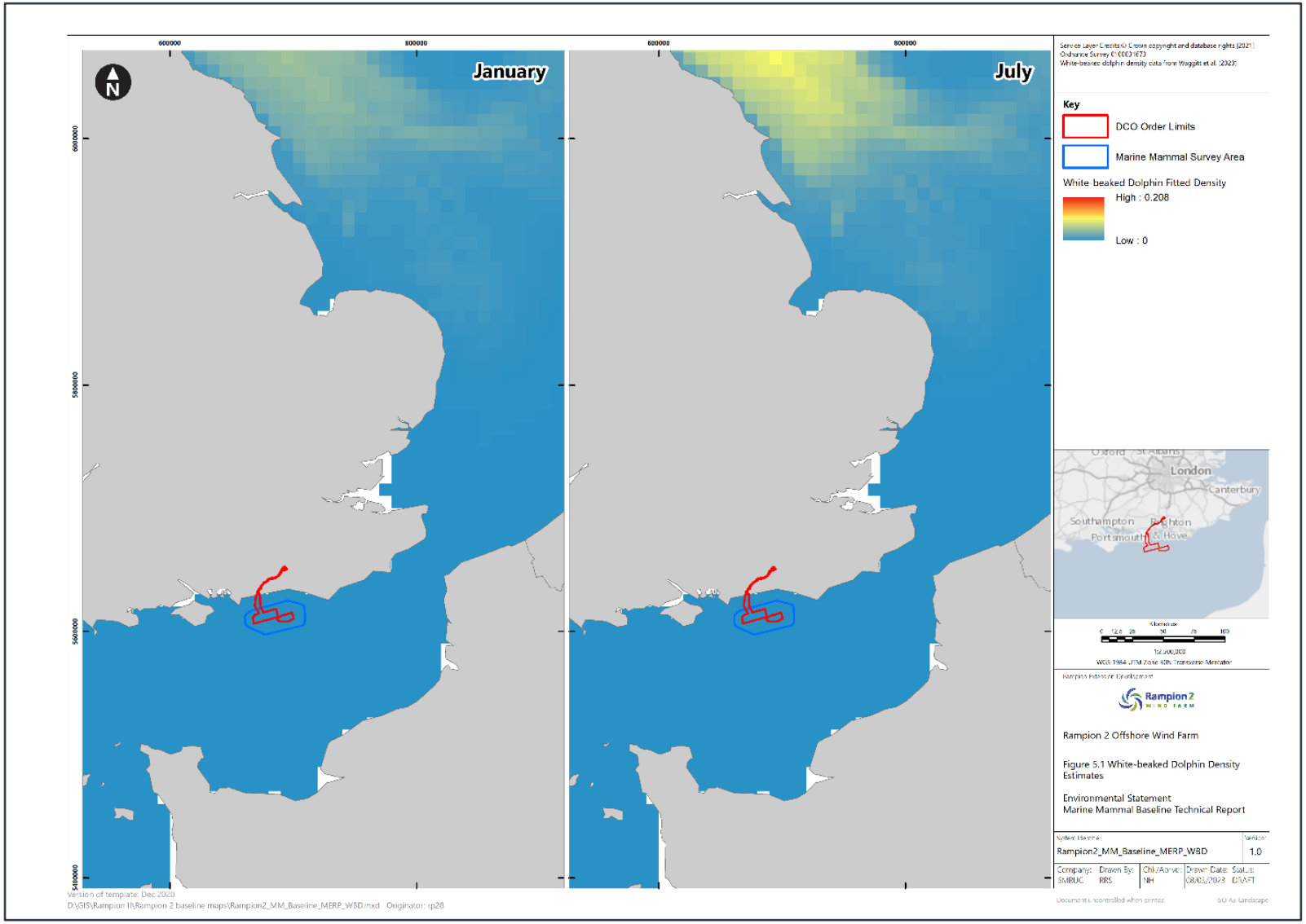
Figure 5.1 White-beaked dolphin (offshore ecotype) fitted density (#/km^2) for January and July (Waggitt et al., 2020)



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5.6 Sea Watch Foundation

5.6.1 Between March 2018 and Aug 2020 (inclusive) a total of 9 individual white-beaked dolphins (over 2 encounters) have been reported by the Sea Watch Foundation for the Southern England Area. No density estimate was provided for this dataset.

5.7 ORCA

5.7.1 No white-beaked dolphins were included in the ORCA sightings map or recent survey reports for the Portsmouth to Caen ferry route (2011, 2015, 2016, 2018, 2019 and 2020). No density estimate was provided for this dataset.

5.8 Summary

5.8.1 Given the lack of white-beaked dolphin sightings in the area from the survey sources (Rampion 2 surveys, SCANS III, JCP data and SAMMS surveys) it is concluded that **white-beaked dolphins can be scoped out of assessment for the Rampion 2 project**.

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6. Common dolphin baseline

6.1 Rampion 2

6.1.1 Only one common dolphin was sighted during the 24 months of Rampion 2 aerial surveys (**Figure 6.1**). This was a sighting of a single individual in October 2019, resulting in a density estimate that month of 0.01 dolphins/km^2 (**Table 6-1**). In addition, there were some sightings of unknown small cetaceans which could have been either a dolphin species or a porpoise.

Table 6-1 Common dolphin sightings count and estimated abundance and density (Rampion 2 array area + 4 km buffer)

Survey number	Date	Count	Abundance	Lower CI	Upper CI	Precision	Density
1-6	Apr-19 – Sep-10	0	0	0	0	0.00	0.00
7	Oct-19	1	8	1	25	1.00	0.01
8-24	Nov-19 – Mar-21	0	0	0	0	0.00	0.00

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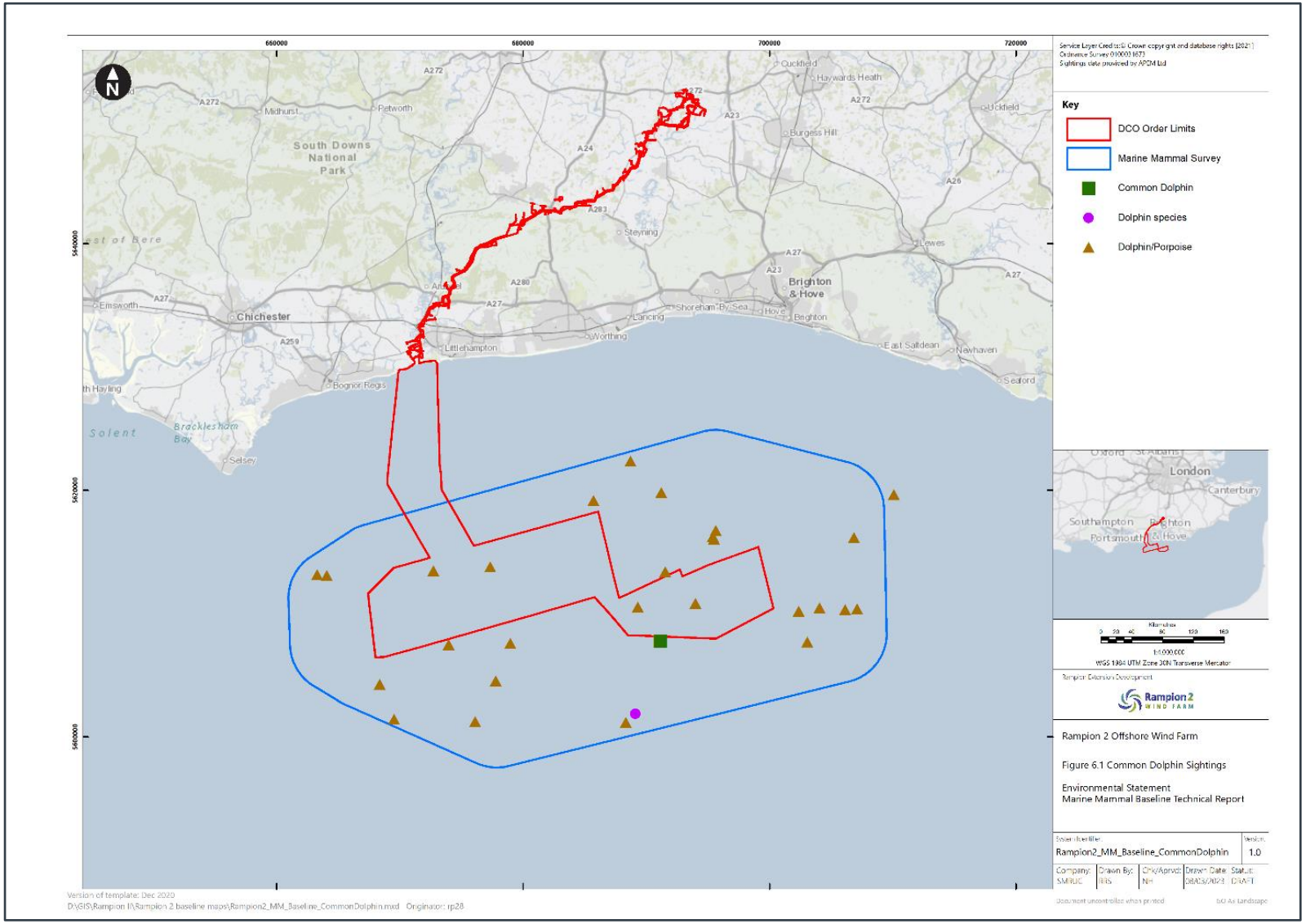
Figure 6.1 Sightings of common dolphins, unidentified dolphins and dolphin/porpoise during the site-specific surveys at Rampion 2



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6.2 Rampion 1

6.2.1 No common dolphins were sighted during the Rampion 1 surveys.

6.3 SCANS III

6.3.1 No common dolphins were sighted in SCANS III survey block C. However unidentified common or striped dolphins were detected in block C, resulting in a block wide abundance estimate of 1,765 common/striped dolphins (95% CI: 0 – 5,248, CV: 0.819) and a density of 0.0217 common/striped dolphins/km^2.

6.4 JCP

6.4.1 No common dolphins were estimated to be present in the Hastings area (region to the south of Sussex in which Rampion 2 is located) (**Table 6-2**) (Paxton et al., 2016). In the IOW area (region to the west of the Isle of Wight) common dolphin density was low, with maximum density estimates of only 0.004 dolphins/km^2 (in 2010) (**Table 6-2**) (Paxton et al., 2016). No common dolphins were estimated to be within the user specified area using the JCP Phase III Data Analysis Product.

Table 6-2 JCP Phase III abundance and density estimates for common dolphins in 2010

		Winter	Spring	Summer	Autumn
Hastings	Abundance point estimate	0	0	0	0
	Density Estimate (#/km^2)	0.000	0.000	0.000	0.000
IOW	Abundance point estimate	0	0	10	20
	Density Estimate (#/km^2)	0.000	0.000	0.002	0.004

6.5 MERP

6.5.1 As with the SCANS III and JCP datasets, the MERP analysis of common dolphin distribution shows low density estimates in the English Channel and in the vicinity of Rampion 2, with little seasonal variation between January and July. The cetacean distribution maps provided by Waggitt et al. (2020) estimate highest common dolphin densities to the south and west of the UK, there are estimated to be high densities in offshore waters and off Ireland and in the Bay of Biscay, with much lower densities within the English Channel (**Figure 6.2**). As outlined previously, the distribution maps are not considered to provide suitable density estimates for use in quantitative impact assessment and are provided in this baseline characterisation for illustrative purposes only to distribution levels relative to the rest of the southern North Sea and the English Channel.

