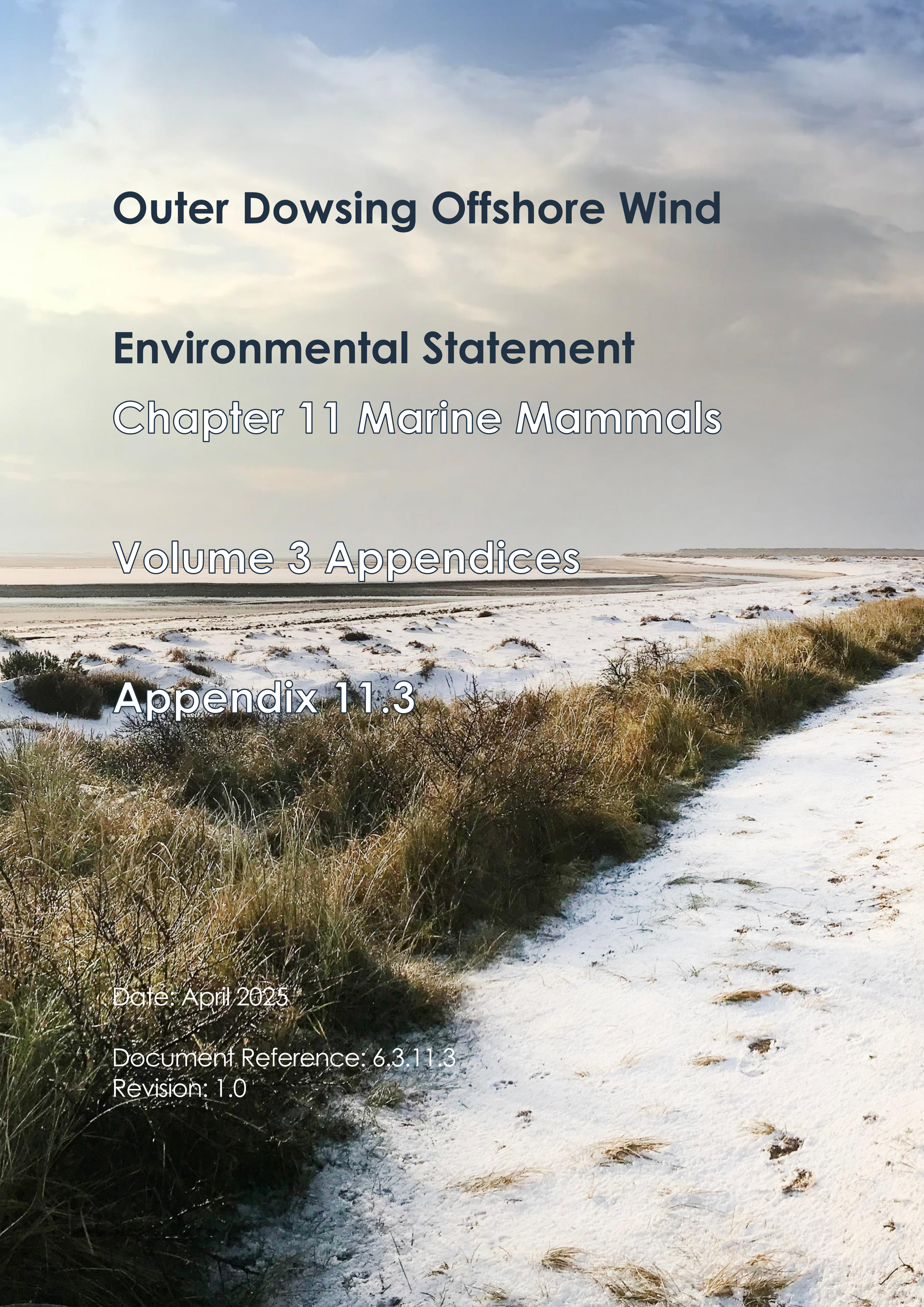

Outer Dowsing Offshore Wind

Environmental Statement

Chapter 11 Marine Mammals

Volume 3 Appendices

Appendix 11.3

Date: April 2025

Document Reference: 6.3.11.3
Revision: 1.0

<table>
<tr><td colspan="2">Company:</td><td colspan="2">Outer Dowsing Offshore Wind</td><td>Asset:</td><td colspan="2">Whole Asset</td></tr>
<tr><td colspan="2">Project:</td><td colspan="2">Whole Wind Farm</td><td>Sub Project/Package:</td><td colspan="2">Whole Asset</td></tr>
<tr><td colspan="2">Document Title or Description:</td><td colspan="5">Interim Population Consequences of Disturbance Modelling Report (Cumulative)</td></tr>
<tr><td colspan="2">Internal Document Number:</td><td colspan="2">PP1-ODOW-DEV-CS-REP-0289</td><td>3rd Party Doc No (If applicable):</td><td colspan="2">N/A</td></tr>
<tr><td>Rev No.</td><td>Date</td><td>Status / Reason for Issue</td><td>Author</td><td>Checked by</td><td>Reviewed by</td><td>Approved by</td></tr>
<tr><td>1.0</td><td>April 2025</td><td>Deadline 6</td><td>SMRUC</td><td>GoBe</td><td>Shepherd & Wedderburn</td><td>Outer Dowsing</td></tr>
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Executive Summary

This report has been prepared to address Natural England's Response to Q.58 and Q.59 of the Report on the Implications for European Sites (RIES) (REP5-172), regarding the cumulative assessment of marine mammal disturbance from pile driving activities at the Outer Dowsing Offshore Wind (ODOW) project site. The report evaluates the potential population-level impacts of the Project's pile driving during construction, cumulatively with other offshore wind farms (OWFs) that are likely to be undertaking pile driving activities within the same timeframe. As project-specific data is not available for all other OWFs, the model incorporates precautionary assumptions to estimate worst-case scenarios.

Key findings indicate that for all three species, the predicted impacts from cumulative pile driving activities do not result in population-level effects. For harbour porpoise, 18 years after the modelled piling ends, the mean impacted population size is 98.8% of the unimpacted population size. The population growth of the impacted population remains stable, at the level of population size just after piling stops. The modelled decline is, therefore, not considered to be evidence of a population-level effect. For both species of seal, the impacted population size remains the same as the unimpacted population size, and thus disturbance from piling at the Project cumulatively with the other OWFs is predicted to not result in a population level effect.

