Rampion 2 Wind Farm

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Category 8: Examination Documents Applicant's Response to Action Points Arising from Issue Specific Hearing 1: Marine Mammals Clarification note
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1. Introduction

1.1 Purpose of this Document

1.1.1 The marine mammal baseline (**Appendix 11.1 Marine mammal baseline technical report [APP-147]**) was drafted in 2021. Due to a change in the bottlenose dolphin Management Units (MUs) since then, the Applicant recognises that this document became outdated at the time of Application in 2023. At the time of writing the baseline, Rampion 2 was located within the Offshore Channel and SW England Management Unit. The boundary of the Coastal West Channel (CWC) Management Unit was revised by the Inter-Agency Marine Mammal Working Group (IAMMWG) in 2023 (after the baseline was finalised). Rampion 2 is now located partly within both the new boundary of the Coastal West Channel Management Unit and the Offshore Channel and SW England Management Unit.

1.1.2 In response to Natural England's Relevant Representations (**Table 1.1**), this Clarification Note provides an updated baseline characterisation for bottlenose dolphins, and an updated quantitative impact assessment for piling to reflect the revised MUs and updated density estimates.

Table 1.1 Natural England's Relevant Representations relating to bottlenose dolphins

Ref	Natural England's Comments	Recommendations
C4	Data from the recent literature on bottlenose dolphin is required.	We advise the bottlenose dolphin baseline is characterised based on the recent literature.
C28	Updated Management Unit boundaries were reviewed and published in March 2023. The relevant change to this project is the eastward extension of the Coastal West Channel (CWC) MU boundary for bottlenose dolphin. The Rampion 2 project now overlaps this MU. The Applicant must undertake their assessment relative to this updated MU.	The Applicant should update assessment of bottlenose dolphin so that it reflects that updated CWC MU that now overlaps with the Rampion 2 area.
C29	The density estimates presented in Table 4-3 do not reflect the latest picture of bottlenose dolphin abundance in this region, which has increased recently due to the expansion of a semi- resident inshore population (Corr, 2020; IAMMWG, 2023). The Applicant should	The Applicant should review sources of bottlenose dolphin density that could reflect the recent changes in distribution.

Ref	Natural England's Comments	Recommendations
	update the population estimates accordingly. One approach to calculating density, which we suggest the Applicant presents, is to assume uniform density of bottlenose dolphin in the extended CWC MU.	The Applicant should present bottlenose dolphin density in the CWC MU assuming uniform distribution.

2. Bottlenose dolphin baseline

2.1 Management Unit

2.1.1 In 2023 the Inter Agency Marine Mammal Working Group (IAMMWG) updated the bottlenose dolphin MUs in UK waters. Previously, Rampion 2 had been located in the Offshore Channel and South West England (OCSW) MU (IAMMWG, 2022). The boundary for the Coastal West Channel (CWC) MU changed in 2023 so that it now extends further to both the east and west along the south coast of England (IAMMWG, 2023). The Rampion 2 offshore Export Cable Corridor (ECC) and most of the array area is now located in the CWC MU, while part of the array is also located within the OCSW MU. Therefore, impacts to both MUs are considered in this updated assessment.

2.1.2 There are an estimated 40 bottlenose dolphins in the CWC MU (IAMMWG, 2023, Corr, 2020). The area of the MU is 18,685.3 km^2, resulting in a uniform density estimate across the MU of 0.002 dolphins/km^2.

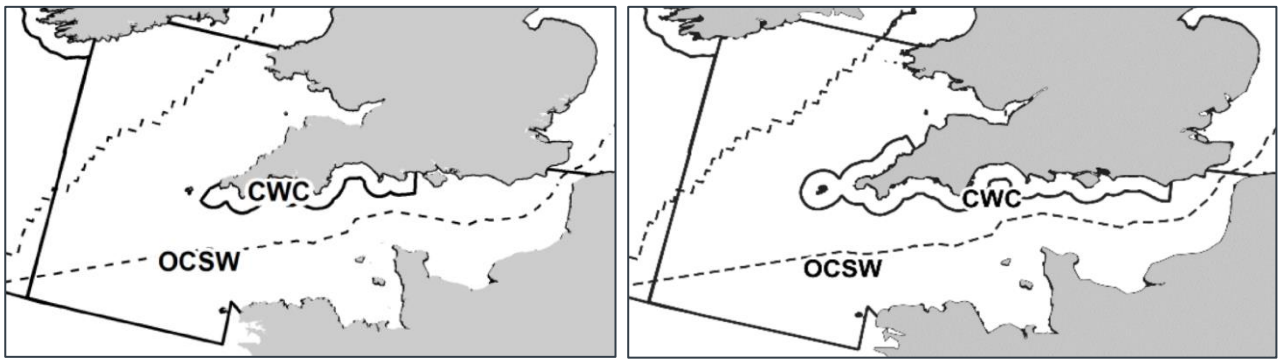
2.1.3 There are an estimated 10,653 bottlenose dolphins in the OCSW MU. The area of the MU is 195,810.9 km^2, resulting in a uniform density estimate across the MU of 0.054 dolphins/km^2 (**Table 2-1**).

Table 2-1 Management unit abundance estimates for bottlenose dolphins in the Rampion 2 area

MU	Area (km^2)	Abundance	Uniform density (#/km^2)	Source
Coastal West Channel (CWC)	18,685.3	40 95% CI: 30 – 59	0.002	IAMMWG, 2023[1]
Offshore Channel and Southwest England (OCSW)	195,810.9	10,653 95% CI: 6,533 – 17,372	0.054	IAMMWG, 2023

[1] CWC MU abundance estimate obtained from: Corr, S. 2020. Using citizen science data to assess the vulnerability of bottlenose dolphins (*Tursiops truncatus*) along England's south coast. Master's Thesis. University of Plymouth.

Figure 2-1 Boundary of the CWC MU in IAMMWG 2022 (left) and IAMMWG 2023 (right)



2.2 Conservation Status

2.2.1 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. Bottlenose dolphins in the UK were assessed as having an Unknown Conservation Status, with an Unknown overall trend (**Table 2-2**).

Table 2-2 Conservation status of bottlenose dolphins in UK waters.