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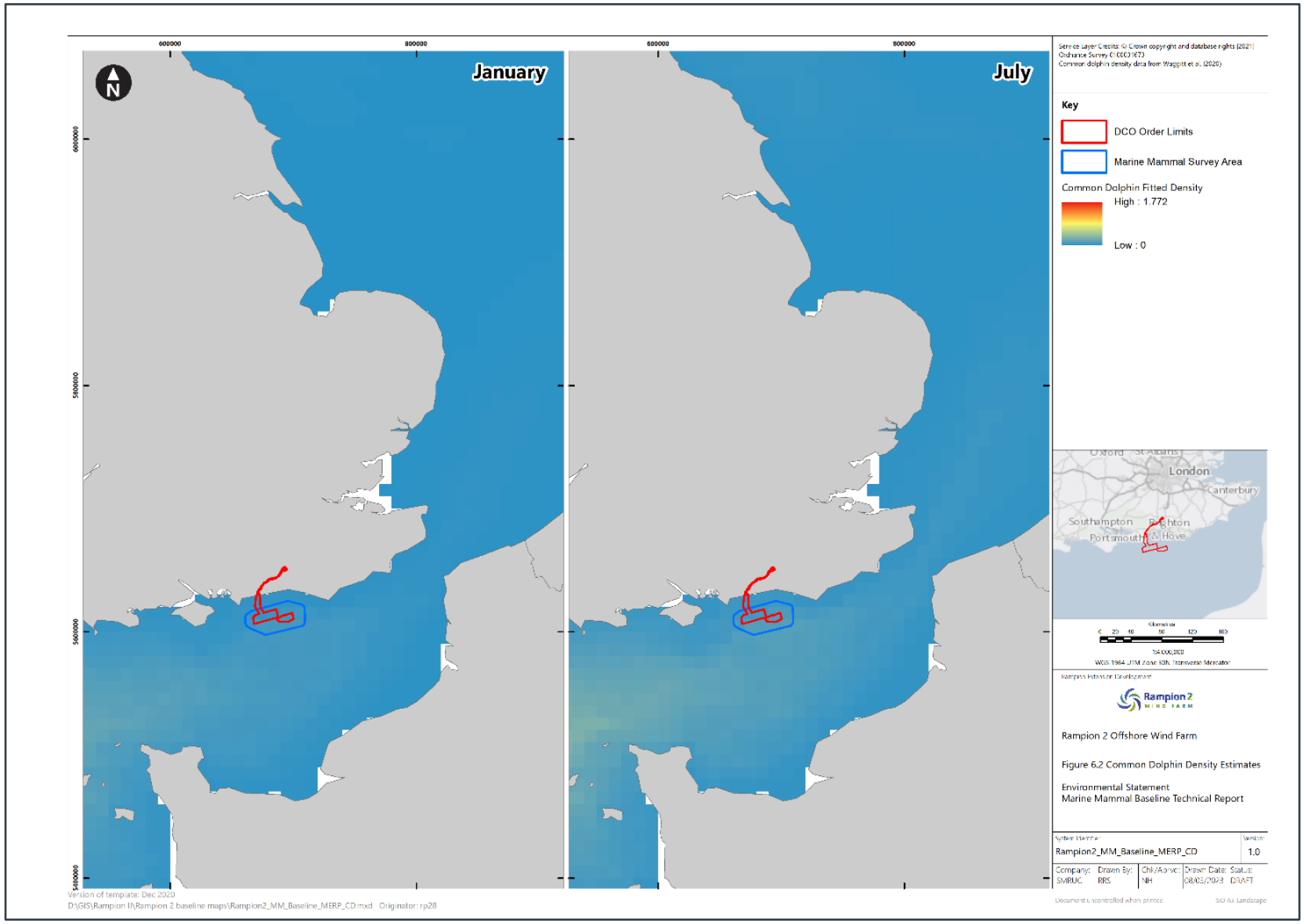
Figure 6.2 Common dolphin fitted density (#/km^2) for January and July (Waggitt et al., 2020)



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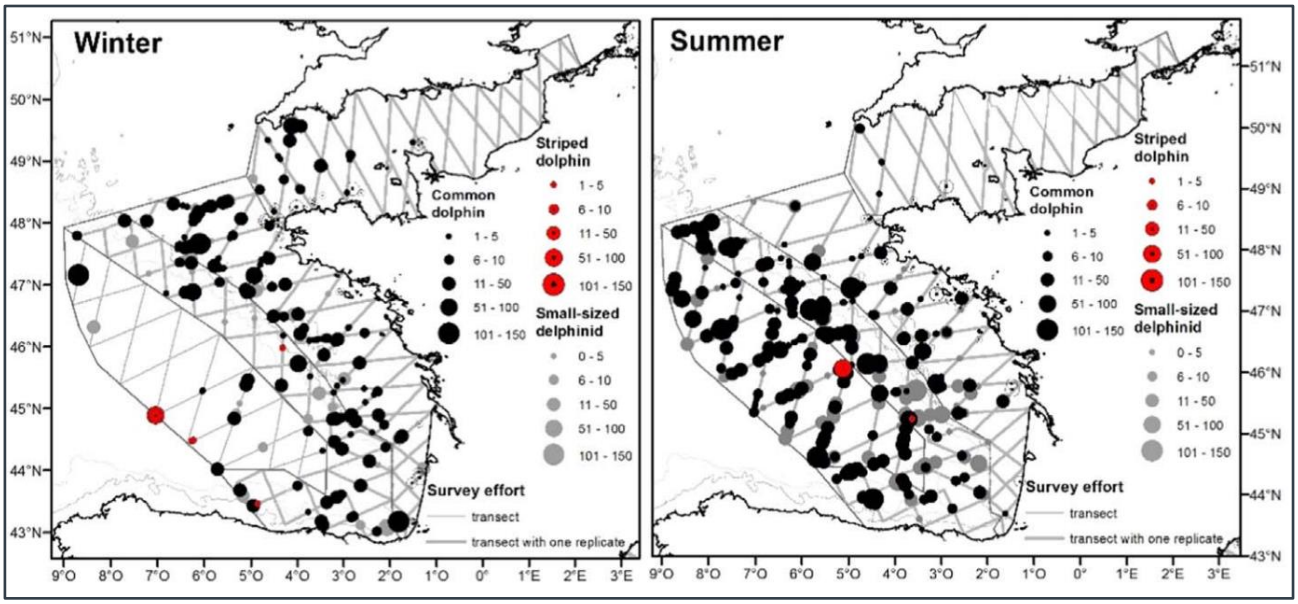
6.6 SAMM surveys

6.6.1 There were 1,122 sightings of “small delphinids” in the Eastern North Atlantic during the SAMMs surveys, consisting of a mixture of common dolphins (76%), striped dolphins (1%) and unidentified small-sized delphinids (23%), however these delphinid sightings were restricted to the Bay of Biscay and the western English Channel, with no sightings in the eastern parts of the English Channel **(Figure 6.3**). In general, small delphinids were sighted on the shelf and slope of the Bay of Biscay and the southern Celtic Sea, however in the summer sightings were more offshore on the slope and oceanic strata of Bay of Biscay. Small-sized delphinids displayed densities which varied significantly by season within the English Channel, with winter corrected densities for combined common/striped dolphins of 0.171 individuals/km^2, compared to summer densities of 0.011 individuals/km^2; resulting in abundance estimates of 15,908 common/striped dolphins in the winter (95% CI: 7,033 – 35,986) and 1,023 common/striped dolphins in the summer (95% CI: 255 – 4,092) (Laran et al., 2017).

Figure 6.3 From Laran et al. (2017): Distribution of sightings and effort for winter and summer surveys for common, striped and small sized delphinids



6.7 Sea Watch Foundation

6.7.1 Castles (2020) used 14 common dolphin sightings from the Sea Watch Foundation data around the Isle of Wight to investigate spatio-temporal trends. Sightings occurred around the Isle of Wight with significantly more sightings in the summer. No density estimate was provided for this dataset.

6.8 ORCA

6.8.1 The ORCA surveys have reported common dolphin sightings along the Portsmouth-Caen ferry route (**Figure 2.8** and **Table 2-5**). No density estimate was provided for this dataset.

6.9 Summary

6.9.1 There are few studies that provide robust density and abundance estimates for common dolphins in the English Channel area. Based on the limited data outlined above, common dolphins are present in the area with estimated densities ranging between 0.000-0.171 dolphins per km^2 (**Table 6-3)**. Given the lack of density estimates for common dolphins, it is considered to be precautionary to take forward to impact assessment the common/striped dolphin density estimate obtained from the SAMMS surveys.

Table 6-3 Common dolphin density estimates

Data source	Density Estimate (dolphins/km^2)
Rampion 2	0.00 – 0.01 (common dolphin) 0.00 – 0.07 (dolphin/porpoise)
Rampion 1	None
SCANS III Block C	0.000 (common) 0.0217 (common/striped)
JCP Phase III Hastings	None
JCP Phase III IOW	0.000 (winter & spring) 0.002 (summer) 0.004 (autumn)
JCP III Data Analysis Product	None
SAMM survey (English Channel)	**0.171 (winter, common/striped)** 0.011 (summer, common/striped)

7. Minke whale baseline

7.1 Rampion 2

7.1.1 No minke whales were sighted in any of the 24 months of site-specific Rampion 2 aerial surveys.

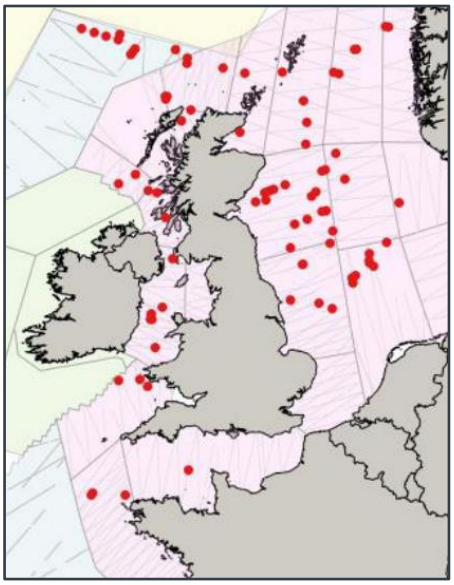
7.2 Rampion 1

7.2.1 In the 30 surveys, only a single unidentified whale (probably minke whale) was observed during the Rampion 1 baseline surveys.

7.3 SCANS III

7.3.1 Minke whales were detected in SCANS III survey block C (**Figure 7.1)**, resulting in a block-wide abundance estimate of 186 whales (95% CI: 0 – 819, CV: 1.119) with a density of 0.0023 whales/km^2. It is worth noting however than none of the sightings within the survey block were in the vicinity of Rampion 2.

Figure 7.1 From Hammond et al. (2017): Distribution of minke whale sightings during the SCANS III surveys



7.4 JCP

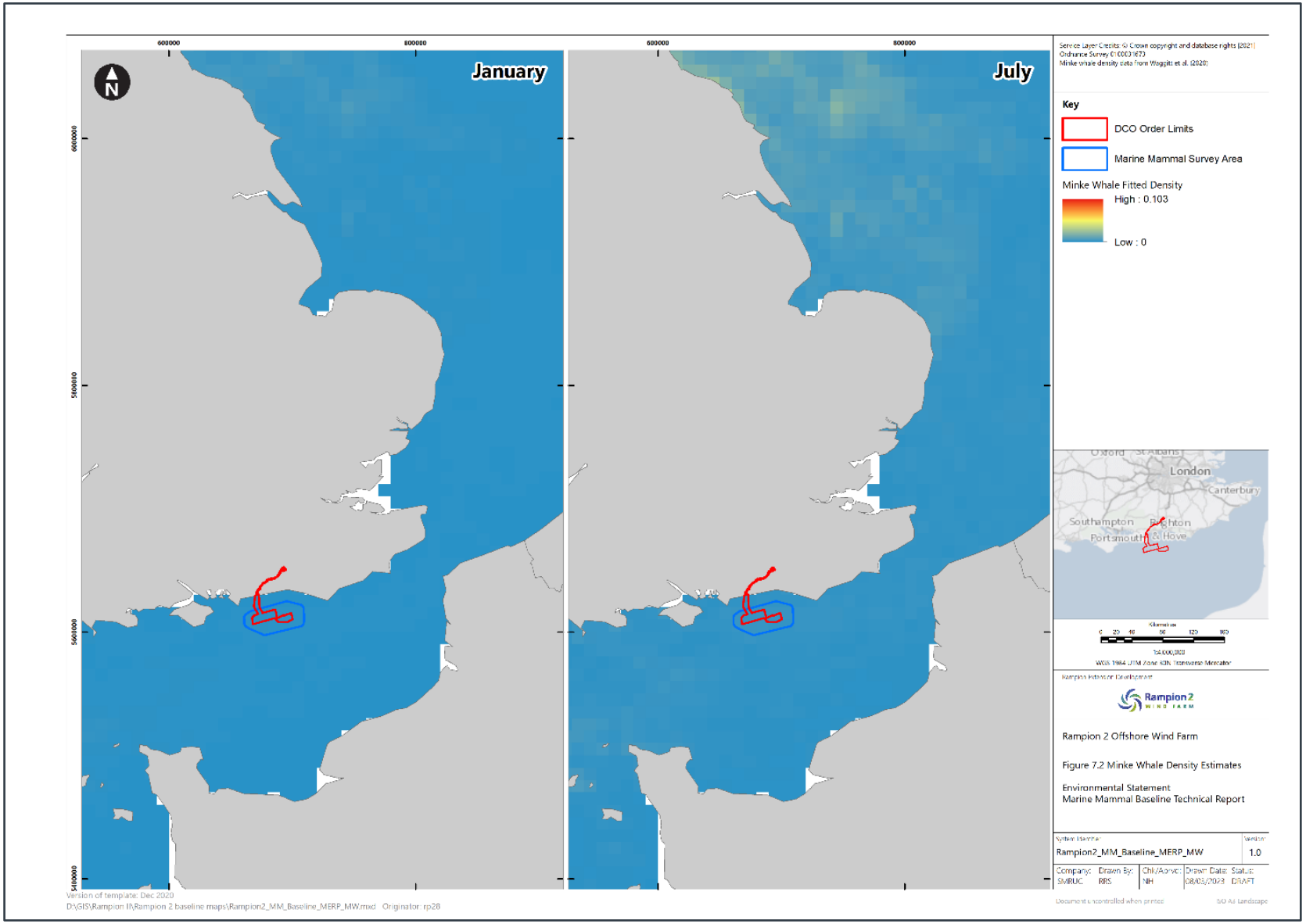
7.4.1 No minke whales were predicted to be in the Hastings of IOW areas of interest for offshore development in the JCP Phase III analysis.