These findings confirm that for the levels of cumulative disturbance modelled, there is no significant effect at population level. These results align with the Project's Environmental Impact Assessment magnitude definition of "Low," meaning that temporary behavioural effects may occur, but survival and reproductive rates are unlikely to be affected in a way that alters population trajectories. This analysis, based on the best available scientific data and methodologies, provides a robust basis for evaluating the possible cumulative impacts of the Project cumulatively with other OWFs.

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1 Introduction and Document Purpose

1. This report was produced to address Natural England's Response to the Report on the Implications for European Sites (RIES) (PD-022) (3.1 Examination Matters – Annex II Marine Mammal Matters - Use of iPCoD):

   - Q58: *Natural England's previous advice regarding cumulative assessment in iPCoD modelling still stands. It is recommended that ODOW produces an iPCoD modelling report for cumulative impacts. We consider this to be possible within the iPCoD model and note that other offshore wind projects have been able to undertake this work.*

   - Q59: *Natural England acknowledges the limitations in providing in-combination assessments (for ES, HRA and iPCoD) at this stage in the project; however, providing an assessment at this stage, even if the information included is an estimate and has assumptions built in to it, will provide the best available prediction of impacts for the project in-combination with other projects.*

2. This report provides population modelling for disturbance from pile driving at the Project cumulatively with pile driving at other Offshore Wind Farms (OWFs).

2 Method

3. The Interim Population Consequences of Disturbance (iPCoD) framework (Harwood *et al.*, 2014, King *et al.*, 2015) was used to predict the potential population consequences of the predicted disturbance resulting from the piling from ODOW cumulatively with other OWFs.
4. The iPCoD uses a stage structured model of population dynamics with nine age classes and one stage class (adults 10 years and older). The model is used to run a number of simulations of future population trajectory with and without the predicted level of impact, to allow an understanding of the potential future population level consequences of predicted behavioural responses.
5. Each iPCoD model simulation is run with matched pairs of populations: 1 un-impacted population and 1 impacted population (1,000 simulations are recommended for each scenario of interest). These matched-pairs experience exactly the same environmental and demographic stochasticity within one simulation of the model. The only variable element between the matched pair is that one population is subjected to a stressor (impulsive noise) and therefore demonstrates the potential effect of disturbance (this is considered to be the impacted population in the pair), the other population in the pair receives no exposure to a stressor and is considered the un-impacted population.
6. In iPCoD, all individuals within the impacted population (within a pair) are assumed to be equally likely to be disturbed by a particular piling operation (unless vulnerable sub-populations are specified – which was not the case for ODOW). On each day of piling, iPCoD performs a binomial trial for each simulated individual using the probability of being disturbed[1] divided by the size of the total population (pmean) to determine whether or not that individual will be disturbed. This results in a calendar record of the days during the simulated year on which each individual is disturbed. The probability of each animal being disturbed on a given day is independent from the probability of this individual being disturbed previously.
7. The potential for a change in an individual's vital rates is determined by the number of repeated piling days that an individual experiences. The probability distributions that form the transfer functions in iPCoD provide the number of days of repeated disturbance an animal is expected to experience before the disturbance can have any effect on its vital rates (and many individuals need to have their vital rates markedly impacted before any change in the population is observed).

[1] calculated as the total number of animals predicted to be disturbed by a particular piling operation (numDT), as specified by the user

8. The effects of disturbance on vital rates (survival and reproduction) are currently unknown. Therefore, expert elicitation was used to construct a probability distribution to represent the knowledge and beliefs of a group of experts regarding a specific Quantity of Interest. In this case, the quantity of interest is the effect of disturbance on the probability of survival and fertility in harbour porpoise, harbour seal and grey seals (Booth *et al.*, 2019). The elicitation assumed that the behaviour of the disturbed porpoise would be altered for 6 hours on the day of disturbance, and that no feeding (or nursing) would occur during the 6 hours of disturbance. For seals, the experts assumed that on average, the behaviour of the disturbed seals would be impacted for much less than 24 hours but did not define an exact duration.

3 iPCoD Model Limitations

3.1 Overview

9. There are several precautions built into the iPCoD model and this specific scenario that mean that the results are considered to be highly precautionary and likely over-estimate the true population level effects. These include:
   - The lack of density dependence in the model (meaning the population will not respond to any reduction in population size)
   - The level of environmental and demographic stochasticity in the model, and
   - The estimates of the number of animals disturbed come from noise impact assessments with many levels of precaution.

3.2 Lack of density dependence

10. Density dependence is described as *"the process whereby demographic rates change in response to changes in population density, resulting in an increase in the population growth rate when density decreases and a decrease in that growth rate when density increases"* (Harwood *et al.*, 2014). The iPCoD assumes no density dependence for any of the species available in the model, since there is insufficient data to parameterise this relationship. Essentially, this means that there is no ability for the modelled, impacted population to increase in size and return to carrying capacity following disturbance.
11. At a recent expert elicitation, conducted for the purpose of modelling population impacts of the Deepwater Horizon oil spill (Schwacke *et al.*, 2021), experts agreed that there would likely be a concave density dependence on fertility. That means, for a population which is assumed to be stable (i.e., neither increasing nor decreasing), it would be expected that if the impacted population declines, it would later recover to carrying capacity, rather than continuing at a stable trajectory that is smaller than that of the un-impacted population. Note that in the iPCoD model, for stable populations, carrying capacity is assumed to be equal to the size of un-impacted population – i.e., it is assumed the un-impacted population is at carrying capacity.

3.3 Environmental and demographic stochasticity

12. The iPCoD model attempts to model some of the sources of uncertainty inherent in the calculation of the potential effects of disturbance on marine mammal population. This includes demographic stochasticity and environmental variation. Environmental variation is defined as *"the variation in demographic rates among years as a result of changes in environmental conditions"* (Harwood *et al.*, 2014). Demographic stochasticity is defined as *"variation among individuals in their realised vital rates as a result of random processes"* (Harwood *et al.*, 2014).

13. The iPCoD protocol describes this in further detail: *"Demographic stochasticity is caused by the fact that, even if survival and fertility rates are constant, the number of animals in a population that die and give birth will vary from year to year because of chance events. Demographic stochasticity has its greatest effect on the dynamics of relatively small populations, and we have incorporated it in models for all situations where the estimated population within an MU is less than 3000 individuals. One consequence of demographic stochasticity is that two otherwise identical populations that experience exactly the same sequence of environmental conditions will follow slightly different trajectories over time. As a result, it is possible for a "lucky" population that experiences disturbance effects to increase, whereas an identical undisturbed but "unlucky" population may decrease"* (Harwood *et al.*, 2014).
14. This is clearly evidenced in the outputs of iPCoD where the un-impacted (baseline) population size varies greatly between iterations, it is not as a result of disturbance but simply as a result on environmental and demographic stochasticity. In the example provided in Figure 1, after 25 years of simulation, the un-impacted population size varies between 6,692 (lower 2.5%) and 16,516 (upper 97.5%). Thus, the change in population size resulting from the impact of disturbance may be significantly smaller than that driven by the environmental and demographic stochasticity in the model.

