TECHNICAL NOTE

Interim PCoD modelling of marine mammal populations

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Contents

Figures & Tables

Figures

Tables

List of Acronyms

AHEP	Aberdeen Harbour Expansion Project
BOWL	Beatrice Offshore Wind Limited
FTOW	Forth and Tay Offshore Wind
ICOL	Inch Cape Offshore Limited
iPCoD	Interim Population Consequences of Disturbance
MFOW	Moray Firth Offshore Wind
MS-LOT	Marine Scotland Licensing Operations Team
MSS	Marine Scotland Science
MU	Management Unit
NnG	Neart na Gaoithe
NnGOWL	Neart na Gaoithe Offshore Wind Limited
NOAA	National Oceanic and Atmospheric Administration
SCANS	Small Cetaceans Abundance in the North Sea
SMRU	Sea Mammal Research Unit

1.0 INTRODUCTION

This report has been prepared for Neart na Gaoithe Offshore Wind Limited (NnGOWL) as part of the marine mammal impact assessment for the Neart na Gaoithe wind farm (NnG), and presents population modelling results for assessing potential impacts that underwater noise generated during the construction of NnG and other developments may have on marine mammal species.

The interim Population Consequences of Disturbance (iPCoD) model framework (iPCoD version 3) has been used to assess the population viability of harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), minke whale (*Balaenoptera acutorostrata*), grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*) in the context of wind farm and harbour developments in eastern Scotland.

For each of the marine mammal species considered, population modelling has been conducted for a number of scenarios involving pile-driving at NnG. Specifically, for the NnG wind farm, the population modelling has been conducted to assess potential impacts from:

- Noise generated from pile-driving at NnG on its own, with one pile-driving vessel operating for 15 months (hereafter referred to as the *NnG single pile-driving* scenario); and
- Noise generated from pile-driving at NnG on its own, with two piling vessels operating concurrently for nine months (hereafter referred to as the *NnG concurrent pile-driving* scenario);

As well as assessing potential impacts from pile-driving at NnG, noise generated from a succession of east coast of Scotland renewables and harbour development projects (hereafter referred to as the *cumulative/in-combination* scenario) has also been considered. In addition to pile-driving at NnG, the cumulative/in-combination scenario has considered noise generated by other Forth and Tay Offshore Wind (FTOW) projects as well as other east of Scotland developments. Specifically, the following projects have been considered in the cumulative/in-combination scenario:

- Beatrice Offshore Wind Limited (BOWL)
- Aberdeen Harbour Expansion Project (AHEP)
- Moray East
- Inch Cape Offshore Limited (ICOL)
- Seagreen A
- Seagreen B
- Moray West

The remainder of this report is organised as follows: Section 2.0 presents the input parameters that have been used in the iPCoD population modelling (including management unit areas and

populations, vulnerable sub-populations, and marine mammal demographic parameters). The modelled scenarios and results of the population modelling are then presented in Section 3.0.

2.0 POPULATION MODELLING INPUTS

This section presents the population modelling input parameters that are common to all iPCoD population model scenarios. Input parameters that are specific to individual population modelling scenarios (such as the estimated number of animals experiencing PTS or disturbance) will be discussed in the following section.

2.1 Management Units and Population Sizes

Potential impacts to marine mammal species have been assessed in relation to management unit (MU) areas and MU populations sizes. The MU areas (see Figure 2-1) and population sizes that have been used in the marine mammal impact assessment are as follows:

- Harbour porpoise: North Sea MU (IAMMWG, 2015) – 333,809 animals (JNCC, 2017);
- Bottlenose dolphin: East Coast MU (IAMMWG, 2015) – 195 animals (as advised in Scoping Opinion; NnGOWL, 2017);
- Minke whale: Celtic and Greater North Sea MU (IAMMWG, 2015) – 11,820 animals (JNCC, 2017);
- Grey seal: East Coast Scotland seal management area – 9,607 animals (population of MU area (Duck *et al.*, 2016) scaled to account for time spent hauled out as per Russel *et al.*, 2016); and
- Harbour seal: East Coast Scotland seal management area – 311 animals (population of MU area (Duck *et al.*, 2016) scaled to account for time spent hauled out as per Sparling *et al.*, 2012).

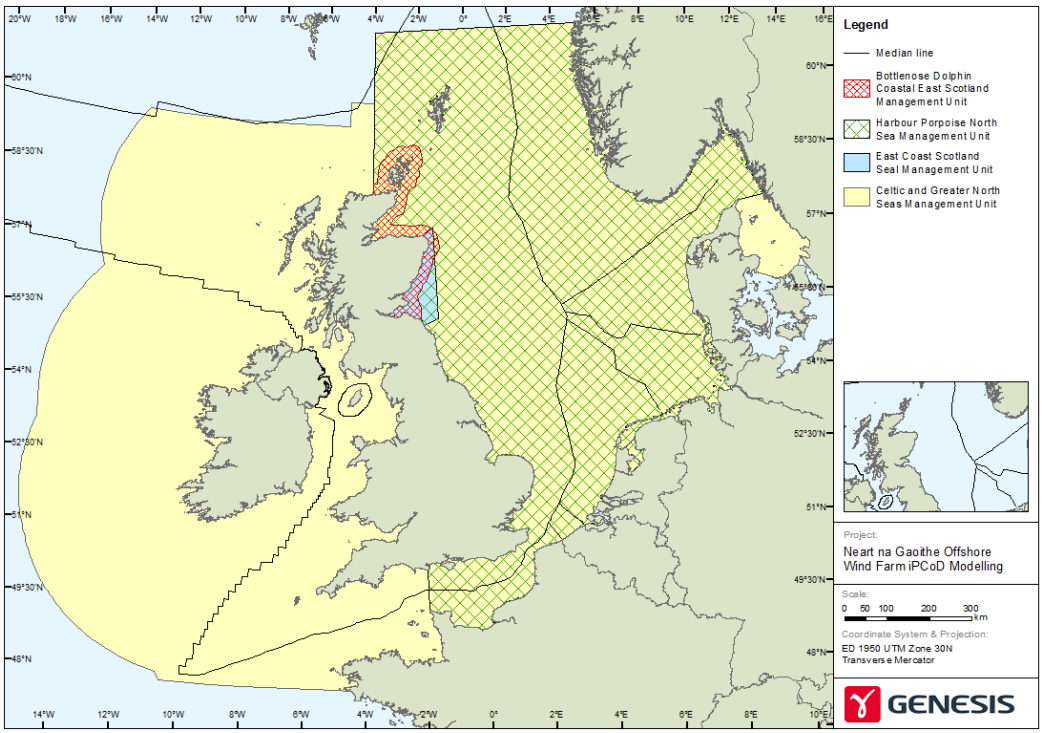

Figure 2-1: Management Unit areas used for assessing potential impacts.

2.2 Vulnerable Sub-populations

Within the iPCoD framework it is possible to specify vulnerable sub-populations that will be impacted by different projects. In the iPCoD modelling, it has been assumed that the FTOW projects (i.e. NnG, ICOL, Seagreen) and AHEP impacted upon different sub-populations to the Moray Firth developments (BOWL, Moray East and Moray West). The species sub-populations that may be impacted by different projects are summarised in Table 2-1, and discussed in more detail in the following sections.

Table 2-1: Vulnerable sub-populations specified in the iPCoD model

Projects	Marine Mammal Species	Management Unit (Population)	Vulnerable sub-population	Percentage of MU that is potentially vulnerable to project
FTOW Projects (i.e. NnG, ICOL, Seagreen) and AHEP	Harbour Porpoise	North Sea MU (333,809 harbour porpoise)	38,646	12%
	Bottlenose Dolphin	East Coast MU (195 bottlenose dolphin)	98	50%
	Minke Whale	Celtic and Greater North Sea MU (11,820 Minke whale)	2,498	21%
	Grey Seal	East Coast Scotland Seal MU (9,607 grey seal)	9,607	100%

Projects	Marine Mammal Species	Management Unit (Population)	Vulnerable sub-population	Percentage of MU that is potentially vulnerable to project
	Harbour Seal	East Coast Scotland Seal MU (311 harbour seal)	311	100%
Moray Firth Projects (i.e. BOWL, Moray East and Moray West)	Harbour Porpoise	North Sea MU (333,809 harbour porpoise)	6,147	2%
	Bottlenose Dolphin	East Coast MU (195 bottlenose dolphin)	97	50%
	Minke Whale	Celtic and Greater North Sea MU (11,820 Minke whale)	383	3%
	Grey Seal	East Coast Scotland Seal MU (9,607 grey seal)	0	0%
	Harbour Seal	East Coast Scotland Seal MU (311 harbour seal)	0	0%

2.2.1 Harbour porpoise

Potential impacts to harbour porpoise have been assessed in relation to the harbour porpoise North Sea MU area (IAMMWG, 2015), which has an estimated population size of 333,809 harbour porpoise (JNCC, 2017). It has been assumed in the iPCoD modelling that the FTOW projects and AHEP could impact upon the population of harbour porpoise within SCANS-III block R, which has an estimated abundance of 38,646 (Hammond *et al.*, 2017) and accounts for 12% of the North Sea MU population. It has also been assumed in the iPCoD modelling that the Moray Firth projects could impact upon the population of harbour porpoise within SCANS-III block S, which has an estimated abundance of 6,147 (Hammond *et al.*, 2017) and accounts for approximately 2% of the North Sea MU population.

2.2.2 Bottlenose dolphin

Potential impacts to bottlenose dolphin have been assessed in relation to the bottlenose dolphin East Coast MU (IAMMWG, 2015), which has an estimated 195 bottlenose dolphin (as advised in Scoping Opinion; NnGOWL, 2017). In the iPCoD population modelling it has been assumed that FTOW could impact upon 50 % of bottlenose dolphin in the MU population, and the Moray Firth projects could impact upon the remaining 50 % of bottlenose dolphin (NnGOWL, 2017).

2.2.3 Minke whale

Potential impacts to Minke Whale have been assessed in relation to the Minke whale Celtic and Greater North Sea MU (IAMMWG, 2015), which has an estimated population size of 11,820 Minke whale (JNCC, 2017). It has been assumed in the iPCoD modelling that the FTOW projects and AHEP could impact upon the population of Minke whale within SCANS-III

block R, which has an estimated abundance of 2,498 (Hammond *et al.*, 2017) and accounts for 21% of the MU population. It has also been assumed in the iPCoD modelling that the Moray Firth projects could impact upon the population of Minke whale within SCANS-III block S, which has an estimated abundance of 383 (Hammond *et al.*, 2017) and accounts for approximately 3% of the MU population.

2.2.4 Grey seal

Potential impacts to grey seals have been assessed in relation to the East Coast Scotland seal management area. An estimated MU population size of 9,607 grey seals has been used in the assessment, which is based on the population estimate in Duck *et al.*, (2016) scaled to account for time spent hauled out as per Russel *et al.*, (2016). It has been assumed in the iPCoD modelling that the FTOW projects and AHEP could impact upon 100% of the grey seal MU population.

2.2.5 Harbour seal

Potential impacts to harbour seal have been assessed in relation to the East Coast Scotland seal management area. An estimated MU population size of 311 harbour seals has been used in the assessment, which is based on the population estimate in Duck *et al.*, (2016) scaled to account for time spent hauled out as per Sparling *et al.*, (2012). It has been assumed in the iPCoD modelling that the FTOW projects and AHEP could impact upon 100% of the grey seal MU population.

2.3 Demographic Parameters

Demographic parameters for the five marine mammal species assessed in this report were taken from the SMRU Consulting Harwood & King (2017) report for the relevant management unit. The demographic parameters used in all iPCoD modelling scenarios are presented in Table 2-2 for the different marine mammal species assessed.

Table 2-2: Demographic parameters used for each species

Species	Growth rate	Age 1 (age at independence)	Age 2 (age at first breeding)	Calf survival	Juvenile survival	Adult survival	Fecundity
Harbour porpoise	1	1	5	0.6	0.85	0.925	0.44
Bottlenose dolphin	1.018	2	9	0.9	0.94	0.945	0.3
Minke whale	1	1	9	0.70	0.77	0.96	0.90

Species	Growth rate	Age 1 (age at independence)	Age 2 (age at first breeding)	Calf survival	Juvenile survival	Adult survival	Fecundity
Harbour seal	0.82	1	4	0.50	0.50	0.75	0.88
Grey seal	1.01	1	5	0.21	0.94	0.94	0.84

3.0 MODELLED SCENARIOS AND RESULTS

This section introduces the different modelling scenarios that have been considered and presents the results of the iPCoD population modelling. Each population modelling scenario was run for 1,000 iterations over 25 years.

3.1 NnG Single Pile-driving Scenario

This section presents the population modelling results for the scenario involving single pile-driving at NnG. This scenario considers the impacts from noise generated by a single pile-driving vessel operating at NnG and no other impacts from any other development. NnG engineers advised that pile-driving for 15 months was a worst case duration under the assumption that only a single vessel would be used at any time, and this has been adopted in the iPCoD modelling.

3.1.1 Number of animals potentially experiencing PTS onset

The number of animals that may potentially experience PTS onset for the NnG single pile-driving scenario has been calculated using the areas of estimated PTS using the NOAA PTS thresholds (see Appendix 8.1: Noise modelling), along with the best available evidence on species density and distribution.

The predicted areas where marine mammals may experience potential PTS onset, the utilised species densities, and the estimated number of animals that may experience PTS onset are shown in Table 3-1 for the NnG single pile-driving scenario.

Table 3-1: Predicted number of animals that may potentially experience PTS onset from single pile-driving at NnG.

Species	Predicted area where animals may experience PTS onset	Species density	Estimated number of animals that may experience PTS onset
Harbour porpoise	127.276 km^2	0.599 animals/km^2 (see Note 1)	77
Bottlenose Dolphin	0 km^2 (see Note 2)	0.070 animals/km^2 (see Note 3)	0
Minke whale	344.357 km^2	0.039 animals/km^2 (see Note 1)	14
Grey seal	0.706 km^2	Variable (see Note 4)	1
Harbour seal	0.706 km^2	Variable (see Note 4)	1

Note 1: Density of animals in SCANS III Block R (Hammond *et al.*, 2017).

Note 2: The predicted area of PTS did not overlap with the bottlenose dolphin management unit area and hence the predicted area where animals may experience PTS onset is 0 km^2.

Note 3: Density has been estimated based on the predicted management unit population and area (IAMMWG, 2015) and assuming a uniform distribution of animals.

Note 4: Number of seals that could potentially experience the onset of PTS has been estimated using seal distribution maps (SMRU and Marine Scotland, 2017). The number of seals that could experience PTS onset has been calculated by estimating the number of seals within the predicted PTS area using the seal distribution maps.

3.1.2 Number of animals potentially experiencing behavioural disturbance

The number of animals that could potentially experience behavioural disturbance for the NnG single pile-driving scenario has also been calculated using the results from the underwater noise modelling (see Appendix 8.1: Noise modelling). Using the dose response curve methodology described in Appendix 8.1: Noise modelling, the probability of behavioural disturbance to all marine mammals has been calculated for different SEL bands. The number of animals that could experience behavioural disturbance can then be calculated for each SEL band by multiplying the animal density (see Table 3-1), the area of the SEL band that overlaps with the MU area, and the probability of behavioural disturbance for that SEL band. Finally, the total number of animals that could suffer behavioural disturbance is given by the sum of animals in all SEL bands. The estimated number of animals that could experience behavioural disturbance for the NnG single pile-driving scenario is shown in Table 3-2.

3.1.3 iPCoD population model results

As suggested in the scoping opinion (NnGOWL, 2017), results from the iPCoD modelling have been used to report a number of summary statistics including, the median of the impacted to unimpacted population ratio (i.e. the median of the disturbed to undisturbed population size), the median of the ratio of impacted to unimpacted annual growth rate (i.e. the median of the ratio of disturbed to undisturbed annual growth rate), and the centile for the unimpacted population size that matches the 50th centile for the impacted population size. These summary statistics are reported in Table 3-3 for all marine mammal species for the NnG single pile-driving scenario.

The probability of population decline (and median annual percentage population decline), and predicted changes in population size have also been estimated for each of the marine mammal species. The predicted probability of population decline (and median annual percentage population decline), and changes in population size are presented in Table 3-4 to Table 3-13 for the NnG single pile-driving scenario. These results are also shown graphically in Section A.1 in Appendix A. The predicted disturbed and undisturbed population size centiles from 0.01 to 0.99 are also provided in Section A.1 in Appendix A.

Table 3-2: Predicted disturbance areas and number of animals that may experience potential behavioural disturbance for the NnG single pile-driving scenario.

SEL band (dB re 1 μPa²s)	Probability of disturbance (%)	Harbour porpoise		Bottlenose dolphin		Minke whale		Grey seal		Harbour seal	
		Area of MU disturbed (km²)	Number of animals disturbed	Area of MU disturbed (km²)	Number of animals disturbed	Area of MU disturbed (km²)	Number of animals disturbed	Area of MU disturbed (km²)	Number of animals disturbed	Area of MU disturbed (km²)	Number of animals disturbed
> 200	99.89%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195 - 200	99.49%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
190 - 195	99.05%	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00
185 - 190	98.23%	0.04	0.03	0.00	0.00	0.04	0.00	0.04	0.01	0.04	0.00
180 - 185	96.74%	0.25	0.15	0.00	0.00	0.25	0.01	0.25	0.05	0.25	0.00
175 - 180	94.06%	2.20	1.24	0.00	0.00	2.20	0.08	2.20	0.40	2.20	0.00
170 - 175	89.42%	8.26	4.43	0.00	0.00	8.26	0.29	8.26	1.44	8.26	0.01
165 - 170	81.86%	33.41	16.38	0.00	0.00	33.41	1.07	33.41	5.36	33.41	0.03
160 - 165	70.68%	110.81	46.91	0.00	0.00	110.81	3.05	110.81	15.27	110.81	0.10
155 - 160	56.28%	318.09	107.23	0.00	0.00	318.09	6.98	318.09	38.33	318.09	0.30
150 - 155	40.73%	669.17	163.27	0.43	0.01	669.17	10.63	669.17	78.70	669.17	1.02
145 - 150	26.85%	1,101.07	177.07	8.23	0.15	1,101.07	11.53	1,101.07	103.88	1,101.07	4.11
140 - 145	16.39%	1,942.20	190.64	23.88	0.27	1,942.20	12.41	1,942.20	112.06	1,942.20	1.48
135 - 140	9.47%	2,955.65	167.73	48.43	0.32	2,955.65	10.92	2,955.65	98.49	2,955.65	0.45
130 - 135	5.29%	9,511.42	301.54	74.69	0.28	9,511.42	19.63	9,511.42	366.41	9,511.42	0.33
Total number of animals disturbed		1,177		2		77		821		8	

Table 3-3: Statistics derived from population modelling for the NnG single pile-driving scenario.

Year	Median of impacted to unimpacted population ratio	Median of the ratio of impacted to unimpacted annual growth rate	Centile for unimpacted population that matches the 50th centile for impacted population
Harbour porpoise			
1	1.000	1.000	0.50
6	0.987	0.997	0.42
12	0.969	0.997	0.37
18	0.962	0.998	0.36
24	0.959	0.998	0.39
Bottlenose dolphin			
1	1.000	1.000	0.45
6	1.016	1.003	0.54
12	1.033	1.003	0.57
18	1.048	1.003	0.60
24	1.063	1.003	0.62
Minke whale			
1	1.000	1.000	0.51
6	0.957	0.992	0.25
12	0.878	0.989	0.06
18	0.850	0.991	0.05
24	0.839	0.993	0.08
Grey seal			
1	1.000	1.000	0.50
6	0.945	0.987	0.16
12	0.953	0.994	0.28
18	0.951	0.996	0.31
24	0.950	0.997	0.32
Harbour seal (see Note 1)			
1	1.083	1.085	0.82
6	1.038	1.004	0.54
12	0.778	0.982	0.27
18	1.000	1.000	0.37
24	1.000	1.000	0.01

Note 1: The iPCoD modelling estimated that harbour seal populations could decline to 0 animals in some simulations. These simulations have been excluded when calculating statistics based on ratios in order to avoid spurious results arising from divisions by 0. Furthermore, in cases where the population size has been estimated to decline to 0 animals, the centile for unimpacted population that matches the 50th

centile for impacted population is not considered to be a robust metric (the results are still presented but should be treated with a high degree of caution).

Table 3-4: Probability of decline in harbour porpoise population for the NnG single pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.400	0.313	0.126	-0.083
6	0.427	0.170	0.001	-0.772
12	0.404	0.090	0.000	-0.792
18	0.334	0.031	0.000	-0.721
24	0.307	0.014	0.000	-0.675
Undisturbed population				
1	0.400	0.313	0.126	-0.082
6	0.344	0.118	0.001	-0.490
12	0.276	0.046	0.000	-0.491
18	0.231	0.015	0.000	-0.484
24	0.208	0.008	0.000	-0.497

Table 3-5: Predicted change in harbour porpoise population for the NnG single pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	309,244	333,532	351,491
6	282,201	318,648	361,308
12	252,630	303,414	355,153
18	240,727	293,048	356,897
24	223,548	283,733	359,889
Undisturbed population			
1	309,250	333,535	351,491
6	285,561	324,113	367,716
12	263,940	314,675	369,895
18	250,609	305,878	372,304
24	234,112	296,184	373,476

Table 3-6: Probability of decline in bottlenose dolphin population for the NnG single pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.303	0.255	0.133	2.041
6	0.099	0.047	0.005	1.944
12	0.019	0.004	0.000	1.912
18	0.006	0.001	0.000	1.920
24	0.001	0.000	0.000	1.874
Undisturbed population				
1	0.301	0.237	0.104	2.041
6	0.095	0.033	0.000	1.633
12	0.017	0.004	0.000	1.702
18	0.005	0.001	0.000	1.626
24	0.001	0.000	0.000	1.616

Table 3-7: Predicted change in bottlenose dolphin population for the NnG single pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	180	200	220
6	174	220	268
12	184	246	318
18	198	276	370
24	216	306	420
Undisturbed population			
1	182	200	216
6	178	216	256
12	186	240	302
18	196	262	346
24	204	288	388

Table 3-8: Probability of decline in Minke whale population for the NnG single pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.361	0.264	0.093	0.195
6	0.449	0.177	0.000	-0.867
12	0.581	0.176	0.000	-1.174
18	0.486	0.043	0.000	-0.981
24	0.326	0.007	0.000	-0.772
Undisturbed population				
1	0.363	0.263	0.093	0.186
6	0.214	0.036	0.000	-0.078
12	0.094	0.003	0.000	-0.072
18	0.046	0.000	0.000	-0.130
24	0.034	0.000	0.000	-0.106

Table 3-9: Predicted change in Minke whale population for the NnG single pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	11,076	11,843	12,448
6	9,956	11,218	12,546
12	8,658	10,258	12,183
18	8,254	9,898	12,050
24	8,014	9,814	11,940
Undisturbed population			
1	11,076	11,842	12,443
6	10,530	11,765	13,028
12	10,254	11,718	13,446
18	9,932	11,547	13,724
24	9,564	11,523	13,721

Table 3-10: Probability of decline in grey seal population for the NnG single pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.314	0.223	0.067	0.614
6	0.428	0.237	0.028	-0.654
12	0.162	0.035	0.000	0.091
18	0.076	0.006	0.000	0.210
24	0.035	0.001	0.000	0.313
Undisturbed population				
1	0.314	0.223	0.067	0.614
6	0.110	0.032	0.000	0.655
12	0.056	0.008	0.000	0.657
18	0.019	0.000	0.000	0.626
24	0.011	0.000	0.000	0.650

Table 3-11: Predicted change in grey seal population for the NnG single pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	9,040	9,667	10,220
6	7,399	9,237	10,773
12	7,662	9,713	11,885
18	7,731	9,978	12,630
24	7,768	10,357	13,692
Undisturbed population			
1	9,040	9,667	10,220
6	8,706	9,992	11,338
12	8,442	10,393	12,589
18	8,524	10,751	13,555
24	8,602	11,224	14,676

Table 3-12: Probability of decline in harbour seal population for the NnG single pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.973	0.961	0.911	-13.462
6	1.000	1.000	1.000	-19.644
12	1.000	1.000	1.000	-21.928
18	1.000	1.000	1.000	-21.498
24	1.000	1.000	1.000	-100.000
Undisturbed population				
1	0.998	0.996	0.988	-19.872
6	1.000	1.000	1.000	-19.966
12	1.000	1.000	1.000	-20.462
18	1.000	1.000	1.000	-21.498
24	1.000	1.000	1.000	-100.000

Table 3-13: Predicted change in harbour seal population for the NnG single pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	238	270	302
6	52	84	126
12	4	16	40
18	0	4	16
24	0	0	8
Undisturbed population			
1	218	250	284
6	56	82	116
12	6	20	40
18	0	4	16
24	0	0	8

3.2 NnG Concurrent Pile-driving Scenario

This section presents the population modelling results for the scenario involving concurrent pile-driving at NnG. This scenario considers the impacts from noise generated by a multiple pile-driving vessels operating at NnG and no other impacts from any other development. NnG engineers advised that pile-driving for 9 months was a worst case duration under the assumption that two pile-driving vessels would be used at any single time, and this has been adopted in the iPCoD modelling.

3.2.1 Number of animals potentially experiencing PTS onset

The number of animals that may potentially experience PTS onset for the NnG concurrent pile-driving scenario has been calculated using the areas of estimated PTS using the NOAA PTS thresholds (see Appendix 8.1: Noise modelling), along with the best available evidence on species density and distribution.

The predicted areas where marine mammals may potentially experience PTS onset, the utilised species densities and the estimated number of animals that may experience PTS onset are shown in Table 3-14 for the NnG concurrent pile-driving scenario.

Table 3-14: Predicted number of animals that may potentially experience PTS onset from concurrent pile-driving at NnG.

Species	Predicted area where animals may experience PTS onset	Species density	Estimated number of animals that may experience PTS onset
Harbour porpoise	240.251 km^2	0.599 animals/km^2 (see Note 1)	144
Bottlenose Dolphin	0 km^2 (see Note 2)	0.070 animals/km^2 (see Note 3)	0
Minke whale	564.483 km^2	0.039 animals/km^2 (see Note 1)	23
Grey seal	1.30591 km^2	Variable (see Note 4)	1
Harbour seal	1.30591 km^2	Variable (see Note 4)	1

Note 1: Density of animals in SCANS III Block R (Hammond *et al.*, 2017).

Note 2: The predicted area of PTS did not overlap with the bottlenose dolphin management unit area and hence the predicted area where animals may experience PTS onset is 0 km^2.

Note 3: Density has been estimated based on the predicted management unit population and area (IAMMWG, 2015) and assuming a uniform distribution of animals.

Note 4: Number of seals that could potentially experience the onset of PTS has been estimated using seal distribution maps (SMRU and Marine Scotland, 2017). The number of seals that could experience PTS onset has been calculated by estimating the number of seals within the predicted PTS area using the seal distribution maps.

3.2.2 Number of animals potentially experiencing behavioural disturbance

The number of animals that could potentially experience behavioural disturbance for the NnG cumulative/in-combination scenario has also been calculated using the results from the underwater noise modelling (see Appendix 8.1: Noise modelling). Using the dose response curve methodology described in Appendix 8.1: Noise modelling, the probability of behavioural disturbance to all marine mammals has been calculated for different SEL bands. The number of animals that could experience behavioural disturbance can then be calculated for each SEL band by multiplying the animal density (see Table 3-14), the area of the SEL band that overlaps with the MU area, and the probability of behavioural disturbance for that SEL band. Finally, the total number of animals that could suffer behavioural disturbance is given by the sum of animals in all SEL bands. The estimated number of animals that could experience behavioural disturbance for the NnG concurrent pile-driving scenario is shown in Table 3-15.

3.2.3 iPCoD population model results

As suggested in the scoping opinion (NnGOWL, 2017), results from the iPCoD modelling have been used to estimate the median of the impacted to unimpacted population ratio (i.e. the median of the disturbed to undisturbed population size), the median of the ratio of impacted to unimpacted annual growth rate (i.e. the median of the ratio of disturbed to undisturbed annual growth rate), and the centile for the unimpacted population size that matches the 50th centile for the impacted population size. These statistics are reported in Table 3-16 for all marine mammal species for the NnG concurrent pile-driving scenario.

The probability of population decline (and median annual percentage population decline), and predicted changes in population size have also been estimated for each of the marine mammal species. The predicted probability of population decline (and median annual percentage population decline), and changes in population size are presented in Table 3-17 to Table 3-26 for the NnG concurrent pile-driving scenario. These results are also shown graphically in Section A.2 in Appendix A. The predicted disturbed and undisturbed population size centiles from 0.01 to 0.99 are also provided in Section A.2 in Appendix A.

Table 3-15: Predicted disturbance areas and number of animals that may potentially experience behavioural disturbance for the NnG concurrent pile-driving scenario.