7.4.2 No minke whales were estimated to be within the user specified area using the JCP Phase III Data Analysis Product.

7.5 MERP

7.5.1 The MERP density surfaces for minke whales highlight the low densities expected in the English Channel, with evidence of slightly higher densities in the North Sea in the summer (**Figure 7.2**). As outlined previously, the distribution maps are not considered to provide suitable density estimates for use in quantitative impact assessment and are provided in this baseline characterisation for illustrative purposes only to distribution levels relative to the rest of the southern North Sea and the English Channel.

Figure 7.2 Minke whale fitted density (#/km^2) for January and July (Waggitt et al., 2020)



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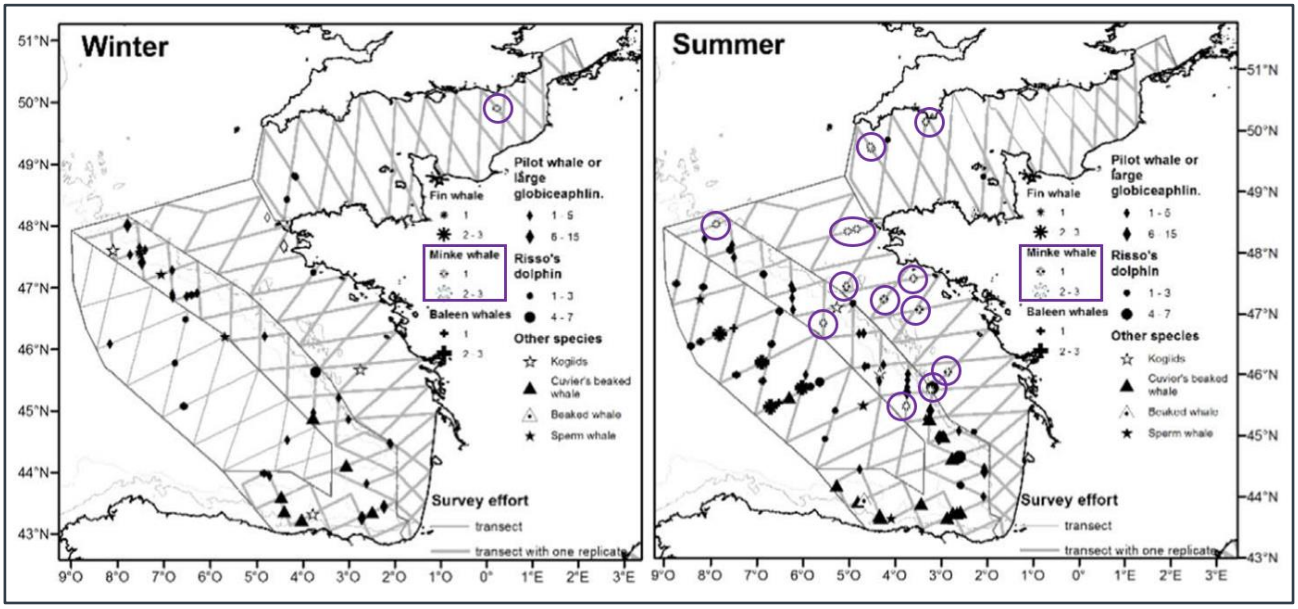
7.6 SAMM surveys

7.6.1 Minke whale sightings were always single individuals, showing preference for areas within the continental shelf. In the English Channel, there was one singular sighting made for minke whales during the winter and three individuals sighted in the summer (**Figure 7.3**). The English Channel summer corrected abundance was estimated to be approximately 1,077 minke whales (95% CI: 351 – 3,299). The English Channel also comprised of 26% of the summer abundance of minke whales, with a summer corrected density of 0.012 individuals/km^2 (Laran et al., 2017).

Figure 7.3 From Laran et al. (2017): Distribution of sightings and effort for winter and summer surveys for minke whales (and various other species)



To better distinguish the minke whale sightings, the maps have been annotated with purple circles.

7.7 Sea Watch Foundation

7.7.1 No minke whale sightings have been reported by the Sea Watch Foundation between March 2018 and August 2020 inclusive. No density estimate was provided for this dataset.

7.8 ORCA

7.8.1 No minke whales were included in the ORCA sightings map or recent survey reports for the Portsmouth to Caen ferry route (2011, 2015, 2016, 2018, 2019 and 2020). No density estimate was provided for this dataset.

7.9 Summary

7.9.1 In conclusion to the data outlined above, all surveys found very low abundances of minke whales, with reported estimated densities ranging between 0.000-0.012 whales per km^2 (**Table 7-1**). From this, it is recommended that the best density estimate for these individuals is that of SCANS III Block C.

Table 7-1 Minke whale density estimates

Data source	Density Estimate (whales/km^2)
Rampion 2	None
Rampion 1	Not estimated
SCANS III Block C	**0.0023**
JCP Phase III Hastings	None
JCP Phase III IOW	None
JCP III Data Analysis Product	None
SAMM survey (English Channel)	0.000 (winter) 0.012 (summer)

8. Harbour seal baseline

8.1 Rampion 2

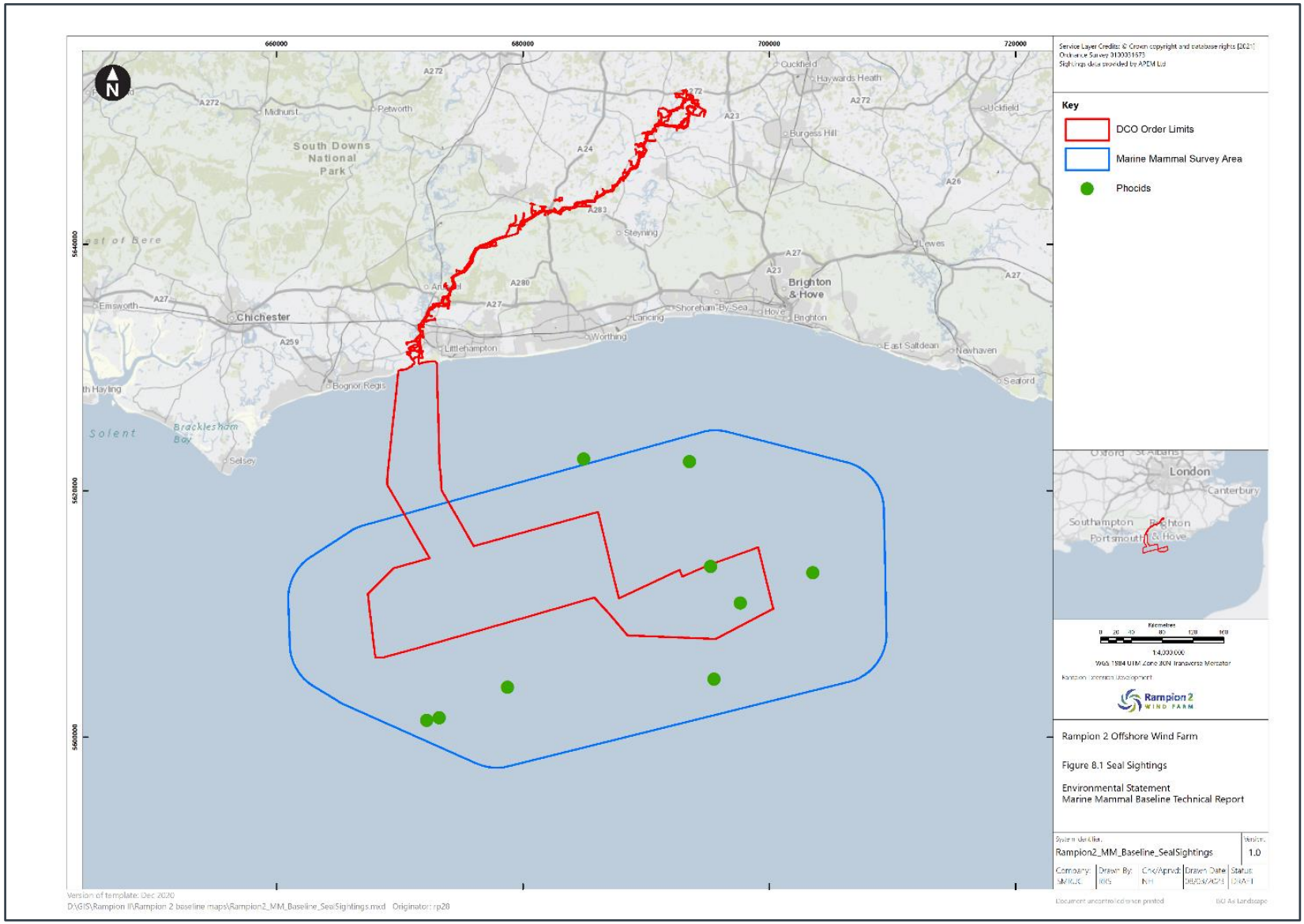
8.1.1 During the Rampion 2 site-specific surveys seals were reported (**Figure 8.1**), however only two of the sightings were able to be identified to species level. There was a peak count of seals in July, where three seals were counted, resulting in a monthly density of 0.04 seals/km^2 (**Table 8-1**).

Table 8-1 Seal sightings count and estimated abundance and density (Rampion 2 array area + 4 km buffer)

Survey number	Date	Count	Abundance	Lower CI	Upper CI	Precision	Density
1	Apr-19	0	0	0	0	0.00	0.00
2	May-19	0	0	0	0	0.00	0.00
3	Jun-19	0	0	0	0	0.00	0.00
4	Jul-19	3	26	3	62	0.58	0.04
5	Aug-19	0	0	0	0	0.00	0.00
6	Sep-19	0	0	0	0	0.00	0.00
7	Oct-19	0	0	0	0	0.00	0.00
8	Nov-19	0	0	0	0	0.00	0.00
9	Dec-19	0	0	0	0	0.00	0.00
10	Jan-20	0	0	0	0	0.00	0.00
11	Feb-20	1	9	1	27	1.00	0.01
12	Mar-20	0	0	0	0	0.00	0.00
13	Apr-20	0	0	0	0	0.00	0.00
14	May-20	0	0	0	0	0.00	0.00
15	Jun-20	0	0	0	0	0.00	0.00
16	Jul-20	0	0	0	0	0.00	0.00
17	Aug-20	1	10	1	29	1.00	0.01
18	Sep-20	0	0	0	0	0.00	0.00

Survey number	Date	Count	Abundance	Lower CI	Upper CI	Precision	Density
19	Oct-20	0	0	0	0	0.00	0.00
20	Nov-20	0	0	0	0	0.00	0.00
21	Dec-20	0	0	0	0	0.00	0.00
22	Jan-21	0	0	0	0	0.00	0.00
23	Feb-21	0	0	0	0	0.00	0.00
24	Mar-21	0	0	0	0	0.00	0.00

Figure 8.1 Sightings of seals during the site-specific surveys at Rampion 2



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8.2 Rampion 1

8.2.1 Surveys conducted as part of the data collection for Rampion 1 concluded a total of two sightings of harbour seals in March and April 2011 as well as three sightings of unidentified seal species.