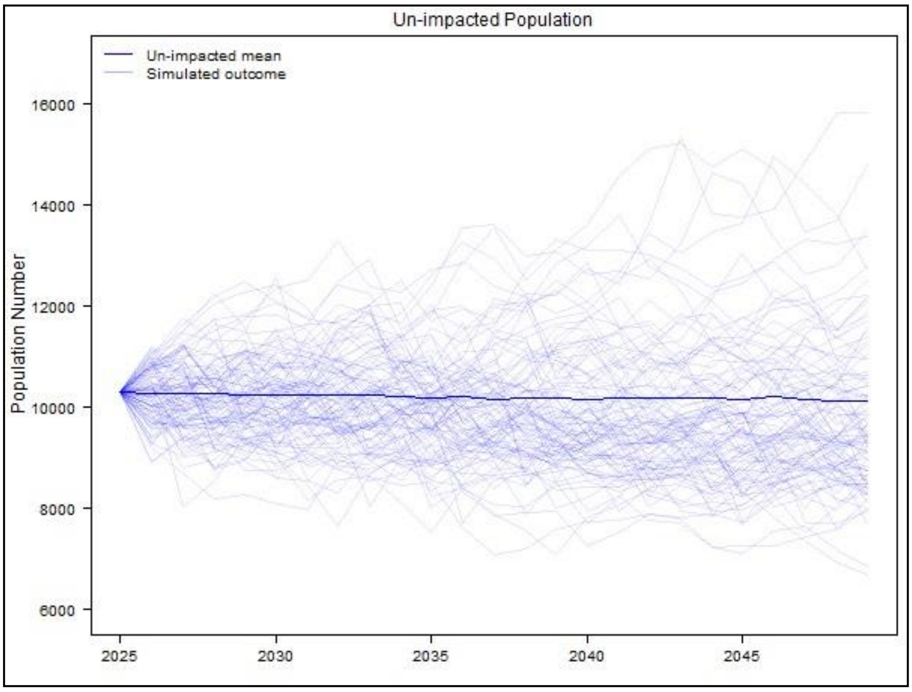


Figure 1 Simulated un-impacted (baseline) population size over the 25 years modelled

3.4 Summary

15. All of these precautions built into the iPCoD model mean that the results are considered to be highly conservative. Despite these limitations and uncertainties, this assessment has been carried out according to best practice and using the best available scientific information. The information provided is therefore considered to be sufficient to carry out an adequate assessment, though a level of precaution around the results should be taken into account when drawing conclusions.

4 iPCoD inputs

16. In order to conduct iPCoD modelling to support a cumulative assessment the model requires the following information to be provided for each OWF included in the model:
    - Number of animals disturbed per piling day
    - Detailed piling schedule (number of piling days and spread of piling days within and across years)
17. For most projects this information is lacking. Therefore, significant assumptions need to be made in order to collate the required inputs. In order to refine the scope of the modelling, and to limit the number of assumptions made, the cumulative iPCoD modelling presented here is for:
    - The three key species of concern
        - harbour porpoise, harbour seals and grey seals
    - UK projects within the relevant species Management Unit (MU) with a quantitative impact assessment available for pile driving
        - North Sea MU for harbour porpoise
        - Southeast (SE) England Seal Management Unit (SMU) for seals
    - Within ±1 year of piling window at ODOW.
18. The following assumptions have been made:
    - the Project is pile driving in 2027 and 2028
        - therefore, the scope of the modelling includes OWFs piling in 2026, 2027, 2028 and 2029
    - If the number of piling days is not presented in an Environmental Statement / Environmental Impact Assessment Report, then the following is assumed:
        - It takes 1 day of piling to install a monopile
        - It takes 2 days of piling to install a jacket
    - If the distribution of piling days is unknown, it is assumed that piling is spread randomly throughout the piling period.
    - All piling (at both the Project and other OWFs) is unabated. This is highly precautionary given the recent JNCC, Natural England and Cefas position (2025) that "quieter installation methods and/or NAS should always be considered as primary and/or secondary mitigation measures when planning or undertaking impact piling" and Defra Policy paper: Reducing marine noise (Defra, 2025) that sets the expectation that all piling in English waters from 2025 will use best endeavours to deliver noise reductions through the use of primary and/or secondary noise reduction methods for pile driving activity.

19. Given the lack of data available for all OWFs, and the necessary assumptions made, there are significant uncertainties in the input parameters. Consequently, the modelled piling scenarios may not accurately represent actual construction. However, this is not uncommon, as even when relevant data is included in EIAs, they are typically based on worst-case scenarios and project specific details often change by the time consent is granted. Therefore, the cumulative impact assessment of ODOW with OWFs presented in this report provides an indication of potential worst-case impacts, acknowledging that project timeframes may vary.