Species	Range	Population	Habitat	Future prospects	Conservation Status	Overall trend	Reference
Bottlenose dolphin	FV	XX	XX	XX	XX	XX	JNCC (2019)

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

2.3 Data sources

2.3.1 **Table 2-3** summarises the data sources used to characterise the bottlenose dolphin baseline. Detail on the old data sources is presented in the marine mammal baseline (**Appendix 11.1 Marine mammal baseline technical report [APP-147]**) and are not repeated here. Detail on the new data sources is provided below.

Table 2-3 Data sources used to characterise the bottlenose dolphin baseline. Rows in bold and italics represent new data sources.

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
Bottlenose dolphins along England's South Coast (Corr et al., 2023)	***2000 - 2020***	***Citizen science sighting network***	***South coast of England***
SCANS IV (Gilles et al., 2023)	***July 2022***	***Abundance estimates for small cetacean populations***	***UK wide***
SCANS III density surface (Lacey et al., 2022)	***July 2016***	***Density surface generated from the SCANS III sightings***	***UK wide***
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
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 sightings (Castles, 2020)	2007 - 2019	Sightings distribution maps	Waters around the Isle of Wight

Data Source	Date	Summary	Coverage
ORCA sightings	2011-2020	Sightings and effort data from opportunistic ferry surveys.	Ferry route between Portsmouth and Caen
SAMM surveys (Laran et al., 2017)	Nov 2011 – Aug 2012	Large scale aerial surveys	English Chanel and the Bay of Biscay
Sussex Biodiversity Record Centre	1848-2020	Opportunistic sightings	Sussex

New data sources

Bottlenose dolphins along England's South Coast

2.3.2 Corr et al. (2023) presents information on bottlenose dolphin presence along England's South Coast. During the period from 2000 to 2020, 7,458 sightings of bottlenose dolphins were reported by the South West Bottlenose Dolphin Consortium, a citizen science network. Individual dolphins were identified using photographic identification techniques. To reduce any potential bias, application of photo-ID techniques was limited to only include individual animals with permanent markings. Estimates of abundance, distribution, ranging behaviour, and survival were generated based on re-sightings of the previously identified individuals. Additionally, an analysis of social structure was conducted in which animals were considered associated if they had been seen in the same encounter. An association index was then used to calculate the strength of association between pairs and resulting association networks were produced. Finally, cumulative utilization and impact distribution scores were calculated to assess the risk various anthropogenic activities pose to the dolphin population along England's south coast.

SCANS IV

2.3.3 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, SCANS III in July 2016 and SCANS IV in late June to mid-August 2022 and all comprised 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, Hammond et al., 2021, Gilles et al., 2023).

2.3.4 Rampion 2 is located in SCANS IV block NS-A in the North Sea. The survey block has a total surface area of 38,782 km^2, of which, 1,743.1 km was surveyed under primary search effort (Gilles et al., 2023).

SCANS III density surface

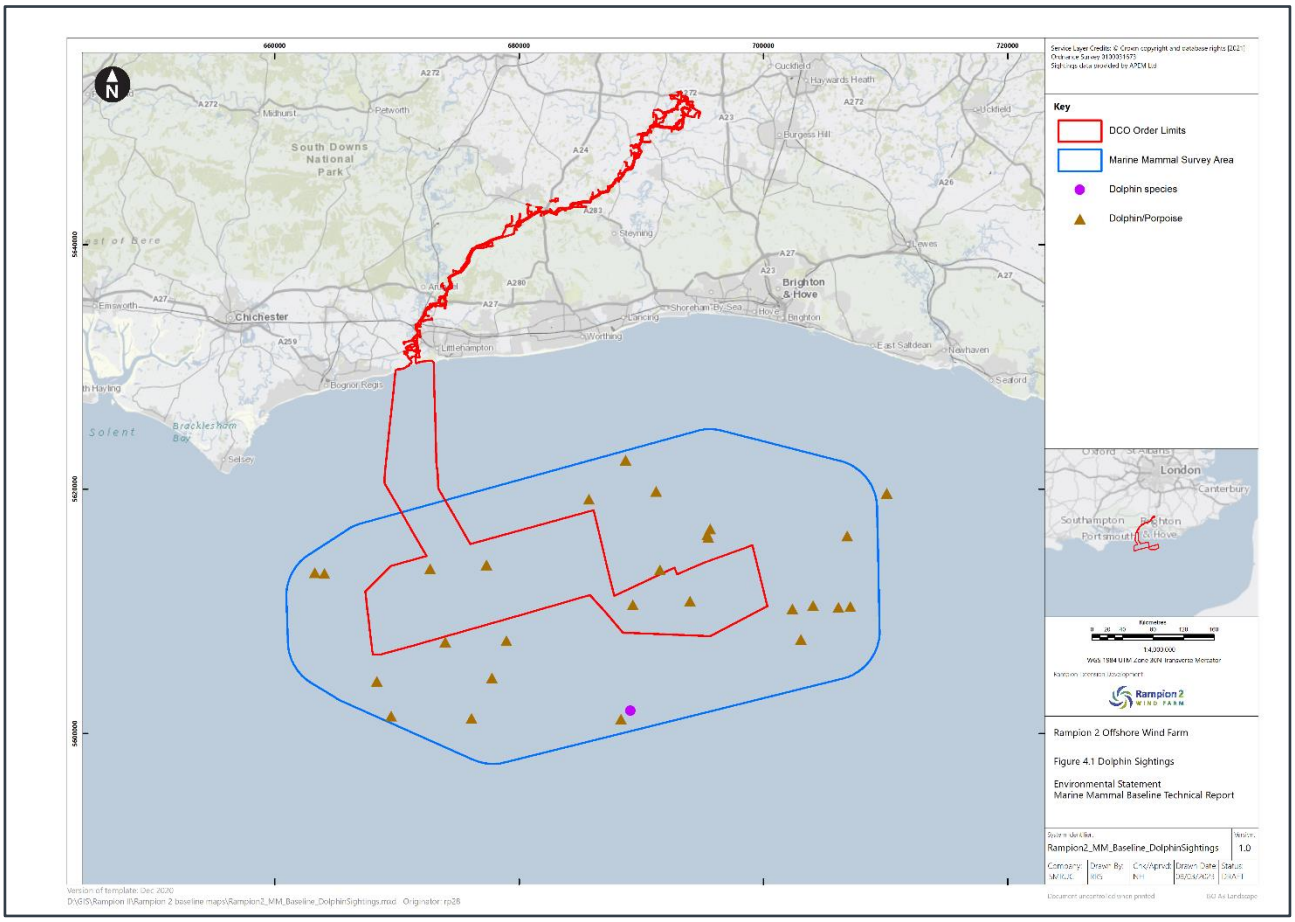
2.3.5 As part of SCANS III, the survey data were modelled in relation to spatially linked environmental features to produce density surface maps for the following cetacean species: harbour porpoise, bottlenose dolphin, white-beaked dolphin, common dolphin, striped dolphin, long-finned pilot whale, beaked whale species, minke whale and fin whale (Lacey et al., 2022). The cetacean data used in the models were the same as those obtained in 2016 that were used to provide block specific abundance estimates in Hammond et al. (2021). The environmental covariates used in the density surface modelling were selected due to their potential to explain the additional variability in the cetacean density estimates (for example, depth of the seabed, sea surface temperature (see Lacey et al. (2022) for the full list of environmental covariates). The models were fitted using a spatial resolution of 10 km and predicted onto a 10 x 10 km spatial grid. Using the predicted density estimates from the surface models, density and abundance estimates can be generated for an entire survey area or a defined area within it, such as the Project site.