8.3 Haul-out counts

8.3.1 Rampion 2 is located within the South England MU; however it is located adjacent to the boarder of the South-east England MU, therefore discussions were had with Natural England regarding the most suitable reference population against which to assess impacts. Through consultation with the Expert Technical Group for marine mammals, Natural England have provided the following advice:

> *"Given Rampion 2's proximity to both the south and south-east draft seal management units, Natural England consider it would be pragmatic in this instance for the reference population for the seal assessments to be comprised of 50% of the south management unit population + 50% of the south-east management unit population. The project has the potential to impact both management unit populations".*

8.3.2 As such, information on both MUs are presented here for harbour seals.

South England MU

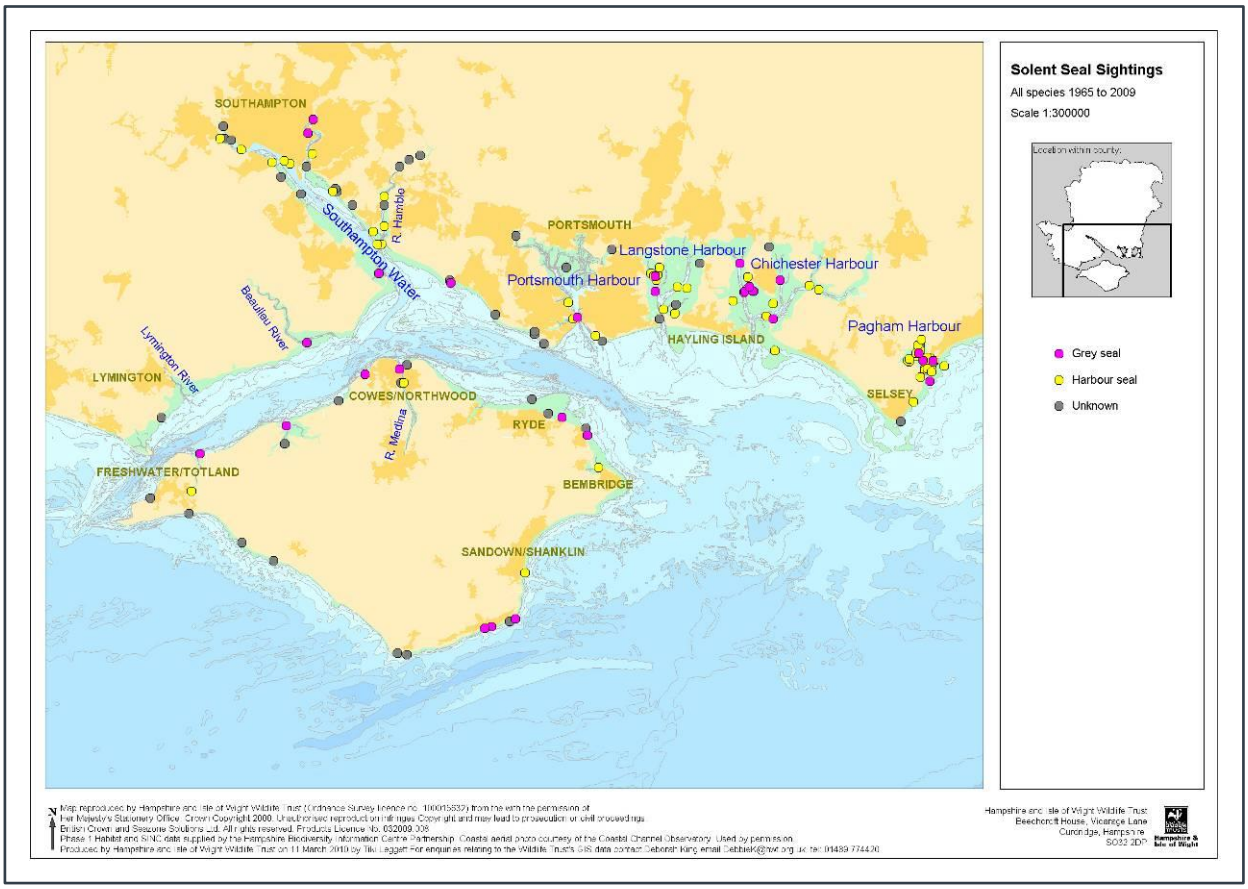
8.3.3 There are no harbour seal surveys conducted by SMRU in the South England MU and as a result, there are reduced data available for this area. SCOS (2020) (reporting on seal data up to and including 2019) reports that the estimate for the South England MU (n=40) was "*compiled from counts shared by other organisations (Langstone Harbour Board & Chichester Harbour Conservancy) or found in various reports & on websites (Boyle, 2012; Hilbrebirdobs.blogspot.co.uk, 2012, 2013; Sayer, 2010, 2011; Sayer et al., 2012; Westcott, 2002)*" (SCOS, 2020).

8.3.4 The Solent Seal Project August counts have increased over time from just three seals in 1994 to a minimum of 49 harbour seals in 2017[6]. Records from public sightings show that seals have been sighted throughout the Solent and the Isle of Wight (**Figure 8.2**).

8.3.5 Three years of photo-ID surveys at Chichester harbour between 2016-2018 have identified 68 individual harbour seals, 16 of which were re-sighted within the three year study (Castles et al., 2021). While only three years of photo-ID data are available to date, these preliminary results indicate site fidelity in Chichester harbour (Castles et al., 2021).

[6] https://www.hiwwt.org.uk/news/secret-lives-our-local-seals-revealed

Figure 8.2 From Chesworth et al. (2010): Locations of public sightings of seals from 1997 to 2009

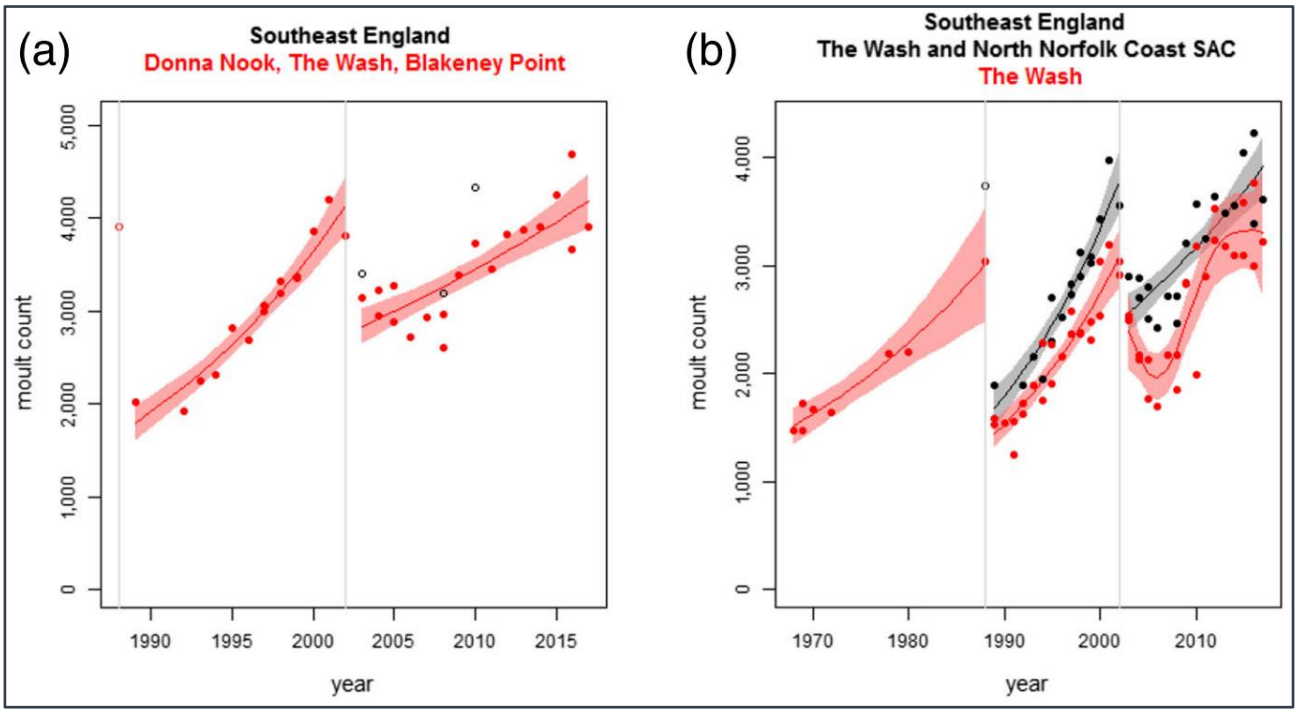


South-East England MU

8.3.6 The South-East England MU consists of 5 geographically categorised haul-out groups including: Donna Nook, The Wash, Blakeney Point, Scroby Sands and the Greater Thames Estuary. The population trend model selected for the Thompson et al. (2016) analysis for the combined counts of harbour seals in this area incorporated two periods of exponential increase in the abundance of harbour seals, one from 1989-2002 with a 6.6% p.a. (95% CI: 5.3, 7.9% p.a.), and one from 2003-2017 with a 2.8% p.a. (95% CI: 1.3, 4.3% p.a.). These two periods were differentiated by a step change decrease of approximately 30% which occurred between 2002 and 2003, coincident with the second PDV epidemic. From 2003-2017, there was evidence of a non-linear trend occurring with a constant abundance of harbour seals, followed by an increase and finishing with a levelling off of counts.

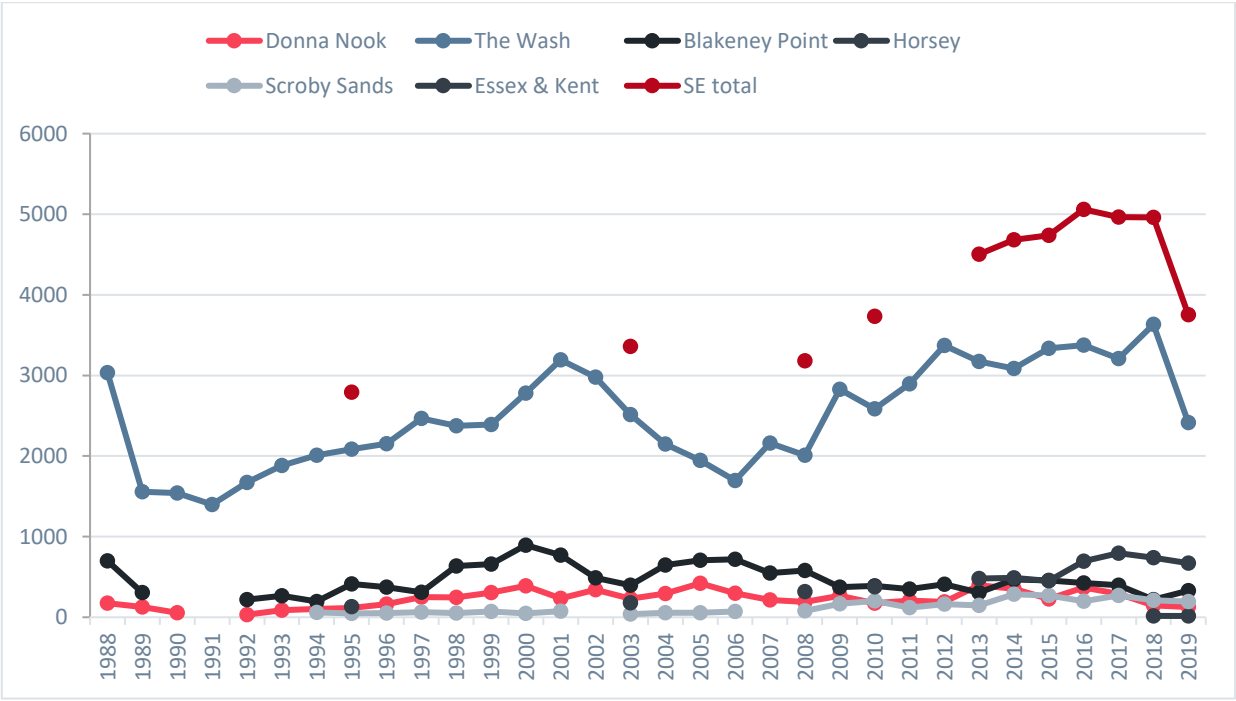
8.3.7 The most recent harbour seal haul-out count period for the South-east England MU (2016-2019, n=3,752) showed a significant decline in counts compared to the previous count period (2011-2015, n=4,740) . The combined counts for the Southeast England MU in 2019 was 27.6% lower than the 2012 to 2018 mean count (**Figure 8.4**), which may be the first indication of a population decline (SCOS, 2021).

Figure 8.3 From Thompson et al. (2019): Harbour seal survey counts and fitted trends (shown in black)



Counts not used in model fits are shown as open dots. Where a robust model could not be fitted to the overall MU, the counts and model fit for a subset of the region is shown in red. (a) Combined South-East England region (1988–2017); (b) The Wash and North Norfolk Special Area of Conservation (SAC; 1988–2017) and The Wash (1967–2017).

Figure 8.4 Harbour seal August haul-out counts in the South-east England MU between 1988 and 2019 (SCOS, 2021)



Combined South and South-east MUs

8.3.8 To estimate the South England MU size, the haul-out counts (n=40 in South England MU and n=3,752 in South-east England MU) can be scaled by the estimated proportion haul-ed out at the time of the survey (0.72, 95% CI: 0.54-0.88) to produce an MU population estimate. This results in an estimated MU size of 56 (95% CI: 45-75) harbour seals for the South England MU and an estimated 5,211 (95% CI: 4,264 – 6,948) harbour seals for the South-east England MU. Since Natural England advise that 50% of both MUs should be included in the reference population, this represents a total combined reference population of 2,633 harbour seals (95% CI: 2,155 – 3,511).