4.1 OWF specific inputs

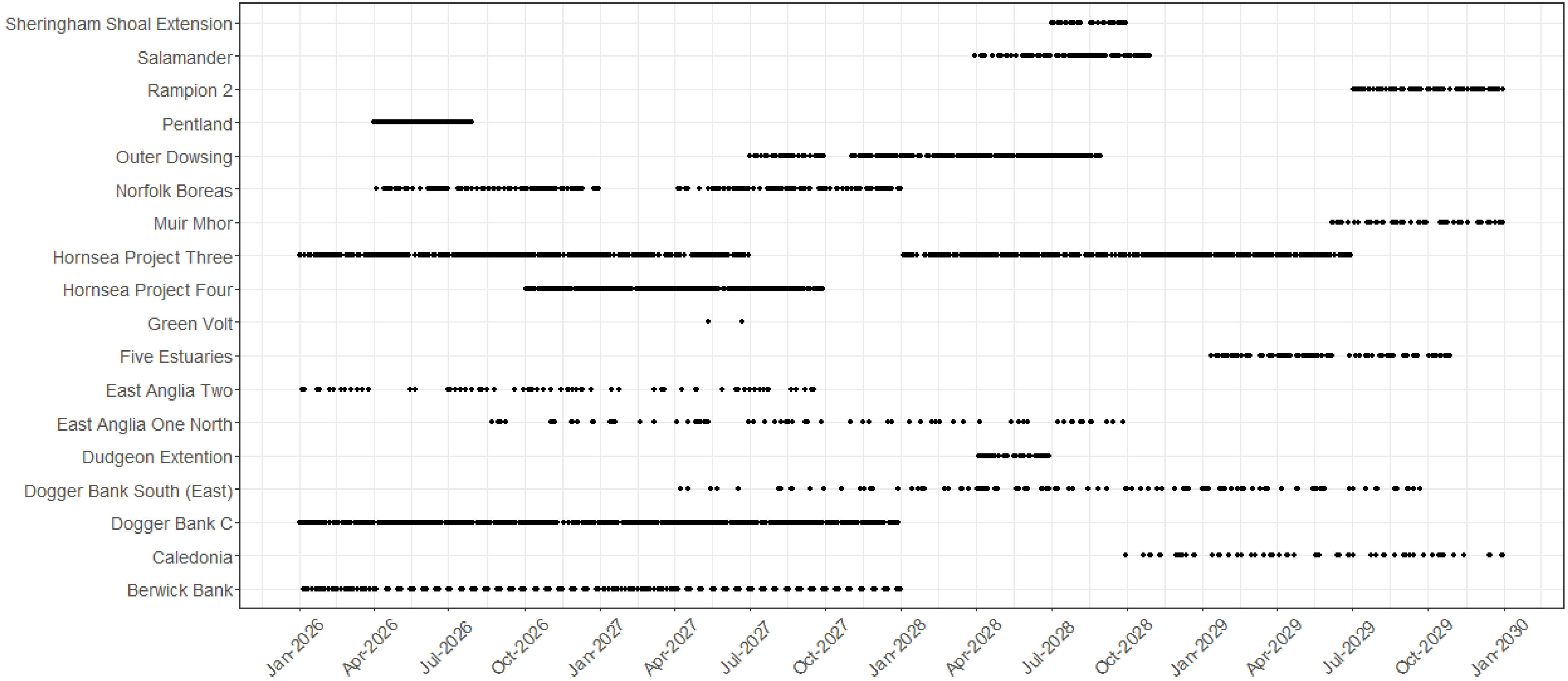
20. Table 1 provides the OWF-specific information obtained from OWF EIAs, along with the notes on assumptions made in cases where data was unavailable. Figure 2 and Figure 3 show the assumed piling schedule for OWF projects screened into the cumulative iPCoD model for harbour porpoise and seals, respectively.

Table 1: OWF-specific information input into the cumulative iPCoD model

OWF	# HP disturbed	# HS disturbed	# GS disturbed	Foundation	# piling days total	Piling window	# piling days between 2026-2029	Source (see 7.1: EIA reference list)	Assumptions
ODOW (WTG)	3,567	18	291	Pin pile	214	Jul 2027 – Aug 2028	214	ODOW examination: 15.12 Interim Population Consequences of Disturbance Modelling Report	
ODOW (ANS)	5,190	9	709	Pin pile	4	Feb 2027	4		
Berwick Bank (WTGs)	2,822	NA	NA	Pin pile	287	2026, 2027, 2031	192	Berwick Bank EIA. Chapter 10 & Appendix 10.4 iPCoD	
Berwick Bank (OSP)	1,754	NA	NA		85		86		
Dogger Bank C	4,302	0	2	Pin pile	694 – see assumptions	Min 3 years	466	Dogger Bank Teesside A & B ES. Chapter 14	1,388 PP (WTG+MM+OCP+AP). Assumed 2 PP/day = 694 piling days. Assumed piling 2025-26-27
Dogger Bank South (East)	4,296	8	3124	Monopile	102	Q2 2027 - Q3 2029	102	Dogger Bank South ES. Chapter 11 & Appendix 11-4 iPCoD	
Dudgeon Ext (WTGs)	5,161	18	163	Monopile	30 – see assumptions	3 months	30	Dudgeon Ext ES. Chapter 10	30 WTG MP. Assumed 1 WTG MP/day = 30 days piling. Assumed piling Q2 2028
Dudgeon Ext (OSPs)	1,718	7	67	Pin pile	4 – see assumptions		4		8 OSP PP. Assumed 2 PP/day = 4 days piling. Assumed piling Q2 2028 after MP WTGs
East Anglia One North	1,289	1	2	Monopile	68 – see assumptions	27 months (2026-2028)	68	EA1N ES. Chapter 11	67 WTG MP + 1 MM MP. Assumed 1 MP/day = 68 days piling. Assumed start Q3 2026 end Q3 2028
East Anglia Two (WTGs)	3,358	2	43	Monopile	46 - see assumptions	27 months (2025-2027)	46	EA2 ES. Chapter 11	75 WTG MP + 1 MM MP. Assumed 1 MP/day = 76 days piling total. Assumed start Q3 2025 end Q3 2027. 30 days in 2025 then 46 days 2026-27.
East Anglia Two (OSPs)	3,285	2 – see assumptions	43 – see assumptions	Pin pile	20 – see assumptions		20		40 OSP PP. Assumed 2 PP/day = 20 days piling. Assumed piling after MP WTGs. # Seals disturbed for OSPs: assumed same as MP as PP not assessed in ES.
Five Estuaries	6,583	1	102	Monopile	81	Jan – Oct 2029	81	Five Estuaries Examination: 10.13 Marine Mammal iPCoD Modelling for Project alone	Used unmitigated estimates
Green Volt	5,208	NA	NA	Floating	2	Q1 - Q2 2027	2	Green Volt ES. Chapter 11	Assumed piling in Q2 2027
Hornsea Project Four	6,417	2	864	Monopile	232	Q4 2026 - Q3 2027	232	Hornsea Four ES. Chapter 4	
Hornsea Project Three	4,046	2	25	Pin pile	555	Q1 2022 - Q2 2023 Q1 2027 - Q2 2028	555	Hornsea Three ES. Chapter 4	HOW3 did not pile in 2022-2023. Assumed piling Q1 2026 - Q2 2027 (278 days), Q1 2028 - Q2 2029 (277 days)
Muir Mhor	14,630	NA	NA	Floating	151	Jun 2029 - Jun 2031	53	Muir Mhor EIA. Chapter 12	
Norfolk Boreas	2,251	0	2	Monopile	182 – see assumptions	Q2 2026 - Q4 2026 Q2 2027 -Q4 2027	182	Norfolk Boreas ES. Chapter 12	180 WTG MP + 2 LIDAR MP. Assumed 1 MP/day = 182 days piling
Pentland	323	NA	NA	Floating	63	2025-2026	63	Pentland ES. Chapter 12	Assumed piling in 2026
Sheringham Shoal Ext (WTGs)	1,138	38	119	Monopile	23 – see assumptions	3 months in 2028	23	Sheringham Ext ES. Chapter 10	23 WTG MP. Assumed 1 WTG MP/day = 23 days piling. Assumed piling in Q3 2028
Sheringham Shoal Ext (OSPs)	445	15	48	Pin pile	4 – see assumptions		4		8 OSP PP. Assumed 2 PP/day = 4 days piling. Assumed piling in Q3 2028
Caledonia (fixed)	8,942	NA	NA	Pin pile	105	Phase 1: 65 days Oct 2028-Feb 2030	60	Caledonia ES. Vol 2 Chapter 7 & Volume 7B, Appendix 7-4 Marine Mammals Population Modelling	
Rampion 2	752	1	1	Monopile	93	Jul 2029 – Feb 2030	71	Rampion 2 ES. Chapter 11 &	