2.4 Bottlenose dolphin baseline

Rampion 2 site specific surveys

2.4.1 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 2-2**). 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.

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



Rampion 1 site specific surveys

2.4.2 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 2-4**). 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 2-4 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 in brackets denote sightings count during the second survey conducted that month.

Bottlenose dolphins along England's South Coast

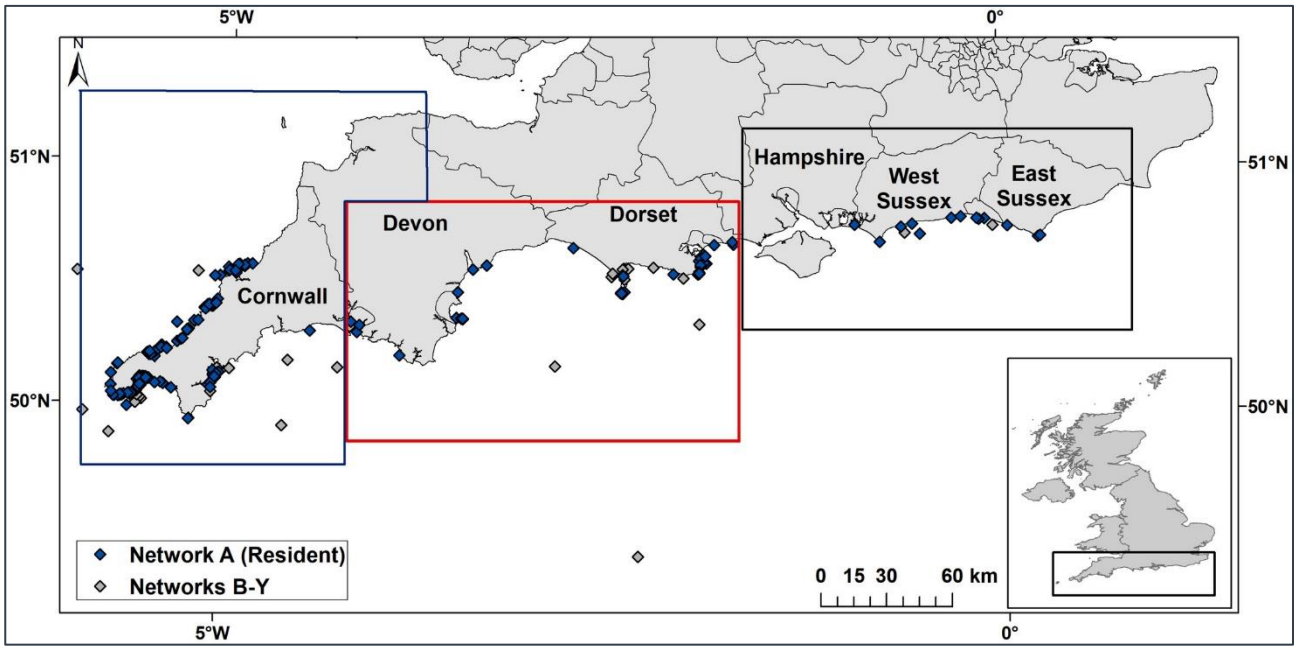
2.4.3 Citizen science efforts resulted in a total of 7,458 sightings of bottlenose dolphins (Corr et al., 2023) (**Figure 2-3**). Of these sightings, only 326 individuals (from 2007-2020) were photographed. Only 18% of the identifiable animals were re-sighted and only 11% of those resighted individuals (n=30) were captured in multiple years. Dolphins were sighted in groups consisting of 1-60 individuals with an average group size of 9.7 (± 8.1 SD). Within these groups, 1-25 individuals were photo-identified (average of 4.0, ± 4.01 SD). The results of the social structure analysis found that, in the study area, there is a distinct population of animals found mainly in the coastal waters that do not appear to mix with offshore conspecifics.

2.4.4 The results of the Bayesian multi-site mark–recapture analysis estimated that about 48 animals (CV = 0.18, 95% HPDI = 38–66) make up the population. The majority of the individuals were found to range between North Cornwall and Dorset, but 10 animals displayed a wider ranging behaviour moving between North Cornwall and East Sussex (**Figure 2-3**). On average, individuals ranged 530 km (range: 68-760 km). Overall, permanently marked individuals were found more frequently from North Devon to Cornwall. Since 2015 dolphin sightings in this area have decreased slightly while those from Hampshire to Sussex have increased. Dolphin sightings from South Devon to Dorset have remained relatively stable. Along the entire South Coast of England, areas that were predicted to be suitable habitat overlapped with areas of high anthropogenic pressure, particularly from pollution and boat traffic. Despite this, adult survival rates were fairly stable from 2008-2019 with models predicting an interannual survival probability of 0.945

(0.017 ± SE, 95% CI: 0.899–0.971) and a capture probability of 0.938 (0.020 ± SE, 95% CI: 0.888–0.967).