SEL band (dB re 1 μPa^2s)	Probability of disturbance (%)	Harbour porpoise		Bottlenose dolphin		Minke whale		Grey seal		Harbour seal	
		Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed
> 200	99.89%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195 - 200	99.49%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
190 - 195	99.05%	0.02	0.01	0.00	0.00	0.02	0.00	0.02	0.00	0.02	0.00
185 - 190	98.23%	0.09	0.06	0.00	0.00	0.09	0.00	0.09	0.02	0.09	0.00
180 - 185	96.74%	0.64	0.37	0.00	0.00	0.64	0.02	0.64	0.09	0.64	0.00
175 - 180	94.06%	4.43	2.50	0.00	0.00	4.43	0.16	4.43	0.69	4.43	0.00
170 - 175	89.42%	16.88	9.04	0.00	0.00	16.88	0.59	16.88	2.48	16.88	0.01
165 - 170	81.86%	70.82	34.73	0.00	0.00	70.82	2.26	70.82	9.67	70.82	0.06
160 - 165	70.68%	283.49	120.02	0.00	0.00	283.49	7.81	283.49	33.07	283.49	0.22
155 - 160	56.28%	565.94	190.77	0.00	0.00	565.94	12.42	565.94	64.59	565.94	0.48
150 - 155	40.73%	988.21	241.12	3.20	0.09	988.21	15.70	988.21	132.61	988.21	1.52
145 - 150	26.85%	1,518.65	244.22	15.43	0.29	1,518.65	15.90	1,518.65	147.26	1518.65	5.16
140 - 145	16.39%	2,280.36	223.83	37.70	0.43	2,280.36	14.57	2,280.36	176.44	2280.36	1.00
135 - 140	9.47%	5,078.42	288.19	49.46	0.33	5,078.42	18.76	5,078.42	581.90	5078.42	1.23
130 - 135	5.29%	16,545.62	524.54	74.15	0.27	16,545.62	34.15	16,545.62	207.48	16545.62	0.22
Total number of animals disturbed		1,880		2		123		1,357		10	

Table 3-16: Statistics derived from population modelling for the NnG concurrent pile-driving scenario.

Year	Median of impacted to unimpacted population ratio	Median of the ratio of impacted to unimpacted annual growth rate	Centile for unimpacted population that matches the 50th centile for impacted population
Harbour porpoise			
1	1.000	1.000	0.51
6	0.982	0.996	0.39
12	0.964	0.996	0.34
18	0.958	0.997	0.36
24	0.954	0.998	0.39
Bottlenose dolphin			
1	1.000	1.000	0.53
6	1.010	1.002	0.53
12	1.027	1.003	0.58
18	1.043	1.002	0.60
24	1.058	1.002	0.60
Minke whale			
1	1.000	1.000	0.50
6	0.954	0.991	0.23
12	0.883	0.990	0.05
18	0.856	0.992	0.05
24	0.845	0.993	0.07
Grey seal			
1	1.000	1.000	0.50
6	0.976	0.992	0.28
12	0.975	0.996	0.35
18	0.974	0.997	0.36
24	0.973	0.998	0.38
Harbour seal			
1	1.083	1.083	0.83
6	1.037	1.004	0.52
12	0.923	0.993	0.40
18	1.000	1.000	0.33
24	1.000	1.000	0.01

Note 1: The iPCoD modelling estimated that harbour seal populations could decline to 0 animals in some simulations. These simulations have been excluded when calculating statistics based on ratios in order to avoid spurious results arising from divisions by 0. Furthermore, in cases where the population size has been estimated to decline to 0 animals, the centile for unimpacted population that matches the 50th

centile for impacted population is not considered to be a robust metric (the results are still presented but should be treated with a high degree of caution).

Table 3-17: Probability of decline in harbour porpoise population for the NnG concurrent pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.414	0.301	0.124	-0.227
6	0.435	0.183	0.001	-0.794
12	0.435	0.114	0.000	-0.868
18	0.340	0.042	0.000	-0.701
24	0.304	0.015	0.000	-0.655
Undisturbed population				
1	0.414	0.301	0.124	-0.228
6	0.320	0.127	0.000	-0.414
12	0.285	0.059	0.000	-0.510
18	0.219	0.017	0.000	-0.450
24	0.195	0.009	0.000	-0.456

Table 3-18: Predicted change in harbour porpoise population for the NnG concurrent pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	309,691	333,049	351,404
6	278,118	318,214	358,502
12	249,226	300,651	360,510
18	234,162	294,123	363,072
24	217,632	285,131	359,564
Undisturbed population			
1	309,695	333,046	351,408
6	283,720	325,595	366,019
12	259,965	313,944	374,337
18	245,088	307,767	382,220
24	230,827	299,137	373,213

Table 3-19: Probability of decline in bottlenose dolphin population for the NnG concurrent pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.345	0.280	0.146	2.041
6	0.151	0.079	0.010	1.633
12	0.034	0.007	0.000	1.702
18	0.014	0.005	0.000	1.753
24	0.009	0.001	0.000	1.704
Undisturbed population				
1	0.344	0.281	0.121	1.020
6	0.123	0.052	0.002	1.396
12	0.026	0.005	0.000	1.415
18	0.013	0.003	0.000	1.495
24	0.004	0.001	0.000	1.467

Table 3-20: Predicted change in bottlenose dolphin population for the NnG concurrent pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	180	200	220
6	166	216	260
12	182	240	308
18	188	268	358
24	202	294	408
Undisturbed population			
1	182	198	216
6	172	213	250
12	184	232	294
18	184	256	332
24	192	278	374

Table 3-21: Probability of decline in Minke whale population for the NnG concurrent pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.367	0.268	0.090	0.127
6	0.521	0.201	0.000	-1.054
12	0.598	0.167	0.000	-1.192
18	0.477	0.037	0.000	-0.958
24	0.326	0.012	0.000	-0.792
Undisturbed population				
1	0.366	0.267	0.091	0.135
6	0.238	0.044	0.000	-0.184
12	0.091	0.003	0.000	-0.153
18	0.046	0.001	0.000	-0.103
24	0.024	0.000	0.000	-0.139

Table 3-22: Predicted change in Minke whale population for the NnG concurrent pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	11,070	11,835	12,432
6	9,834	11,092	12,430
12	8,707	10,236	12,026
18	8,332	9,939	12,050
24	8,098	9,767	12,128
Undisturbed population			
1	11,074	11,836	12,436
6	10,498	11,690	12,978
12	10,282	11,605	13,349
18	9,944	11,602	13,664
24	9,664	11,432	13,861

Table 3-23: Probability of decline in grey seal population for the NnG concurrent pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.287	0.206	0.052	0.895
6	0.321	0.194	0.011	-0.169
12	0.150	0.036	0.000	0.223
18	0.076	0.003	0.000	0.371
24	0.046	0.001	0.000	0.399
Undisturbed population				
1	0.287	0.206	0.052	0.895
6	0.130	0.031	0.000	0.633
12	0.057	0.006	0.000	0.634
18	0.023	0.001	0.000	0.665
24	0.013	0.000	0.000	0.643

Table 3-24: Predicted change in grey seal population for the NnG concurrent pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	9,100	9,694	10,256
6	7,683	9,511	10,908
12	7,698	9,868	12,121
18	7,702	10,270	13,193
24	7,691	10,571	14,152
Undisturbed population			
1	9,100	9,694	10,256
6	8,670	9,979	11,314
12	8,426	10,365	12,619
18	8,342	10,826	13,716
24	8,333	11,206	14,718

Table 3-25: Probability of decline in harbour seal population for the NnG concurrent pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.977	0.961	0.913	-13.462
6	1.000	1.000	1.000	-19.644
12	1.000	1.000	1.000	-20.462
18	1.000	1.000	1.000	-21.498
24	1.000	1.000	1.000	-100.000
Undisturbed population				
1	1.000	0.999	0.986	-19.872
6	1.000	1.000	1.000	-19.966
12	1.000	1.000	1.000	-19.828
18	1.000	1.000	1.000	-19.709
24	1.000	1.000	1.000	-100.000

Table 3-26: Predicted change in harbour seal population for the NnG concurrent pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	236	270	302
6	52	84	124
12	6	20	42
18	0	4	18
24	0	0	8
Undisturbed population			
1	214	250	282
6	56	82	114
12	6	22	40
18	0	6	18
24	0	0	8

3.3 Cumulative/In-combination Pile-driving Scenario

This section presents the population modelling results for the cumulative/in-combination pile-driving scenario involving noise generated from a number of different projects. As per the scoping advice (NnGOWL, 2017), in addition to NnG, the projects included within the cumulative impact assessment were:

- Beatrice Offshore Wind Limited (BOWL)
- Aberdeen Harbour Expansion Project (AHEP)
- Moray East
- Inch Cape Offshore Limited (ICOL)
- Seagreen A
- Seagreen B
- Moray West

Best available evidence was used to determine the pile-driving schedule. NnG engineers advised that pile-driving for 15 months was a worst case duration assuming that only a single pile-driving vessel would be used at any one time, and this has been adopted in the cumulative/in-combination modelling scenario.

A pile-driving schedule was devised, whereby projects already in construction (i.e. BOWL, AHEP) were included according to their actual construction timeline, and all other projects were included based on the best available evidence/estimates (i.e. published scoping reports and construction programmes). Additionally, the worst-case scenario was considered to be when all projects are constructed sequentially (as opposed to any projects being constructed concurrently). This is extremely unlikely to occur but was established for the purpose of a worst-case assessment. The pile-driving schedule included in the population modelling for the cumulative/in-combination scenario is presented in Table 3-27 and is further highlighted in Figure 3-1.

Table 3-27: Pile-driving schedule for the cumulative/in-combination pile-driving scenario.

Project	Start date	Duration	End Date
BOWL	1 April 2017	9 months	31 December 2017
AHEP	1 April 2017	18 months	30 September 2018
Moray East	1 July 2019	24 months	30 June 2021
Neart na Gaoithe	1 July 2021	15 months	30 September 2022
ICOL	1 October 2022	12 months	30 September 2023
Seagreen A	1 October 2023	18 months	31 March 2025
Seagreen B	1 April 2025	18 months	30 September 2026
Moray West	1 October 2026	15 months	31 December 2027

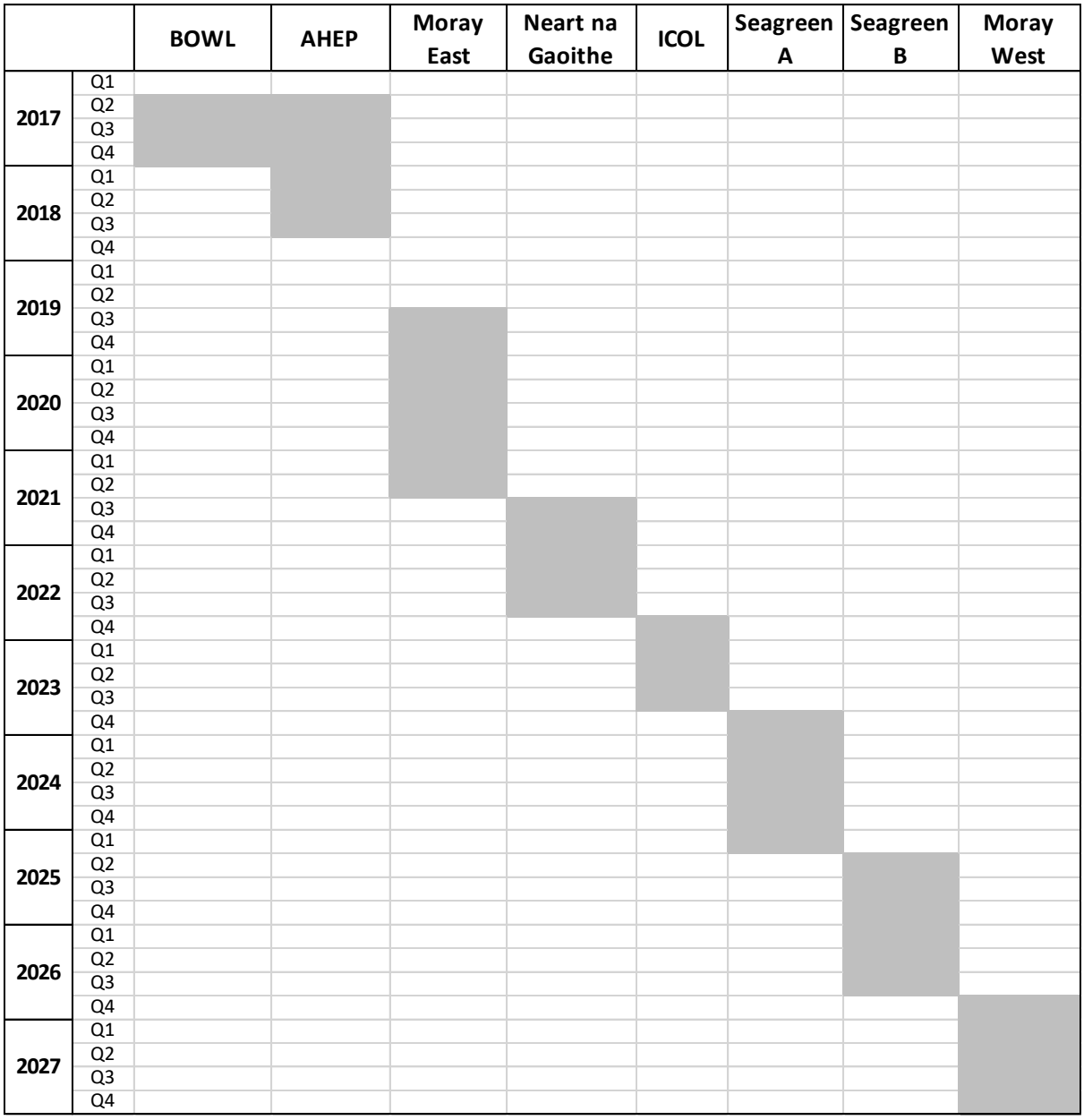

Figure 3-1: Chart illustrating pile-driving schedule for the cumulative/in-combination pile-driving scenario.

3.3.1 Number of animals potentially experiencing PTS onset and behavioural disturbance from FTOW projects

The number of animals that may potentially experience potential PTS onset for the FTOW projects (i.e. for NnG, ICOL, and Seagreen) has been calculated using the areas of estimated PTS onset using the NOAA PTS thresholds (see Appendix 8.1: Noise modelling), along with the best available evidence on species density and distribution. The predicted areas where marine mammals may experience PTS onset, the utilised species densities and the estimated number of animals that may experience PTS onset are shown in Table 3-28 for the FTOW projects.

The number of animals that could potentially experience behavioural disturbance from pile-driving at the FTOW projects has also been calculated using the results from the underwater noise modelling (see Appendix 8.1: Noise modelling). Using the dose response curve methodology described in Appendix 8.1: Noise modelling, the probability of behavioural disturbance to all marine mammals has been calculated for different SEL bands. The number of animals that could experience behavioural disturbance can then be calculated for each SEL band by multiplying the animal density (see Table 3-28), the area of the SEL band that overlaps with the MU area, and the probability of behavioural disturbance for that SEL band. Finally, the total number of animals that could suffer behavioural disturbance is given by the sum of animals in all SEL bands. The estimated number of animals that could experience behavioural disturbance for pile-driving at NnG, ICOL, Seagreen A, and Seagreen B are shown in Table 3-29, Table 3-30, Table 3-31, and Table 3-32, respectively.

3.3.2 Number of animals potentially experiencing PTS onset and behavioural disturbance from other projects

The population modelling for the cumulative/in-combination scenario has also considered potential impacts from a number of projects other than the FTOW developments (i.e. BOWL, AHEP, Moray East and Moray West). The number of mammals that could potentially experience PTS onset or disturbance from pile-driving at these projects have been taken from previous modelling or environmental impact assessments and are shown in Table 3-33.

3.3.3 iPCoD population model results

As suggested in the scoping opinion (NnGOWL, 2017), results from the iPCoD modelling have been used to estimate the median of the impacted to unimpacted population ratio (i.e. the median of the disturbed to undisturbed population size), the median of the ratio of impacted to unimpacted annual growth rate (i.e. the median of the ratio of disturbed to undisturbed annual growth rate), and the centile for the unimpacted population size that matches the 50th centile for the impacted population size. These statistics are reported in Table 3-34 for all marine mammal species for the cumulative/in-combination pile-driving scenario.

The probability of population decline (and median annual percentage population decline), and predicted changes in population size have also been estimated for each of the marine mammal species. The predicted probability of population decline (and median annual percentage population decline), and changes in population size are presented in Table 3-35 to Table 3-42

for the cumulative/in-combination pile-driving scenario. These results are also shown graphically in Section A.3 in Appendix A. The predicted disturbed and undisturbed population size centiles from 0.01 to 0.99 are also provided in Section A.3 in Appendix A for the cumulative/in-combination scenario.

Table 3-28: Predicted number of animals that may potentially experience PTS onset from pile-driving at FTOW projects.

Species	Predicted area where animals may experience PTS onset	Species density	Estimated number of animals that may experience PTS onset
NnG			
Harbour porpoise	127.276 km^2	0.599 animals/km^2 (see Note 1)	77
Bottlenose Dolphin	0 km^2 (see Note 2)	0.070 animals/km^2 (see Note 3)	0
Minke whale	344.357 km^2	0.039 animals/km^2 (see Note 1)	14
Grey seal	0.706 km^2	Variable (see Note 4)	1
ICOL (New Application)			
Harbour porpoise	142.231 km^2	0.599 animals/km^2 (see Note 1)	86
Bottlenose Dolphin	0 km^2 (see Note 2)	0.070 animals/km^2 (see Note 3)	0
Minke whale	376.146 km^2	0.039 animals/km^2 (see Note 1)	15
Grey seal	0.458 km^2	Variable (see Note 4)	1
Seagreen A (New Application)			
Harbour porpoise	161.297 km^2	0.599 animals/km^2 (see Note 1)	97
Bottlenose Dolphin	0 km^2 (see Note 2)	0.070 animals/km^2 (see Note 3)	0
Minke whale	586.676 km^2	0.039 animals/km^2 (see Note 1)	23
Grey seal	0.495 km^2	Variable (see Note 4)	1
Seagreen B (New Application)			
Harbour porpoise	124.966 km^2	0.599 animals/km^2 (see Note 1)	75
Bottlenose Dolphin	0 km^2 (see Note 2)	0.070 animals/km^2 (see Note 3)	0
Minke whale	333.136 km^2	0.039 animals/km^2 (see Note 1)	13
Grey seal	0.339 km^2	Variable (see Note 4)	1

Note 1: Density of animals in SCANS III Block R (Hammond *et al.*, 2017).

Note 2: The predicted area of PTS did not overlap with the bottlenose dolphin management unit area and hence the predicted area where animals may experience PTS onset is 0 km^2.

Note 3: Density has been estimated based on the predicted management unit population and area (IAMMWG, 2015) and assuming a uniform distribution of animals.

Note 4: Number of seals that could potentially experience the onset of PTS has been estimated using seal distribution maps (SMRU and Marine Scotland, 2017). The number of seals that could experience PTS onset has been calculated by estimating the number of seals within the predicted PTS area using the seal distribution maps.

Table 3-29: Predicted disturbance areas and number of animals that may potentially experience behavioural disturbance for pile-driving at NnG.

SEL band (dB re 1 μPa^2s)	Probability of disturbance (%)	Harbour porpoise		Bottlenose dolphin		Minke whale		Grey seal	
		Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed
> 200	99.89%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195 - 200	99.49%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
190 - 195	99.05%	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00
185 - 190	98.23%	0.04	0.03	0.00	0.00	0.04	0.00	0.04	0.01
180 - 185	96.74%	0.25	0.15	0.00	0.00	0.25	0.01	0.25	0.05
175 - 180	94.06%	2.20	1.24	0.00	0.00	2.20	0.08	2.20	0.40
170 - 175	89.42%	8.26	4.43	0.00	0.00	8.26	0.29	8.26	1.44
165 - 170	81.86%	33.41	16.38	0.00	0.00	33.41	1.07	33.41	5.36
160 - 165	70.68%	110.81	46.91	0.00	0.00	110.81	3.05	110.81	15.27
155 - 160	56.28%	318.09	107.23	0.00	0.00	318.09	6.98	318.09	38.33
150 - 155	40.73%	669.17	163.27	0.43	0.01	669.17	10.63	669.17	78.70
145 - 150	26.85%	1,101.07	177.07	8.23	0.15	1,101.07	11.53	1,101.07	103.88
140 - 145	16.39%	1,942.20	190.64	23.88	0.27	1,942.20	12.41	1,942.20	112.06
135 - 140	9.47%	2,955.65	167.73	48.43	0.32	2,955.65	10.92	2,955.65	98.49
130 - 135	5.29%	9,511.42	301.54	74.69	0.28	9,511.42	19.63	9,511.42	366.41
Total number of animals disturbed		1,177		2		77		821	

Table 3-30: Predicted disturbance areas and number of animals that may potentially experience behavioural disturbance for pile-driving at ICOL (New Application).

SEL band (dB re 1 μPa²s)	Probability of disturbance (%)	Harbour porpoise		Bottlenose dolphin		Minke whale		Grey seal	
		Area of MU disturbed (km²)	Number of animals disturbed	Area of MU disturbed (km²)	Number of animals disturbed	Area of MU disturbed (km²)	Number of animals disturbed	Area of MU disturbed (km²)	Number of animals disturbed
> 200	99.89%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195 - 200	99.49%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
190 - 195	99.05%	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00
185 - 190	98.23%	0.08	0.05	0.00	0.00	0.08	0.00	0.08	0.02
180 - 185	96.74%	0.58	0.33	0.00	0.00	0.58	0.02	0.58	0.14
175 - 180	94.06%	2.81	1.59	0.00	0.00	2.81	0.10	2.81	0.68
170 - 175	89.42%	10.88	5.83	0.00	0.00	10.88	0.38	10.88	2.72
165 - 170	81.86%	42.31	20.75	0.00	0.00	42.31	1.35	42.31	10.89
160 - 165	70.68%	134.11	56.78	0.00	0.00	134.11	3.70	134.11	27.26
155 - 160	56.28%	359.57	121.21	0.00	0.00	359.57	7.89	359.57	52.46
150 - 155	40.73%	761.37	185.77	0.00	0.00	761.37	12.10	761.37	105.33
145 - 150	26.85%	1,447.48	232.78	0.00	0.00	1,447.48	15.16	1,447.48	131.72
140 - 145	16.39%	2,329.19	228.62	11.63	0.13	2,329.19	14.89	2,329.19	96.87
135 - 140	9.47%	5,199.21	295.04	45.78	0.30	5,199.21	19.21	5,199.21	96.04
130 - 135	5.29%	17,079.85	541.48	60.58	0.22	17,079.85	35.25	17,079.85	399.88
Total number of animals disturbed		1,691		1		111		925	

Table 3-31: Predicted disturbance areas and number of animals that may potentially experience behavioural disturbance for pile-driving at Seagreen A (New Application).

SEL band (dB re 1 μPa^2s)	Probability of disturbance (%)	Harbour porpoise		Bottlenose dolphin		Minke whale		Grey seal	
		Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed
> 200	99.89%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195 - 200	99.49%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
190 - 195	99.05%	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00
185 - 190	98.23%	0.07	0.04	0.00	0.00	0.07	0.00	0.07	0.02
180 - 185	96.74%	0.56	0.33	0.00	0.00	0.56	0.02	0.56	0.16
175 - 180	94.06%	2.98	1.68	0.00	0.00	2.98	0.11	2.98	0.83
170 - 175	89.42%	11.25	6.02	0.00	0.00	11.25	0.39	11.25	3.20
165 - 170	81.86%	41.46	20.33	0.00	0.00	41.46	1.32	41.46	23.02
160 - 165	70.68%	128.31	54.32	0.00	0.00	128.31	3.54	128.31	65.34
155 - 160	56.28%	412.55	139.07	0.00	0.00	412.55	9.05	412.55	87.71
150 - 155	40.73%	1,123.31	274.08	0.00	0.00	1,123.31	17.84	1,123.31	105.60
145 - 150	26.85%	1,887.61	303.56	5.77	0.11	1,887.61	19.76	1,887.61	120.88
140 - 145	16.39%	3,629.13	356.22	16.38	0.19	3,629.13	23.19	3,629.13	248.16
135 - 140	9.47%	8,213.99	466.13	16.52	0.11	8,213.99	30.35	8,213.99	168.94
130 - 135	5.29%	18,444.96	584.75	11.64	0.04	18,444.96	38.07	18,444.96	278.37
Total number of animals disturbed		2,207		1		144		1,103	

Table 3-32: Predicted disturbance areas and number of animals that may potentially experience behavioural disturbance for pile-driving at Seagreen B (New Application).

SEL band (dB re 1 μPa^2s)	Probability of disturbance (%)	Harbour porpoise		Bottlenose dolphin		Minke whale		Grey seal	
		Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed	Area of MU disturbed (km^2)	Number of animals disturbed
> 200	99.89%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195 - 200	99.49%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
190 - 195	99.05%	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00
185 - 190	98.23%	0.07	0.04	0.00	0.00	0.07	0.00	0.07	0.01
180 - 185	96.74%	0.53	0.31	0.00	0.00	0.53	0.02	0.53	0.07
175 - 180	94.06%	2.97	1.67	0.00	0.00	2.97	0.11	2.97	0.38
170 - 175	89.42%	11.45	6.13	0.00	0.00	11.45	0.40	11.45	1.34
165 - 170	81.86%	41.11	20.16	0.00	0.00	41.11	1.31	41.11	4.38
160 - 165	70.68%	132.30	56.01	0.00	0.00	132.30	3.65	132.30	12.59
155 - 160	56.28%	342.53	115.46	0.00	0.00	342.53	7.52	342.53	30.40
150 - 155	40.73%	785.21	191.58	0.00	0.00	785.21	12.47	785.21	59.10
145 - 150	26.85%	1,690.09	271.79	0.00	0.00	1,690.09	17.70	1,690.09	95.15
140 - 145	16.39%	4,061.82	398.69	0.00	0.00	4,061.82	25.96	4,061.82	112.01
135 - 140	9.47%	11,424.34	648.31	0.00	0.00	11,424.34	42.21	11,424.34	339.69
130 - 135	5.29%	24,579.36	779.23	10.16	0.04	24,579.36	50.73	24,579.36	431.02
Total number of animals disturbed		2,490		1		163		1,087	

Table 3-33: Predicted number of animals that may potentially experience PTS onset and behavioural disturbance from other projects.

Species	Estimated number of animals that may experience PTS onset	Estimated number of animals that may experience behavioural disturbance
BOWL		
Harbour porpoise	9	3,191
Minke whale	36	177
Bottlenose Dolphin	1	19
Harbour seal	0 (see Note 1)	0 (see Note 1)
Grey seal	0 (see Note 1)	0 (see Note 1)
AHEP		
Harbour porpoise	1	30
Minke whale	1	2
Bottlenose Dolphin	1	15
Harbour seal	1	7
Grey seal	1	7
Moray East		
Harbour porpoise	7	2,933
Minke whale	13	168
Bottlenose Dolphin	1	17
Harbour seal	0 (see Note 1)	0 (see Note 1)
Grey seal	0 (see Note 1)	0 (see Note 1)
Moray West		
Harbour porpoise	7	2,933
Minke whale	13	168
Bottlenose Dolphin	1	17
Harbour seal	0 (see Note 1)	0 (see Note 1)
Grey seal	0 (see Note 1)	0 (see Note 1)

Note 1: Estimated impacts to grey seals and harbour seals has been assessed in relation to the East Coast Scotland seal management area (see Figure 2-1). It has been assumed in the population modelling that the Moray Firth projects will not impact the East Coast Scotland seal management unit area.

Table 3-34: Statistics derived from population modelling for the cumulative/in-combination pile-driving scenario.