								Rampion 2 Examination: 6.4.11.4 ES - Appendix 11.4 Bottlenose Dolphin Population Modelling	
Salamander	12,336	NA	NA	Floating	80	Apr 2028 - Oct 2028	80	Salamander ES. Chapter 3.11	

projects with NA listed for seals are outwith the SE England SMU. HP = harbour porpoise, HS = harbour seal, GS = grey seal, WTG = wind turbine generator, ANS = Artificial Nesting Structure, OSP = offshore platform, MM = metmast, MP = monopile, PP = pin pile



Sheringham Shoal Extension
Salamander
Rampion 2
Pentland
Outer Dowsing
Norfolk Boreas
Muir Mhor
Hornsea Project Three
Hornsea Project Four
Green Volt
Five Estuaries
East Anglia Two
East Anglia One North
Dudgeon Extention
Dogger Bank South (East)
Dogger Bank C
Caledonia
Berwick Bank
Jan-2026
Apr-2026
Jul-2026
Oct-2026
Jan-2027
Apr-2027
Jul-2027
Oct-2027
Jan-2028
Apr-2028
Jul-2028
Oct-2028
Jan-2029
Apr-2029
Jul-2029
Oct-2029
Jan-2030

Figure 2 Assumed piling schedule for OWF projects screened into the cumulative iPCoD model for harbour porpoise.

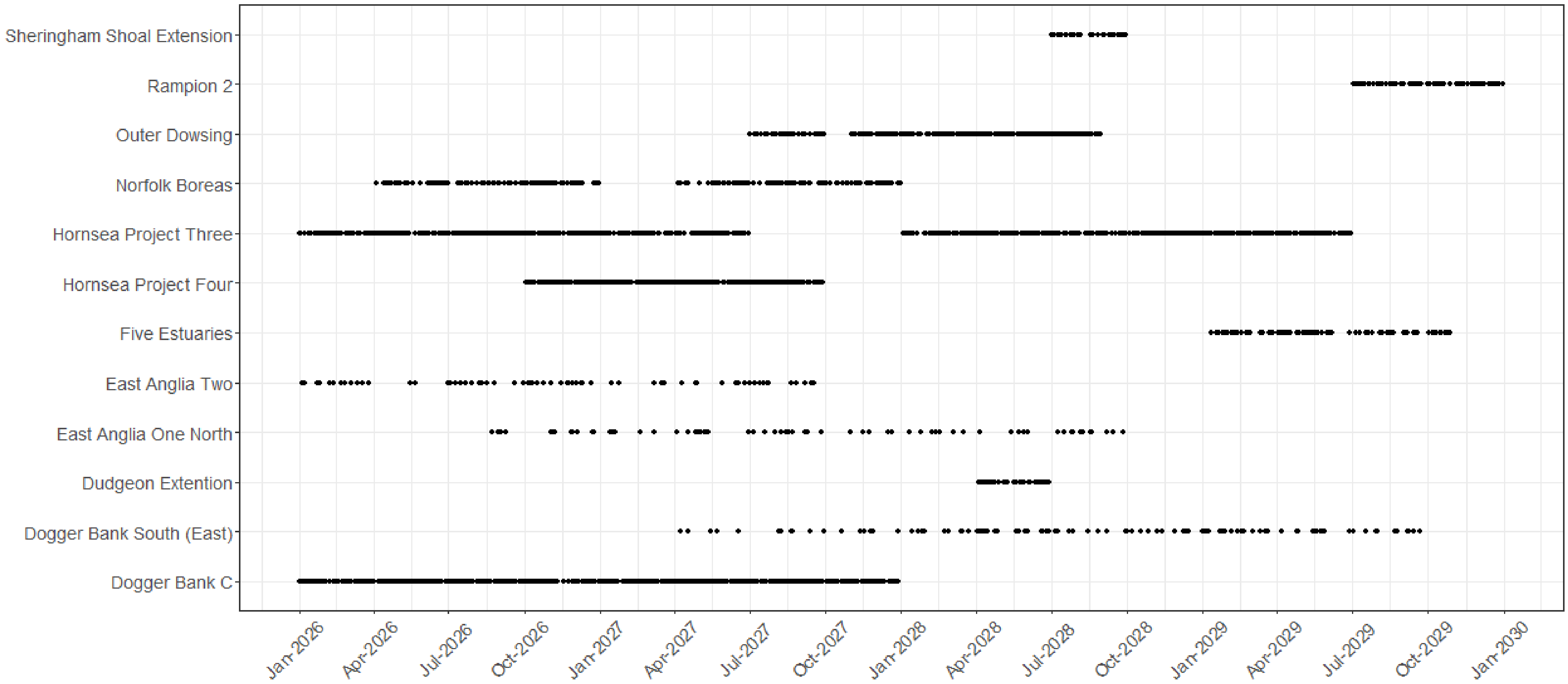


Figure 3 Assumed piling schedule for OWF projects screened into the cumulative iPCoD model for both seal species.

4.3 Demographic parameters

21. The MU specific demographic parameters used in the iPCoD modelling were obtained from Sinclair *et al.* (2020) and are summarised in Table 2. In Sinclair *et al.* (2020) the SE England harbour seal MU was modelled to be stable, however, recent counts show that this population is now in decline (SCOS, 2023). Therefore, both a stable and a declining population has been modelled.