2.4.5 No density estimates were provided.

Figure 2-3 Map of study area with areas of interest indicated. The study area is segregated into three discrete regions: Site 1 (North Devon and Cornwall) in blue, Site 2 (South Devon and Dorset) in red and Site 3 (Hampshire and Sussex) in black. Blue diamonds represent photo-verified encounters of network A (the resident population) and other networks B-Y in grey. Figure taken from Corr et al. (2023)



SCANS IV

2.4.6 Bottlenose dolphins were sighted in SCANS IV survey block NS-A, within which Rampion 2 is located. This resulted in a block-wide abundance estimate of 114 dolphins (95% CI: 2 – 306) and a density estimate of 0.0029 dolphins/km^2, with a mean group size of 1 individual (Gilles et al., 2023).

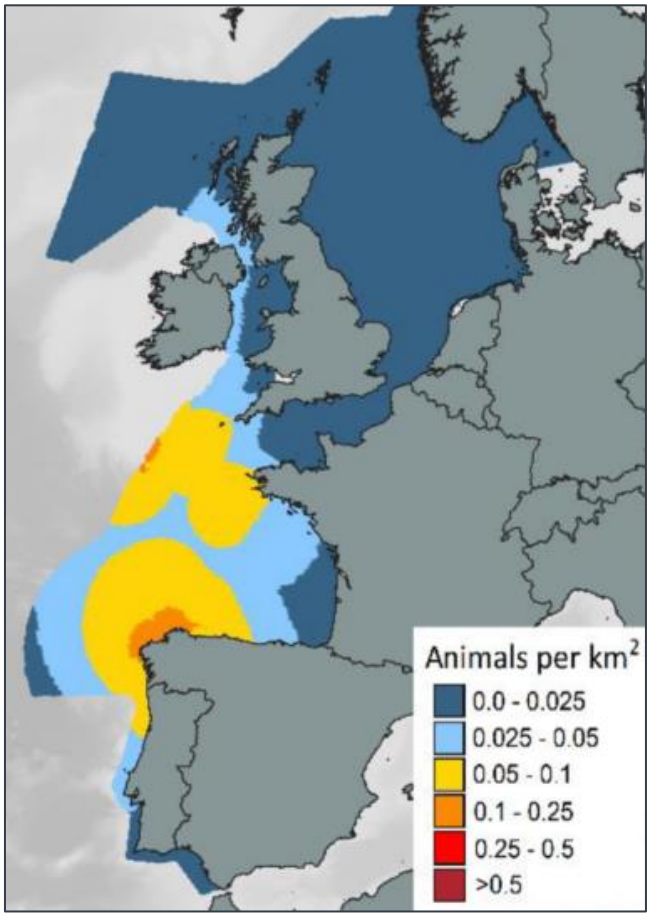
SCANS III

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

2.4.8 The bottlenose dolphin density surface showed highest density estimates in the Celtic Sea and Bay of Biscay (Lacey et al., 2022) (**Figure 2-4**). Densities in the vicinity of Rampion 2 were relatively low. Using the SCANS III modelled density surface (Lacey et al., 2022), the maximum density estimate within grid cells within the Rampion 2 ECC and marine mammal survey area was 0.003 dolphins/km^2 (range: 0.002-0.003). Regarding small coastal populations of bottlenose dolphins, the authors do note that "*Large scale line transect surveys such as SCANS, ObSERVE and SAMM are not designed to collect data at a sufficiently small spatial scale necessary to generate estimates of abundance from these small,*

coastal populations". Therefore, this density surface is not considered to be particularly representative for the small coastal population of bottlenose dolphins in the CWC MU.

Figure 2-4 Predicted surface of estimated density for bottlenose dolphins in SCANS III. Figure taken from (Lacey et al., 2022)



JCP Phase III data

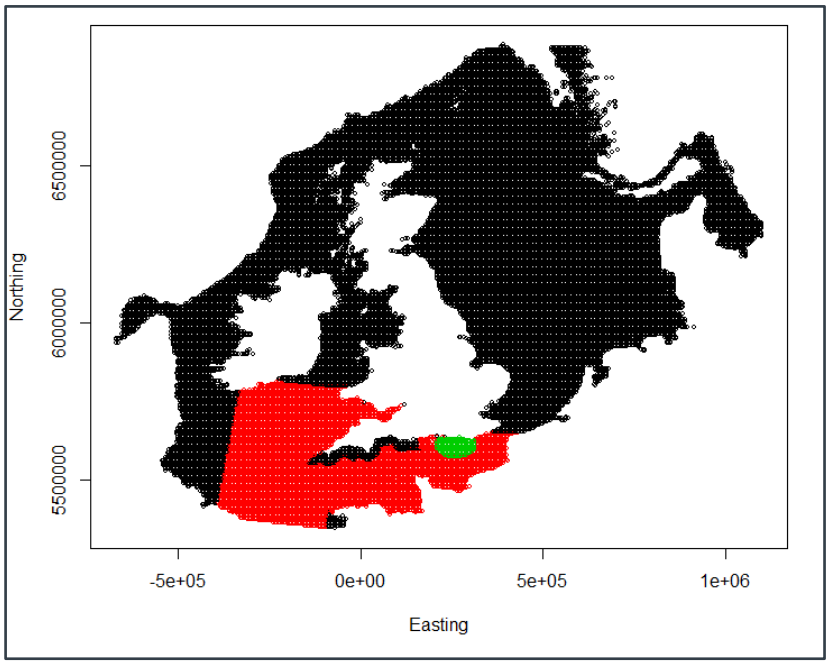
2.4.9 Density estimates provided for Hastings (region to the south of Sussex in which Rampion 2 is located) and IOW (region to the west of the Isle of Wight) showed that bottlenose dolphin density was higher in the summer months and reached an estimated maximum of 0.011 dolphins/km^2 (in 2010) (**Table 2-5**) (Paxton et al., 2016).