Year	Median of impacted to unimpacted population ratio	Median of the ratio of impacted to unimpacted annual growth rate	Centile for unimpacted population that matches the 50th centile for impacted population
Harbour porpoise			
1	0.999	0.998	0.48
6	0.975	0.995	0.37
12	0.921	0.993	0.22
18	0.910	0.994	0.25
24	0.904	0.996	0.26
Bottlenose dolphin			
1	0.970	0.960	0.18
6	0.828	0.966	0.04
12	0.679	0.965	0.01
18	0.588	0.968	0.01
24	0.535	0.973	0.01
Minke whale			
1	0.994	0.993	0.43
6	0.929	0.987	0.12
12	0.845	0.986	0.02
18	0.819	0.989	0.02
24	0.802	0.991	0.02
Grey seal			
1	0.996	0.995	0.45
6	0.908	0.981	0.09
12	0.739	0.973	0.01
18	0.715	0.980	0.01
24	0.707	0.985	0.03

Table 3-35: Probability of decline in harbour porpoise population for the cumulative/in-combination pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.451	0.342	0.126	-0.517
6	0.479	0.201	0.003	-0.951
12	0.595	0.217	0.000	-1.205
18	0.523	0.107	0.000	-1.038
24	0.461	0.044	0.000	-0.938
Undisturbed population				
1	0.419	0.322	0.121	-0.325
6	0.351	0.118	0.001	-0.474
12	0.291	0.053	0.000	-0.486
18	0.267	0.022	0.000	-0.487
24	0.223	0.006	0.000	-0.515

Table 3-36: Predicted change in harbour porpoise population for the cumulative/in-combination pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	309,821	332,082	352,381
6	275,933	315,211	358,063
12	238,263	288,611	343,225
18	217,219	276,636	343,793
24	206,772	266,251	341,717
Undisturbed population			
1	310,263	332,722	352,841
6	285,452	324,423	364,692
12	260,864	314,854	371,177
18	242,521	305,720	374,931
24	229,815	294,888	372,956

Table 3-37: Probability of decline in bottlenose dolphin population for the cumulative/in-combination pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.554	0.508	0.402	-2.041
6	0.602	0.502	0.294	-2.154
12	0.614	0.520	0.270	-2.259
18	0.618	0.506	0.226	-2.010
24	0.608	0.436	0.138	-1.572
Undisturbed population				
1	0.286	0.222	0.108	2.041
6	0.106	0.038	0.002	1.317
12	0.034	0.004	0.000	1.268
18	0.024	0.002	0.000	1.224
24	0.010	0.000	0.000	1.119

Table 3-38: Predicted change in bottlenose dolphin population for the cumulative/in-combination pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	156	192	224
6	84	172	270
12	46	149	278
18	38	136	296
24	36	134	304
Undisturbed population			
1	182	200	216
6	176	212	252
12	178	228	284
18	180	244	320
24	180	256	354

Table 3-39: Probability of decline in Minke whale population for the cumulative/in-combination pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.446	0.345	0.131	-0.474
6	0.659	0.325	0.002	-1.450
12	0.732	0.287	0.000	-1.546
18	0.618	0.105	0.000	-1.182
24	0.494	0.013	0.000	-0.986
Undisturbed population				
1	0.369	0.281	0.100	0.195
6	0.210	0.042	0.000	-0.116
12	0.089	0.000	0.000	-0.106
18	0.046	0.000	0.000	-0.099
24	0.015	0.000	0.000	-0.114

Table 3-40: Predicted change in Minke whale population for the cumulative/in-combination pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	11,002	11,764	12,410
6	9,582	10,828	12,174
12	8,296	9,804	11,694
18	7,917	9,542	11,401
24	7,598	9,319	11,515
Undisturbed population			
1	11,066	11,843	12,482
6	10,540	11,738	12,945
12	10,245	11,671	13,308
18	9,918	11,612	13,308
24	9,672	11,500	13,733

Table 3-41: Probability of decline in grey seal population for the cumulative/in-combination pile-driving scenario.

Year	Prob. 1% decline	Prob. 2% decline	Prob. 5% decline	Median % annual decline
Disturbed population				
1	0.361	0.265	0.075	0.281
6	0.540	0.317	0.036	-1.170
12	0.735	0.503	0.049	-2.022
18	0.610	0.294	0.001	-1.311
24	0.445	0.143	0.000	-0.869
Undisturbed population				
1	0.300	0.203	0.054	0.874
6	0.107	0.023	0.000	0.739
12	0.044	0.003	0.000	0.684
18	0.024	0.001	0.000	0.691
24	0.012	0.000	0.000	0.663

Table 3-42: Predicted change in grey seal population for the cumulative/in-combination pile-driving scenario.

Year	5th percentile	50th percentile	95th percentile
Disturbed population			
1	9,068	9,635	10,222
6	7,300	8,953	10,532
12	5,215	7,519	9,963
18	5,135	7,577	10,329
24	5,059	7,793	11,100
Undisturbed population			
1	9,118	9,692	10,284
6	8,772	10,042	11,360
12	8,624	10,427	12,557
18	8,524	10,876	13,652
24	8,567	11,260	14,902

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APPENDIX A: POPULATION MODELLING RESULTS

A.1 NnG Single Pile-driving Scenario

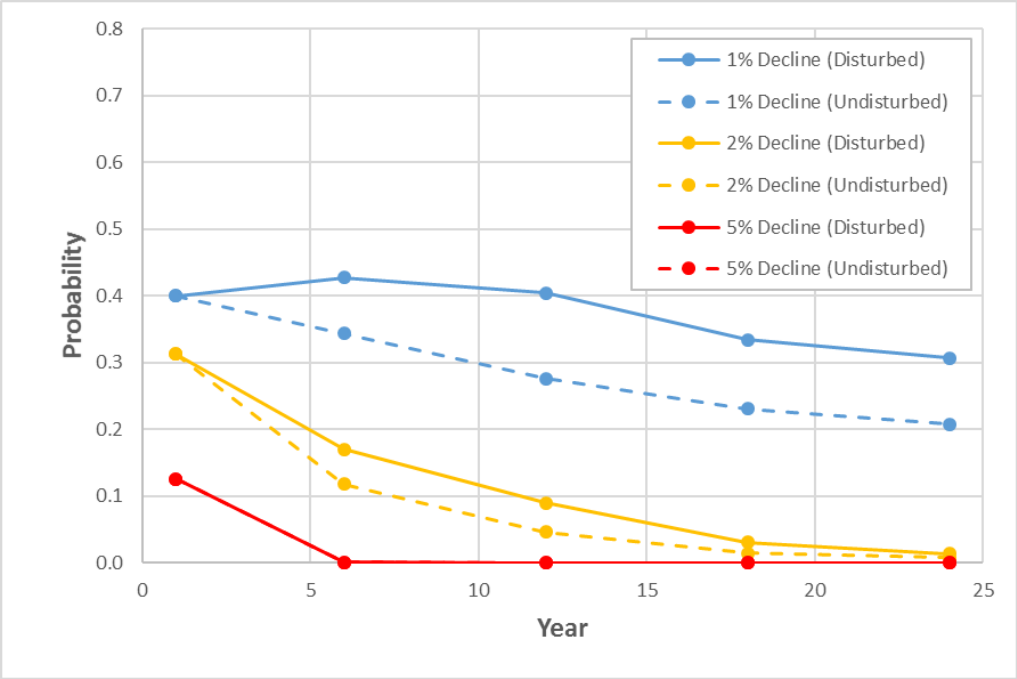

Figure A-1: Probability of a decline in harbour porpoise population for the NnG single pile-driving scenario.

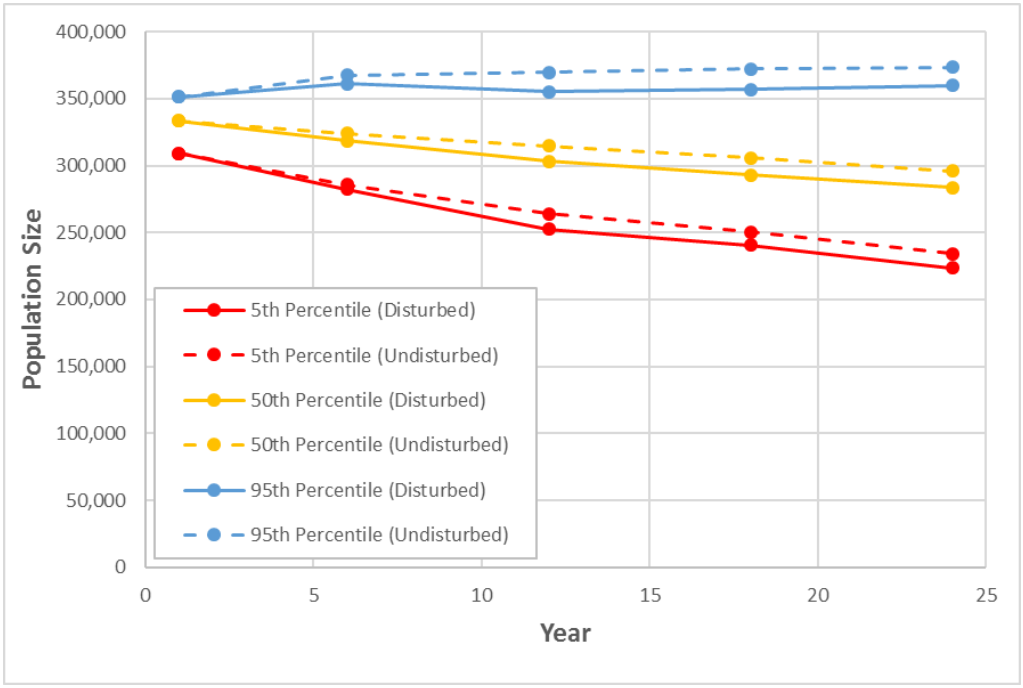

Figure A-2: Estimated change in harbour porpoise population for the NnG single pile-driving scenario.

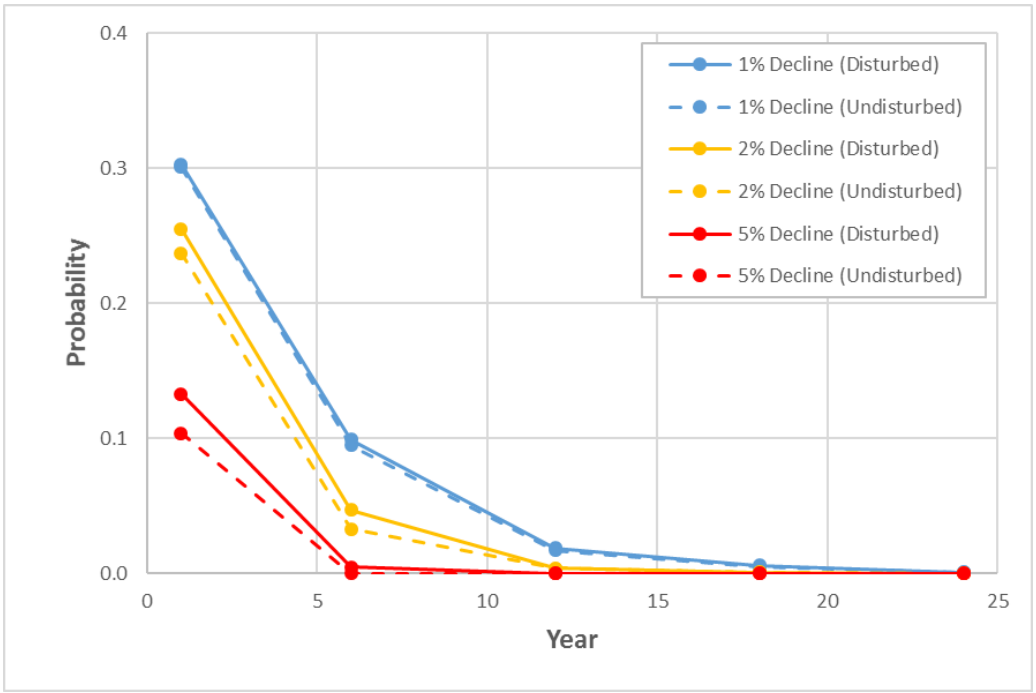

Figure A-3: Probability of a decline in bottlenose dolphin population for the NnG single pile-driving scenario.

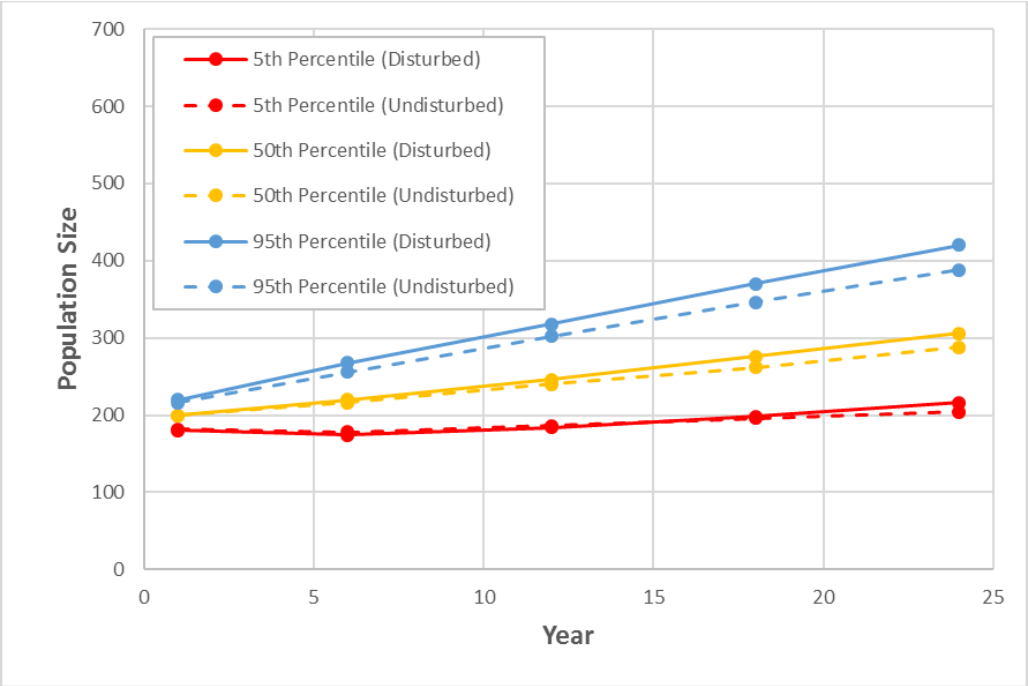

Figure A-4: Estimated change in bottlenose dolphin population for the NnG single pile-driving scenario.

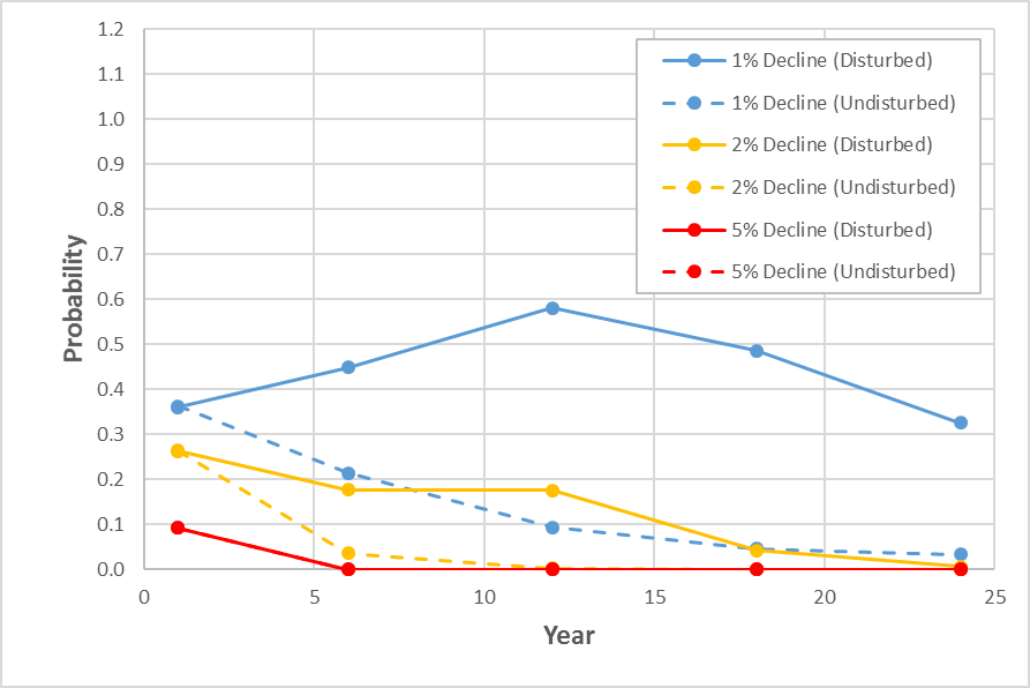

Figure A-5: Probability of a decline in Minke whale population for the NnG single pile-driving scenario.

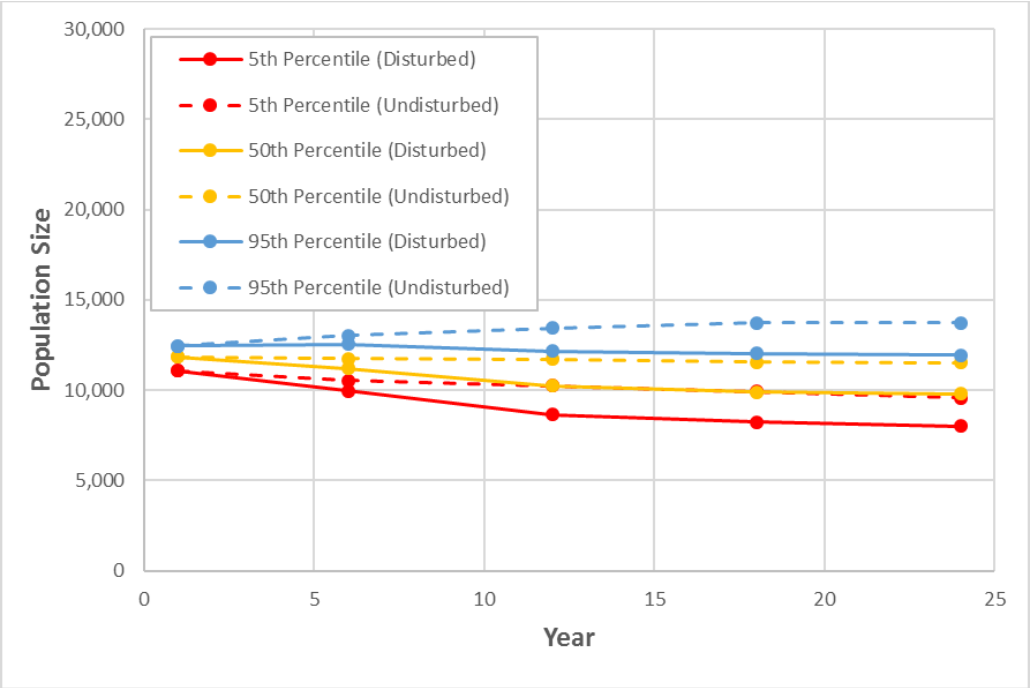

Figure A-6: Estimated change in Minke whale population for the NnG single pile-driving scenario.

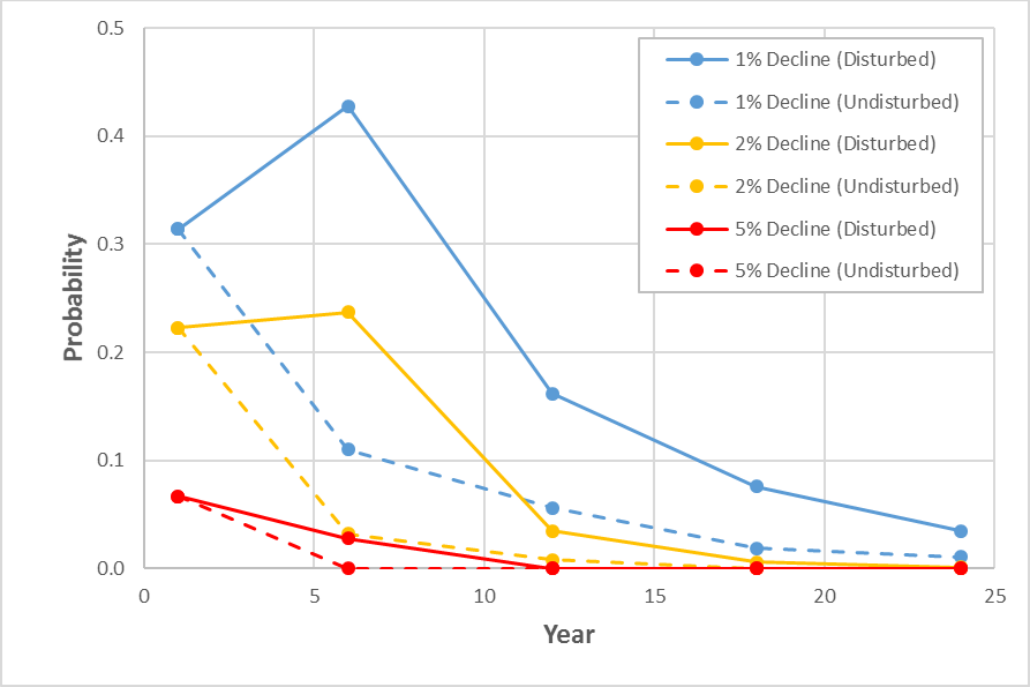

Figure A-7: Probability of a decline in grey seal population for the NnG single pile-driving scenario.

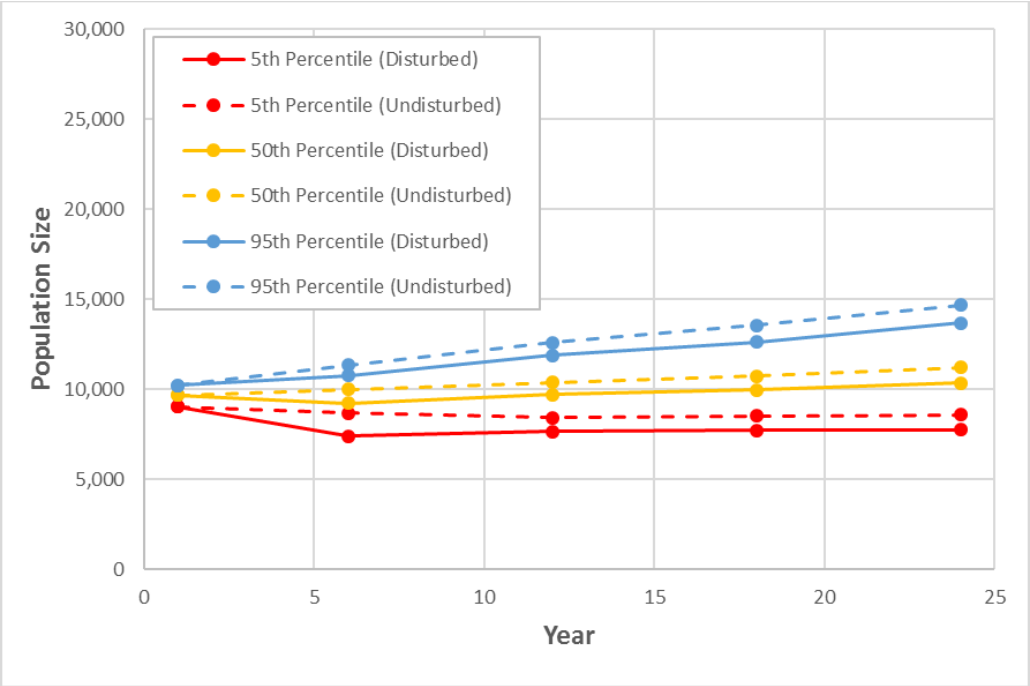

Figure A-8: Estimated change in grey seal population for the NnG single pile-driving scenario.

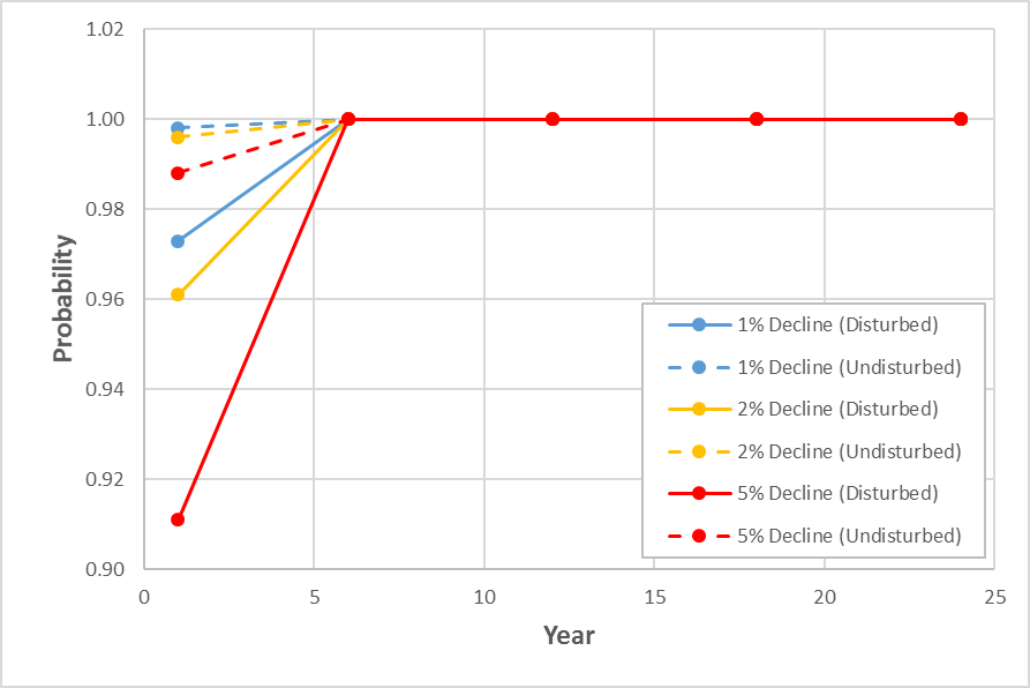

Figure A-9: Probability of a decline in harbour seal population for the NnG single pile-driving scenario.

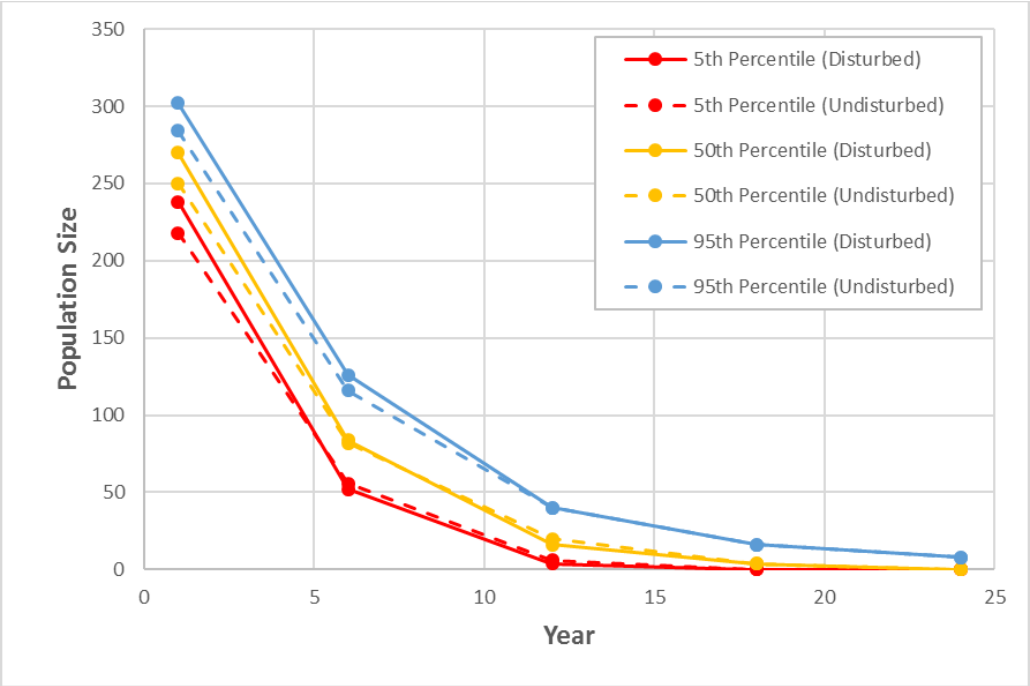

Figure A-10: Probability of a decline in harbour seal population for the NnG single pile-driving scenario.