Table 2 Demographic parameters used in the iPCoD modelling from Sinclair *et al.* (2020)

	Harbour porpoise	Harbour seal		Grey seal
MU size	346,601	4,868		65,505
Trend	Stable	Stable	Declining[2]	Increasing
Calf/pup survival	0.8455	0.4	0.24	0.222
Juvenile survival	0.85	0.78	0.86	0.94
Adult survival	0.925	0.92	0.8	0.94
Fertility	0.34	0.85	0.9	0.84
Age at independence	1	1	1	1
Age at first birth	5	4	4	6

[2] Using demographic parameters for the declining North Coast and Orkney harbour seal MU in the absence of declining parameters specific to the SE England MU.

5 Results

5.1 Harbour porpoise

22. Table 3 and Figure 4 show the results for the cumulative iPCoD simulation for harbour porpoise. The counter-factual metric indicates that the mean impacted population size is 98.6% of the unimpacted population size at the end of the piling activities. At 18 years after the modelled piling ends, the mean impacted population size is 98.8% of the unimpacted population size. The population growth of the impacted population remains stable, at the level of population size just after piling stops. The modelled decline is, therefore, not considered to be evidence of a population-level effect (i.e. a mean reduction of 1.2% over 22 years (4 years piling, 18 years post piling) is very small – and likely recoverable). It is noted that the current iPCoD model does not account for density-dependent factors; in reality, it is expected that the impacted population size would soon return to that of an undisturbed state following the end of the disturbance. This is detailed in section 3.2. Such recovery was observed across simulations of varying levels of disturbance (of up to 20% population decline) within the DEPONS model, which does allow for density-dependent recovery (Nabe-Nielsen et al 2018). For further discussion on issues of carrying capacity and density dependence in relation to harbour porpoise, please see Section 4 and 6 of Brown et al. (2023).

Table 3 Results of the harbour porpoise cumulative iPCoD simulation

	Un-impacted pop mean	Impacted pop mean	Impacted mean as % unimpacted	Un-impacted pop median	Impacted pop median	Impacted median as % unimpacted	Un-impacted pop lower 2.5%	Un-impacted pop upper 97.5%	Impacted pop lower 2.5%	Impacted pop upper 97.5%
Population size at the start of 2026 before the modelling commences = 346,602										
End 2029 (end piling)	346,501	3415,50	98.6%	347,101	341,943	98.5%	294,681	392,751	290,845	387,574
End 2030 – 1 year after piling ends	347,208	342,538	98.7%	347,741	342,529	98.5%	293,990	399,736	289,896	397,065
End 2035 – 6 years after piling ends	347,541	343,229	98.8%	347,314	342,379	98.6%	276,491	422,433	273,390	420,089
End 2041 – 12 years after	348,239	343,949	98.8%	347,177	342,199	98.6%	265,097	445,573	263,403	440,483

piling ends										
End 2047 – 18 years after piling ends	348,421	344,161	98.8%	343,554	338,827	98.6%	253,191	470,665	249,747	468,211

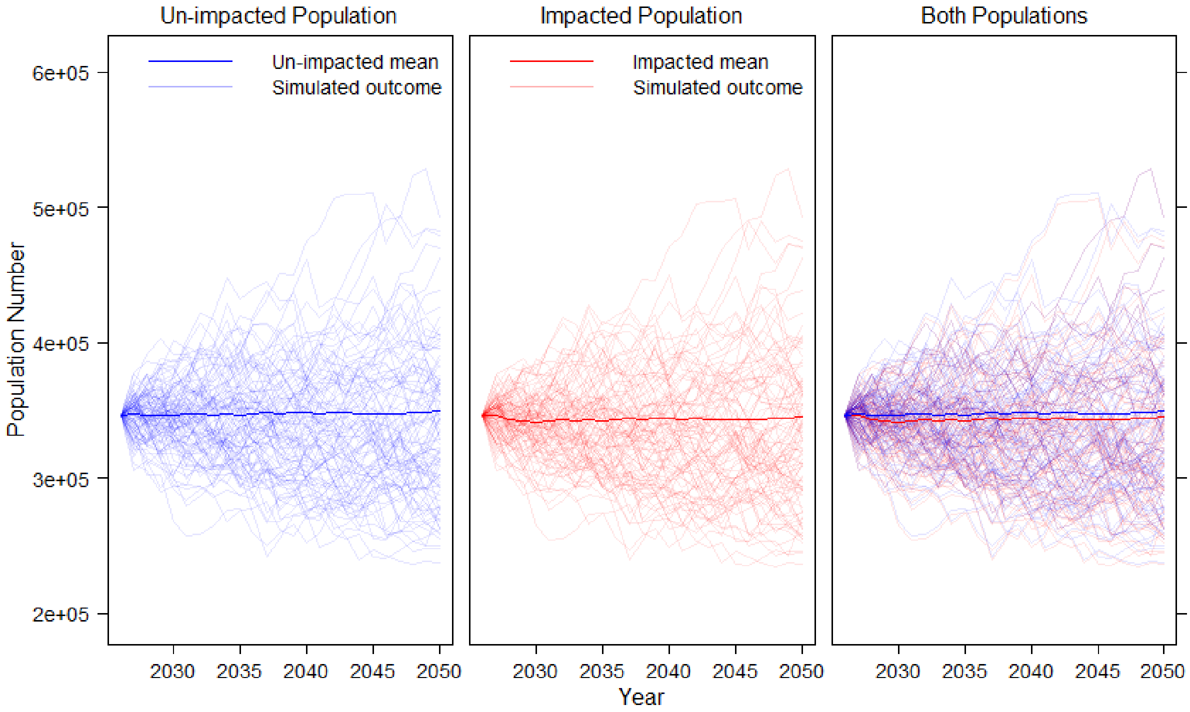


Figure 4 Results of the harbour porpoise cumulative iPCoD simulation

5.2 Harbour seal – stable

23. Table 4 and

24. Figure 5 show the results for the cumulative iPCoD simulation for harbour seals assuming a stable population. The counter-factual metric indicates that the impacted population size remains at 100% of the unimpacted population size, and the population continues on a stable trajectory. Therefore, disturbance from piling at ODOW cumulatively with the other OWF is predicted to not result in a population level effect.