2.4.10 Utilising the JCP data analysis tool for the user specified area (**Figure 2-5**), 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 2-5 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

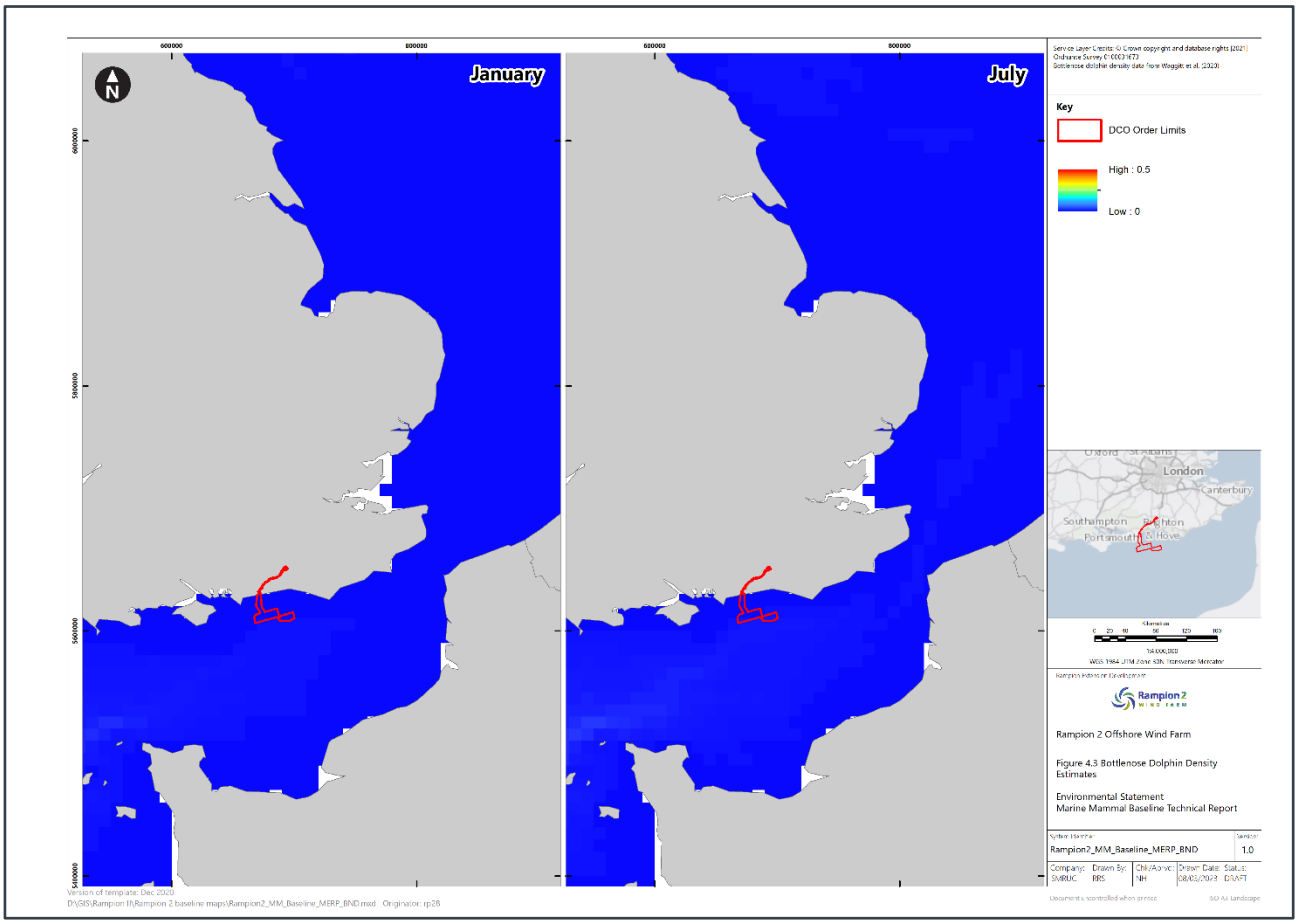
Figure 2-5 The user specified area used to extract cetacean abundance and density estimates from the JCP III Data Analysis Product. The map shows the whole area under consideration (black), the bottlenose dolphin MU (red) and the specific area of interest (green)



MERP density surface

2.4.11 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 2-6**). 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 2-6 Bottlenose dolphin (offshore ecotype) fitted density (#/km^2) for January and July (Waggitt et al., 2020)



Sea Watch Foundation sightings

2.4.12 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.

ORCA surveys

2.4.13 The ORCA surveys have reported bottlenose dolphin sightings along the Portsmouth-Caen ferry route (**Figure 2-7** and **Table 2-6**). No density estimate was calculated for this dataset.

Figure 2-7 Marine mammal sightings on the Portsmouth-Caen ferry route (2011, 2015 and 2016).[2] Grey circle = bottlenose dolphin

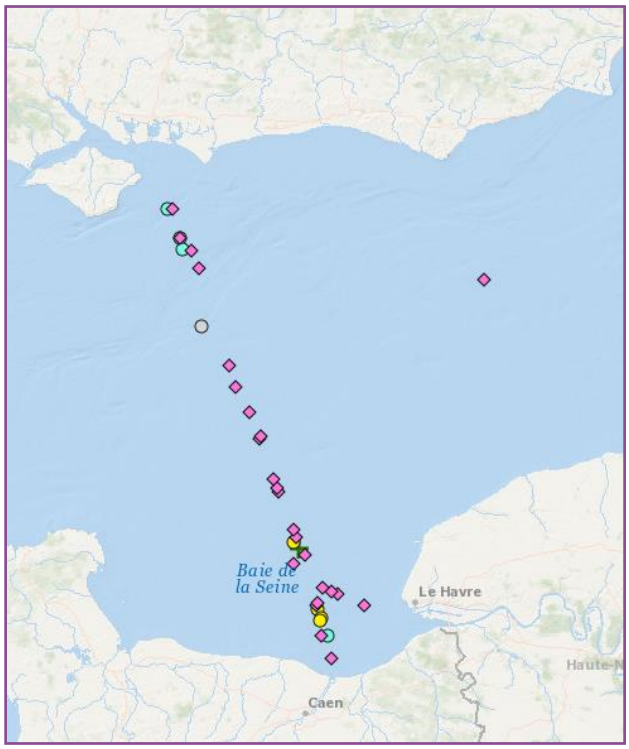


Table 2-6 Marine mammal sightings during the Portsmouth-Caen ferry trips 2018-2020[3]