Table A-1: Centiles for disturbed and undisturbed population sizes of harbour porpoise for the NnG single pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	298,390	298,390	266,055	272,005	232,667	242,599	218,050	228,552	200,661	211,125
0.02	302,904	302,912	271,793	277,765	240,717	249,435	225,382	236,894	209,074	221,684
0.03	306,799	306,803	275,560	282,127	244,501	254,246	231,931	245,189	216,488	225,513
0.04	308,396	308,395	278,365	283,768	248,943	260,433	237,613	249,021	220,543	230,093
0.05	309,244	309,250	282,201	285,561	252,630	263,940	240,727	250,609	223,548	234,112
0.06	311,086	311,088	283,504	287,651	257,416	266,959	242,328	253,900	227,600	238,182
0.07	312,573	312,573	284,856	289,603	259,768	268,832	244,848	255,613	229,177	241,169
0.08	313,872	313,877	286,477	290,765	260,732	270,750	246,934	259,576	232,022	242,793
0.09	314,814	314,818	288,629	292,912	262,034	273,522	248,906	261,401	233,711	244,985
0.10	315,298	315,303	289,467	293,914	265,043	275,580	250,590	263,346	235,938	246,006
0.11	315,978	315,980	290,196	295,082	266,344	277,229	252,725	264,706	238,154	248,088
0.12	316,540	316,539	291,583	296,240	267,412	278,170	253,679	265,584	238,914	249,158

0.13	317,601	317,599	292,400	297,286	269,146	280,348	255,670	266,507	240,503	251,003
0.14	318,024	318,027	292,997	298,225	270,190	281,339	256,617	268,289	241,693	252,198
0.15	318,530	318,534	293,845	299,542	271,546	282,383	257,301	269,356	242,765	253,824
0.16	319,244	319,244	294,972	300,522	272,888	283,601	258,672	270,671	243,999	255,156
0.17	320,092	320,093	295,796	301,573	273,624	284,851	259,704	271,918	245,024	256,939
0.18	320,726	320,729	296,549	302,153	274,487	286,294	262,000	273,011	246,459	258,492
0.19	321,404	321,402	297,334	302,962	276,240	287,098	262,769	274,133	248,294	260,509
0.20	321,656	321,655	298,580	303,732	277,371	288,348	263,619	274,959	249,256	261,304
0.21	322,546	322,547	299,418	304,548	277,992	289,358	264,837	276,019	250,792	262,940
0.22	323,101	323,102	300,161	305,421	279,097	290,333	265,840	276,999	252,409	264,309
0.23	323,492	323,495	300,981	306,100	280,293	291,604	266,558	278,504	253,971	265,459
0.24	323,841	323,843	301,432	306,659	281,470	292,711	267,500	279,795	255,230	266,662
0.25	324,462	324,458	302,515	307,328	282,436	294,027	268,620	280,913	256,592	267,910
0.26	324,925	324,924	303,328	307,791	283,437	294,839	270,047	282,337	258,507	269,357
0.27	325,536	325,538	304,163	308,404	284,847	295,454	270,492	283,354	259,258	270,741
0.28	325,945	325,948	304,834	308,872	285,967	296,190	271,676	284,370	260,182	271,498
0.29	326,297	326,298	305,485	309,495	286,526	297,158	273,075	285,848	260,637	272,641
0.30	326,707	326,706	305,888	310,367	287,412	298,527	274,359	286,537	261,584	273,795
0.31	326,955	326,959	306,463	311,232	288,543	299,344	275,861	287,339	262,747	275,767
0.32	327,360	327,358	307,075	311,902	289,536	300,467	277,224	288,602	263,815	276,522
0.33	327,942	327,943	307,594	312,463	290,176	301,407	278,143	290,120	264,790	277,244
0.34	328,241	328,246	308,359	313,832	290,735	301,861	279,319	291,180	265,724	278,084
0.35	328,648	328,651	309,205	314,676	291,377	302,478	280,421	292,509	266,524	279,513
0.36	329,019	329,015	309,711	315,523	291,991	303,232	282,103	293,118	267,546	280,693
0.37	329,347	329,349	310,153	316,114	292,763	304,112	282,773	294,711	268,978	281,855
0.38	329,813	329,813	310,752	317,002	293,433	305,067	283,536	295,527	269,872	282,865
0.39	330,246	330,248	311,535	317,540	294,167	305,904	284,194	296,813	271,173	283,812
0.40	330,502	330,501	312,325	317,883	295,636	307,126	284,713	297,581	272,190	285,109

0.41	330,644	330,646	313,122	318,422	296,443	307,698	285,784	298,264	273,816	286,136
0.42	331,274	331,275	313,908	318,911	297,048	308,700	286,587	299,009	274,614	287,147
0.43	331,621	331,619	314,720	319,636	297,528	309,453	287,672	300,273	275,906	288,461
0.44	331,984	331,982	315,433	320,250	297,856	310,539	288,791	300,885	276,863	289,519
0.45	332,389	332,387	316,039	320,814	298,720	311,322	289,360	301,529	278,074	290,206
0.46	332,615	332,614	316,365	321,322	299,586	311,852	290,056	302,343	279,076	290,968
0.47	332,809	332,813	316,960	321,837	300,646	312,321	290,596	303,015	280,009	291,761
0.48	332,987	332,986	317,548	323,031	301,695	313,034	291,343	304,046	280,888	293,679
0.49	333,254	333,252	317,978	323,480	302,787	313,939	292,035	304,729	281,558	295,388
0.50	333,532	333,535	318,648	324,113	303,414	314,675	293,048	305,878	283,733	296,184
0.51	333,685	333,688	319,375	324,773	304,057	315,870	294,014	306,692	284,594	296,637
0.52	334,014	334,014	319,902	325,310	304,626	316,847	295,033	307,720	285,181	298,369
0.53	334,213	334,217	320,659	325,662	305,270	317,521	295,682	308,343	286,496	299,503
0.54	334,575	334,578	321,296	326,400	306,192	318,185	296,674	309,168	287,851	300,513
0.55	334,862	334,864	321,835	326,931	306,932	318,921	297,495	309,906	288,644	301,865
0.56	335,122	335,124	322,696	327,362	307,901	319,735	298,134	310,923	289,380	302,709
0.57	335,362	335,363	323,126	327,987	308,856	320,678	298,881	311,652	290,608	303,893
0.58	335,745	335,744	323,926	328,896	309,980	321,416	300,055	312,810	291,468	304,460
0.59	335,917	335,920	324,430	329,331	310,739	322,326	301,150	313,603	292,807	305,727
0.60	336,214	336,218	324,795	330,052	311,608	323,472	301,783	314,804	294,014	307,067
0.61	336,492	336,492	325,371	330,964	312,365	324,240	302,465	315,761	295,222	308,618
0.62	336,833	336,833	325,797	331,516	313,091	325,430	302,838	317,018	295,891	310,020
0.63	337,141	337,142	326,383	332,139	313,959	326,445	303,733	317,848	296,825	311,260
0.64	337,390	337,390	327,010	332,726	314,903	326,950	304,662	318,754	297,903	312,240
0.65	337,968	337,972	327,726	333,800	315,234	327,664	305,574	319,271	298,926	313,871
0.66	338,309	338,309	328,251	334,219	316,217	328,863	306,309	321,418	300,216	314,942
0.67	338,854	338,854	328,936	334,781	316,928	329,514	307,665	322,119	301,294	317,469
0.68	339,252	339,250	329,823	335,618	317,970	330,057	309,097	322,820	302,493	318,610

0.69	339,466	339,466	330,589	336,212	318,889	331,047	309,895	323,606	304,218	319,910
0.70	339,886	339,889	331,416	337,053	320,033	331,935	311,052	324,288	306,069	321,004
0.71	340,317	340,320	332,154	338,218	321,101	333,117	312,177	325,178	307,025	322,095
0.72	340,637	340,637	332,949	338,690	321,661	333,995	313,758	325,862	308,830	323,532
0.73	340,930	340,930	333,313	339,314	322,164	335,443	314,802	327,935	310,652	324,714
0.74	341,133	341,134	334,507	340,019	323,419	336,284	315,889	329,334	312,022	325,468
0.75	341,286	341,287	335,074	341,128	324,299	337,137	317,403	331,515	313,676	326,993
0.76	341,593	341,594	336,373	341,493	325,601	337,967	318,919	333,289	315,192	327,940
0.77	341,852	341,849	336,978	342,343	326,452	339,358	319,921	335,180	316,794	330,724
0.78	342,137	342,137	337,928	343,105	327,703	339,999	321,516	336,220	318,022	331,817
0.79	342,479	342,479	338,854	343,714	328,297	341,360	322,898	338,295	319,496	333,127
0.80	342,832	342,834	339,871	344,653	329,728	342,132	324,454	339,136	320,183	333,909
0.81	343,299	343,299	340,938	345,432	330,923	343,769	326,123	340,957	321,326	336,560
0.82	343,744	343,744	341,674	346,730	332,319	344,408	328,051	342,805	323,604	338,977
0.83	344,202	344,201	342,551	347,783	333,435	345,537	330,032	343,875	324,931	341,054
0.84	344,604	344,603	343,043	348,792	334,697	347,466	332,053	345,025	326,212	343,064
0.85	345,198	345,197	344,590	349,934	335,590	349,186	333,071	347,013	329,535	345,095
0.86	345,594	345,601	345,765	351,605	336,776	350,268	334,830	349,163	331,241	346,288
0.87	346,192	346,194	346,579	353,109	337,809	352,269	336,415	351,766	333,180	347,658
0.88	346,868	346,871	347,867	353,752	340,305	353,496	338,593	353,946	335,871	350,679
0.89	347,436	347,437	349,061	356,139	342,823	354,926	342,731	356,202	338,103	352,868
0.90	348,169	348,169	351,045	357,898	344,584	357,015	345,081	357,559	339,590	356,750
0.91	348,567	348,565	352,592	359,126	346,443	359,810	346,496	359,666	343,228	359,069
0.92	349,138	349,131	354,026	360,669	348,247	361,486	348,364	361,736	345,684	363,034
0.93	350,131	350,129	356,713	362,884	349,936	363,053	350,797	366,070	349,358	367,459
0.94	350,778	350,776	359,177	364,751	351,388	367,869	353,514	369,677	356,796	370,804
0.95	351,491	351,491	361,308	367,716	355,153	369,895	356,897	372,304	359,889	373,476
0.96	352,901	352,901	364,509	371,615	359,409	374,596	362,533	377,775	363,754	380,942

0.97	354,430	354,428	368,199	373,374	365,082	379,550	369,226	385,396	366,794	385,555
0.98	356,856	356,860	371,102	377,440	373,790	385,844	375,313	399,388	383,037	395,649
0.99	359,783	359,783	375,119	381,461	385,252	395,992	393,736	406,352	401,933	415,665

Table A-2: Centiles for disturbed and undisturbed population sizes of bottlenose dolphin for the NnG single pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	172	174	156	162	166	168	174	172	190	182
0.02	176	178	164	168	174	174	186	180	196	188
0.03	178	180	166	172	178	180	190	186	204	196
0.04	180	182	172	174	182	182	196	190	212	200
0.05	180	182	174	178	184	186	198	196	216	204
0.06	182	184	176	180	190	188	202	198	218	208
0.07	182	186	180	180	190	190	206	200	220	212
0.08	184	186	180	182	192	192	208	204	224	214
0.09	184	186	182	184	194	194	210	204	226	218
0.10	184	186	186	186	198	194	214	206	230	220
0.11	186	188	188	188	198	196	216	210	232	224
0.12	186	188	188	188	200	198	218	212	236	226
0.13	186	188	190	190	202	200	220	214	238	230
0.14	188	190	190	192	204	202	222	214	240	232
0.15	188	190	192	192	206	204	224	216	242	234
0.16	188	190	192	192	208	206	226	220	246	238
0.17	190	190	194	194	208	206	228	220	248	240
0.18	190	190	194	194	210	208	230	222	250	240
0.19	190	192	196	196	210	208	232	224	252	242
0.20	190	192	196	196	212	208	232	224	256	242
0.21	192	192	198	198	212	210	234	226	258	244
0.22	192	192	198	198	214	210	236	228	258	246
0.23	192	192	200	200	216	212	238	228	260	246
0.24	192	194	200	200	216	212	240	232	262	248
0.25	192	194	200	202	218	214	240	232	266	250
0.26	194	194	202	202	218	214	242	234	266	252
0.27	194	194	202	202	220	216	244	235	268	254
0.28	194	194	204	204	222	216	246	236	272	254
0.29	194	194	204	204	222	217	248	238	272	258
0.30	194	194	206	204	224	218	248	239	274	260
0.31	196	196	206	206	226	219	250	240	276	260
0.32	196	196	208	206	228	220	252	242	278	262
0.33	196	196	208	206	229	221	252	244	280	264
0.34	196	196	210	208	230	222	254	244	282	266
0.35	196	196	210	208	232	224	256	246	284	268
0.36	196	196	210	208	234	224	258	246	286	270
0.37	198	196	212	208	234	226	258	247	288	270
0.38	198	198	212	210	234	228	260	248	290	272

0.39	198	198	212	210	236	228	262	248	292	274
0.40	198	198	214	210	236	228	264	250	294	275
0.41	198	198	214	210	238	230	264	252	296	276
0.42	198	198	214	212	240	232	266	254	296	278
0.43	198	198	216	212	240	233	268	254	298	280
0.44	200	198	216	212	242	234	268	256	300	280
0.45	200	200	216	214	242	236	269	257	302	282
0.46	200	200	217	214	243	236	270	258	302	284
0.47	200	200	218	214	244	238	272	259	304	284
0.48	200	200	218	216	246	238	274	260	306	286
0.49	200	200	218	216	246	238	274	262	306	286
0.50	200	200	220	216	246	240	276	262	306	288
0.51	201	200	220	218	248	240	278	264	308	290
0.52	202	200	222	218	250	240	280	264	310	292
0.53	202	202	222	218	250	242	280	266	312	292
0.54	202	202	222	220	250	244	280	268	313	294
0.55	202	202	224	220	252	244	282	270	316	296
0.56	202	202	224	220	252	244	283	270	317	297
0.57	202	202	226	220	254	246	284	271	318	300
0.58	204	202	226	222	256	246	286	272	320	302
0.59	204	202	226	222	256	246	286	274	322	302
0.60	204	202	228	222	258	248	288	276	324	304
0.61	204	202	228	224	258	250	290	276	326	304
0.62	204	202	228	224	258	250	292	278	327	306
0.63	204	204	230	224	260	252	294	278	328	308
0.64	204	204	230	224	262	252	294	280	330	309
0.65	206	204	232	226	264	254	296	282	334	312
0.66	206	204	232	226	264	254	297	284	336	314
0.67	206	204	232	226	266	256	298	284	338	316
0.68	206	204	234	228	268	256	300	286	340	318
0.69	206	204	234	228	268	258	302	288	342	320
0.70	206	204	236	228	268	258	304	290	344	322
0.71	206	206	236	230	270	260	306	292	346	322
0.72	208	206	238	230	270	262	308	292	348	324
0.73	208	206	238	230	272	262	310	294	352	326
0.74	208	206	240	232	272	263	312	296	354	328
0.75	208	206	240	232	274	264	314	296	354	332
0.76	208	206	240	232	276	266	316	300	358	334
0.77	208	206	242	234	278	266	318	300	360	336
0.78	210	208	242	236	278	268	318	302	362	340
0.79	210	208	244	236	280	270	320	304	364	342
0.80	210	208	244	238	282	272	322	306	370	344
0.81	210	208	244	238	284	272	324	306	372	346
0.82	212	208	246	240	284	274	326	310	374	348
0.83	212	208	246	240	286	274	328	312	376	350
0.84	212	210	248	240	288	276	330	314	380	352
0.85	212	210	250	242	290	278	334	316	382	354
0.86	214	210	250	242	292	280	338	318	384	356
0.87	214	210	252	244	292	280	340	320	388	360
0.88	214	210	252	244	296	282	342	322	392	362
0.89	214	212	254	246	298	284	346	326	394	366
0.90	216	212	256	248	300	286	350	328	398	370
0.91	216	212	258	248	304	290	354	332	402	374

0.92	216	212	260	250	308	292	358	334	406	378
0.93	218	214	262	252	310	294	362	338	412	380
0.94	218	214	266	254	312	298	368	344	414	384
0.95	220	216	268	256	318	302	370	346	420	388
0.96	222	216	270	258	320	304	378	352	426	396
0.97	224	218	276	260	326	308	382	356	436	402
0.98	226	220	280	266	336	320	392	364	454	414
0.99	230	222	290	278	350	328	408	380	470	432

Table A-3: Centiles for disturbed and undisturbed population sizes of Minke whale for the NnG single pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	10,672	10,672	9,456	10,230	8,188	9,800	7,659	9,266	7,348	8,877
0.02	10,850	10,850	9,656	10,326	8,345	9,976	8,031	9,499	7,653	9,034
0.03	10,938	10,942	9,722	10,408	8,442	10,032	8,133	9,570	7,820	9,187
0.04	11,030	11,032	9,838	10,502	8,552	10,096	8,196	9,807	7,936	9,426
0.05	11,076	11,076	9,956	10,530	8,658	10,254	8,254	9,932	8,014	9,564
0.06	11,098	11,098	10,033	10,606	8,714	10,308	8,308	10,034	8,091	9,691
0.07	11,150	11,150	10,108	10,663	8,792	10,358	8,390	10,104	8,153	9,792
0.08	11,198	11,200	10,144	10,708	8,840	10,404	8,459	10,172	8,222	9,888
0.09	11,220	11,222	10,160	10,750	8,892	10,455	8,530	10,215	8,260	9,958
0.10	11,242	11,240	10,198	10,792	8,942	10,500	8,617	10,263	8,339	9,986
0.11	11,268	11,268	10,228	10,830	8,974	10,520	8,662	10,308	8,383	10,046
0.12	11,313	11,309	10,264	10,852	9,013	10,596	8,706	10,392	8,437	10,094
0.13	11,336	11,337	10,318	10,870	9,058	10,651	8,774	10,422	8,495	10,146
0.14	11,361	11,365	10,344	10,902	9,110	10,692	8,812	10,455	8,530	10,187
0.15	11,388	11,390	10,369	10,923	9,161	10,729	8,868	10,475	8,575	10,262
0.16	11,406	11,406	10,403	10,958	9,217	10,757	8,890	10,492	8,619	10,301
0.17	11,423	11,424	10,450	10,993	9,246	10,784	8,920	10,547	8,659	10,365
0.18	11,447	11,446	10,484	11,013	9,298	10,824	8,950	10,608	8,704	10,426
0.19	11,468	11,469	10,519	11,049	9,327	10,844	8,991	10,632	8,755	10,465
0.20	11,484	11,486	10,554	11,078	9,361	10,880	9,039	10,674	8,798	10,524
0.21	11,496	11,497	10,584	11,118	9,380	10,903	9,074	10,734	8,831	10,571
0.22	11,516	11,518	10,609	11,138	9,412	10,932	9,110	10,759	8,878	10,609
0.23	11,536	11,538	10,630	11,169	9,460	10,964	9,128	10,795	8,929	10,654
0.24	11,546	11,546	10,671	11,194	9,495	10,982	9,162	10,828	8,948	10,711
0.25	11,562	11,561	10,717	11,222	9,524	11,018	9,192	10,842	8,984	10,730
0.26	11,577	11,577	10,741	11,244	9,543	11,044	9,235	10,871	9,037	10,764
0.27	11,594	11,593	10,761	11,263	9,590	11,082	9,269	10,912	9,071	10,793
0.28	11,604	11,606	10,779	11,292	9,637	11,112	9,301	10,936	9,098	10,824
0.29	11,617	11,615	10,801	11,317	9,678	11,140	9,327	10,962	9,146	10,835
0.30	11,625	11,626	10,818	11,334	9,709	11,167	9,353	10,990	9,185	10,867
0.31	11,636	11,635	10,836	11,350	9,732	11,193	9,378	11,028	9,219	10,900
0.32	11,646	11,646	10,858	11,370	9,766	11,222	9,411	11,053	9,259	10,936
0.33	11,661	11,665	10,866	11,408	9,798	11,243	9,435	11,076	9,300	10,977
0.34	11,674	11,674	10,883	11,441	9,822	11,266	9,458	11,099	9,354	10,997
0.35	11,685	11,684	10,919	11,471	9,857	11,296	9,489	11,122	9,379	11,036
0.36	11,699	11,697	10,945	11,495	9,884	11,317	9,529	11,145	9,394	11,079
0.37	11,710	11,708	10,969	11,515	9,916	11,349	9,548	11,175	9,415	11,105

0.38	11,724	11,724	10,994	11,537	9,954	11,378	9,573	11,208	9,448	11,151
0.39	11,732	11,733	11,012	11,561	9,982	11,410	9,598	11,238	9,490	11,163
0.40	11,746	11,747	11,034	11,581	10,002	11,429	9,622	11,249	9,520	11,177
0.41	11,754	11,755	11,048	11,601	10,025	11,458	9,630	11,274	9,566	11,229
0.42	11,760	11,760	11,065	11,619	10,057	11,486	9,656	11,300	9,591	11,264
0.43	11,774	11,776	11,086	11,641	10,074	11,515	9,700	11,337	9,621	11,286
0.44	11,788	11,788	11,109	11,666	10,104	11,551	9,721	11,362	9,666	11,331
0.45	11,799	11,800	11,132	11,679	10,124	11,578	9,747	11,397	9,687	11,367
0.46	11,810	11,810	11,144	11,700	10,152	11,610	9,766	11,426	9,720	11,401
0.47	11,816	11,816	11,157	11,710	10,183	11,631	9,815	11,461	9,733	11,432
0.48	11,823	11,822	11,176	11,726	10,215	11,662	9,853	11,501	9,765	11,460
0.49	11,832	11,832	11,197	11,745	10,235	11,692	9,871	11,530	9,788	11,505
0.50	11,843	11,842	11,218	11,765	10,258	11,718	9,898	11,547	9,814	11,523
0.51	11,856	11,856	11,239	11,779	10,285	11,734	9,924	11,575	9,833	11,556
0.52	11,863	11,864	11,254	11,796	10,316	11,748	9,941	11,614	9,851	11,604
0.53	11,876	11,878	11,284	11,812	10,336	11,770	9,963	11,653	9,889	11,645
0.54	11,884	11,885	11,300	11,824	10,363	11,784	9,987	11,665	9,916	11,676
0.55	11,892	11,892	11,314	11,836	10,373	11,801	10,025	11,692	9,957	11,719
0.56	11,900	11,899	11,328	11,853	10,414	11,816	10,074	11,729	9,976	11,752
0.57	11,910	11,911	11,350	11,871	10,449	11,831	10,121	11,755	10,003	11,791
0.58	11,928	11,927	11,369	11,901	10,475	11,848	10,158	11,792	10,038	11,805
0.59	11,935	11,936	11,386	11,916	10,499	11,884	10,197	11,831	10,059	11,821
0.60	11,946	11,944	11,404	11,954	10,519	11,900	10,218	11,858	10,085	11,851
0.61	11,954	11,955	11,420	11,970	10,536	11,931	10,243	11,872	10,119	11,905
0.62	11,962	11,962	11,434	11,996	10,564	11,953	10,270	11,901	10,153	11,938
0.63	11,973	11,974	11,452	12,025	10,607	12,005	10,309	11,929	10,198	11,972
0.64	11,982	11,980	11,467	12,043	10,641	12,031	10,335	11,946	10,242	11,993
0.65	11,992	11,992	11,501	12,055	10,663	12,081	10,375	11,976	10,264	12,029
0.66	11,998	12,000	11,520	12,074	10,681	12,099	10,405	12,023	10,290	12,059
0.67	12,010	12,011	11,548	12,093	10,716	12,151	10,439	12,068	10,310	12,117
0.68	12,023	12,022	11,568	12,117	10,743	12,185	10,471	12,121	10,342	12,146
0.69	12,042	12,041	11,583	12,139	10,777	12,207	10,498	12,173	10,384	12,188
0.70	12,050	12,052	11,596	12,153	10,797	12,243	10,521	12,199	10,431	12,218
0.71	12,064	12,064	11,641	12,175	10,821	12,263	10,557	12,245	10,475	12,261
0.72	12,073	12,073	11,685	12,196	10,861	12,289	10,593	12,271	10,520	12,291
0.73	12,081	12,080	11,710	12,211	10,913	12,322	10,617	12,315	10,555	12,317
0.74	12,090	12,089	11,731	12,234	10,953	12,346	10,643	12,362	10,602	12,346
0.75	12,102	12,101	11,740	12,262	10,991	12,367	10,711	12,401	10,644	12,379
0.76	12,112	12,112	11,765	12,288	11,018	12,386	10,761	12,453	10,681	12,442
0.77	12,126	12,126	11,796	12,318	11,047	12,447	10,800	12,484	10,716	12,480
0.78	12,139	12,140	11,824	12,343	11,075	12,494	10,861	12,515	10,749	12,530
0.79	12,154	12,154	11,848	12,388	11,102	12,534	10,893	12,564	10,790	12,553
0.80	12,170	12,168	11,876	12,417	11,156	12,568	10,936	12,632	10,840	12,606
0.81	12,178	12,176	11,915	12,451	11,188	12,602	10,994	12,684	10,923	12,657
0.82	12,186	12,188	11,938	12,472	11,256	12,661	11,036	12,732	10,989	12,699
0.83	12,196	12,196	11,977	12,512	11,289	12,718	11,077	12,782	11,034	12,750
0.84	12,216	12,215	12,017	12,559	11,346	12,746	11,137	12,814	11,086	12,821
0.85	12,234	12,236	12,056	12,599	11,404	12,811	11,176	12,848	11,132	12,886
0.86	12,256	12,256	12,078	12,634	11,450	12,872	11,215	12,889	11,179	12,948
0.87	12,276	12,272	12,108	12,671	11,492	12,918	11,278	12,936	11,252	13,014
0.88	12,292	12,292	12,150	12,698	11,529	12,976	11,358	13,029	11,325	13,065
0.89	12,300	12,302	12,194	12,726	11,567	13,010	11,467	13,100	11,408	13,186
0.90	12,312	12,314	12,236	12,778	11,642	13,056	11,539	13,226	11,458	13,249

0.91	12,334	12,338	12,294	12,818	11,772	13,112	11,621	13,303	11,529	13,352
0.92	12,358	12,356	12,316	12,864	11,896	13,170	11,714	13,400	11,610	13,430
0.93	12,384	12,384	12,377	12,908	11,992	13,214	11,804	13,513	11,695	13,528
0.94	12,404	12,406	12,485	12,944	12,062	13,340	11,908	13,636	11,821	13,619
0.95	12,448	12,443	12,546	13,028	12,183	13,446	12,050	13,724	11,940	13,721
0.96	12,490	12,486	12,688	13,072	12,366	13,504	12,138	13,886	12,030	13,859
0.97	12,532	12,532	12,838	13,213	12,552	13,647	12,348	14,047	12,166	14,048
0.98	12,602	12,600	12,978	13,394	12,671	13,780	12,668	14,310	12,338	14,280
0.99	12,677	12,675	13,211	13,667	12,982	14,008	13,044	14,592	12,743	14,641

Table A-4: Centiles for disturbed and undisturbed population sizes of grey seal for the NnG single pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	8,860	8,860	6,693	8,172	7,028	7,639	7,004	7,662	6,891	7,534
0.02	8,894	8,894	6,940	8,336	7,292	7,974	7,224	8,050	7,211	7,959
0.03	8,940	8,940	7,088	8,442	7,443	8,154	7,470	8,213	7,377	8,142
0.04	9,006	9,006	7,230	8,646	7,560	8,339	7,622	8,351	7,628	8,328
0.05	9,040	9,040	7,399	8,706	7,662	8,442	7,731	8,524	7,768	8,602
0.06	9,098	9,098	7,509	8,798	7,700	8,571	7,869	8,654	7,993	8,756
0.07	9,132	9,132	7,598	8,842	7,836	8,662	7,946	8,732	8,102	8,829
0.08	9,166	9,166	7,648	8,908	7,930	8,799	8,053	8,842	8,210	8,924
0.09	9,186	9,186	7,736	8,950	7,968	8,888	8,156	8,918	8,325	9,014
0.10	9,208	9,208	7,860	9,001	8,055	8,969	8,200	8,980	8,394	9,056
0.11	9,240	9,240	7,956	9,051	8,120	9,021	8,294	9,040	8,426	9,132
0.12	9,266	9,266	8,004	9,089	8,230	9,082	8,354	9,118	8,504	9,244
0.13	9,288	9,288	8,052	9,127	8,284	9,116	8,388	9,187	8,545	9,292
0.14	9,304	9,304	8,100	9,160	8,368	9,155	8,444	9,241	8,593	9,343
0.15	9,320	9,320	8,168	9,213	8,454	9,198	8,525	9,317	8,670	9,449
0.16	9,332	9,332	8,195	9,240	8,508	9,208	8,581	9,357	8,754	9,489
0.17	9,350	9,350	8,238	9,256	8,558	9,276	8,644	9,394	8,807	9,537
0.18	9,361	9,361	8,298	9,274	8,599	9,325	8,691	9,491	8,898	9,618
0.19	9,376	9,376	8,355	9,296	8,650	9,366	8,742	9,539	8,942	9,665
0.20	9,388	9,388	8,402	9,318	8,679	9,410	8,799	9,579	8,994	9,736
0.21	9,394	9,394	8,430	9,358	8,700	9,486	8,822	9,616	9,034	9,807
0.22	9,414	9,414	8,451	9,382	8,748	9,516	8,884	9,650	9,078	9,844
0.23	9,427	9,427	8,486	9,395	8,786	9,542	8,920	9,717	9,122	9,886
0.24	9,434	9,434	8,523	9,416	8,811	9,587	8,972	9,773	9,182	9,949
0.25	9,446	9,446	8,546	9,448	8,854	9,627	9,015	9,812	9,248	10,018
0.26	9,455	9,455	8,600	9,469	8,888	9,661	9,064	9,837	9,283	10,059
0.27	9,468	9,468	8,626	9,497	8,931	9,696	9,100	9,875	9,318	10,195
0.28	9,476	9,476	8,662	9,523	8,990	9,739	9,147	9,896	9,360	10,248
0.29	9,488	9,488	8,684	9,543	9,029	9,782	9,195	9,951	9,422	10,275
0.30	9,495	9,495	8,719	9,566	9,058	9,827	9,229	9,978	9,491	10,313
0.31	9,504	9,504	8,737	9,585	9,093	9,851	9,276	10,017	9,543	10,334
0.32	9,520	9,520	8,777	9,607	9,108	9,882	9,323	10,060	9,594	10,364
0.33	9,527	9,527	8,804	9,619	9,130	9,918	9,345	10,078	9,647	10,402
0.34	9,537	9,537	8,825	9,642	9,165	9,951	9,393	10,116	9,690	10,449
0.35	9,546	9,546	8,848	9,663	9,197	9,972	9,438	10,167	9,751	10,494