Table 4 Results of the harbour seal cumulative iPCoD simulation, assuming a stable population

	Un-impacted pop mean	Impacted pop mean	Impacted mean as % unimpacted	Un-impacted pop median	Impacted pop median	Impacted median as % unimpacted	Un-impacted pop lower 2.5%	Un-impacted pop upper 97.5%	Impacted pop lower 2.5%	Impacted pop upper 97.5%
Population size at the start of 2026 before the modelling commences = 4,866										

End 2029 (end piling)	4,869	4,869	100%	4,865	4,865	100%	4,302	5,458	4,302	5,458
End 2030 – 1 year after piling ends	4,873	4,873	100%	4,878	4,878	100%	4,224	5,574	4,224	5,574
End 2035 – 6 years after piling ends	4,873	4,873	100%	4,863	4,863	100%	4,038	5,874	4,038	5,874
End 2041 – 12 years after piling ends	4,888	4,888	100%	4,846	4,846	100%	3,862	6,110	3,862	6,110
End 2047 – 18 years after piling ends	4,915	4,915	100%	4,849	4,849	100%	3,706	6,357	3,706	6,357

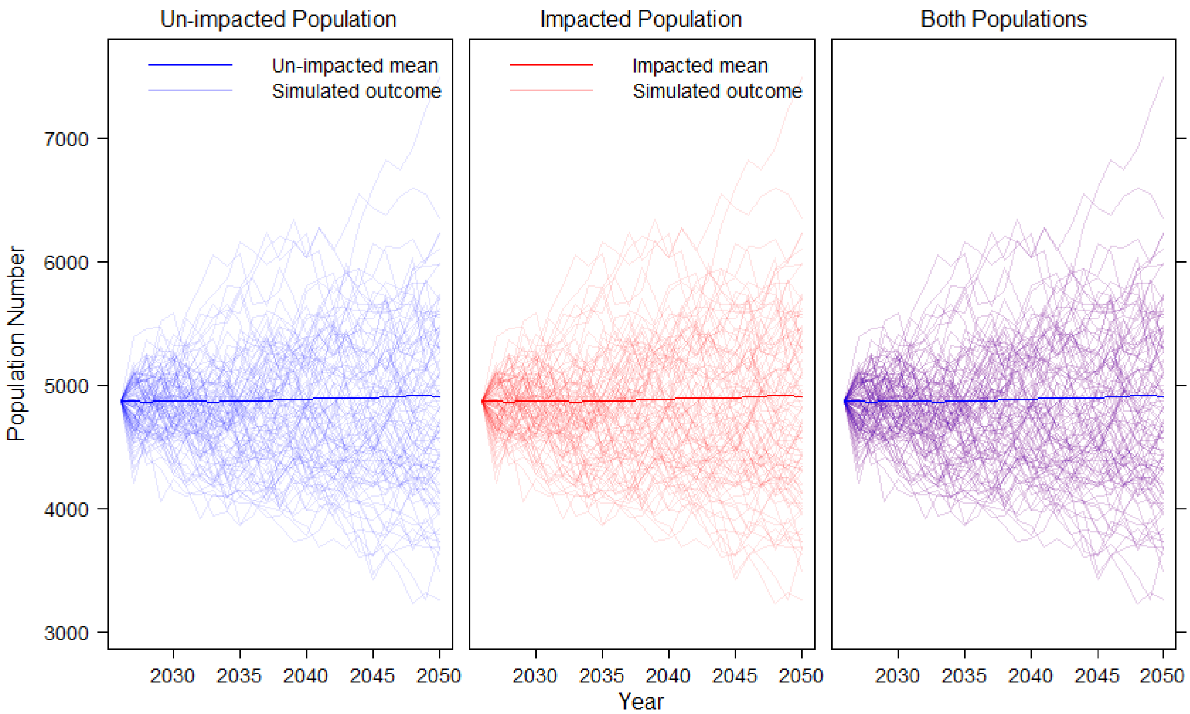


Figure 5 Results of the harbour seal cumulative iPCoD simulation, assuming a stable population

5.3 Harbour seal - decline

25. Because the SE England MU has shown a decline in recent years, the modelling was also conducted assuming a declining harbour seal population.
26. Table 5 and Figure 6 show the results for the cumulative iPCoD simulation for harbour seals assuming a declining population. The counter-factual metric indicates that the impacted population size remains at 100% of the unimpacted population size, and the population continues on a declining trajectory. Therefore, disturbance from piling at ODOW cumulatively with the other OWF is predicted to not result in a population level effect.

Table 5 Results of the harbour seal cumulative iPCoD simulation, assuming a declining population

	Un-impacted pop mean	Impacted pop mean	Impacted mean as % unimpacted	Un-impacted pop median	Impacted pop median	Impacted median as % unimpacted	Un-impacted pop lower 2.5%	Un-impacted pop upper 97.5%	Impacted pop lower 2.5%	Impacted pop upper 97.5%
Population size at the start of 2026 before the modelling commences = 4,868										
End 2029 (end piling)	3,121	3,121	100%	3,124	3,124	100%	2,644	3,624	2,644	3,624
End 2030 – 1 year after piling ends	2,786	2,786	100%	2,775	2,775	100%	2,336	3,302	2,336	3,302
End 2035 – 6 years after piling ends	1,608	1,608	100%	1,594	1,594	100%	1,228	2,026	1,228	2,026
End 2041 – 12 years after piling ends	830	830	100%	820	820	100%	580	1,144	580	1,144
End 2047 – 18 years after piling ends	429	429	100%	422	422	100%	270	632	270	632