8.4 Telemetry

8.4.1 None of the harbour seals tagged with GPS tags at the Thames (n=10) or The Wash (n=37) have recorded any GPS locations within the South England MU (**Figure 8.5**). Therefore there is no evidence from this data set of connectivity between the Rampion 2 site and the Southeast England MU or The Wash SAC.

8.4.2 The tagging of five harbour seals in the Solent Sea in 2009 showed very limited movement. The seals stayed primarily in the Portsmouth, Langstone and Chichester harbours, and in the eastern Solent, from Southampton water to Selsey Bill (**Figure 8.6**). One of the seals left the eastern Solent and travelled as far as Brighton before returning to the Solent (**Figure 8.6**). Though this dataset is limited, there is no evidence of connectivity between the Solent Seals and Southeast England MU or The Wash SAC.

Figure 8.5 From Carter et al. (2020): GPS tracking data for harbour seals available for habitat preference models

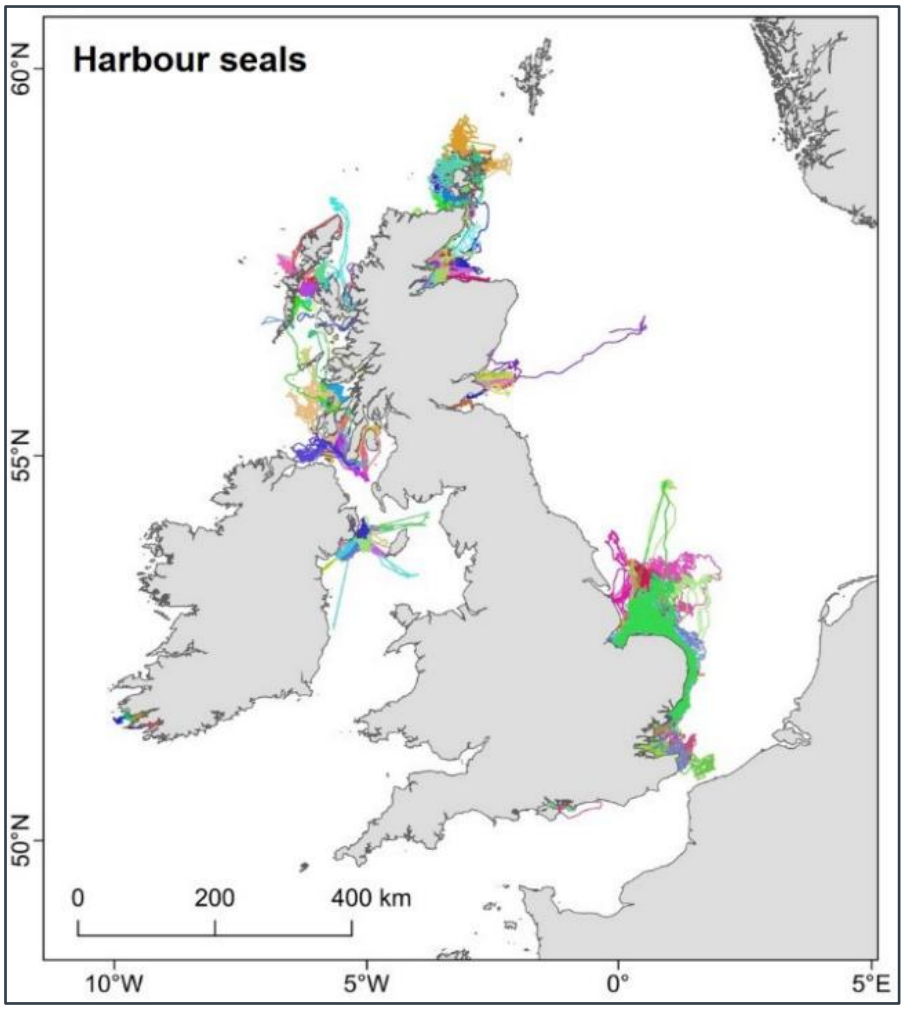
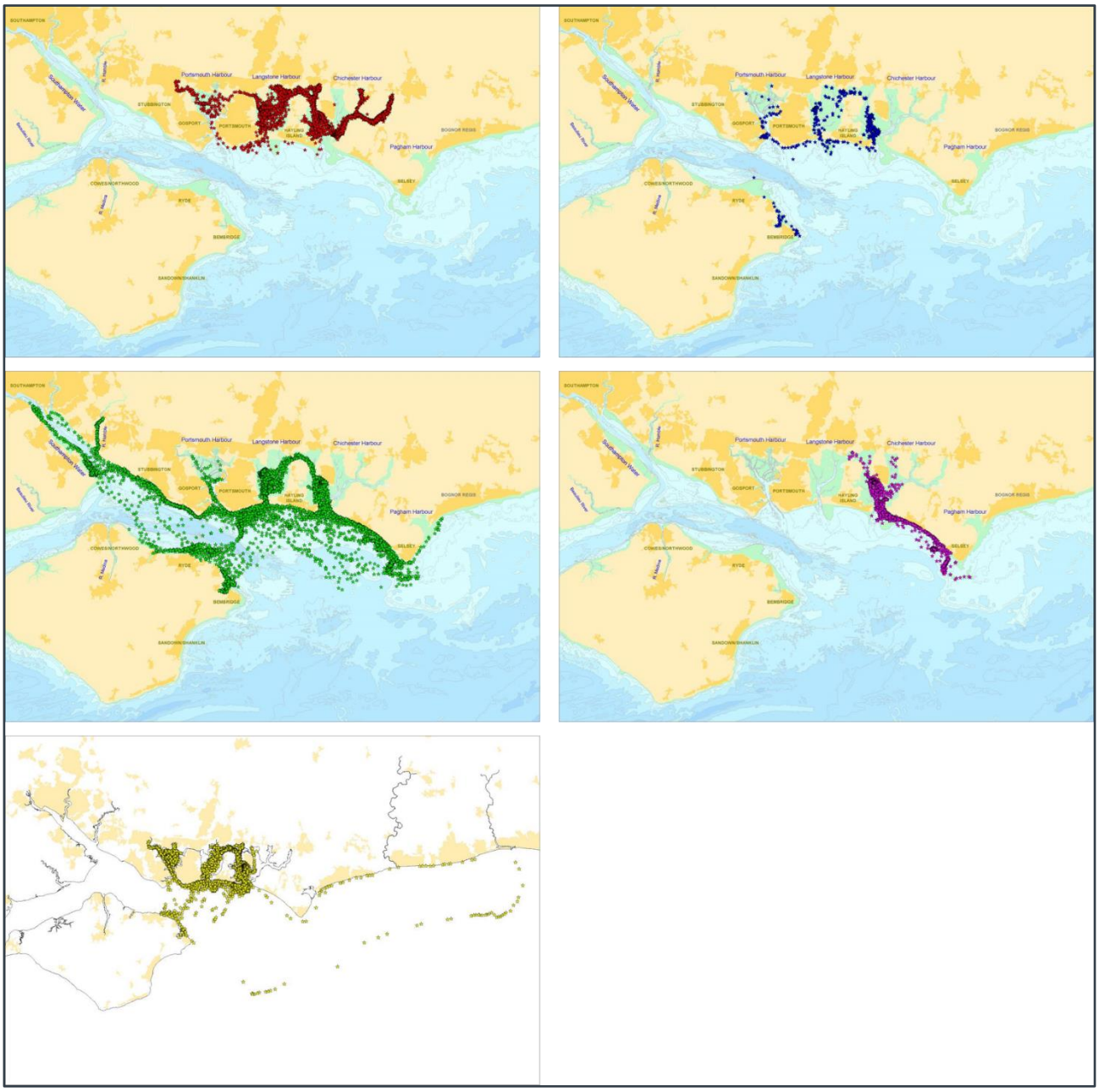


Figure 8.6 From Chesworth et al. (2010): GPS positions of the 5 harbour seals tagged as part of the Solent Seal Tagging Project in March 2009



8.5 At-sea density

8.5.1 Data availability for the at-sea usage of harbour seals in this area is relatively low. There were only three haul-out locations reported for harbour seals in the south England MU, with very little accompanying telemetry data for harbour seal movement patterns, with only 5 individuals tagged in this area. The at-sea usage maps estimated 12 harbour seal within a 25 km buffer of the Rampion 2 windfarm array area, which equates to an average of 0.003 seals/km^2 (**Figure 8.7**). The habitat preference maps provided by Carter et al. (2020) predicted there to be 27 harbour seals within a 25 km buffer of the site, which equates to an average density of 0.007 seals/km^2 (**Figure 8.8**).

8.5.2 While the at-sea density estimate is very low for harbour seals within the survey area, this may not necessarily be representative of a true lack of usage, since none of the data from harbour seals tagged in France or the Wadden Sea were included in the habitat preference analysis to inform the usage in this area.

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Figure 8.7 Harbour seal at-sea usage estimates (Russell et al 2017)