0.36	9,556	9,556	8,875	9,690	9,225	9,999	9,475	10,203	9,785	10,530
0.37	9,568	9,568	8,898	9,715	9,277	10,039	9,506	10,253	9,834	10,585
0.38	9,574	9,574	8,925	9,737	9,324	10,056	9,546	10,294	9,885	10,657
0.39	9,584	9,584	8,948	9,773	9,358	10,084	9,568	10,330	9,910	10,692
0.40	9,593	9,593	8,971	9,786	9,394	10,113	9,604	10,382	9,953	10,743
0.41	9,600	9,600	8,998	9,807	9,434	10,147	9,622	10,412	9,996	10,800
0.42	9,606	9,606	9,015	9,826	9,448	10,180	9,673	10,458	10,029	10,843
0.43	9,610	9,610	9,051	9,845	9,482	10,205	9,699	10,495	10,067	10,899
0.44	9,619	9,619	9,076	9,861	9,502	10,219	9,758	10,528	10,099	10,925
0.45	9,627	9,627	9,115	9,872	9,540	10,253	9,776	10,576	10,150	10,988
0.46	9,634	9,634	9,141	9,892	9,586	10,286	9,821	10,610	10,198	11,007
0.47	9,640	9,640	9,161	9,918	9,614	10,295	9,862	10,635	10,239	11,064
0.48	9,650	9,650	9,195	9,941	9,641	10,356	9,908	10,676	10,291	11,100
0.49	9,656	9,656	9,212	9,976	9,674	10,369	9,937	10,704	10,324	11,175
0.50	9,667	9,667	9,237	9,992	9,713	10,393	9,978	10,751	10,357	11,224
0.51	9,674	9,674	9,259	10,019	9,757	10,415	10,036	10,793	10,400	11,265
0.52	9,681	9,681	9,278	10,051	9,769	10,468	10,068	10,832	10,433	11,298
0.53	9,693	9,693	9,298	10,064	9,798	10,499	10,116	10,882	10,487	11,361
0.54	9,701	9,701	9,320	10,074	9,829	10,539	10,164	10,915	10,509	11,395
0.55	9,709	9,709	9,350	10,100	9,861	10,564	10,195	10,944	10,567	11,422
0.56	9,717	9,717	9,364	10,130	9,885	10,584	10,230	10,970	10,622	11,455
0.57	9,730	9,730	9,391	10,142	9,911	10,614	10,255	11,021	10,671	11,489
0.58	9,738	9,738	9,413	10,163	9,939	10,635	10,297	11,067	10,710	11,538
0.59	9,747	9,747	9,459	10,181	9,969	10,653	10,336	11,099	10,751	11,587
0.60	9,757	9,757	9,480	10,193	9,984	10,674	10,350	11,137	10,810	11,634
0.61	9,767	9,767	9,491	10,221	10,009	10,702	10,382	11,184	10,854	11,706
0.62	9,772	9,772	9,518	10,241	10,062	10,729	10,448	11,240	10,904	11,749
0.63	9,784	9,784	9,548	10,261	10,092	10,741	10,469	11,264	10,939	11,812
0.64	9,788	9,788	9,577	10,291	10,119	10,777	10,506	11,307	10,982	11,867
0.65	9,796	9,796	9,591	10,306	10,156	10,827	10,528	11,359	11,037	11,931
0.66	9,800	9,800	9,624	10,329	10,205	10,864	10,581	11,408	11,088	11,980
0.67	9,806	9,806	9,672	10,351	10,228	10,895	10,612	11,445	11,136	12,043
0.68	9,810	9,810	9,708	10,365	10,267	10,930	10,644	11,487	11,208	12,087
0.69	9,816	9,816	9,729	10,391	10,291	10,979	10,681	11,517	11,255	12,144
0.70	9,826	9,826	9,762	10,413	10,326	11,000	10,704	11,568	11,293	12,209
0.71	9,834	9,834	9,787	10,434	10,350	11,030	10,764	11,602	11,344	12,293
0.72	9,844	9,844	9,825	10,469	10,383	11,062	10,831	11,636	11,391	12,352
0.73	9,853	9,853	9,858	10,496	10,434	11,113	10,874	11,692	11,458	12,382
0.74	9,870	9,870	9,885	10,513	10,470	11,148	10,905	11,744	11,530	12,458
0.75	9,874	9,874	9,915	10,540	10,493	11,203	10,938	11,786	11,597	12,496
0.76	9,886	9,886	9,936	10,566	10,521	11,260	10,988	11,851	11,677	12,535
0.77	9,896	9,896	9,962	10,596	10,572	11,320	11,085	11,906	11,724	12,635
0.78	9,906	9,906	9,984	10,632	10,603	11,376	11,128	11,949	11,804	12,678
0.79	9,914	9,914	10,013	10,647	10,626	11,419	11,162	11,998	11,865	12,716
0.80	9,928	9,928	10,038	10,680	10,658	11,455	11,238	12,055	11,898	12,759
0.81	9,934	9,934	10,076	10,714	10,725	11,488	11,299	12,146	11,970	12,839
0.82	9,946	9,946	10,112	10,754	10,770	11,524	11,381	12,193	12,031	12,918
0.83	9,956	9,956	10,144	10,788	10,817	11,571	11,453	12,248	12,084	13,032
0.84	9,972	9,972	10,188	10,816	10,865	11,612	11,535	12,372	12,163	13,142
0.85	9,994	9,994	10,207	10,855	10,914	11,690	11,584	12,468	12,239	13,268
0.86	10,008	10,008	10,265	10,886	10,990	11,783	11,690	12,535	12,303	13,376
0.87	10,020	10,020	10,295	10,919	11,069	11,841	11,791	12,613	12,439	13,438
0.88	10,050	10,050	10,348	10,962	11,132	11,900	11,834	12,673	12,582	13,538

0.89	10,070	10,070	10,384	10,997	11,214	11,960	11,911	12,762	12,715	13,673
0.90	10,086	10,086	10,420	11,058	11,284	12,036	11,997	12,878	12,818	13,826
0.91	10,104	10,104	10,519	11,094	11,368	12,128	12,108	12,995	13,000	13,977
0.92	10,134	10,134	10,573	11,150	11,480	12,194	12,236	13,096	13,198	14,104
0.93	10,158	10,158	10,631	11,212	11,548	12,296	12,344	13,192	13,328	14,243
0.94	10,184	10,184	10,688	11,256	11,672	12,393	12,502	13,326	13,461	14,515
0.95	10,220	10,220	10,773	11,338	11,885	12,589	12,630	13,555	13,692	14,676
0.96	10,284	10,284	10,844	11,390	11,986	12,760	12,870	13,770	13,903	14,994
0.97	10,324	10,324	10,996	11,429	12,258	12,947	13,287	14,148	14,308	15,500
0.98	10,388	10,388	11,188	11,572	12,430	13,194	13,862	14,699	14,803	15,985
0.99	10,494	10,494	11,404	11,834	12,888	13,499	14,537	15,205	15,691	16,439

Table A-5: Centiles for disturbed and undisturbed population sizes of harbour seal for the NnG single pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	224	204	40	44	0	2	0	0	0	0
0.02	230	210	44	50	2	4	0	0	0	0
0.03	234	212	48	52	2	6	0	0	0	0
0.04	236	216	50	54	4	6	0	0	0	0
0.05	238	218	52	56	4	6	0	0	0	0
0.06	240	218	54	56	4	8	0	0	0	0
0.07	242	220	56	56	4	8	0	0	0	0
0.08	244	222	58	58	4	8	0	0	0	0
0.09	244	224	58	60	6	10	0	0	0	0
0.10	246	224	60	60	6	10	0	0	0	0
0.11	248	226	62	62	6	10	0	0	0	0
0.12	248	226	62	62	6	10	0	0	0	0
0.13	248	228	62	62	6	10	0	0	0	0
0.14	250	228	64	64	8	10	0	0	0	0
0.15	250	228	64	64	8	12	0	0	0	0
0.16	252	230	66	64	8	12	0	0	0	0
0.17	252	230	66	64	8	12	0	0	0	0
0.18	254	230	66	66	8	12	0	0	0	0
0.19	254	232	66	66	8	12	0	0	0	0
0.20	254	232	68	68	8	14	0	0	0	0
0.21	256	232	68	68	8	14	0	0	0	0
0.22	256	234	68	68	10	14	0	0	0	0
0.23	256	234	70	70	10	14	0	2	0	0
0.24	256	236	70	70	10	14	0	2	0	0
0.25	258	236	70	70	10	14	0	2	0	0
0.26	258	236	72	71	10	14	0	2	0	0
0.27	258	238	72	72	10	16	0	2	0	0
0.28	258	238	72	72	10	16	2	2	0	0
0.29	260	238	74	72	10	16	2	2	0	0
0.30	260	238	74	72	12	16	2	2	0	0
0.31	260	240	74	74	12	16	2	2	0	0
0.32	262	240	74	74	12	16	2	2	0	0
0.33	262	240	76	74	12	16	2	2	0	0
0.34	262	241	76	76	12	16	2	2	0	0

0.35	262	242	76	76	12	18	2	2	0	0
0.36	264	242	78	76	12	18	2	2	0	0
0.37	264	242	78	76	12	18	2	4	0	0
0.38	264	244	78	76	14	18	2	4	0	0
0.39	266	244	78	78	14	18	2	4	0	0
0.40	266	244	78	78	14	18	2	4	0	0
0.41	266	244	80	78	14	18	2	4	0	0
0.42	267	244	80	78	14	18	2	4	0	0
0.43	268	246	80	78	14	20	4	4	0	0
0.44	268	246	82	80	14	20	4	4	0	0
0.45	268	246	82	80	14	20	4	4	0	0
0.46	268	248	82	80	16	20	4	4	0	0
0.47	270	248	82	80	16	20	4	4	0	0
0.48	270	248	82	80	16	20	4	4	0	0
0.49	270	248	84	82	16	20	4	4	0	0
0.50	270	250	84	82	16	20	4	4	0	0
0.51	272	250	84	82	16	21	4	4	0	0
0.52	272	250	84	82	18	22	4	6	0	0
0.53	272	252	86	82	18	22	4	6	0	0
0.54	272	252	86	84	18	22	4	6	0	0
0.55	274	252	86	84	18	22	4	6	0	0
0.56	274	254	88	84	18	22	4	6	0	0
0.57	274	254	88	86	18	22	4	6	0	0
0.58	276	254	88	86	20	23	6	6	0	0
0.59	276	254	89	86	20	24	6	6	0	0
0.60	276	256	90	86	20	24	6	6	0	0
0.61	276	256	90	86	20	24	6	6	0	0
0.62	276	256	91	88	20	24	6	6	0	0
0.63	278	256	92	88	20	24	6	6	0	0
0.64	278	256	92	88	20	24	6	6	0	0
0.65	278	258	92	88	22	26	6	6	0	0
0.66	280	258	94	90	22	26	6	8	0	0
0.67	280	260	94	90	22	26	6	8	0	2
0.68	280	260	94	90	22	26	6	8	2	2
0.69	280	260	96	90	22	26	6	8	2	2
0.70	282	260	96	92	22	26	6	8	2	2
0.71	282	262	96	92	24	28	6	8	2	2
0.72	282	262	98	94	24	28	6	8	2	2
0.73	284	262	98	94	24	28	8	8	2	2
0.74	284	264	100	94	24	28	8	8	2	2
0.75	284	264	100	96	24	28	8	8	2	2
0.76	284	264	100	96	24	30	8	8	2	2
0.77	284	266	102	96	26	30	8	10	2	2
0.78	286	266	102	98	26	30	8	10	2	2
0.79	286	266	102	98	26	30	8	10	2	4
0.80	288	268	104	98	26	30	8	10	4	4
0.81	288	268	104	98	26	32	8	10	4	4
0.82	288	270	106	100	28	32	10	10	4	4
0.83	290	270	106	100	28	32	10	10	4	4
0.84	290	270	108	102	28	32	10	10	4	4
0.85	290	272	108	102	30	32	10	10	4	4
0.86	292	272	108	104	30	34	10	12	4	4
0.87	292	274	110	106	30	34	10	12	4	4

0.88	292	274	112	106	32	34	12	12	4	4
0.89	294	276	112	108	32	36	12	12	6	6
0.90	296	276	116	110	34	36	12	12	6	6
0.91	296	278	116	110	34	36	12	14	6	6
0.92	298	278	120	112	36	38	14	14	6	6
0.93	300	280	122	114	36	38	14	14	6	6
0.94	302	282	124	114	38	40	16	16	6	6
0.95	302	284	126	116	40	40	16	16	8	8
0.96	304	286	130	120	44	42	16	18	8	8
0.97	308	290	134	122	46	44	18	18	8	8
0.98	312	294	136	126	48	48	20	20	10	10
0.99	316	298	144	132	52	50	24	22	12	12

A.2 NnG Concurrent Pile-driving Scenario

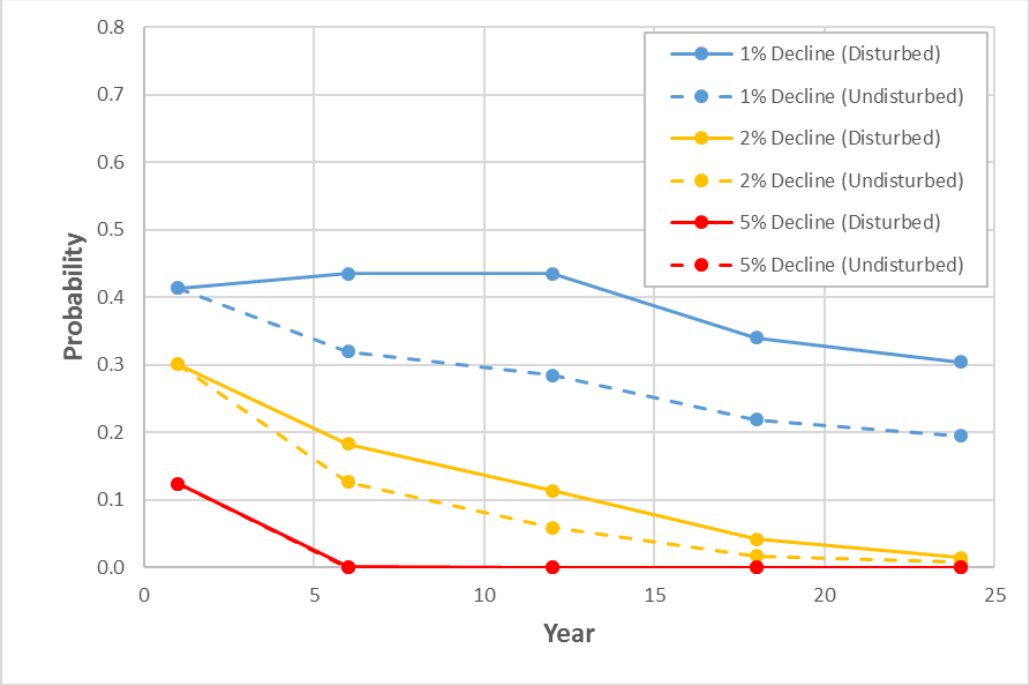

Figure A-11: Probability of a decline in harbour porpoise population for the NnG concurrent pile-driving scenario.

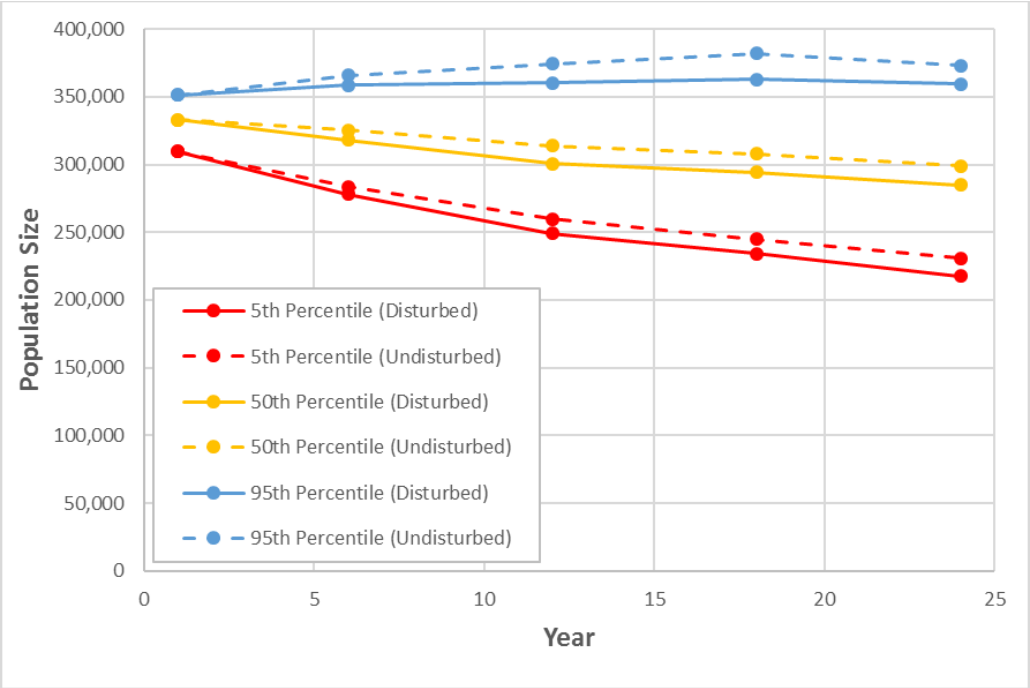

Figure A-12: Estimated change in harbour porpoise population for the NnG concurrent pile-driving scenario.

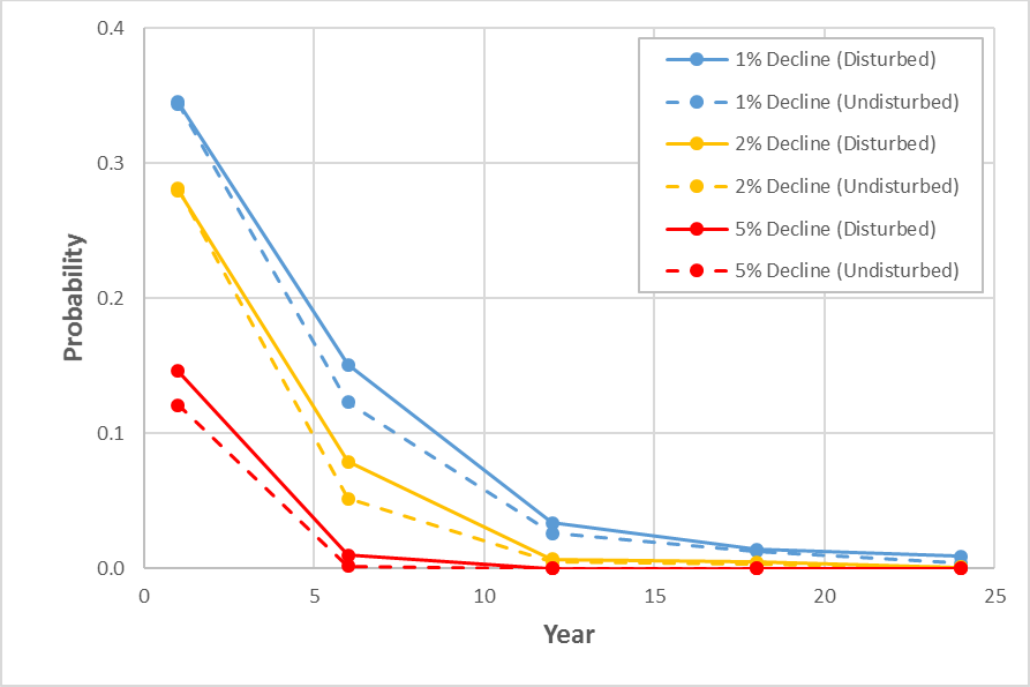

Figure A-13: Probability of a decline in bottlenose dolphin population for the NnG concurrent pile-driving scenario.

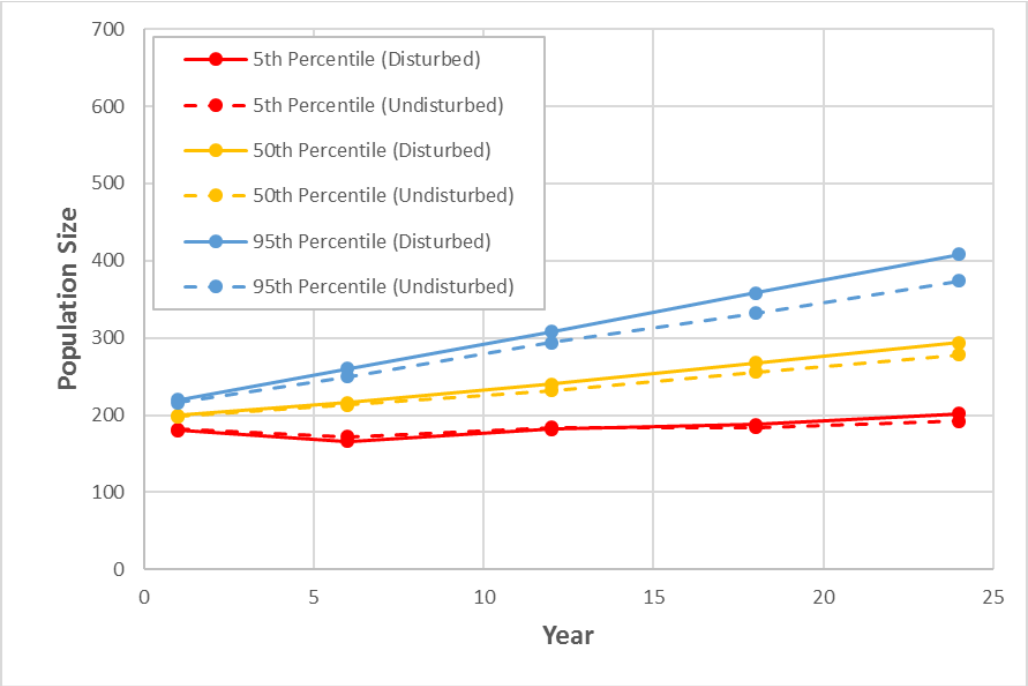

Figure A-14: Estimated change in bottlenose dolphin population for the NnG concurrent pile-driving scenario.

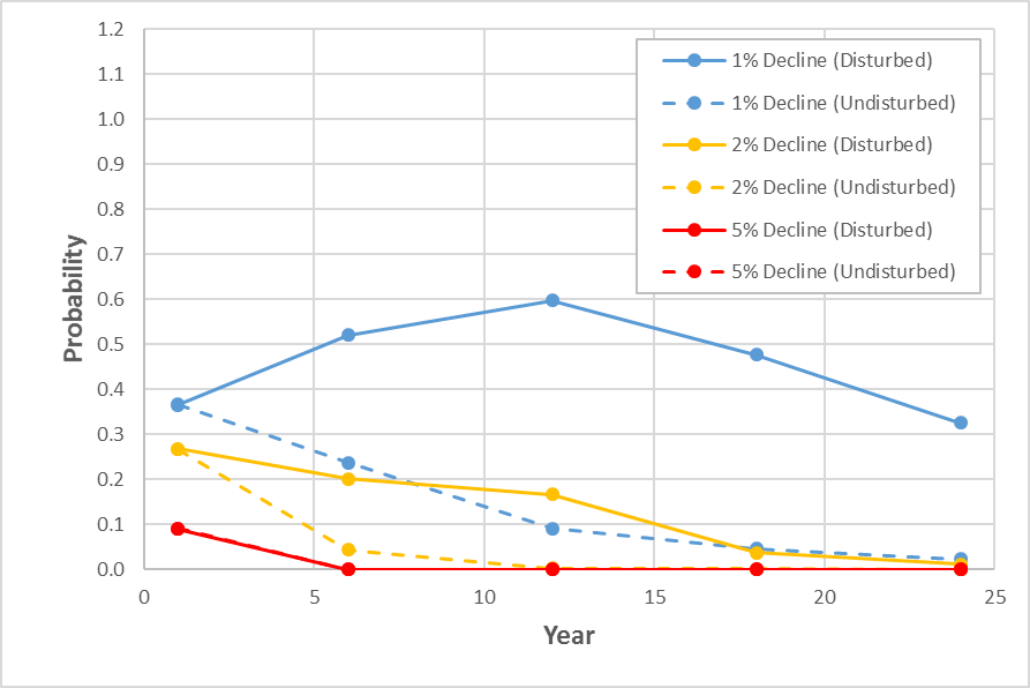

Figure A-15: Probability of a decline in Minke whale population for the NnG concurrent pile-driving scenario.

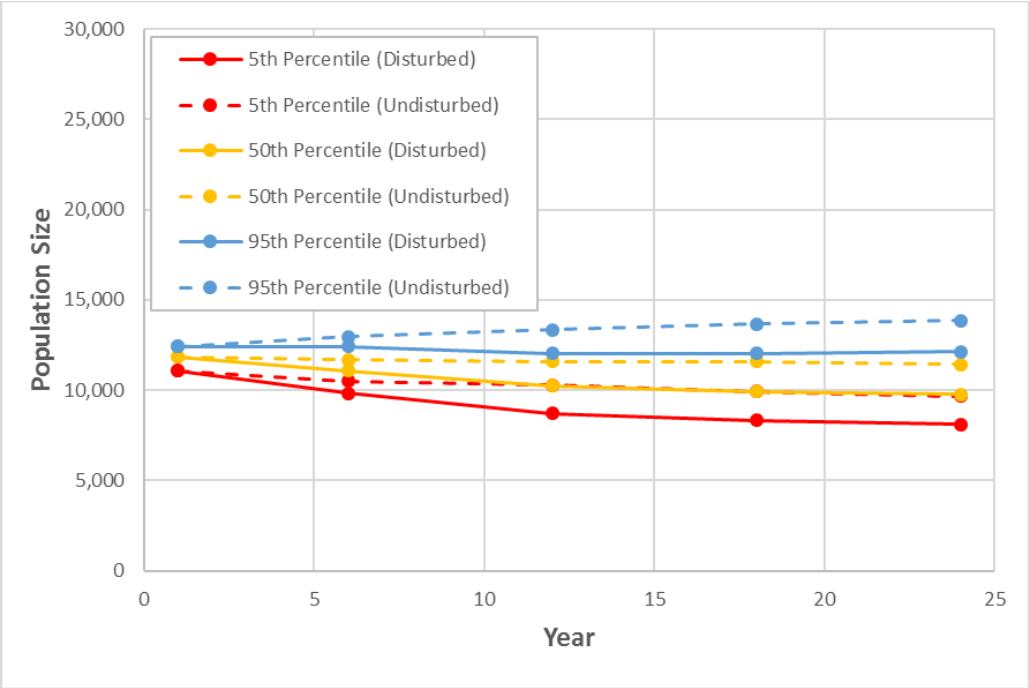

Figure A-16: Estimated change in Minke whale population for the NnG concurrent pile-driving scenario.

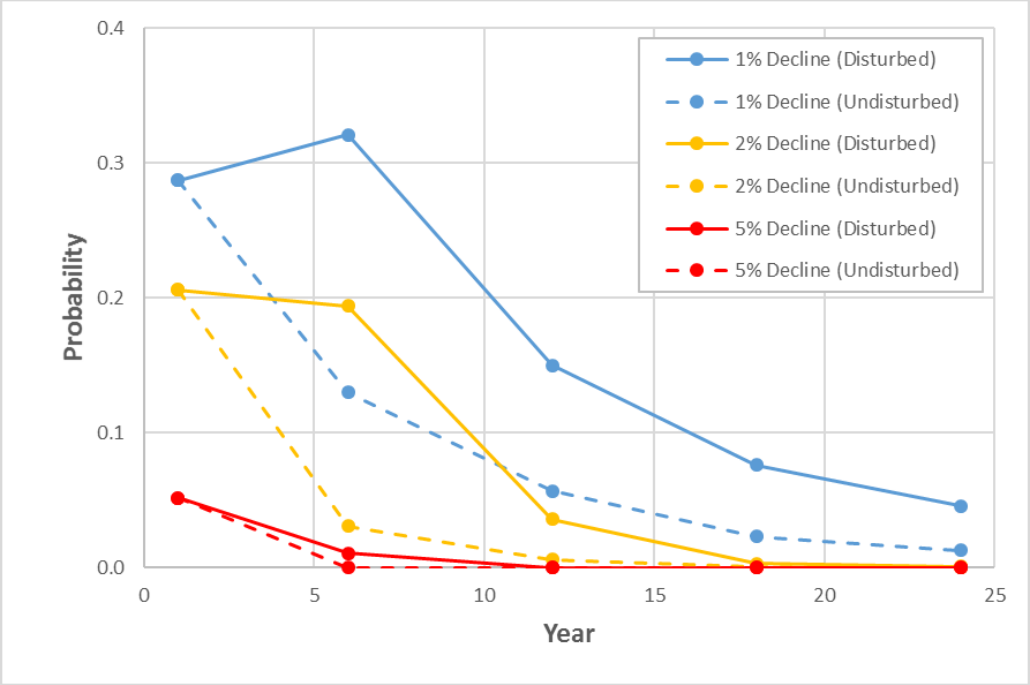

Figure A-17: Probability of a decline in grey seal population for the NnG concurrent pile-driving scenario.