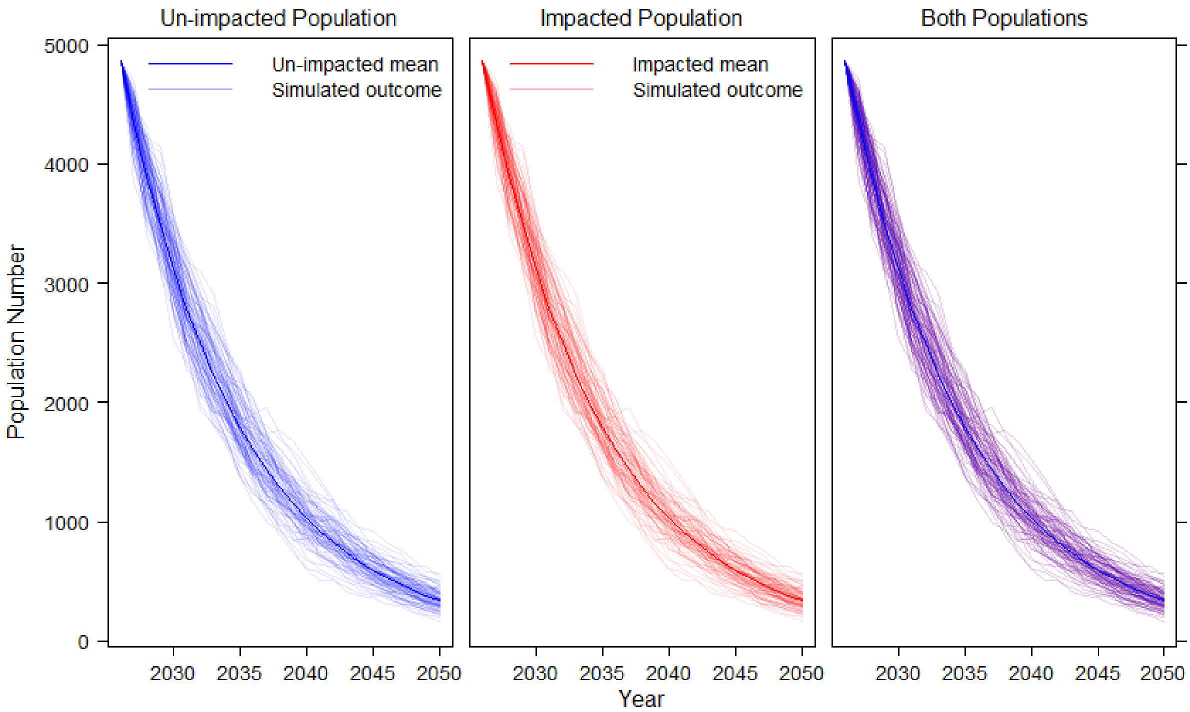


Figure 6 Results of the harbour seal cumulative iPCoD simulation, assuming a declining population

5.4 Grey seal

27. Table 6 and Figure 7 show the results for the cumulative iPCoD simulation for grey seals. The counter-factual metric indicates that the impacted population size remains at 100% of the unimpacted population size, and the population continues on an increasing trajectory. Therefore, disturbance from piling at ODOW cumulatively with the other OWF is predicted to not result in a population level effect.

Table 6 Results of the grey seal cumulative iPCoD simulation

	Un-impacted pop mean	Impacted pop mean	Impacted mean as % unimpacted	Un-impacted pop median	Impacted pop median	Impacted median as % unimpacted	Un-impacted pop lower 2.5%	Un-impacted pop upper 97.5%	Impacted pop lower 2.5%	Impacted pop upper 97.5%
Population size at the start of 2026 before the modelling commences = 65,502										
End 2029 (end piling)	67,240	67,240	100%	67,633	67,633	100%	58,200	74,990	58,200	74,990
End 2030 – 1 year after piling ends	67,618	67,618	100%	68,059	68,059	100%	57,823	75,545	57,823	75,545

End 2035 – 6 years after piling ends	69,759	69,759	100%	69,888	69,888	100%	54,908	83,718	54,908	83,718
End 2041 – 12 years after piling ends	72,462	72,462	100%	72,595	72,595	100%	53,790	91,314	53,790	91,314
End 2047 – 18 years after piling ends	75,208	75,208	100%	74,911	74,911	100%	53,273	100,580	53,273	100,580

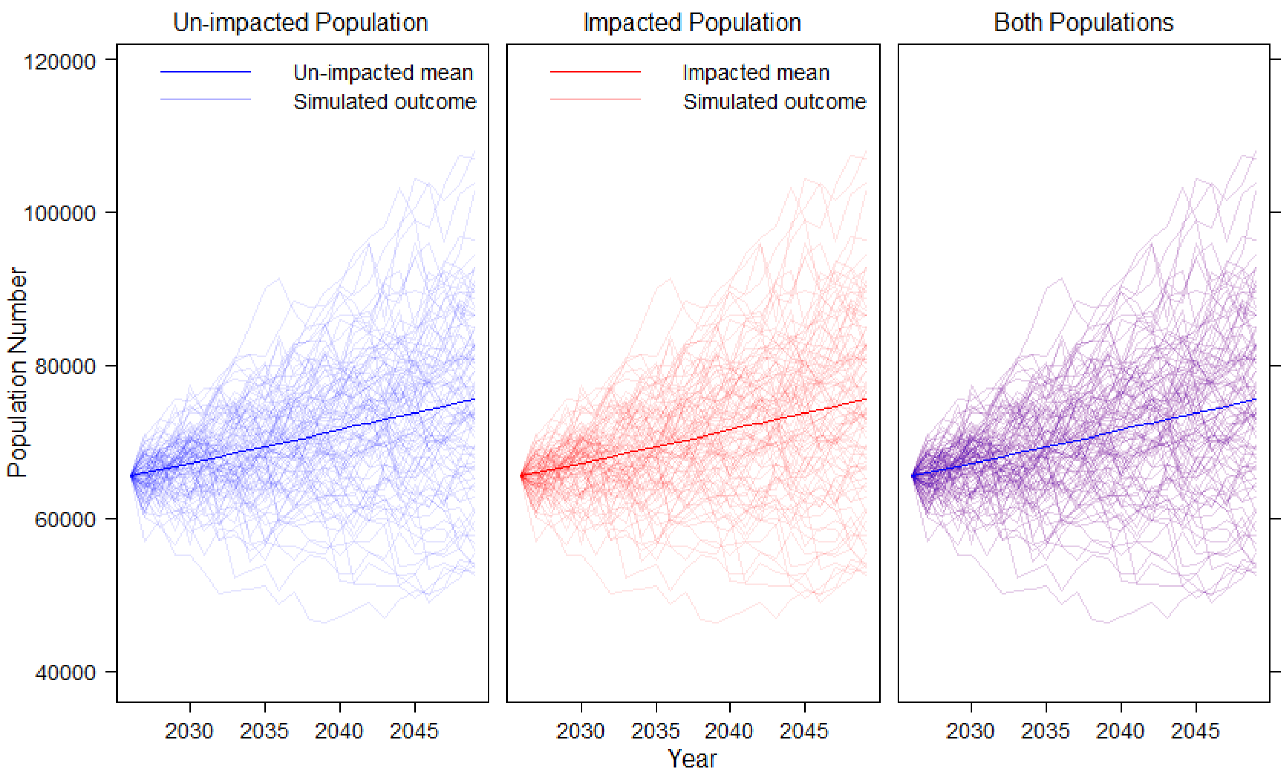


Figure 7 Results of the grey seal cumulative iPCoD simulation

6 Conclusion

28. iPCoD has shown that for the modelled levels of disturbance from piling at ODOW cumulatively with piling from other OWFs between 2026-2029, there is not predicted to be a population level effect. This aligns with the Project's Environmental Impact Assessment magnitude definition "Low", where temporary behavioural effects in a small proportion of the population may occur, and reproductive rates of individuals may be impacted in the short term (over a limited number of breeding cycles), however survival and reproductive rates very unlikely to be impacted to the extent that the population trajectory would be altered.

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