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
2019-07-26 - Portsmouth-Caen	12 Harbour Porpoises 1 Unidentified Dolphin

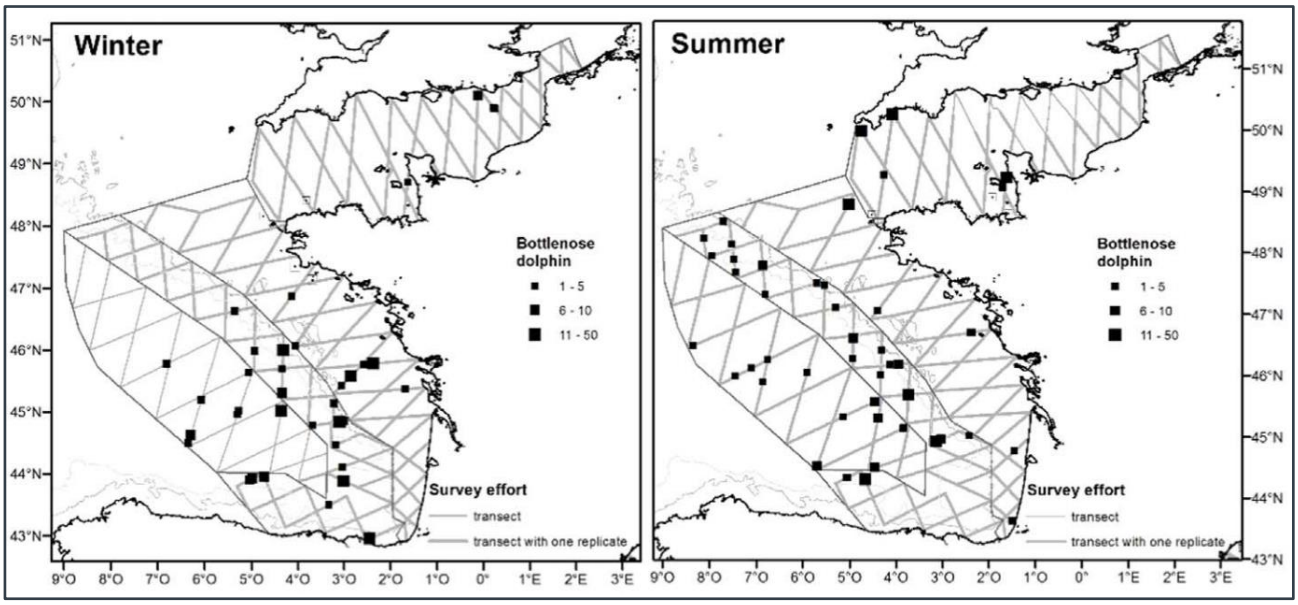
[2] Obtained from the ORCA interactive map on 07/12/2020: https://www.orcaweb.org.uk/species-sightings/sightings-map
[3] Obtained from the ORCA survey reports on 07/12/2020: https://www.orcaweb.org.uk/species-sightings/survey-reports/route-portsmouth-caen

Ferry route	Marine mammal sightings
2019-06-28 - 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

SAMM surveys

2.4.14 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 2-8**). 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 2-8 From Laran et al. (2017): Distribution of sightings and effort for winter and summer surveys for bottlenose dolphins