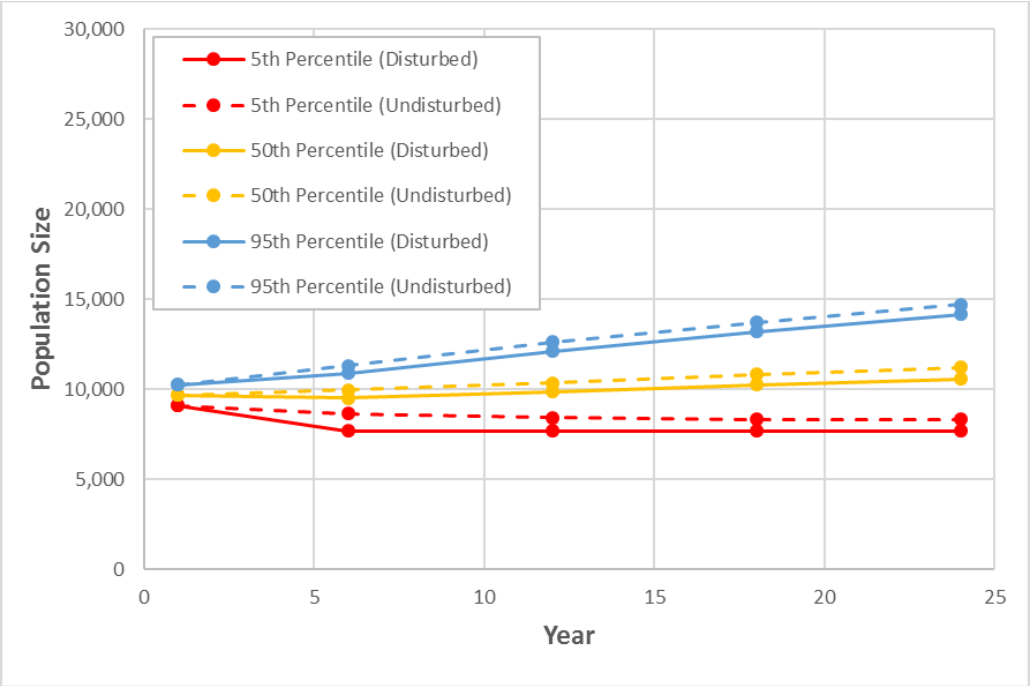

Figure A-18: Estimated change in grey seal population for the NnG concurrent pile-driving scenario.

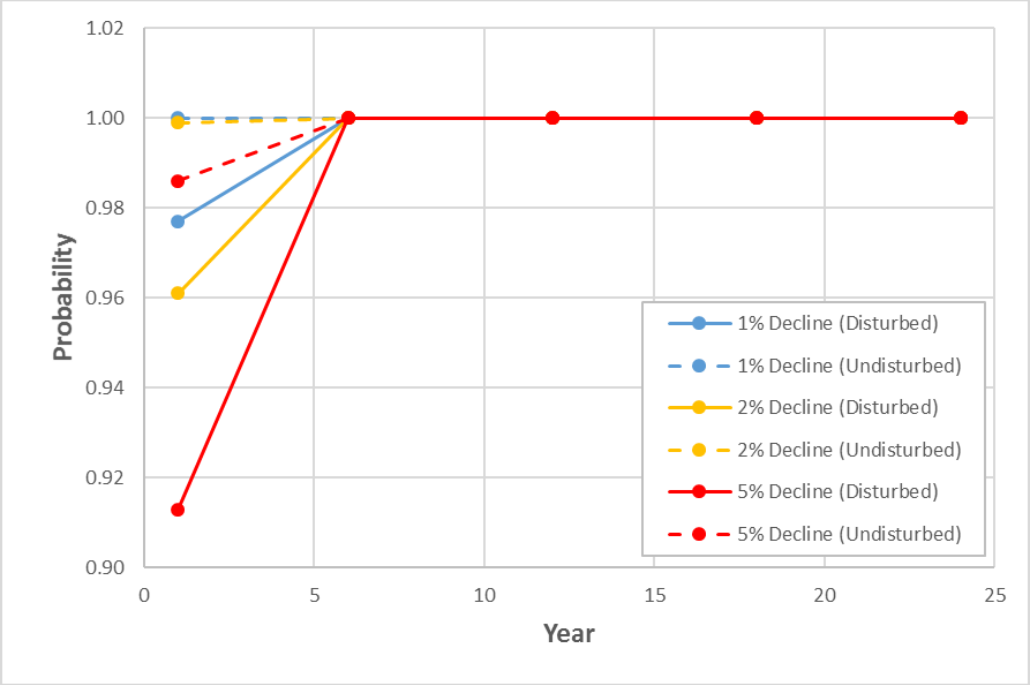

Figure A-19: Probability of a decline in harbour seal population for the NnG concurrent pile-driving scenario.

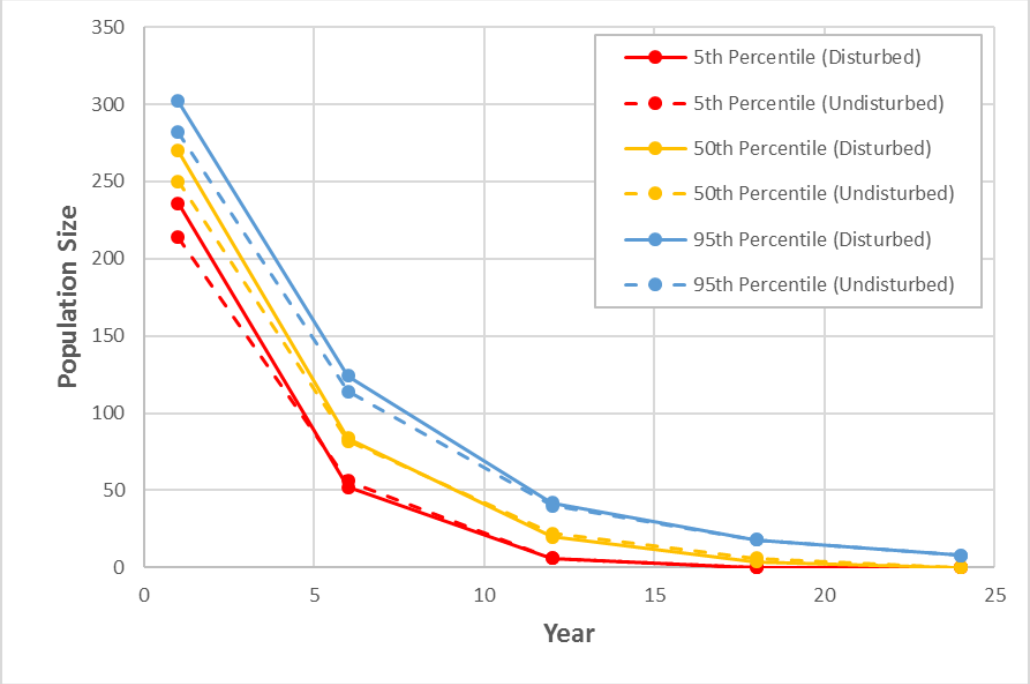

Figure A-20: Probability of a decline in harbour seal population for the NnG concurrent pile-driving scenario.

Table A-6: Centiles for disturbed and undisturbed population sizes of harbour porpoise for the NnG concurrent pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	296,661	296,661	262,081	266,879	231,752	243,347	216,784	226,106	200,652	209,811
0.02	303,159	303,157	268,553	275,647	238,305	250,837	221,962	234,847	208,317	218,273
0.03	305,995	305,993	272,088	279,732	242,969	255,910	229,086	238,393	212,271	223,121
0.04	307,493	307,497	275,398	281,232	246,406	258,148	231,267	242,005	215,269	228,721
0.05	309,691	309,695	278,118	283,720	249,226	259,965	234,162	245,088	217,632	230,827
0.06	310,758	310,758	279,799	285,045	250,002	262,754	236,278	249,588	220,958	232,746
0.07	311,985	311,980	281,372	286,971	251,652	265,178	238,682	251,505	223,538	234,160
0.08	313,256	313,255	282,866	289,862	255,830	267,124	240,695	253,603	225,828	237,234
0.09	314,307	314,308	284,132	291,239	258,016	268,654	243,065	256,108	228,201	240,201
0.10	315,194	315,195	285,222	292,876	259,773	269,930	246,259	258,363	229,737	243,334
0.11	315,671	315,673	286,615	293,834	261,369	273,078	248,993	259,676	232,519	247,328
0.12	316,797	316,797	288,466	295,001	262,999	275,265	250,334	261,666	237,072	249,237

0.13	317,339	317,341	289,864	296,566	263,901	277,406	251,748	264,250	238,053	250,554
0.14	318,100	318,100	290,991	297,308	266,127	278,890	253,643	265,925	239,145	252,589
0.15	318,551	318,552	292,141	298,150	268,062	280,495	255,101	268,521	241,740	254,238
0.16	319,160	319,157	293,474	299,586	269,488	281,113	256,287	269,729	244,169	256,283
0.17	319,831	319,837	294,306	300,410	270,977	282,168	258,504	272,249	245,053	257,388
0.18	320,381	320,383	295,339	301,287	272,405	283,636	260,059	272,968	245,922	259,525
0.19	321,011	321,014	296,289	302,651	273,706	285,175	261,695	273,853	247,716	261,143
0.20	321,490	321,489	297,356	303,820	274,342	286,510	262,792	275,271	248,857	262,995
0.21	322,028	322,028	298,462	305,482	275,822	288,394	263,461	277,692	249,431	264,526
0.22	322,563	322,560	299,358	306,457	276,718	289,464	264,546	278,681	251,160	265,173
0.23	323,469	323,472	300,617	306,884	278,118	290,558	266,490	280,152	252,722	266,540
0.24	324,133	324,135	300,982	308,021	280,112	291,349	267,735	281,550	254,380	267,634
0.25	324,575	324,574	301,483	308,942	280,803	292,051	268,886	282,529	256,432	268,844
0.26	325,091	325,090	302,787	309,860	281,817	293,220	269,710	283,345	257,287	270,820
0.27	325,669	325,669	303,328	310,623	282,495	294,838	270,833	284,475	258,691	271,980
0.28	325,971	325,971	304,159	311,719	283,274	295,537	272,205	285,706	259,791	273,258
0.29	326,490	326,493	304,919	312,648	284,323	296,782	273,110	286,874	260,999	274,225
0.30	327,100	327,101	305,370	313,083	284,696	297,915	274,064	288,059	261,897	275,185
0.31	327,342	327,342	306,408	313,439	285,787	298,737	275,345	289,039	263,228	276,517
0.32	327,663	327,661	307,204	314,353	286,459	299,322	276,207	289,662	264,134	277,688
0.33	327,903	327,906	307,841	315,145	287,416	300,462	277,662	290,529	265,314	278,451
0.34	328,323	328,327	308,535	315,820	288,309	301,080	278,567	291,742	266,374	279,642
0.35	328,654	328,653	309,196	316,218	289,616	301,751	279,742	293,458	267,204	280,482
0.36	328,889	328,890	309,817	316,856	290,556	302,639	280,495	294,329	268,629	281,272
0.37	329,271	329,273	310,508	317,248	291,066	303,270	281,468	295,292	269,882	283,016
0.38	329,587	329,589	311,269	317,731	291,784	303,959	282,217	296,337	271,241	284,454
0.39	329,852	329,849	311,806	318,424	292,359	304,739	283,187	297,094	272,021	285,691
0.40	330,140	330,145	312,610	319,207	292,909	305,294	283,730	298,224	272,962	286,940

0.41	330,430	330,430	313,252	320,413	294,067	306,114	284,715	298,876	274,145	288,439
0.42	330,575	330,574	313,754	321,034	294,700	307,237	285,289	299,790	274,770	289,417
0.43	330,864	330,867	314,116	321,581	295,396	307,919	286,112	300,795	275,200	290,519
0.44	331,339	331,340	314,389	322,515	296,393	308,889	286,690	301,870	277,004	292,858
0.45	331,738	331,738	315,055	323,109	297,061	309,773	287,432	303,451	278,289	294,190
0.46	331,961	331,962	315,681	323,527	297,767	310,858	288,706	304,244	280,442	294,985
0.47	332,107	332,112	316,181	324,189	298,415	311,709	290,552	305,157	280,843	295,855
0.48	332,481	332,483	316,840	324,615	299,082	312,552	292,283	305,874	282,249	296,467
0.49	332,740	332,740	317,342	325,223	299,719	313,388	293,240	306,782	284,166	297,342
0.50	333,049	333,046	318,214	325,595	300,651	313,944	294,123	307,767	285,131	299,137
0.51	333,371	333,372	318,872	326,618	301,541	314,640	294,988	309,327	286,588	300,750
0.52	333,692	333,693	319,294	327,156	302,785	315,820	295,860	309,898	287,672	301,759
0.53	334,215	334,214	319,682	327,707	303,415	317,431	296,802	311,044	289,066	303,137
0.54	334,430	334,433	320,166	328,275	304,313	318,211	297,980	312,064	290,162	304,770
0.55	334,736	334,735	320,881	328,878	305,258	319,343	298,613	312,729	291,084	305,855
0.56	334,991	334,995	321,608	329,694	306,242	320,244	299,571	313,443	292,064	306,783
0.57	335,167	335,168	322,585	330,501	307,483	321,271	300,596	314,428	293,169	308,353
0.58	335,414	335,415	323,498	331,453	308,530	322,234	301,638	315,785	294,045	309,730
0.59	335,730	335,729	324,367	332,088	309,138	323,025	302,527	316,584	295,156	310,947
0.60	336,281	336,283	324,750	332,829	309,917	323,593	303,718	317,710	296,066	311,896
0.61	336,710	336,709	325,283	333,227	310,253	324,290	304,624	318,134	297,338	312,366
0.62	336,943	336,939	325,912	333,772	311,691	325,882	305,284	319,409	298,086	313,144
0.63	337,343	337,339	326,956	334,237	312,668	326,566	306,244	321,055	299,159	315,018
0.64	337,619	337,618	327,848	334,736	313,582	328,027	307,466	321,654	300,213	315,887
0.65	338,023	338,020	328,390	335,285	314,436	329,039	308,277	322,537	301,505	317,085
0.66	338,342	338,345	329,249	336,896	315,414	329,492	309,216	323,693	302,311	317,700
0.67	338,821	338,818	329,863	337,993	316,548	330,636	310,327	325,125	303,143	318,278
0.68	339,187	339,191	330,747	338,591	317,386	332,018	311,286	326,043	304,723	319,256

0.69	339,515	339,512	331,192	339,157	318,521	332,682	312,024	327,231	305,710	320,235
0.70	339,892	339,895	331,982	339,990	319,294	333,764	312,915	328,854	306,654	321,284
0.71	340,268	340,271	332,596	340,450	320,234	335,051	313,533	330,005	308,120	322,262
0.72	340,620	340,618	333,317	341,059	320,838	335,835	314,672	331,096	309,655	323,915
0.73	340,832	340,833	334,275	342,038	322,240	337,773	316,191	331,857	310,939	325,716
0.74	341,168	341,172	335,010	342,319	322,842	338,671	317,486	333,476	312,094	327,200
0.75	341,570	341,570	336,357	342,832	324,153	339,596	319,064	334,880	312,777	328,708
0.76	341,783	341,788	337,027	343,606	325,580	341,019	320,919	336,941	314,527	329,339
0.77	342,178	342,180	337,746	344,333	326,699	341,837	323,083	338,897	315,589	330,571
0.78	342,405	342,404	338,398	345,253	327,916	343,430	324,757	340,501	317,341	331,715
0.79	342,882	342,886	339,035	345,894	329,354	344,631	326,157	341,701	318,940	332,957
0.80	343,221	343,223	339,476	347,106	330,828	345,613	328,579	343,776	320,943	335,465
0.81	343,589	343,588	340,329	348,033	332,428	346,710	330,472	345,928	321,961	337,112
0.82	344,003	344,003	341,060	348,918	334,056	347,273	332,705	348,119	323,900	339,186
0.83	344,364	344,364	342,128	350,020	335,782	348,295	334,581	349,820	325,974	341,057
0.84	344,772	344,774	343,463	350,742	337,668	349,911	336,408	351,882	327,210	343,522
0.85	345,166	345,170	344,957	352,163	339,387	351,229	339,340	353,327	329,685	345,534
0.86	345,479	345,481	346,482	353,462	340,969	352,061	340,841	354,959	331,896	347,537
0.87	346,112	346,111	348,222	354,944	341,904	354,387	343,273	357,850	332,918	349,822
0.88	346,498	346,500	349,270	356,042	343,308	356,143	344,200	361,130	334,262	352,232
0.89	347,319	347,317	350,108	357,269	344,891	358,837	346,160	362,745	335,914	354,642
0.90	347,839	347,844	350,925	358,591	347,241	362,117	348,847	365,206	338,772	357,984
0.91	348,291	348,289	352,434	359,695	349,887	364,567	350,997	367,180	341,339	359,316
0.92	348,840	348,846	353,653	361,307	351,134	367,643	353,755	369,385	344,326	361,165
0.93	349,832	349,834	354,685	362,520	353,469	369,682	356,594	373,621	348,344	366,944
0.94	350,652	350,658	356,832	364,325	357,449	372,659	359,103	377,730	352,996	370,522
0.95	351,404	351,408	358,502	366,019	360,510	374,337	363,072	382,220	359,564	373,213
0.96	352,685	352,687	361,502	370,045	362,389	378,431	368,529	386,498	364,044	379,170

0.97	354,497	354,497	363,743	372,296	366,887	381,134	375,327	391,547	367,015	390,538
0.98	358,120	358,116	367,479	375,016	369,521	388,061	380,507	398,503	378,050	397,986
0.99	362,524	362,524	373,886	384,088	383,161	397,502	389,721	409,549	388,581	405,431

Table A-7: Centiles for disturbed and undisturbed population sizes of bottlenose dolphin for the NnG concurrent pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	170	172	146	156	160	162	158	158	158	162
0.02	174	178	154	160	168	166	170	170	176	174
0.03	178	180	160	166	170	174	176	176	190	184
0.04	178	182	162	170	176	178	182	180	196	190
0.05	180	182	166	172	182	184	188	184	202	192
0.06	180	182	168	176	184	186	192	188	204	196
0.07	182	184	172	178	186	188	196	192	208	200
0.08	184	184	174	180	188	188	200	196	214	204
0.09	184	184	176	182	188	190	206	198	218	208
0.10	184	186	178	182	192	192	208	202	220	210
0.11	184	186	178	184	194	194	208	204	224	214
0.12	184	186	180	184	196	196	210	206	228	216
0.13	186	188	182	186	198	196	212	206	230	220
0.14	186	188	184	186	200	198	214	208	232	222
0.15	188	188	184	188	200	200	216	210	234	224
0.16	188	188	188	190	202	202	218	212	236	226
0.17	188	190	188	190	204	202	218	212	238	228
0.18	188	190	188	192	206	204	222	214	242	232
0.19	190	190	190	192	208	206	222	216	244	234
0.20	190	190	192	192	208	206	224	216	246	236
0.21	190	190	192	194	210	206	226	218	248	236
0.22	190	192	194	194	210	208	228	220	250	240
0.23	190	192	194	196	212	208	228	222	252	240
0.24	192	192	194	196	214	210	230	224	254	242
0.25	192	192	196	198	214	210	232	226	256	244
0.26	192	192	196	198	216	212	234	226	258	246
0.27	192	192	197	198	216	214	236	228	260	248
0.28	193	192	198	198	218	214	236	228	262	248
0.29	194	194	198	200	218	214	240	230	264	250
0.30	194	194	200	200	220	216	241	230	264	252
0.31	194	194	200	200	222	216	244	232	266	254
0.32	194	194	201	202	222	218	244	234	268	254
0.33	194	194	202	202	224	218	246	236	270	256
0.34	194	194	202	202	225	220	246	238	270	258
0.35	196	196	204	204	226	220	248	238	272	258
0.36	196	196	204	204	227	220	248	240	274	260
0.37	196	196	206	204	228	222	250	242	276	262
0.38	196	196	206	206	228	223	250	244	276	262

0.39	196	196	206	206	230	224	252	244	278	264
0.40	196	196	208	206	231	224	254	246	280	266
0.41	196	196	209	208	232	226	254	248	282	266
0.42	198	196	210	208	232	226	256	248	284	266
0.43	198	198	210	208	234	228	258	248	284	268
0.44	198	198	212	208	235	228	260	250	287	270
0.45	198	198	212	210	236	228	260	250	288	272
0.46	198	198	212	210	237	230	262	252	290	272
0.47	198	198	214	210	238	230	264	252	290	274
0.48	198	198	214	212	238	231	266	254	292	276
0.49	200	198	215	212	238	232	266	254	294	277
0.50	200	198	216	213	240	232	268	256	294	278
0.51	200	198	216	214	240	234	268	258	296	280
0.52	200	198	216	214	242	234	270	259	298	282
0.53	200	200	218	216	244	236	270	261	300	283
0.54	200	200	218	216	244	236	272	262	301	284
0.55	200	200	220	216	244	236	274	262	304	287
0.56	201	200	220	218	246	238	274	264	306	288
0.57	202	200	220	218	246	238	276	265	308	290
0.58	202	200	222	218	248	240	276	266	310	292
0.59	202	200	222	220	250	240	278	266	310	292
0.60	202	200	222	220	250	242	279	268	312	294
0.61	202	202	224	220	251	242	281	268	314	296
0.62	202	202	224	220	252	244	282	270	316	296
0.63	204	202	224	222	253	246	284	270	318	298
0.64	204	202	226	222	254	246	284	272	320	300
0.65	204	202	226	223	256	248	286	273	322	302
0.66	204	202	226	224	256	248	288	274	324	304
0.67	204	204	228	224	258	248	288	276	326	306
0.68	204	204	230	224	260	250	290	276	326	306
0.69	206	204	230	226	260	250	292	278	328	308
0.70	206	204	230	226	262	252	292	280	332	312
0.71	206	204	232	226	263	254	295	282	333	312
0.72	206	204	232	228	264	254	296	284	334	314
0.73	206	204	234	228	264	254	298	284	336	318
0.74	206	206	234	228	266	256	299	286	340	318
0.75	208	206	236	230	266	256	302	286	342	321
0.76	208	206	236	230	268	258	304	288	344	322
0.77	208	206	236	232	268	260	306	290	346	324
0.78	208	206	238	232	270	260	306	292	350	326
0.79	208	206	240	232	270	260	308	294	352	330
0.80	210	208	240	234	272	262	310	296	354	332
0.81	210	208	240	234	276	264	312	298	354	334
0.82	210	208	242	234	278	266	314	298	358	338
0.83	210	208	244	234	278	268	316	300	362	340
0.84	212	208	244	236	280	270	318	300	366	342
0.85	212	210	246	236	282	270	320	302	368	344
0.86	212	210	246	238	284	272	324	306	370	346
0.87	214	210	248	238	288	274	326	310	372	348
0.88	214	210	248	240	288	278	328	312	376	350
0.89	214	210	250	242	290	278	332	314	378	352
0.90	216	212	250	242	292	282	336	316	382	356
0.91	216	212	252	244	296	282	338	322	386	360

0.92	216	212	254	246	298	284	342	324	390	362
0.93	218	214	256	248	302	286	346	326	396	368
0.94	218	214	258	248	306	290	354	330	398	372
0.95	220	216	260	250	308	294	358	332	408	374
0.96	220	216	264	254	314	298	366	340	416	382
0.97	222	218	270	258	322	304	374	350	422	396
0.98	224	218	276	264	328	312	380	356	434	404
0.99	226	220	286	272	340	326	388	366	456	432

Table A-8: Centiles for disturbed and undisturbed population sizes of Minke whale for the NnG concurrent pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	10,694	10,692	9,386	10,130	8,298	9,794	7,592	9,279	7,198	8,762
0.02	10,848	10,844	9,534	10,257	8,406	9,992	7,932	9,613	7,617	9,111
0.03	10,942	10,948	9,719	10,356	8,478	10,106	8,152	9,687	7,835	9,459
0.04	11,029	11,031	9,786	10,460	8,562	10,228	8,286	9,808	7,986	9,595
0.05	11,070	11,074	9,834	10,498	8,707	10,282	8,332	9,944	8,098	9,664
0.06	11,140	11,138	9,886	10,558	8,738	10,322	8,404	10,036	8,158	9,746
0.07	11,170	11,168	9,940	10,606	8,794	10,360	8,480	10,122	8,255	9,800
0.08	11,198	11,194	10,000	10,647	8,876	10,407	8,547	10,174	8,305	9,907
0.09	11,230	11,228	10,044	10,675	8,964	10,475	8,603	10,221	8,347	9,968
0.10	11,264	11,264	10,084	10,716	9,031	10,510	8,642	10,268	8,392	10,012
0.11	11,290	11,290	10,128	10,768	9,081	10,548	8,700	10,302	8,436	10,122
0.12	11,320	11,318	10,173	10,826	9,133	10,580	8,746	10,336	8,514	10,168
0.13	11,349	11,352	10,225	10,856	9,175	10,631	8,790	10,386	8,553	10,224
0.14	11,360	11,364	10,250	10,869	9,190	10,666	8,834	10,420	8,576	10,261
0.15	11,384	11,384	10,272	10,885	9,219	10,691	8,880	10,468	8,626	10,290
0.16	11,405	11,402	10,304	10,911	9,244	10,718	8,898	10,503	8,680	10,328
0.17	11,419	11,420	10,372	10,928	9,300	10,744	8,928	10,540	8,718	10,374
0.18	11,432	11,434	10,412	10,952	9,328	10,818	8,985	10,576	8,784	10,410
0.19	11,446	11,452	10,444	10,996	9,368	10,856	9,031	10,600	8,808	10,461
0.20	11,460	11,460	10,470	11,020	9,393	10,888	9,086	10,654	8,841	10,500
0.21	11,485	11,485	10,500	11,057	9,413	10,918	9,125	10,694	8,869	10,527
0.22	11,498	11,500	10,522	11,088	9,436	10,948	9,150	10,734	8,892	10,565
0.23	11,513	11,515	10,559	11,106	9,458	11,002	9,193	10,766	8,940	10,605
0.24	11,534	11,536	10,580	11,134	9,494	11,026	9,223	10,801	8,982	10,640
0.25	11,549	11,546	10,610	11,166	9,524	11,038	9,248	10,839	9,018	10,700
0.26	11,573	11,572	10,632	11,192	9,566	11,058	9,281	10,873	9,062	10,737
0.27	11,586	11,585	10,658	11,223	9,600	11,079	9,304	10,902	9,095	10,787
0.28	11,594	11,597	10,686	11,249	9,621	11,096	9,334	10,927	9,135	10,821
0.29	11,604	11,606	10,714	11,257	9,664	11,112	9,361	10,949	9,160	10,839
0.30	11,623	11,620	10,740	11,266	9,697	11,135	9,392	10,978	9,207	10,860
0.31	11,635	11,636	10,753	11,285	9,723	11,164	9,420	11,001	9,238	10,886
0.32	11,654	11,655	10,782	11,326	9,757	11,186	9,446	11,028	9,262	10,899
0.33	11,666	11,663	10,819	11,355	9,799	11,211	9,482	11,060	9,296	10,921
0.34	11,674	11,674	10,839	11,381	9,826	11,255	9,523	11,080	9,329	10,961
0.35	11,682	11,684	10,855	11,408	9,849	11,275	9,547	11,124	9,363	11,005
0.36	11,695	11,695	10,862	11,429	9,889	11,297	9,562	11,150	9,380	11,028
0.37	11,705	11,705	10,881	11,449	9,913	11,314	9,592	11,198	9,419	11,053