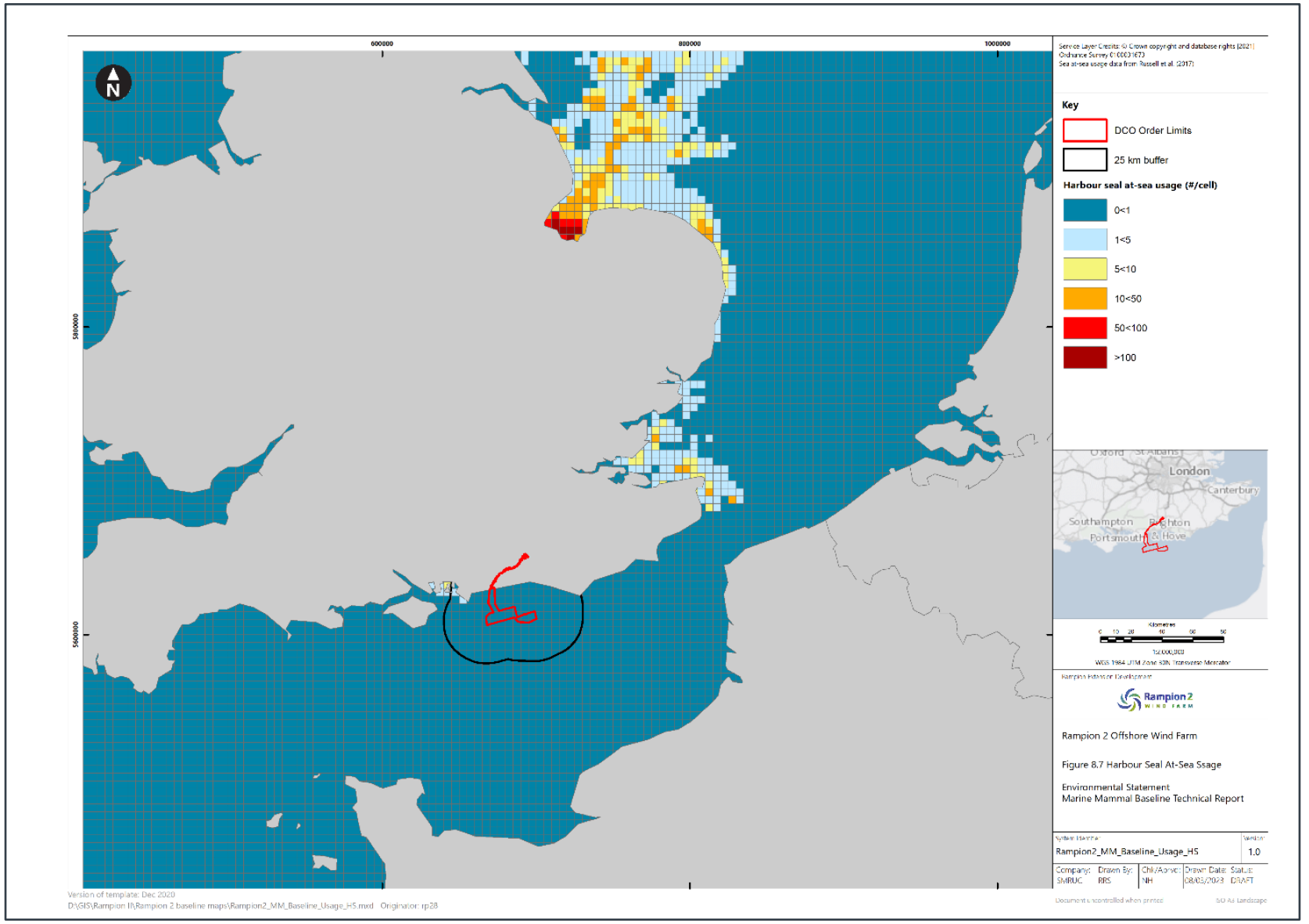
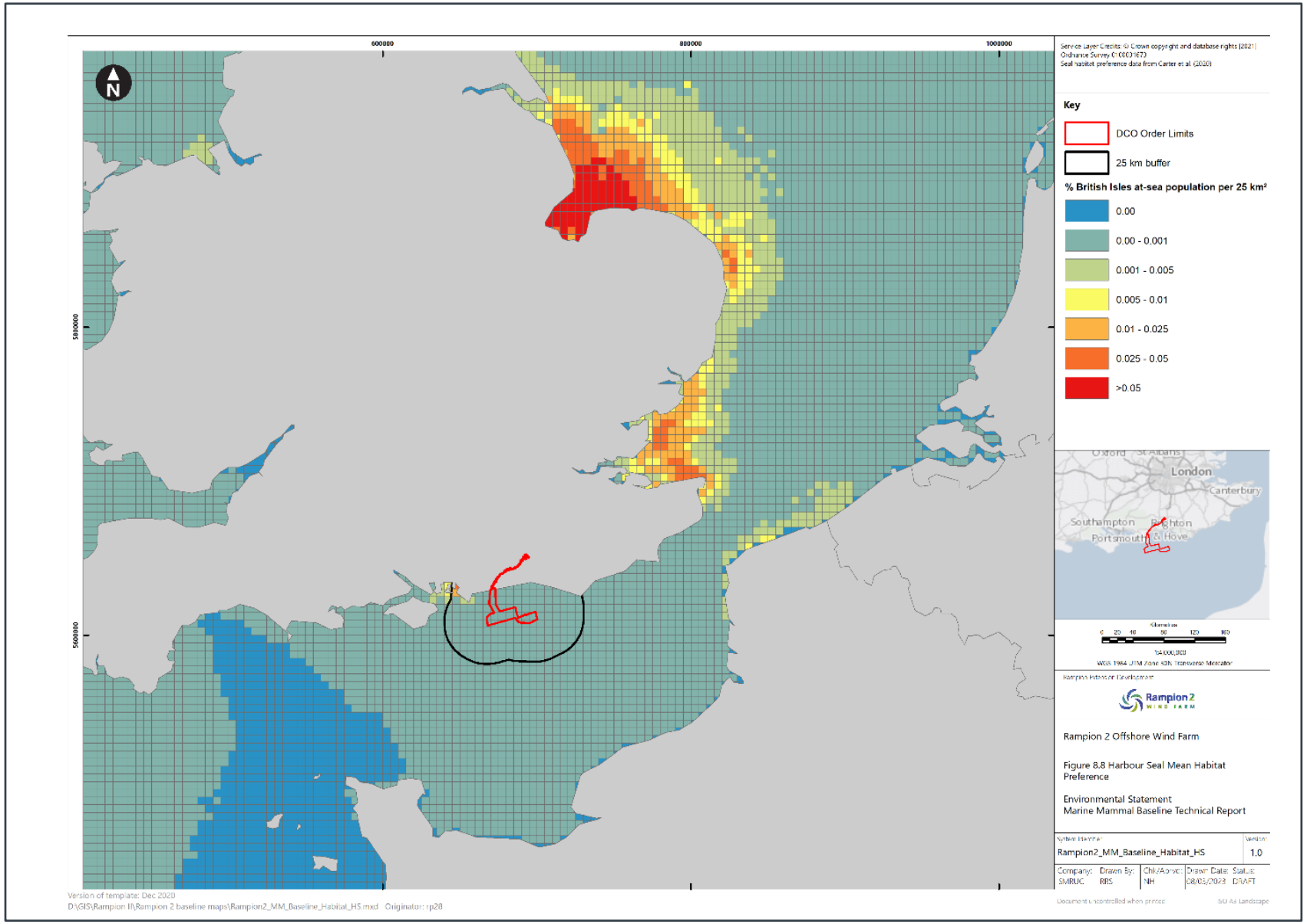


Figure 8.8 Harbour seal habitat preference map (Carter et al. 2020)



8.6 French seal data

8.6.1 In a study conducted by Vincent et al. (2017) on the abundance of harbour and grey seals along the French coast of the English Channel, it was found that harbour seals remain very much coastal for the majority of time and in close proximity to their respective haul-out sites (**Figure 8.9** and **Figure 8.10**). The findings of this study showed no connectivity between harbour seals tagged at French haul-out sites and the Rampion 2 area (**Figure 8.10**).

Figure 8.9 From Vincent et al. (2017): Density of harbour seal locations (per grid cell) obtained by telemetry from 2006 to 2010, from individuals captured in BSM, BDV and BDS

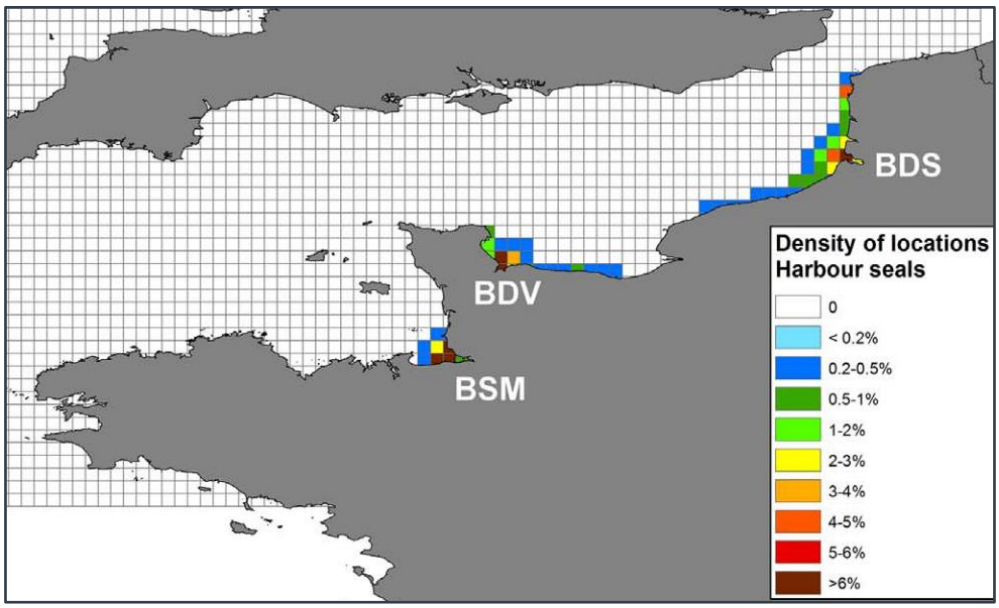
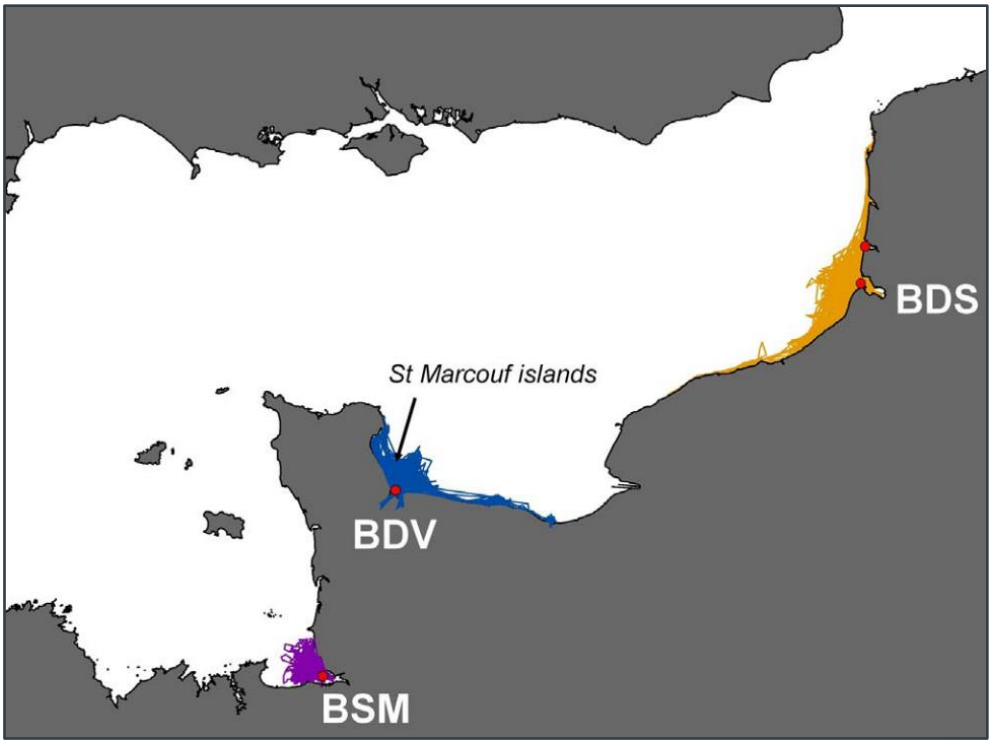


Figure 8.10 From Vincent et al. (2017): Harbour seal telemetry tracks



BSM = 6 individuals tracked in 2006 and 2007, in purple. BDV = 12 individuals tracked in 2007 and 2008, in blue. BDS = 10 individuals tracked in 2010, in orange. Red dots indicate haul-out locations of the seals. Seals tracked for less than a month are not shown here.

9. Grey seal baseline

9.1 Rampion 2

9.1.1 During surveys conducted for Rampion 2, seals were reported, however, most sightings did not include a species identification. There was a peak count of seals in July, where three seals were counted, resulting in a monthly density of 0.04 seals/km^2 (**Table 8-1**).

9.1.2 There were only two sightings of seals that could be identified as grey seals. These occurred in January and March 2021 and resulted in a density estimate for those two months of 0.01 grey seals/km^2.

9.2 Rampion 1

9.2.1 Surveys conducted as part of the data collection for Rampion 1 recorded a total of one sighting for grey seals in March 2011, as well as three sightings of unidentified seal species.

9.3 Haul-out counts

9.3.1 Rampion 2 is located within the South England MU but is adjacent to the boarder of the South-east England MU. Given knowledge of the wide-ranging behaviour of grey seals (they frequently travel over 100 km between haul-out sites) (SCOS, 2020), and the degree of connectivity between the English Channel and South-east of England (see telemetry data in **Section 9.6**), the South England MU alone is not an appropriate reference population against which to assess impacts. Therefore the recommended reference population is a combination of both the South and the South-east England MUs.

South England MU

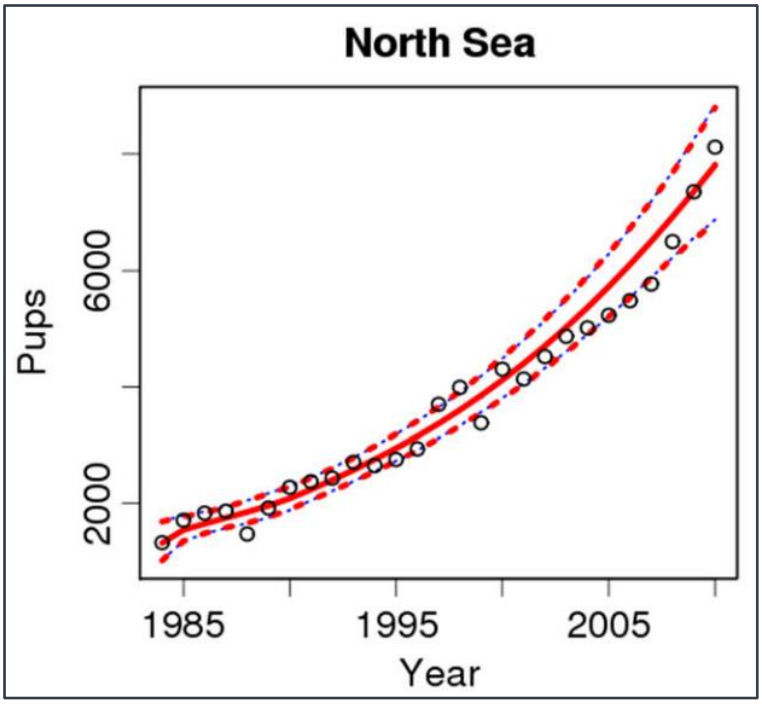
9.3.2 There are no grey seal surveys conducted by SMRU in the South England MU and as a result, there are reduced data available for this area. SCOS (2020) (reporting on seal data up to and including 2019) reports that the estimate for the South England MU (n=25) was "*compiled from counts shared by other organisations (Langstone Harbour Board & Chichester Harbour Conservancy, Natural England, Natural Resources wales, RSPB) or found in various reports & on websites (Boyle, 2012; Büche & Stubbings, 2019; Hilbrebirdobs blogspot 2013; Leeney et al., 2010; Sayer, 2010, 2011, 2012a, 2012b; Sayer et al., 2012; Westcott, 2002, 2009; Westcott & Stringell, 2004; Woodfin Jones, 2017)*".