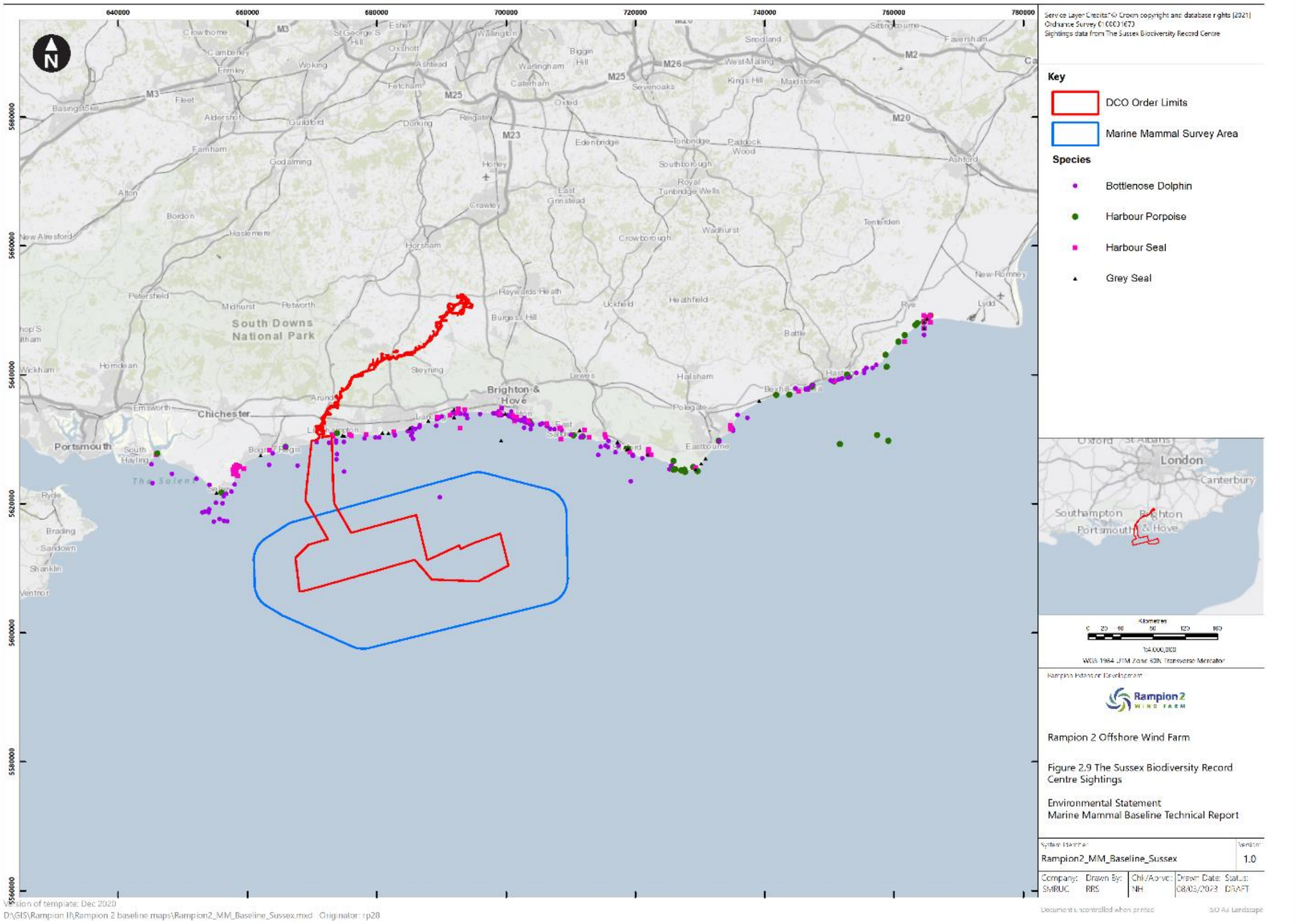


Sussex Biodiversity Record Centre

2.4.15 The Sussex Biodiversity Record Centre[4] 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). No density estimates were provided.

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

Figure 2-9 Locations of marine mammal sightings in the Sussex Biodiversity Record Centre database



Summary

2.4.16 **Table 2-7** presents the range of density estimates available for bottlenose dolphins in the vicinity of Rampion 2. Given the large uncertainty in bottlenose dolphin densities in the area, four different approaches will be used in this updated piling assessment:

i. Assume uniform density of 0.002 dolphins/km^2 within the CWC MU and 0.054 dolphins/km^2 in the OCSW MU

ii. Assume SCANS IV block NS-A density (0.0029 dolphins/km^2) throughout the entire impacted area

iii. Assume SAMMS density (0.037 dolphins/km^2) throughout the entire impacted area

iv. Use grid cell specific densities from the SCANS III density surface.

2.4.17 The number of animals impacted, and the proportion of the MU this represents will be presented for the CWC MU and OCSW MU separately.

Table 2-7 Bottlenose dolphin density estimates. Bold denotes the density estimates taken forward to the quantitative assessment.

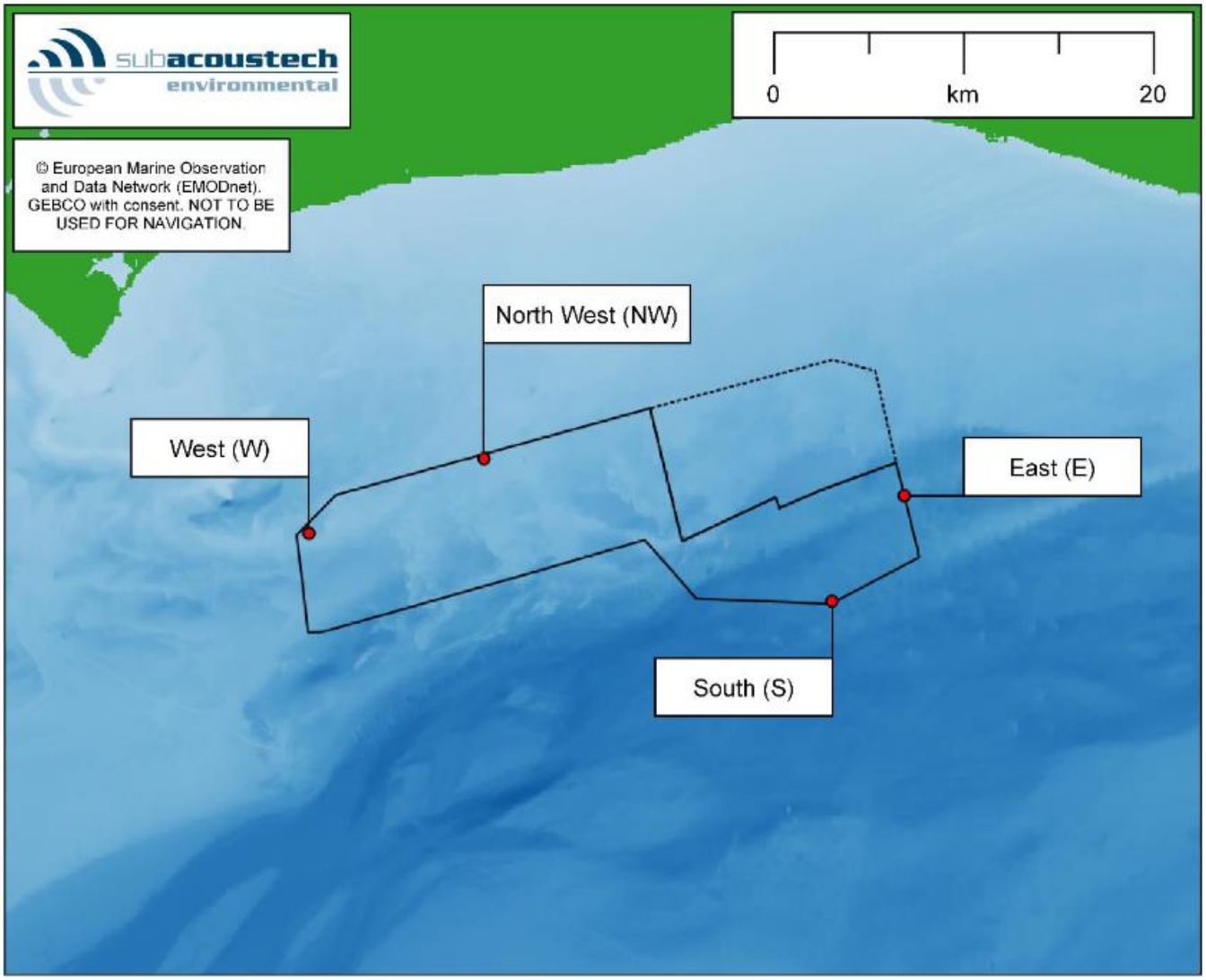
Data source	Density Estimate (dolphins/km^2)
Rampion 2 site specific surveys	None sighted
Rampion 1 site specific surveys	No density estimate provided
CWC MU uniform density	**0.002**
OCSW MU uniform density	**0.054**
SCANS IV Block NS-A	**0.0029**
SCANS III density surface	**Grid cell specific** (max 0.003 ECC & survey area)
SCANS III Block C	No density estimate provided
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)
Sea Watch Foundation sightings	No density estimate provided

Data source	Density Estimate (dolphins/km^2)
ORCA surveys	No density estimate provided
SAMM survey (English Channel)	0.010 (winter) **0.037 (summer)**
Sussex Biodiversity	No density estimate provided

3. Quantitative impact assessment

3.1.1 Underwater noise modelling parameters are provided in **Appendix 11.2: Marine mammal quantitative underwater noise impact assessment [APP-148]**. Modelling was conducted at four locations within the array area: Northwest (NW), West (W), East (E) and South (S) as well as a concurrent scenario assuming piling at the E and W locations at the same time (see **Figure** 3-1).