0.38	11,718	11,716	10,897	11,462	9,940	11,330	9,610	11,215	9,452	11,102
0.39	11,728	11,729	10,908	11,490	9,968	11,346	9,639	11,264	9,468	11,126
0.40	11,742	11,739	10,924	11,509	10,001	11,376	9,666	11,287	9,508	11,143
0.41	11,751	11,750	10,940	11,532	10,020	11,405	9,689	11,332	9,523	11,161
0.42	11,756	11,759	10,957	11,550	10,042	11,433	9,728	11,369	9,550	11,192
0.43	11,768	11,766	10,975	11,564	10,059	11,453	9,754	11,397	9,577	11,217
0.44	11,775	11,775	10,990	11,576	10,097	11,473	9,785	11,420	9,602	11,245
0.45	11,785	11,785	11,018	11,597	10,121	11,496	9,812	11,472	9,641	11,282
0.46	11,794	11,794	11,029	11,608	10,149	11,526	9,824	11,486	9,662	11,311
0.47	11,806	11,806	11,046	11,618	10,167	11,538	9,852	11,518	9,706	11,342
0.48	11,813	11,814	11,055	11,638	10,188	11,566	9,876	11,546	9,725	11,372
0.49	11,823	11,821	11,079	11,662	10,209	11,586	9,903	11,577	9,749	11,399
0.50	11,835	11,836	11,092	11,690	10,236	11,605	9,939	11,602	9,767	11,432
0.51	11,844	11,845	11,114	11,707	10,274	11,627	9,959	11,627	9,785	11,465
0.52	11,855	11,856	11,126	11,722	10,292	11,648	9,990	11,642	9,813	11,527
0.53	11,864	11,866	11,142	11,748	10,313	11,675	10,013	11,663	9,835	11,556
0.54	11,876	11,876	11,160	11,771	10,334	11,709	10,055	11,692	9,873	11,578
0.55	11,886	11,884	11,193	11,784	10,353	11,735	10,075	11,716	9,901	11,594
0.56	11,893	11,894	11,209	11,794	10,379	11,763	10,098	11,749	9,924	11,623
0.57	11,903	11,901	11,221	11,812	10,408	11,782	10,130	11,791	9,949	11,655
0.58	11,915	11,917	11,250	11,820	10,441	11,828	10,149	11,821	9,986	11,695
0.59	11,923	11,924	11,270	11,831	10,461	11,848	10,179	11,854	10,034	11,731
0.60	11,932	11,930	11,285	11,854	10,479	11,885	10,205	11,880	10,075	11,766
0.61	11,940	11,940	11,302	11,877	10,507	11,905	10,240	11,911	10,116	11,810
0.62	11,954	11,957	11,324	11,900	10,517	11,922	10,275	11,937	10,156	11,832
0.63	11,965	11,967	11,342	11,927	10,545	11,969	10,295	11,966	10,189	11,871
0.64	11,974	11,975	11,356	11,955	10,570	11,989	10,320	12,011	10,227	11,908
0.65	11,982	11,982	11,377	11,978	10,603	12,020	10,344	12,038	10,261	11,937
0.66	11,991	11,992	11,396	11,998	10,625	12,040	10,381	12,063	10,288	11,979
0.67	12,004	12,003	11,424	12,016	10,657	12,070	10,404	12,113	10,320	12,019
0.68	12,012	12,011	11,442	12,050	10,684	12,093	10,448	12,157	10,352	12,065
0.69	12,025	12,024	11,459	12,071	10,712	12,125	10,475	12,196	10,432	12,101
0.70	12,036	12,036	11,476	12,088	10,745	12,144	10,509	12,212	10,464	12,131
0.71	12,044	12,045	11,496	12,115	10,765	12,162	10,541	12,232	10,482	12,163
0.72	12,062	12,064	11,529	12,149	10,782	12,186	10,605	12,253	10,495	12,200
0.73	12,070	12,071	11,551	12,170	10,822	12,252	10,643	12,302	10,510	12,249
0.74	12,078	12,079	11,575	12,198	10,877	12,279	10,697	12,352	10,533	12,283
0.75	12,089	12,089	11,609	12,225	10,932	12,298	10,739	12,397	10,605	12,324
0.76	12,100	12,100	11,641	12,244	10,968	12,330	10,776	12,448	10,642	12,358
0.77	12,123	12,122	11,665	12,262	11,010	12,372	10,816	12,485	10,682	12,407
0.78	12,130	12,132	11,685	12,282	11,042	12,396	10,857	12,516	10,762	12,465
0.79	12,140	12,139	11,701	12,320	11,066	12,448	10,892	12,556	10,825	12,526
0.80	12,163	12,166	11,742	12,340	11,105	12,494	10,922	12,590	10,862	12,582
0.81	12,178	12,178	11,776	12,360	11,140	12,525	10,974	12,622	10,933	12,650
0.82	12,190	12,192	11,812	12,389	11,175	12,558	11,025	12,649	10,983	12,716
0.83	12,200	12,200	11,845	12,423	11,236	12,609	11,096	12,700	11,043	12,783
0.84	12,210	12,210	11,872	12,456	11,271	12,637	11,155	12,744	11,103	12,844
0.85	12,232	12,232	11,927	12,492	11,341	12,680	11,197	12,788	11,139	12,928
0.86	12,248	12,250	11,965	12,530	11,402	12,731	11,244	12,853	11,181	12,966
0.87	12,268	12,266	11,990	12,544	11,458	12,760	11,303	12,925	11,245	13,010
0.88	12,282	12,283	12,010	12,588	11,506	12,804	11,385	12,989	11,316	13,089
0.89	12,298	12,300	12,027	12,639	11,573	12,850	11,460	13,053	11,382	13,160
0.90	12,318	12,320	12,082	12,678	11,649	12,913	11,512	13,143	11,477	13,312

0.91	12,332	12,332	12,114	12,724	11,708	12,982	11,592	13,225	11,591	13,394
0.92	12,352	12,356	12,187	12,772	11,786	13,070	11,801	13,298	11,704	13,526
0.93	12,376	12,376	12,251	12,810	11,874	13,143	11,891	13,386	11,780	13,589
0.94	12,402	12,400	12,343	12,878	11,934	13,220	11,964	13,460	11,922	13,724
0.95	12,432	12,436	12,430	12,978	12,026	13,349	12,050	13,664	12,128	13,861
0.96	12,482	12,480	12,534	13,066	12,271	13,455	12,152	13,792	12,330	14,025
0.97	12,522	12,520	12,712	13,182	12,403	13,618	12,383	13,951	12,492	14,177
0.98	12,572	12,578	12,866	13,416	12,573	13,803	12,646	14,200	12,884	14,593
0.99	12,646	12,642	13,082	13,578	12,903	14,169	13,144	15,000	13,379	15,348

Table A-9: Centiles for disturbed and undisturbed population sizes of grey seal for the NnG concurrent pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	8,562	8,562	7,060	8,177	7,066	7,764	7,014	7,690	6,920	7,435
0.02	8,846	8,846	7,222	8,342	7,294	7,992	7,228	7,960	7,182	7,776
0.03	9,002	9,002	7,408	8,495	7,481	8,179	7,400	8,100	7,316	7,996
0.04	9,056	9,056	7,574	8,598	7,627	8,269	7,568	8,207	7,500	8,147
0.05	9,100	9,100	7,683	8,670	7,698	8,426	7,702	8,342	7,691	8,333
0.06	9,168	9,168	7,788	8,728	7,799	8,540	7,877	8,541	7,794	8,431
0.07	9,202	9,202	7,877	8,774	7,959	8,682	7,970	8,604	7,974	8,595
0.08	9,212	9,212	7,963	8,828	8,009	8,757	8,034	8,679	8,048	8,698
0.09	9,240	9,240	8,035	8,874	8,059	8,816	8,151	8,772	8,188	8,774
0.10	9,264	9,264	8,078	8,916	8,139	8,863	8,295	8,846	8,247	8,896
0.11	9,288	9,288	8,146	8,948	8,231	8,913	8,368	8,906	8,347	8,980
0.12	9,302	9,302	8,198	8,990	8,291	8,977	8,443	8,992	8,484	9,074
0.13	9,318	9,318	8,234	9,049	8,393	9,017	8,486	9,067	8,536	9,165
0.14	9,334	9,334	8,274	9,105	8,475	9,089	8,524	9,118	8,585	9,216
0.15	9,352	9,352	8,322	9,145	8,526	9,143	8,560	9,168	8,687	9,278
0.16	9,365	9,365	8,360	9,176	8,556	9,191	8,616	9,240	8,764	9,353
0.17	9,376	9,376	8,398	9,219	8,603	9,226	8,709	9,271	8,835	9,415
0.18	9,388	9,388	8,442	9,244	8,656	9,256	8,752	9,333	8,901	9,482
0.19	9,398	9,398	8,489	9,292	8,689	9,280	8,822	9,424	8,986	9,528
0.20	9,406	9,406	8,530	9,310	8,747	9,333	8,884	9,473	9,060	9,582
0.21	9,424	9,424	8,579	9,336	8,800	9,386	8,939	9,520	9,108	9,642
0.22	9,430	9,430	8,611	9,371	8,857	9,437	8,986	9,608	9,137	9,716
0.23	9,448	9,448	8,630	9,406	8,877	9,492	9,042	9,653	9,181	9,772
0.24	9,458	9,458	8,680	9,424	8,916	9,532	9,082	9,690	9,254	9,805
0.25	9,466	9,466	8,727	9,450	8,957	9,559	9,142	9,768	9,325	9,875
0.26	9,482	9,482	8,779	9,467	9,005	9,591	9,204	9,821	9,385	9,908
0.27	9,493	9,493	8,838	9,487	9,052	9,620	9,265	9,891	9,452	9,973
0.28	9,502	9,502	8,892	9,516	9,087	9,645	9,312	9,927	9,512	10,062
0.29	9,513	9,513	8,930	9,536	9,145	9,701	9,374	9,951	9,554	10,095
0.30	9,524	9,524	8,974	9,550	9,185	9,731	9,401	9,979	9,603	10,158
0.31	9,531	9,531	9,009	9,569	9,221	9,763	9,449	10,019	9,661	10,225
0.32	9,539	9,539	9,044	9,605	9,252	9,784	9,473	10,073	9,722	10,293
0.33	9,544	9,544	9,079	9,641	9,306	9,815	9,532	10,110	9,771	10,369
0.34	9,557	9,557	9,108	9,673	9,336	9,840	9,582	10,151	9,822	10,417
0.35	9,567	9,567	9,141	9,701	9,363	9,889	9,624	10,227	9,867	10,478

0.36	9,577	9,577	9,161	9,713	9,392	9,915	9,660	10,277	9,925	10,525
0.37	9,586	9,586	9,178	9,731	9,427	9,939	9,709	10,310	9,971	10,558
0.38	9,600	9,600	9,216	9,744	9,450	9,965	9,747	10,342	10,022	10,582
0.39	9,609	9,609	9,252	9,762	9,500	10,002	9,792	10,398	10,069	10,635
0.40	9,616	9,616	9,273	9,783	9,524	10,031	9,834	10,451	10,117	10,700
0.41	9,624	9,624	9,295	9,808	9,569	10,086	9,890	10,488	10,151	10,738
0.42	9,634	9,634	9,319	9,840	9,596	10,117	9,944	10,518	10,218	10,785
0.43	9,642	9,642	9,355	9,859	9,636	10,139	9,985	10,545	10,242	10,816
0.44	9,648	9,648	9,380	9,869	9,666	10,166	10,028	10,596	10,278	10,854
0.45	9,656	9,656	9,404	9,882	9,689	10,186	10,075	10,636	10,321	10,898
0.46	9,667	9,667	9,427	9,891	9,727	10,212	10,119	10,680	10,404	10,979
0.47	9,674	9,674	9,461	9,909	9,756	10,252	10,150	10,717	10,444	11,038
0.48	9,682	9,682	9,478	9,926	9,803	10,300	10,196	10,747	10,476	11,106
0.49	9,688	9,688	9,494	9,951	9,846	10,333	10,229	10,803	10,527	11,168
0.50	9,694	9,694	9,511	9,979	9,868	10,365	10,270	10,826	10,571	11,206
0.51	9,703	9,703	9,531	10,009	9,898	10,394	10,334	10,872	10,613	11,243
0.52	9,711	9,711	9,549	10,023	9,923	10,424	10,380	10,921	10,646	11,288
0.53	9,724	9,724	9,564	10,049	9,969	10,446	10,438	10,947	10,728	11,333
0.54	9,731	9,731	9,591	10,066	9,999	10,472	10,475	10,982	10,774	11,394
0.55	9,741	9,741	9,616	10,081	10,032	10,481	10,526	11,042	10,822	11,503
0.56	9,752	9,752	9,647	10,109	10,063	10,510	10,556	11,065	10,911	11,527
0.57	9,759	9,759	9,667	10,126	10,094	10,541	10,594	11,093	10,980	11,557
0.58	9,767	9,767	9,676	10,149	10,120	10,567	10,631	11,134	11,025	11,615
0.59	9,783	9,783	9,708	10,163	10,142	10,595	10,673	11,174	11,058	11,634
0.60	9,790	9,790	9,727	10,188	10,168	10,625	10,714	11,224	11,150	11,698
0.61	9,796	9,796	9,753	10,213	10,199	10,650	10,757	11,261	11,181	11,731
0.62	9,808	9,808	9,797	10,226	10,237	10,688	10,786	11,299	11,206	11,769
0.63	9,816	9,816	9,827	10,247	10,272	10,729	10,815	11,325	11,231	11,819
0.64	9,823	9,823	9,857	10,271	10,327	10,757	10,859	11,353	11,281	11,870
0.65	9,833	9,833	9,885	10,287	10,352	10,795	10,884	11,389	11,344	11,922
0.66	9,843	9,843	9,905	10,326	10,383	10,826	10,923	11,436	11,391	11,995
0.67	9,846	9,846	9,932	10,349	10,432	10,869	10,961	11,459	11,423	12,029
0.68	9,852	9,852	9,972	10,370	10,475	10,909	11,003	11,510	11,490	12,087
0.69	9,860	9,860	10,016	10,391	10,506	10,948	11,059	11,543	11,572	12,120
0.70	9,872	9,872	10,048	10,407	10,544	11,000	11,103	11,606	11,608	12,183
0.71	9,878	9,878	10,069	10,431	10,582	11,027	11,154	11,672	11,689	12,255
0.72	9,882	9,882	10,093	10,473	10,645	11,087	11,198	11,713	11,750	12,316
0.73	9,887	9,887	10,111	10,486	10,663	11,131	11,230	11,777	11,786	12,355
0.74	9,898	9,898	10,123	10,510	10,699	11,155	11,283	11,806	11,832	12,405
0.75	9,904	9,904	10,160	10,532	10,751	11,206	11,323	11,886	11,907	12,485
0.76	9,908	9,908	10,188	10,550	10,776	11,245	11,347	11,936	11,948	12,536
0.77	9,919	9,919	10,212	10,571	10,806	11,280	11,396	11,986	12,012	12,590
0.78	9,928	9,928	10,232	10,601	10,845	11,317	11,461	12,056	12,108	12,676
0.79	9,938	9,938	10,267	10,628	10,903	11,373	11,560	12,128	12,177	12,738
0.80	9,946	9,946	10,302	10,664	10,935	11,409	11,636	12,165	12,218	12,813
0.81	9,958	9,958	10,332	10,696	10,993	11,446	11,673	12,224	12,292	12,928
0.82	9,967	9,967	10,360	10,734	11,038	11,496	11,748	12,326	12,382	13,031
0.83	9,982	9,982	10,404	10,762	11,094	11,552	11,815	12,430	12,430	13,114
0.84	9,998	9,998	10,430	10,804	11,136	11,652	11,895	12,472	12,513	13,186
0.85	10,012	10,012	10,452	10,846	11,186	11,699	12,021	12,564	12,641	13,306
0.86	10,024	10,024	10,477	10,862	11,265	11,756	12,128	12,631	12,745	13,393
0.87	10,042	10,042	10,521	10,903	11,317	11,808	12,226	12,761	12,873	13,480
0.88	10,058	10,058	10,555	10,930	11,445	11,848	12,284	12,896	12,982	13,598

0.89	10,076	10,076	10,627	10,980	11,518	11,900	12,354	12,948	13,111	13,755
0.90	10,092	10,092	10,671	11,040	11,616	12,035	12,504	13,029	13,309	13,897
0.91	10,123	10,123	10,732	11,070	11,652	12,108	12,607	13,161	13,411	14,004
0.92	10,144	10,144	10,776	11,106	11,728	12,178	12,706	13,306	13,564	14,153
0.93	10,170	10,170	10,808	11,148	11,814	12,260	12,881	13,432	13,692	14,410
0.94	10,218	10,218	10,872	11,240	11,970	12,454	13,054	13,581	13,910	14,508
0.95	10,256	10,256	10,908	11,314	12,121	12,619	13,193	13,716	14,152	14,718
0.96	10,284	10,284	11,000	11,402	12,309	12,917	13,346	13,896	14,336	14,845
0.97	10,346	10,346	11,084	11,472	12,515	13,105	13,638	14,174	14,575	15,290
0.98	10,398	10,398	11,300	11,724	12,770	13,283	13,902	14,474	14,933	15,574
0.99	10,504	10,504	11,647	12,087	13,048	13,538	14,340	14,892	15,428	16,370

Table A-10: Centiles for disturbed and undisturbed population sizes of harbour seal for the NnG concurrent pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	226	204	44	46	2	4	0	0	0	0
0.02	228	208	46	50	4	4	0	0	0	0
0.03	232	210	48	52	4	6	0	0	0	0
0.04	234	212	50	54	4	6	0	0	0	0
0.05	236	214	52	56	6	6	0	0	0	0
0.06	238	216	54	58	6	8	0	0	0	0
0.07	240	218	56	58	6	8	0	0	0	0
0.08	242	220	58	60	6	8	0	0	0	0
0.09	244	222	58	60	8	8	0	0	0	0
0.10	244	224	60	62	8	10	0	0	0	0
0.11	246	224	60	62	8	10	0	0	0	0
0.12	248	226	62	62	8	10	0	0	0	0
0.13	248	228	62	64	10	10	0	0	0	0
0.14	248	228	64	64	10	12	0	0	0	0
0.15	250	230	64	64	10	12	0	0	0	0
0.16	250	230	64	66	10	12	0	0	0	0
0.17	252	230	66	66	10	12	0	0	0	0
0.18	252	232	66	66	10	12	0	0	0	0
0.19	252	232	66	66	12	14	0	0	0	0
0.20	254	232	68	68	12	14	0	0	0	0
0.21	254	234	68	68	12	14	2	2	0	0
0.22	254	234	70	68	12	14	2	2	0	0
0.23	256	234	70	70	12	14	2	2	0	0
0.24	256	234	70	70	12	14	2	2	0	0
0.25	256	236	72	70	14	14	2	2	0	0
0.26	258	236	72	72	14	16	2	2	0	0
0.27	258	236	72	72	14	16	2	2	0	0
0.28	258	238	72	72	14	16	2	2	0	0
0.29	258	238	74	72	14	16	2	2	0	0
0.30	260	238	74	74	14	16	2	2	0	0
0.31	260	238	74	74	14	16	2	2	0	0
0.32	260	240	76	74	14	16	2	2	0	0
0.33	260	240	76	74	16	18	2	4	0	0
0.34	262	240	76	74	16	18	2	4	0	0

0.35	262	240	76	76	16	18	2	4	0	0
0.36	262	242	78	76	16	18	4	4	0	0
0.37	262	242	78	76	16	18	4	4	0	0
0.38	264	244	78	76	16	18	4	4	0	0
0.39	264	244	80	78	16	18	4	4	0	0
0.40	264	244	80	78	16	20	4	4	0	0
0.41	266	244	80	78	16	20	4	4	0	0
0.42	266	246	80	78	18	20	4	4	0	0
0.43	266	246	82	78	18	20	4	4	0	0
0.44	268	246	82	80	18	20	4	4	0	0
0.45	268	247	82	80	18	20	4	4	0	0
0.46	268	248	82	80	18	20	4	4	0	0
0.47	270	248	84	80	18	20	4	4	0	0
0.48	270	248	84	82	19	22	4	4	0	0
0.49	270	250	84	82	20	22	4	4	0	0
0.50	270	250	84	82	20	22	4	6	0	0
0.51	272	250	85	82	20	22	6	6	0	0
0.52	272	250	86	84	20	22	6	6	0	0
0.53	272	252	86	84	20	22	6	6	0	0
0.54	272	252	86	84	20	22	6	6	0	0
0.55	274	252	86	84	22	22	6	6	0	0
0.56	274	252	88	84	22	24	6	6	0	0
0.57	274	254	88	86	22	24	6	6	0	0
0.58	274	254	88	86	22	24	6	6	0	0
0.59	275	254	90	86	22	24	6	6	0	0
0.60	276	254	90	86	22	24	6	6	2	0
0.61	276	254	90	88	24	24	6	8	2	0
0.62	276	256	92	88	24	24	6	8	2	0
0.63	278	256	92	88	24	24	8	8	2	0
0.64	278	256	92	88	24	26	8	8	2	0
0.65	278	258	93	90	24	26	8	8	2	0
0.66	278	258	94	90	24	26	8	8	2	2
0.67	278	258	94	90	26	26	8	8	2	2
0.68	280	260	94	90	26	26	8	8	2	2
0.69	280	260	96	92	26	26	8	8	2	2
0.70	280	260	96	92	26	28	8	8	2	2
0.71	282	262	96	92	26	28	8	8	2	2
0.72	282	262	98	92	28	28	8	8	2	2
0.73	282	262	98	94	28	28	8	10	2	2
0.74	284	264	98	94	28	28	10	10	2	2
0.75	284	264	98	94	28	28	10	10	4	2
0.76	284	264	100	94	28	30	10	10	4	2
0.77	286	266	100	96	30	30	10	10	4	2
0.78	286	266	100	96	30	30	10	10	4	4
0.79	286	266	102	98	30	30	10	10	4	4
0.80	288	268	102	98	30	32	10	10	4	4
0.81	288	268	104	98	30	32	10	10	4	4
0.82	288	268	104	100	32	32	10	12	4	4
0.83	290	270	104	100	32	32	12	12	4	4
0.84	290	270	106	102	32	34	12	12	4	4
0.85	292	270	106	102	32	34	12	12	4	4
0.86	292	272	108	102	32	34	12	12	4	4
0.87	292	272	108	102	34	34	12	12	6	4

0.88	294	274	108	104	34	34	12	14	6	4
0.89	294	274	110	106	36	36	14	14	6	6
0.90	296	276	110	106	36	36	14	14	6	6
0.91	296	276	112	108	36	38	14	14	6	6
0.92	298	278	114	108	38	38	14	16	6	6
0.93	298	278	118	110	40	38	16	16	6	6
0.94	300	280	120	114	40	40	16	16	8	6
0.95	302	282	124	114	42	40	18	18	8	8
0.96	304	284	126	116	44	44	20	18	8	8
0.97	308	286	130	120	46	44	20	20	10	8
0.98	310	290	138	124	50	48	22	20	10	8
0.99	314	298	144	130	56	56	24	24	12	12

A.3 Cumulative/In-combination Pile-driving Scenario

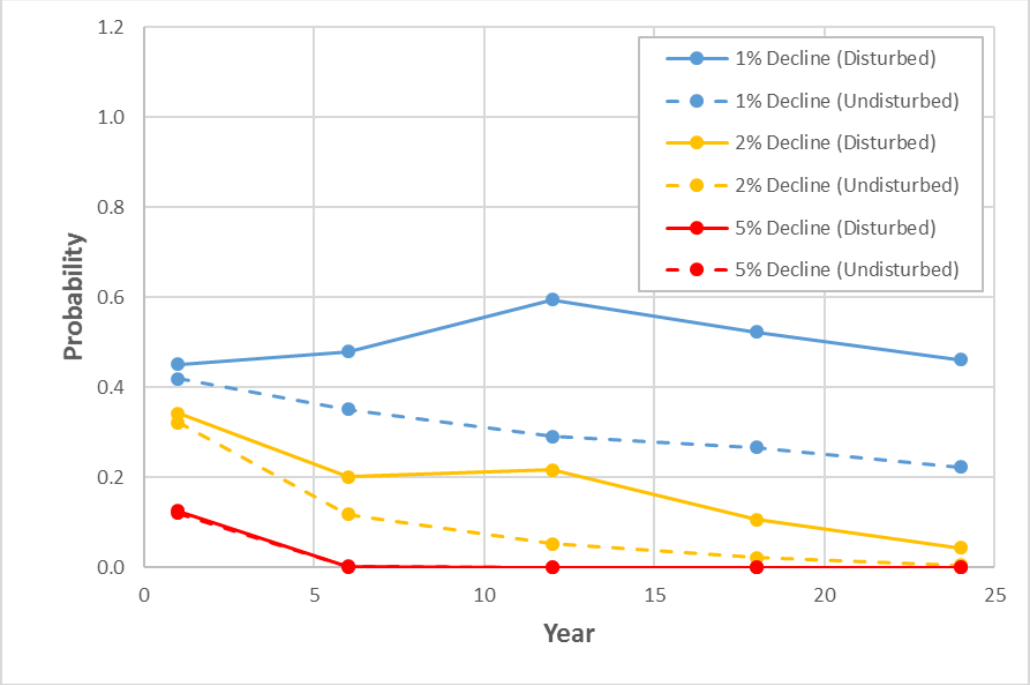

Figure A-21: Probability of a decline in harbour porpoise population for the cumulative/in-combination pile-driving scenario.

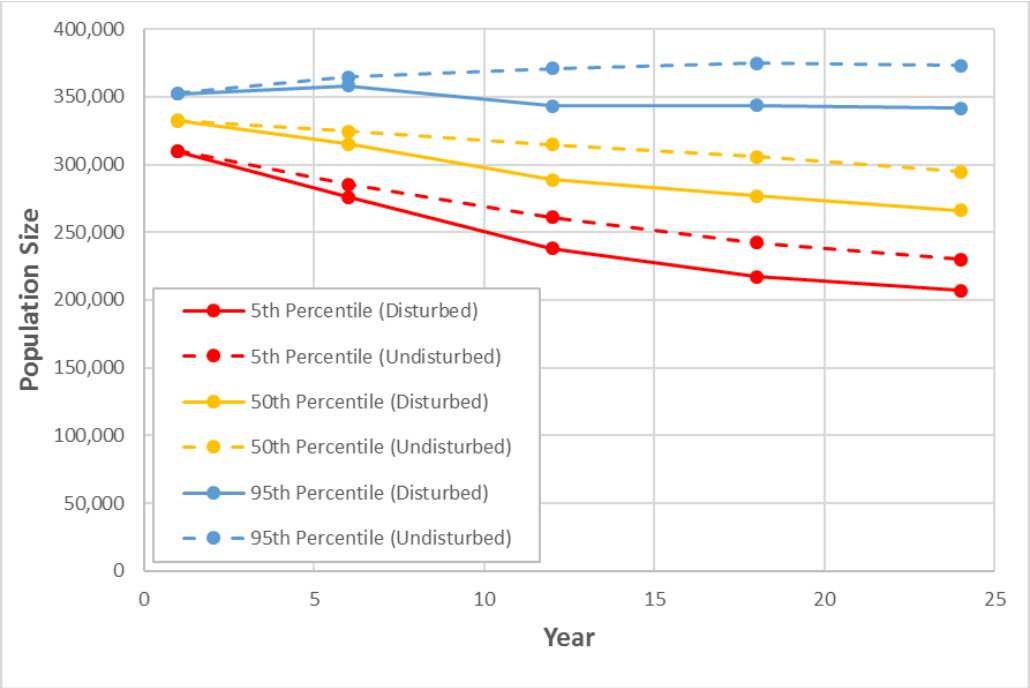

Figure A-22: Estimated change in harbour porpoise population for the cumulative/in-combination pile-driving scenario.

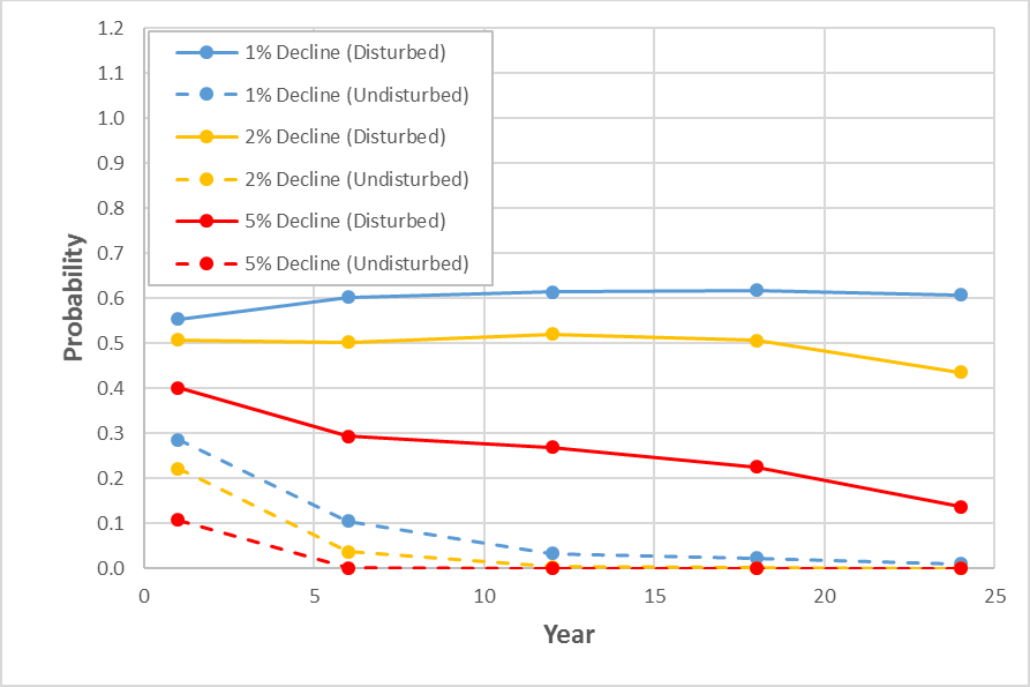

Figure A-23: Probability of a decline in bottlenose dolphin population for the cumulative/in-combination pile-driving scenario.