9.3.3 In the Solent, the first hauled-out grey seal was recorded at Chichester harbour in July 2008. Since then there has been a significant increase in grey seal counts to a mean count of 12 individuals in 2019 (Castles et al., 2021).

South-east England MU

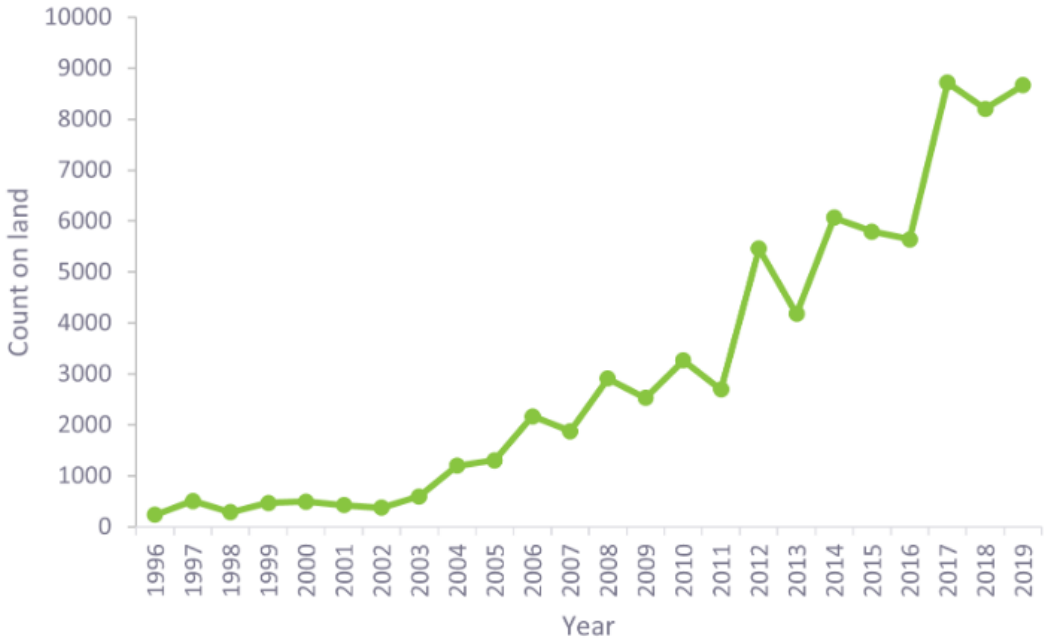
9.3.4 Grey seal pup production estimates in the North Sea have indicated that the North Sea population has increased almost constantly since pup count records began in 1984 (Thomas et al., 2019) (**Figure 9.1**). This is also reflected in the annual haul-out count (when grey seals are counted during the August harbour seal surveys) (**Figure 9.2**). The latest grey seal haul-out count in 2019 for the South-east England MU was 8,667 grey seals (data provided by Chris Morris at SMRU).

Figure 9.1 From Thomas et al. (2019): Posterior mean estimates of regional pup production (solid lines) from the state–space model, with 95% credible intervals (dashed lines)



Thick red lines show the results from a model fitted to pup production plus the total population estimate from 2008; thinner blue lines show the fit to pup production alone. The two sets of lines are nearly identical, so the blue lines are partly hidden. Circles show pup production data.

Figure 9.2 Grey seal August haul-out counts in the South-east England MU between 1996 and 2019. Data provided by Chris Morris at SMRU



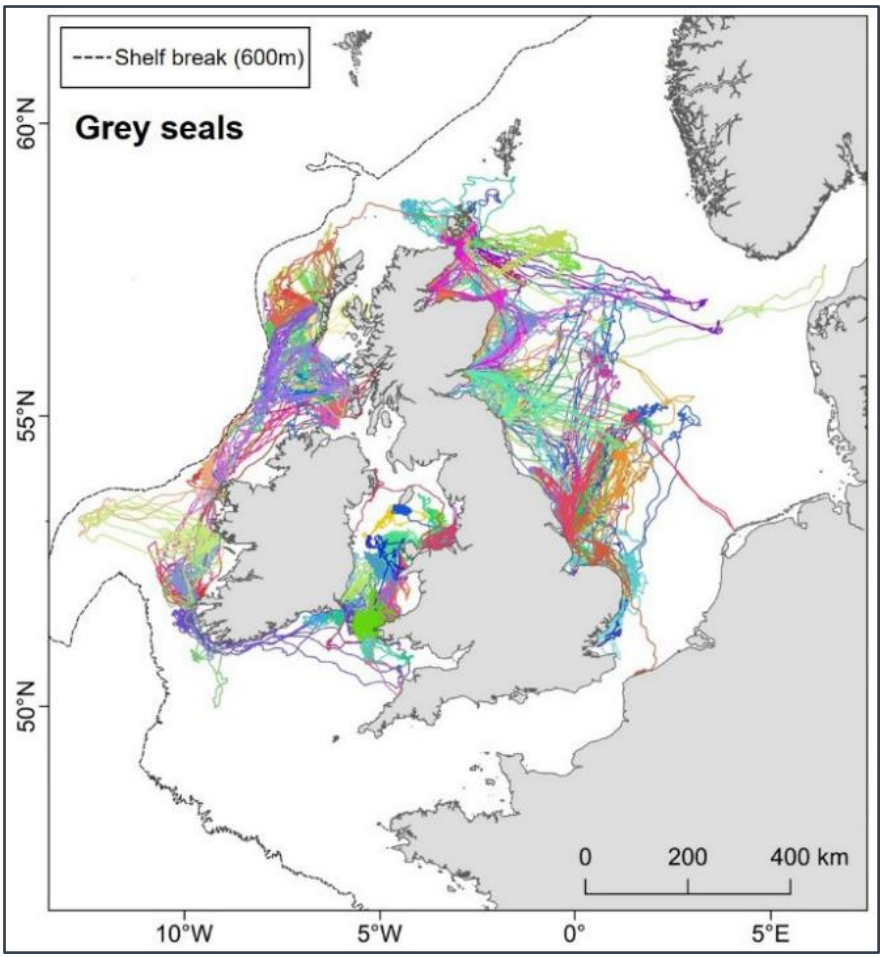
Combined South and South-east England MUs

9.3.5 To estimate the relevant MU size, the haul-out counts (n=25 in South England MU and n=8,667 in South-east England MU) can be scaled by the estimated proportion of time hauled-out (23.9%, 95% CI: 19.2-28.6%) (Russell et al., 2016) to produce an MU population estimate. This results in an estimated MU size of 105 (95% CI: 87-130) grey seals for the South England MU and an estimated 36,264 (95% CI: 30,304 – 45,141) grey seals for the South-east England MU. This represents a total combined reference population of 36,368 grey seals (95% CI: 30,392 – 45,271).

9.4 SMRU Telemetry

9.4.1 No grey seals have been tagged in the South England MU. None of the grey seals tagged with GPS tags at Donna Nook/ Blakeney Point in 2015 (n=24) recorded GPS locations within the South England MU (**Figure 9.3**). Therefore, there is no evidence from this telemetry dataset of any connectivity between the Rampion 2 site and the Humber Estuary SAC.

Figure 9.3 From Carter et al. (2020): GPS tracking data for grey seals available for habitat preference models



9.5 At-sea density

9.5.1 The at-sea usage maps estimated <1 grey seal within a 25 km buffer of the Rampion 2 windfarm array area, which equates to an average of 0.00005 seals/km^2 (**Figure 9.4**). The habitat preference maps presented in Carter et al. (2020) predicted there to be 8 grey seals within a 25 km buffer of the site, which equates to an average density of 0.002 seals/km^2 (**Figure 9.5**).

9.5.2 While the at-sea density estimate is very low for grey seals within the survey area, this may not necessarily be representative of a true lack of usage, since there were no telemetry or haul-out data from the South England MU included in the analysis to inform the usage in this area. In addition, none of the data from grey seals tagged in France or the Wadden Sea were included in the habitat preference analysis to inform the usage in this area.

Figure 9.4 Grey seal at-sea usage estimates (Russell et al 2017)

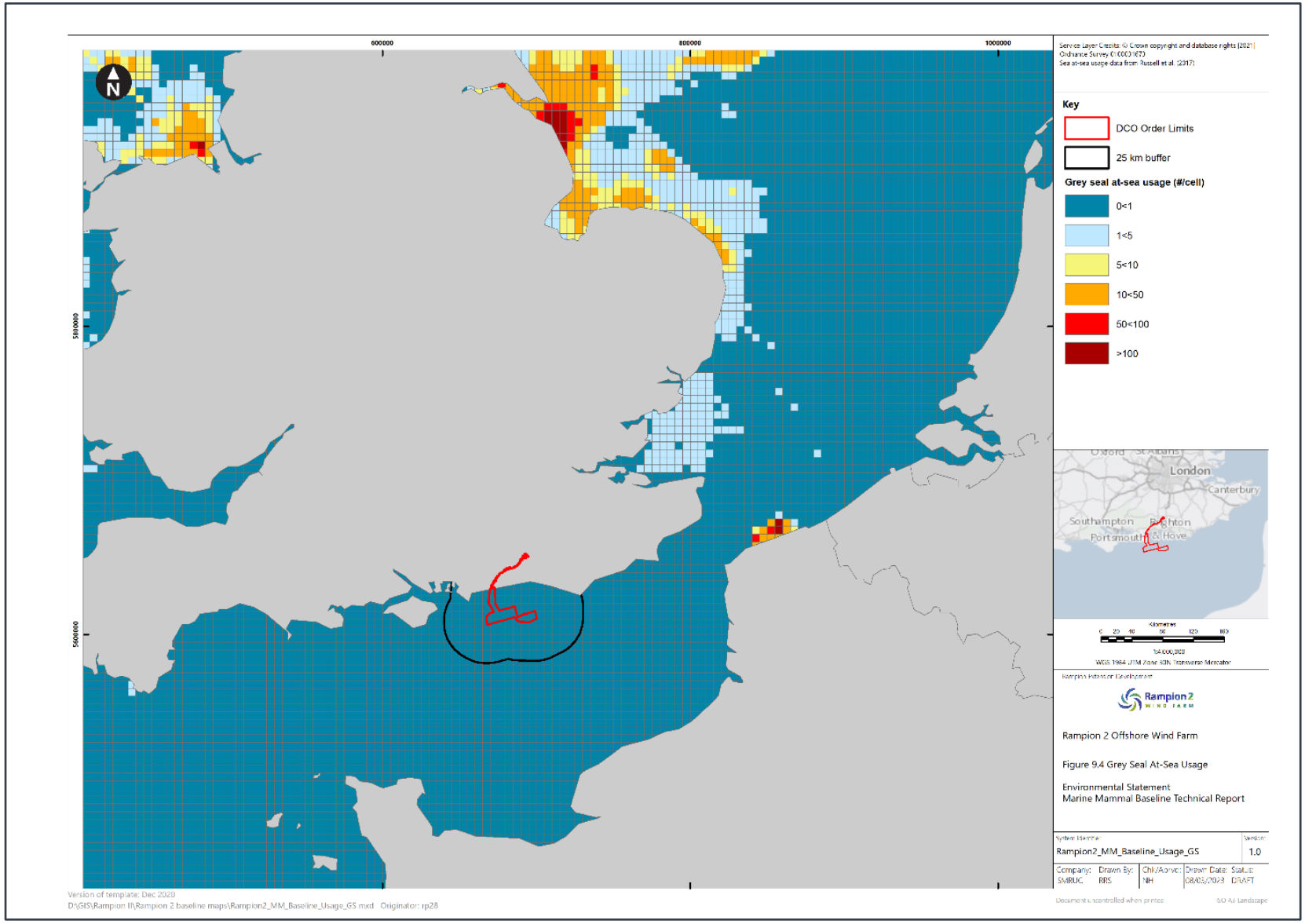
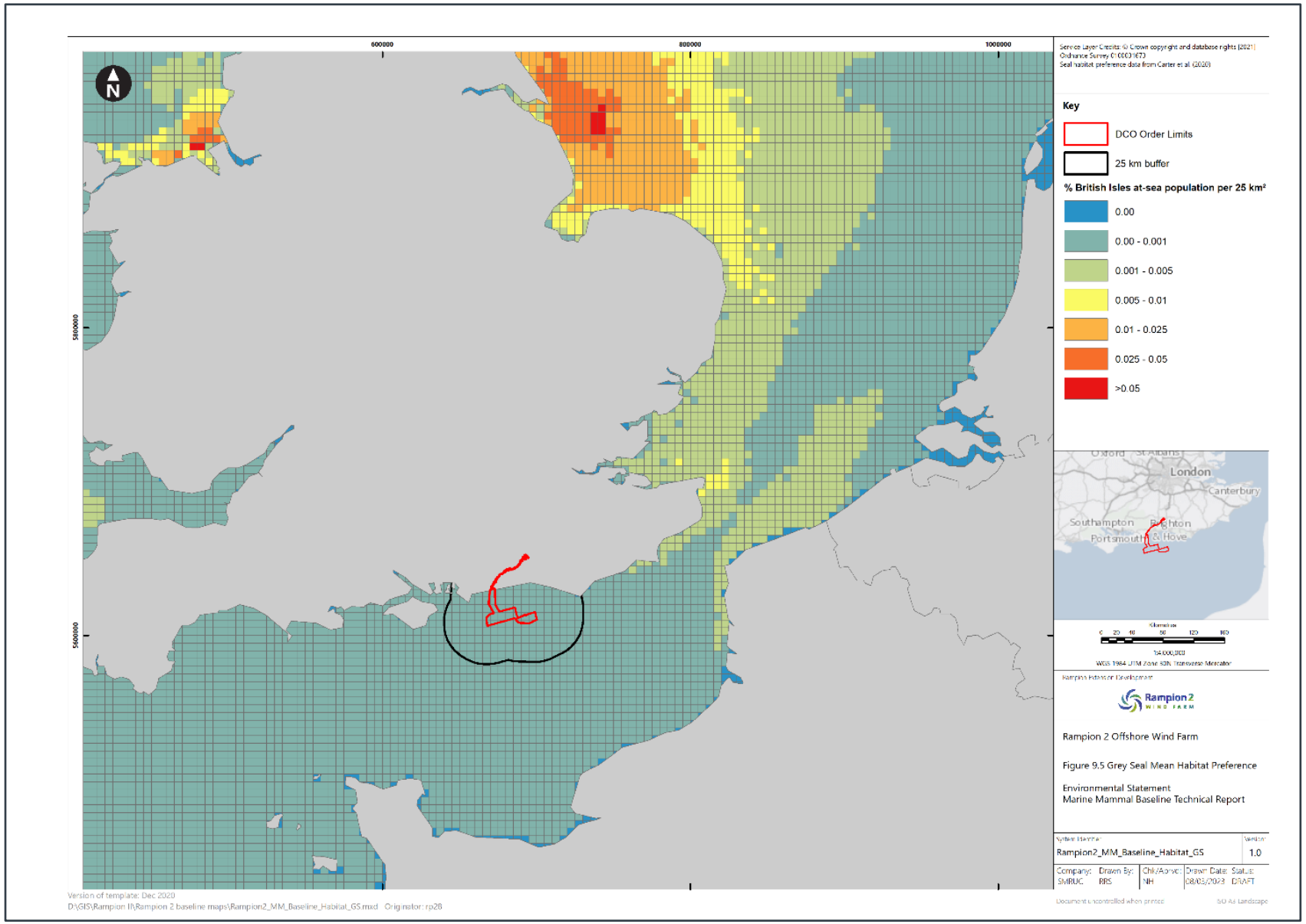