Figure 3-1 Underwater noise modelling locations



3.2 PTS from piling

3.2.1 PTS-onset impact ranges were all <100 m. This would impact <1 dolphin.

3.3 Disturbance from piling

3.3.1 TTS-onset impact ranges were all <100 m. This would impact <1 dolphin.

3.4 Disturbance from piling

Magnitude

3.4.1 **Table 3-1** presents the number of bottlenose dolphins in the CWC MU and the OCSW MU predicted to experience disturbance per piling day.

CWC MU

3.4.2 The maximum number of bottlenose dolphins in the CWC MU predicted to experience disturbance per piling day is 4 for the installation of concurrent monopiles or pin-piles at the es, Iunder the worst-case scenario (WCS) which equates to 10.0% CWC MU (**Table 3-1**). For single location piling, between 2 and 3 dolphins were predicted to be impacted by monopile installation per piling day (5.0-7.5% CWC MU).

3.4.3 Given the proportion of the MU potentially disturbed per piling day, the magnitude of disturbance from pile driving to the CWC MU is considered to be **Medium**, where temporary changes in behaviour and/or distribution of individuals are at a scale that could result in potential reductions to lifetime reproductive success to some individuals although not enough to affect the population trajectory over a generational scale.

OCSW MU

3.4.4 The maximum number of bottlenose dolphins in the OCSW MU predicted to experience disturbance per piling day is 131 for the installation of a monopile at the S location under the WCS, which equates to 1.2% OCSW MU (**Table 3-1**).

3.4.5 The magnitude of disturbance from pile driving to the OCSW MU is considered to be **Low**, where short-term and/or intermittent and temporary behavioural effects are expected in a small proportion of the population, and any impact to vital rates of individuals occur only in the short term (over a limited number of breeding cycles, <1 in this case) and where any changes to individual vital rates are very unlikely to occur to the extent that the population trajectory would be altered.

Table 3-1 Number of bottlenose dolphins and percentage of each MU predicted to experience potential behavioural disturbance for the monopile and pinpile WCS for the NW, W, E and S modelling locations as well as concurrent piling at the E&W locations

Density		Result	NW	W	E	S	E&W	NW	W	E	S	E&W
			Monopile (4,400 kJ)					Pinpile (2,500 kJ)				
Uniform MU	0.002	# CWC MU	1	1	2	2	3	1	1	2	2	3
		% CWC MU	2.5	2.5	5.0	5.0	7.5	2.5	2.5	5.0	5.0	7.5
	0.054	# OCSW MU	43	57	108	131	115	35	49	95	117	102
		% OCSW MU	0.4	0.5	1.0	1.2	1.1	0.3	0.5	0.9	1.1	1.0
SCANS IV NS-A	0.0029	# CWC MU	2	2	3	3	4	1	3	3	3	4
		% CWC MU	5.0	5.0	7.5	7.5	10.0	2.5	7.5	7.5	7.5	10.0
	0.0029	# OCSW MU	2	3	6	7	6	2	6	5	6	5
		% OCSW MU	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0
SAMMS	0.037	# CWC MU*	-	-	-	-	-	-	-	-	-	-
		% CWC MU*	-	-	-	-	-	-	-	-	-	-
	0.037	# combined MUs	50	62	109	126	129	42	54	97	113	116
		% combined MUs	0.5	0.6	1.0	1.1	1.2	0.4	0.5	0.9	1.0	1.1

Density		Result	NW	W	E	S	E&W	NW	W	E	S	E&W
			Monopile (4,400 kJ)					Pinpile (2,500 kJ)				
	0.037	# OCSW MU	29	39	74	90	79	24	33	65	80	70
		% OCSW MU	0.3	0.4	0.7	0.8	0.7	0.2	0.3	0.6	0.7	0.6
SCANS III surface	Grid cell specific	# CWC MU	2	2	2	3	4	1	2	2	2	4
		% CWC MU	5.0	5.0	5.0	7.5	10.0	2.5	5.0	5.0	5.0	10.0
		# OCSW MU	2	3	5	7	6	2	3	5	6	5
		% OCSW MU	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0

*** Note: the SAMMS density estimate is not compatible with the CWC MU population estimate of 40 dolphins. The high density estimate results in more animals being impacted than there are present in the MU population.**

Sensitivity

3.4.6 As presented in **Appendix 11.2: Marine mammal quantitative underwater noise impact assessment [APP-148]**, the sensitivity of bottlenose dolphins to disturbance from pile driving is **Low**.

Significance

CWC MU

3.4.7 The magnitude of disturbance from pile driving to the CWC MU is considered to be **Medium**.

3.4.8 The sensitivity of bottlenose dolphins to disturbance from pile driving is considered to be **Low**.

3.4.9 Therefore, the resulting impact significance for behavioural disturbance in bottlenose dolphins in the CWC MU is **Minor (not significant)**.

OCSW MU

3.4.10 The magnitude of disturbance from pile driving to the OCSW MU is considered to be **Low**.

3.4.11 The sensitivity of bottlenose dolphins to disturbance from pile driving is considered to be **Low**.

3.4.12 Therefore, the resulting impact significance for behavioural disturbance in bottlenose dolphins in the OCWS MU is **Minor (not significant)**.

Comparison to ES

3.4.13 As presented in **Appendix 11.2: Marine mammal quantitative underwater noise impact assessment [APP-148]**, the original ES assessment concluded that disturbance from piling would result in an impact significance of **Minor (not significant)**. Therefore, despite the revised MUs and the updated density estimates, there is no change to the conclusion of the bottlenose dolphin assessment.

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Rampion 2
WIND FARM