Figure 9.5 Grey seal habitat preference map (Carter et al. 2020)



9.6 French seal data

9.6.1 Data collected and reported on by Vincent et al. (2017) on the abundance of harbour and grey seals along the French coast of the English Channel reported clear evidence that grey seals exhibit wide-ranging movement behaviours. Grey seals tagged in France recorded telemetry data throughout the English Channel, the Wadden Sea and in the vicinity of the Rampion 2 survey area (**Figure 9.6** and **Figure 9.7**). Therefore, grey seals will need to be considered in the transboundary assessment of the EIA for Rampion 2 due to potential impacts that may occur to this species.

9.6.2 The fact that the data presented in Vincent et al. (2017) show connectivity between French waters, the Wadden Sea and the English Channel highlights a limitation of the current seal habitat preference maps. The current version of the habitat preference maps includes only grey seals tagged in the UK, and therefore does not account for the presence of grey seals from France or the Wadden Sea. Therefore it is highly likely that the seal habitat preference maps underestimate the true density of grey seals present in the English Channel and in the vicinity of Rampion 2 since these seals from these other populations are not included.

Figure 9.6 From Vincent et al. (2017): Density of grey seal locations (per grid cell) obtained by telemetry from 1999 to 2013, from individuals captured in MOL and BDS

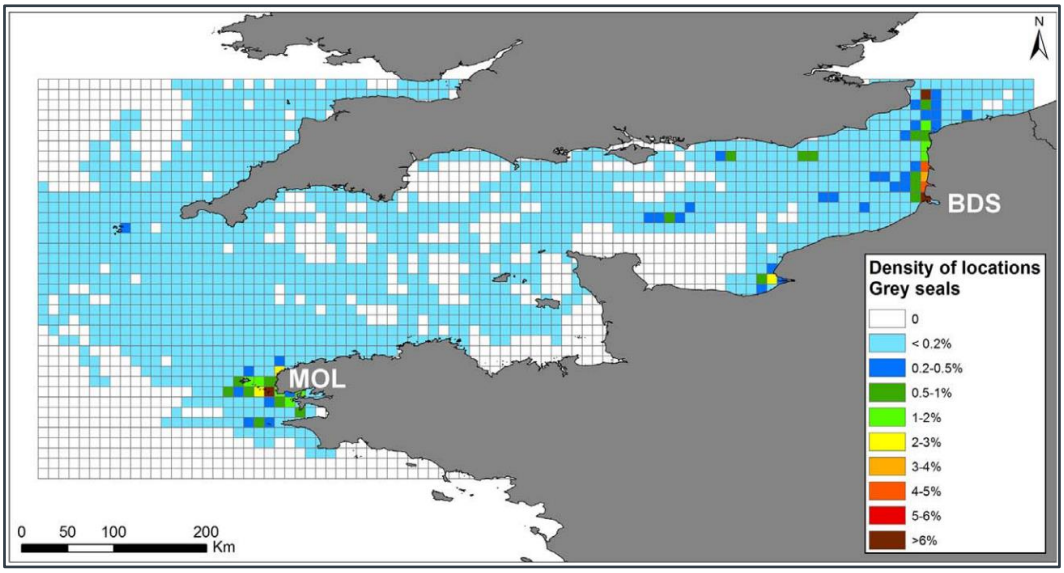
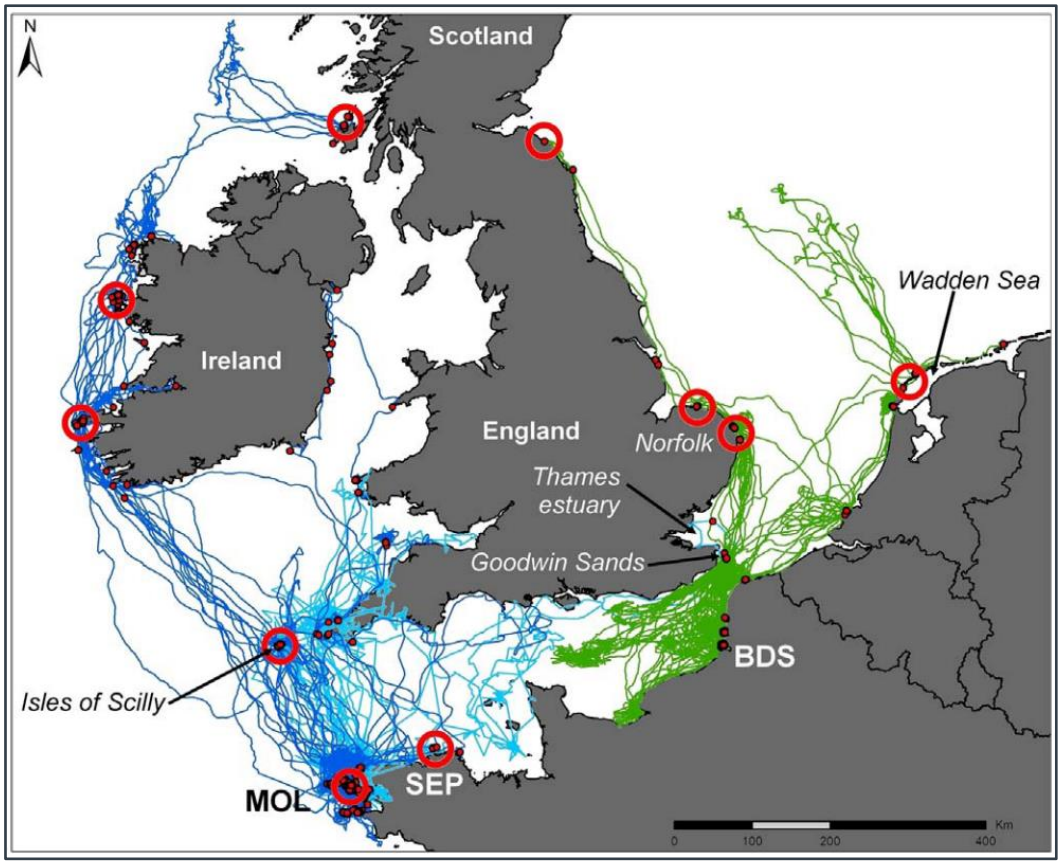


Figure 9.7 From Vincent et al. (2017): Grey seal telemetry tracks



MOL = 15 individuals tracked by Argos tags from 1999 to 2003, in light blue, and 19 individuals tracked by GPS/GSM tags from 2010 to 2013, in dark blue. BDS = 11 individuals tracked in 2012, in green. Red dots indicate haul-out locations of the seals. Thick, red circles indicate breeding locations, as suggested from the activity budget of the seals.

10. Conclusions

10.1.1 From the data outlined above it is concluded that Rampion 2 is not an important site for any marine mammal species and predicted densities of all species are relatively low. The main species present during the Rampion 2 site-specific surveys were the harbour porpoise with some sightings of common dolphins and seal species. Bottlenose dolphins and minke whales have also been sighted during local and opportunistic surveys and so it is recommended that they are also scoped into the quantitative impact assessment for Rampion 2. Given the lack of white-beaked dolphins sightings during the Rampion 2 surveys, SCANS III, JCP or ORCA surveys, it is recommended that this species is scoped out. The recommended MU and density estimate for each species to be used in the quantitative impact assessment for Rampion 2 are presented in **Table 10-1**.

Table 10-1 Marine mammal reference population and density estimates recommended for use in the Rampion 2 impact assessment

Species	Density (#/km^2)	Source	Reference Population	Reference Population size	Source
Harbour porpoise	0.213	SCANS III (Hammond et al., 2021)	North Sea MU	346,601	IAMMWG (2021)
Bottlenose dolphin	0.037	SAMMS surveys (Laran et al., 2017)	Offshore Channel and SW England	10,947	IAMMWG (2021)
White-beaked dolphin	Scoped out				
Common dolphin	0.171	SAMMS surveys (Laran et al., 2017)	Celtic and Greater North Seas	102,656	IAMMWG (2021)
Minke whale	0.0023	SCANS III (Hammond et al., 2021)	Celtic and Greater North Seas	20,118	IAMMWG (2021)
Harbour seal	Grid cell specific	Habitat preference (Carter et al., 2020)	50% South & South-east England MUs combined	2,633	2019 counts provided by SMRU

Species	Density (#/km^2)	Source	Reference Population	Reference Population size	Source
Grey seal	Grid cell specific	Habitat preference (Carter et al., 2020)	South and South-east England MUs combined	36,368	2019 counts provided by SMRU

11. Glossary of terms and abbreviations

Table 11-1 Glossary of terms and abbreviations

Term (acronym)	Definition
ECC	Export Cable Corridor
EP	Evidence Plan
EP Technical Panel	Marine Mammal Evidence Plan Technical Panel
FCS	Favourable Conservation Status
JCP	Joint Cetacean Protocol
JNCC	Joint Nature Conservation Committee
MERP	Marine Ecosystems Research Programme
MMO	Marine Management Organisation
MU	Management Unit
NERC	Natural Environment Research Council
SACs	Special Areas of Conservation
SCOS	Special Committee on Seals
SMRU	Sea Mammal Research Unit
TWT	The Wildlife Trusts

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JNCC 2019b. European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S1350 - Common dolphin (*Delphinus delphis*) UNITED KINGDOM.
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JNCC 2019f. European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S2032 - White-beaked dolphin (*Lagenorhynchus albirostris*) UNITED KINGDOM.
JNCC 2019g. European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S2618 - Minke whale (*Balaenoptera acutorostrata*) UNITED KINGDOM.
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