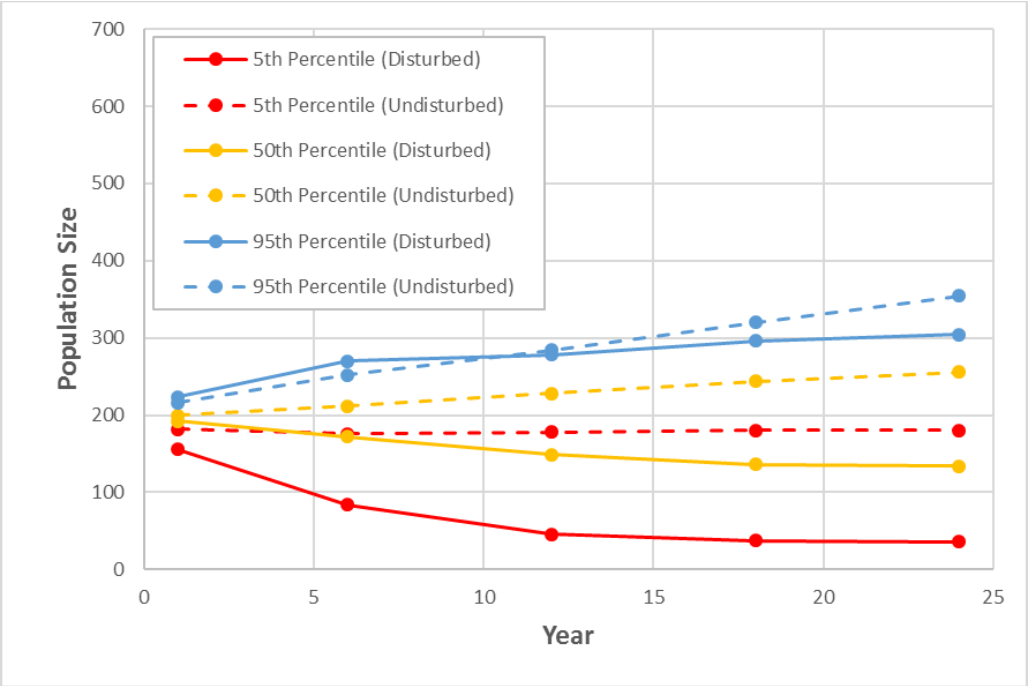

Figure A-24: Estimated change in bottlenose dolphin population for the cumulative/in-combination pile-driving scenario.

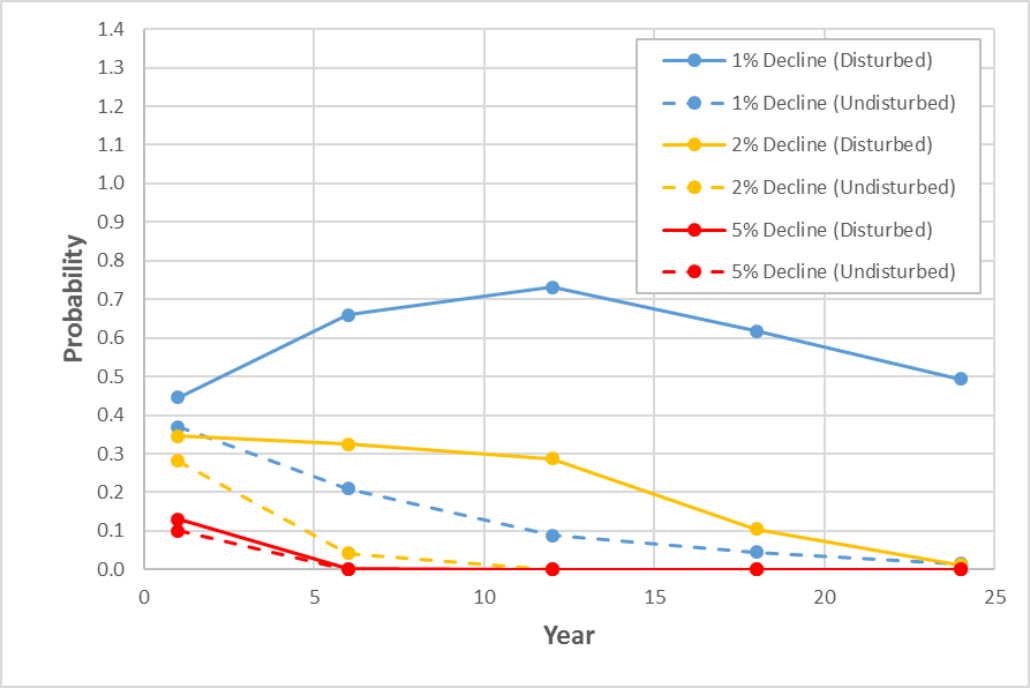

Figure A-25: Probability of a decline in Minke whale population for the cumulative/in-combination pile-driving scenario.

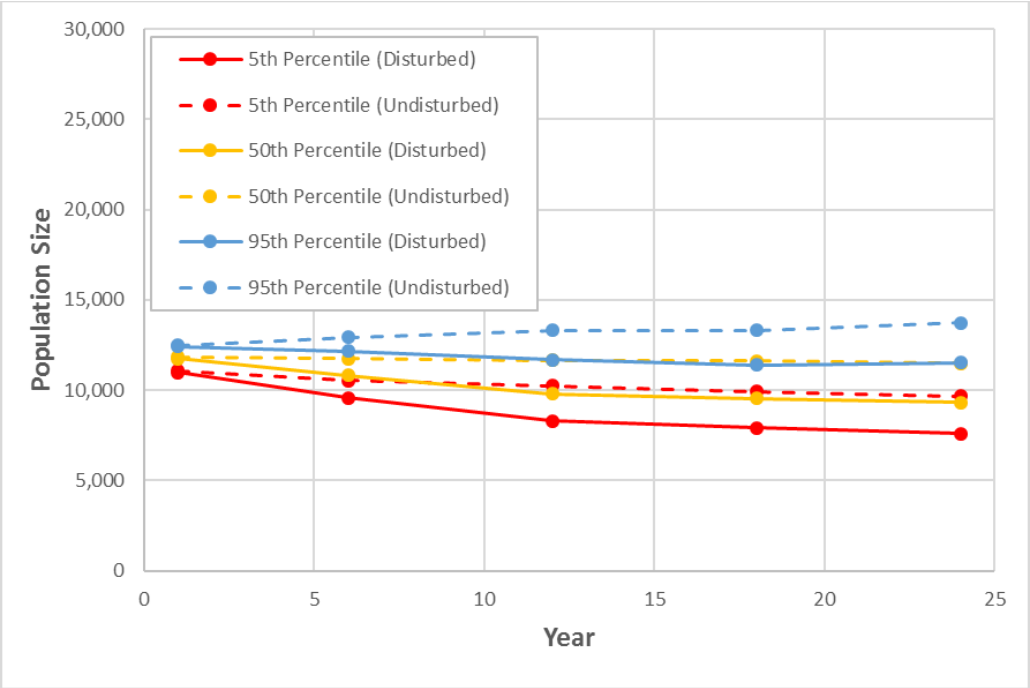

Figure A-26: Estimated change in Minke whale population for the cumulative/in-combination pile-driving scenario.

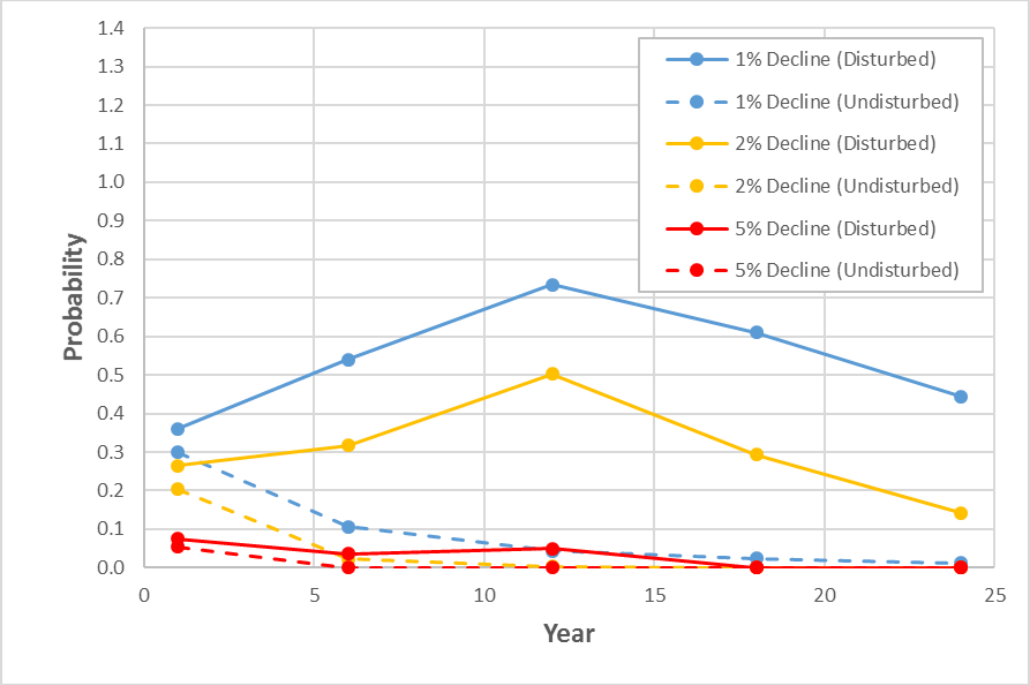

Figure A-27: Probability of a decline in grey seal population for the cumulative/in-combination pile-driving scenario.

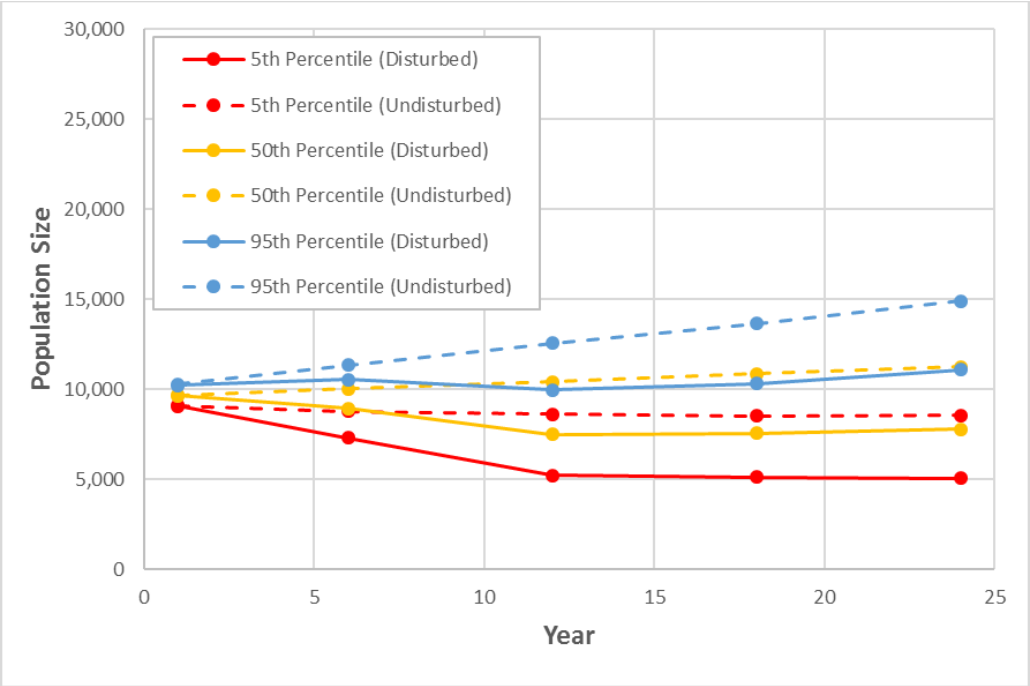

Figure A-28: Estimated change in grey seal population for the cumulative/in-combination pile-driving scenario.

Table A-11: Centiles for disturbed and undisturbed population sizes of harbour porpoise for the cumulative/in-combination pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	298,262	299,434	258,755	264,714	218,196	242,008	199,831	223,454	188,134	212,889
0.02	304,037	304,496	266,329	275,758	227,058	248,869	204,809	230,744	193,675	218,527
0.03	307,413	307,553	271,730	279,172	232,409	253,002	211,792	235,907	200,367	222,097
0.04	309,014	309,491	274,185	283,385	235,960	257,968	215,237	238,081	203,141	226,599
0.05	309,821	310,263	275,933	285,452	238,263	260,864	217,219	242,521	206,772	229,815
0.06	310,960	311,812	278,152	287,289	240,749	263,920	220,491	246,527	209,709	231,930
0.07	312,098	312,605	280,086	288,554	242,338	267,217	223,483	248,841	210,650	235,033
0.08	312,883	313,467	281,161	289,854	244,453	268,271	224,808	251,714	214,261	238,215
0.09	313,793	314,582	283,269	291,368	245,984	270,023	227,136	254,303	217,771	240,500
0.10	314,892	315,399	284,417	292,601	247,654	271,372	229,887	255,976	219,485	241,865
0.11	315,666	316,239	285,874	294,965	248,845	272,556	232,535	257,984	220,697	243,170
0.12	316,701	317,057	287,090	295,863	250,571	274,799	233,846	258,755	221,986	245,700

0.13	317,332	317,885	288,352	296,392	251,149	276,867	235,712	259,736	223,455	247,336
0.14	318,032	318,379	289,298	298,062	252,525	278,266	237,496	261,364	224,429	249,106
0.15	318,822	319,306	290,793	299,329	253,783	280,449	239,166	263,430	225,320	251,669
0.16	319,359	319,995	291,607	300,440	254,855	282,357	239,982	264,766	226,598	253,128
0.17	319,716	320,558	292,313	301,428	255,397	284,117	241,778	266,773	227,636	254,379
0.18	320,232	320,891	293,021	302,408	256,044	285,042	242,648	267,869	229,067	255,365
0.19	320,706	321,289	293,687	302,835	257,656	285,949	243,612	269,512	230,451	257,442
0.20	321,188	321,692	295,554	303,480	259,678	287,234	245,299	270,660	231,884	258,921
0.21	321,705	322,371	296,384	303,902	260,302	288,193	246,459	271,784	233,303	260,751
0.22	322,156	323,033	296,996	304,621	262,218	289,383	247,543	272,902	235,076	261,907
0.23	322,786	323,382	297,564	305,690	263,359	290,276	249,205	274,524	236,268	263,441
0.24	323,238	323,680	298,232	306,667	264,385	290,805	250,219	275,920	237,413	265,355
0.25	323,667	324,206	298,744	307,141	265,664	292,116	251,625	277,451	238,606	266,163
0.26	324,087	324,655	299,505	307,673	266,908	292,981	252,829	277,979	240,002	266,848
0.27	324,506	325,002	300,290	308,461	268,455	293,968	253,710	279,545	241,235	267,612
0.28	324,734	325,434	300,963	309,198	269,941	294,862	254,224	280,340	242,647	268,419
0.29	325,169	325,890	301,574	309,795	271,068	295,812	255,388	282,026	243,911	271,454
0.30	325,488	326,271	302,183	310,503	272,131	296,824	256,224	283,091	244,780	272,499
0.31	325,968	326,749	302,759	311,209	273,049	298,008	256,817	284,462	246,256	273,324
0.32	326,208	327,109	303,420	312,181	273,978	298,906	257,789	285,532	247,247	274,938
0.33	326,562	327,433	304,098	312,879	274,713	299,748	258,800	286,261	248,885	276,319
0.34	327,083	327,931	304,511	313,424	275,361	300,814	260,120	287,467	249,669	277,383
0.35	327,599	328,245	305,015	314,200	276,170	301,291	260,917	289,121	251,370	278,508
0.36	327,978	328,450	305,495	315,025	276,875	302,222	261,576	290,631	252,459	279,910
0.37	328,300	328,969	306,419	316,368	277,790	303,376	262,685	291,402	252,900	281,157
0.38	328,608	329,253	306,921	316,777	279,066	304,526	263,824	292,817	253,915	282,754
0.39	328,841	329,468	307,478	317,414	280,105	305,269	264,889	294,156	254,883	283,515
0.40	329,078	329,998	308,247	317,652	280,820	306,739	266,378	294,923	255,884	284,088

0.41	329,431	330,232	309,024	318,184	281,359	307,930	267,619	295,878	257,141	285,442
0.42	329,737	330,501	309,997	318,576	282,298	308,914	268,330	296,954	258,101	286,508
0.43	330,001	330,793	310,754	319,471	283,021	309,936	269,206	298,177	259,262	287,962
0.44	330,241	331,077	311,392	319,806	284,151	310,615	270,093	298,938	260,405	288,587
0.45	330,433	331,326	312,194	320,331	284,890	311,655	270,837	299,771	261,132	289,544
0.46	330,870	331,680	313,008	321,312	285,767	312,360	272,207	301,142	262,169	290,556
0.47	331,074	331,951	313,835	321,782	286,335	312,649	273,458	302,259	263,041	291,527
0.48	331,480	332,164	314,395	322,490	286,893	313,297	274,859	303,424	264,525	292,622
0.49	331,807	332,435	314,805	323,680	287,727	314,029	275,760	304,534	265,448	293,722
0.50	332,082	332,722	315,211	324,423	288,611	314,854	276,636	305,720	266,251	294,888
0.51	332,341	333,008	315,513	325,052	289,426	315,605	277,487	306,699	266,858	295,658
0.52	332,614	333,286	315,982	325,332	290,233	316,227	278,320	308,030	267,275	296,923
0.53	332,780	333,622	317,609	326,233	290,892	317,011	279,328	308,681	268,083	298,002
0.54	333,093	333,839	317,968	327,149	291,620	317,751	279,918	309,590	269,208	298,985
0.55	333,394	334,082	318,525	327,732	292,218	318,660	280,843	310,793	270,079	300,365
0.56	333,703	334,346	318,804	328,250	292,760	319,470	282,013	312,013	271,172	301,440
0.57	334,012	334,647	319,865	329,025	293,390	320,318	282,919	313,106	272,271	302,284
0.58	334,365	335,075	320,278	329,515	294,677	321,482	284,444	314,568	273,376	303,820
0.59	334,771	335,396	320,704	330,434	295,537	322,465	285,709	315,382	274,800	304,728
0.60	334,954	335,724	321,342	331,700	296,366	323,627	286,219	316,182	275,752	305,754
0.61	335,224	335,931	322,183	332,479	297,138	324,738	287,515	317,165	276,946	307,086
0.62	335,505	336,197	322,933	332,944	297,750	325,102	288,243	318,222	278,292	308,633
0.63	335,756	336,355	323,403	333,425	298,435	325,655	289,173	319,803	278,931	309,506
0.64	335,950	336,574	323,814	333,808	299,145	326,538	290,340	320,443	279,894	311,182
0.65	336,220	336,829	324,187	334,215	299,728	327,469	291,588	321,332	281,496	312,221
0.66	336,640	337,412	325,101	334,853	300,067	328,305	292,464	322,084	282,315	313,840
0.67	337,154	337,898	325,617	335,551	300,720	329,274	293,010	323,236	283,751	314,902
0.68	337,662	338,243	326,454	336,246	301,407	330,165	293,675	324,082	285,150	316,247

0.69	337,894	338,594	326,909	337,119	302,195	330,990	294,652	324,840	285,725	317,870
0.70	338,340	338,930	327,540	337,723	303,083	332,140	294,999	326,284	287,466	319,668
0.71	338,803	339,358	327,917	338,306	304,175	332,912	296,739	327,301	288,549	321,258
0.72	339,130	339,651	328,672	338,858	305,072	333,728	297,408	328,521	289,825	322,577
0.73	339,434	340,120	329,542	339,923	305,846	335,075	298,191	330,359	290,610	323,600
0.74	339,731	340,487	330,155	340,798	306,841	336,167	299,547	331,548	291,911	325,492
0.75	340,084	340,998	331,063	341,318	307,942	337,255	300,742	332,474	293,285	327,075
0.76	340,445	341,260	331,794	341,679	309,430	338,678	301,623	334,036	295,351	328,304
0.77	340,954	341,549	332,668	342,491	310,640	339,753	302,857	335,586	296,990	330,036
0.78	341,302	341,870	333,603	343,588	312,281	340,678	305,296	337,342	298,531	330,903
0.79	341,746	342,348	334,564	344,159	312,961	342,399	306,124	338,553	300,734	332,361
0.80	342,388	342,933	335,418	344,848	314,210	343,372	308,084	339,877	301,912	333,881
0.81	342,819	343,438	335,973	345,800	315,320	344,609	309,541	341,015	303,515	335,464
0.82	343,036	343,670	337,001	346,596	316,065	345,093	310,729	342,588	305,312	337,239
0.83	343,402	344,418	338,331	347,294	317,156	346,382	312,296	344,189	307,879	339,294
0.84	343,929	344,821	339,906	347,903	318,352	347,598	313,859	345,512	309,671	341,072
0.85	344,356	345,170	340,702	348,969	319,847	348,994	315,179	347,176	311,257	343,847
0.86	345,226	346,107	342,470	349,952	322,043	349,888	316,059	348,792	312,261	346,296
0.87	345,803	346,717	343,425	351,410	323,725	352,379	319,097	350,983	314,676	349,516
0.88	346,372	347,160	344,476	352,894	325,207	353,486	320,285	352,555	318,212	352,181
0.89	347,060	347,724	345,809	353,952	326,812	355,636	321,584	355,346	321,906	354,343
0.90	347,649	348,370	347,071	355,723	328,741	357,697	323,104	358,143	323,485	358,120
0.91	348,504	349,310	347,977	357,260	330,495	360,255	325,253	360,256	326,010	360,097
0.92	349,390	349,993	350,503	358,688	333,459	361,254	328,990	362,814	329,625	363,132
0.93	350,405	350,865	352,489	361,766	335,722	362,779	332,766	364,699	332,717	367,271
0.94	351,263	351,942	353,708	363,391	340,164	367,360	335,170	368,696	337,855	370,078
0.95	352,381	352,841	358,063	364,692	343,225	371,177	343,793	374,931	341,717	372,956
0.96	352,910	353,867	359,799	367,030	346,378	376,462	347,657	378,333	344,350	377,637

0.97	353,811	354,667	362,407	371,646	349,684	380,409	353,983	385,648	351,264	385,429
0.98	355,084	355,714	365,609	375,748	357,699	383,939	365,144	398,648	360,611	401,118
0.99	358,062	358,221	368,799	381,952	366,051	394,030	373,591	406,914	376,861	411,406

Table A-12: Centiles for disturbed and undisturbed population sizes of bottlenose dolphin for the cumulative/in-combination pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	148	174	52	158	30	160	24	154	20	156
0.02	154	176	62	168	32	166	26	160	24	160
0.03	154	180	72	172	36	172	26	172	30	174
0.04	156	180	78	174	38	174	30	176	32	178
0.05	156	182	84	176	46	178	38	180	36	180
0.06	160	184	88	178	52	178	42	180	38	182
0.07	162	184	98	180	56	180	46	184	42	184
0.08	164	184	102	182	62	182	50	186	46	186
0.09	166	186	104	184	64	186	54	186	48	190
0.10	166	186	106	184	68	188	56	188	50	198
0.11	168	188	110	186	72	188	56	190	54	200
0.12	168	188	114	186	72	190	58	192	56	204
0.13	170	188	116	188	77	192	60	194	56	206
0.14	172	188	118	188	80	192	62	196	58	208
0.15	172	190	122	188	82	192	62	198	58	210
0.16	174	190	124	190	84	194	66	200	62	212
0.17	174	190	126	190	86	194	68	204	64	214
0.18	176	192	128	192	88	196	68	206	64	216
0.19	176	192	128	192	90	198	70	206	66	218
0.20	176	192	130	192	92	198	72	206	68	220
0.21	178	192	132	194	94	200	74	208	70	222
0.22	178	192	134	194	96	202	76	208	72	224
0.23	178	194	136	194	98	204	78	210	72	224
0.24	180	194	138	196	98	204	80	212	74	226
0.25	180	194	140	196	100	206	82	212	78	228
0.26	180	194	141	196	103	206	84	214	79	228
0.27	180	194	142	198	105	208	86	216	80	230
0.28	180	194	144	198	108	210	90	216	82	232
0.29	182	196	144	198	109	210	94	218	82	232
0.30	182	196	148	200	112	210	96	219	86	234
0.31	182	196	148	200	114	212	98	220	89	234
0.32	182	196	150	200	117	213	100	222	92	236
0.33	182	196	152	202	120	214	102	224	94	236
0.34	184	196	154	202	122	214	104	226	96	238
0.35	184	196	154	202	122	214	106	226	100	238
0.36	185	196	155	204	125	216	108	228	102	240
0.37	186	197	156	204	127	217	110	228	104	240
0.38	186	198	158	205	128	218	113	230	108	242

0.39	186	198	160	206	131	218	116	230	110	243
0.40	186	198	162	206	134	219	119	232	111	245
0.41	188	198	162	208	136	220	120	233	114	247
0.42	188	198	164	208	137	221	122	234	116	248
0.43	188	198	166	208	138	222	124	235	119	249
0.44	190	198	166	209	140	222	126	236	123	250
0.45	190	199	168	210	143	222	128	238	124	252
0.46	190	200	170	210	144	224	130	238	128	252
0.47	192	200	170	210	146	225	130	240	130	252
0.48	192	200	172	212	146	226	132	242	132	254
0.49	192	200	172	212	147	226	134	244	132	255
0.50	192	200	172	212	149	228	136	244	134	256
0.51	194	200	174	214	150	228	138	246	135	258
0.52	194	202	176	214	153	228	140	246	138	259
0.53	194	202	176	214	158	230	144	247	138	260
0.54	194	202	178	214	158	230	147	248	140	262
0.55	194	202	180	216	160	230	150	248	141	264
0.56	196	202	180	216	160	232	152	250	144	264
0.57	196	202	180	216	162	232	154	250	147	266
0.58	196	202	182	218	164	232	156	252	148	268
0.59	196	202	184	218	167	233	157	252	150	269
0.60	198	202	184	219	171	234	159	254	152	270
0.61	198	204	186	220	172	234	162	254	154	272
0.62	198	204	188	220	175	236	164	256	160	274
0.63	198	204	188	220	177	236	168	256	164	274
0.64	200	204	190	222	182	238	169	258	165	274
0.65	200	204	192	222	183	238	172	258	168	276
0.66	200	204	194	222	184	240	173	260	171	278
0.67	202	204	196	222	188	240	174	260	173	278
0.68	202	206	196	224	190	242	176	262	177	280
0.69	202	206	198	224	190	243	180	264	181	282
0.70	202	206	200	225	194	244	180	266	186	284
0.71	204	206	200	226	196	246	183	266	188	285
0.72	204	206	203	226	198	246	185	268	190	288
0.73	204	206	206	226	198	246	189	270	194	289
0.74	204	206	206	228	200	248	193	270	195	293
0.75	205	207	210	228	202	249	198	272	198	296
0.76	206	208	212	228	204	252	202	272	202	296
0.77	206	208	212	230	206	254	204	272	206	298
0.78	208	208	216	230	206	254	206	274	208	300
0.79	208	208	218	230	212	256	208	276	212	304
0.80	210	208	220	232	214	258	210	278	214	306
0.81	210	210	222	232	218	258	214	280	216	308
0.82	210	210	224	234	222	260	218	280	220	310
0.83	210	210	226	234	228	262	222	282	224	312
0.84	212	212	228	236	230	264	226	286	234	314
0.85	212	212	230	238	234	266	230	290	240	316
0.86	214	212	234	238	238	266	236	290	244	316
0.87	214	214	236	240	240	270	242	292	249	318
0.88	214	214	240	242	246	270	246	298	254	320
0.89	216	214	242	242	250	272	248	298	260	322
0.90	216	214	246	244	252	274	256	300	266	328
0.91	218	214	248	246	258	274	264	302	272	332

0.92	218	216	250	248	262	276	274	306	284	338
0.93	220	216	258	250	270	276	282	312	290	342
0.94	222	216	262	250	272	280	288	314	298	348
0.95	224	216	270	252	278	284	296	320	304	354
0.96	224	218	278	252	288	292	302	328	316	360
0.97	226	218	282	258	298	294	314	338	348	364
0.98	230	220	302	262	320	300	338	344	376	384
0.99	236	222	312	268	366	314	358	350	430	400

Table A-13: Centiles for disturbed and undisturbed population sizes of Minke whale for the cumulative/in-combination pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	10,634	10,714	9,074	10,226	7,815	9,628	7,486	9,296	7,184	9,050
0.02	10,778	10,880	9,311	10,294	7,972	9,838	7,646	9,580	7,385	9,384
0.03	10,876	10,965	9,459	10,406	8,076	9,956	7,730	9,715	7,442	9,508
0.04	10,934	11,027	9,550	10,454	8,224	10,100	7,822	9,826	7,530	9,613
0.05	11,002	11,066	9,582	10,540	8,296	10,245	7,917	9,918	7,598	9,672
0.06	11,042	11,106	9,642	10,589	8,366	10,320	7,984	10,030	7,702	9,722
0.07	11,062	11,132	9,698	10,654	8,412	10,368	8,014	10,065	7,793	9,800
0.08	11,086	11,175	9,764	10,691	8,490	10,424	8,100	10,124	7,832	9,864
0.09	11,120	11,200	9,799	10,744	8,535	10,491	8,134	10,180	7,896	9,947
0.10	11,152	11,232	9,840	10,779	8,576	10,530	8,196	10,222	7,962	10,002
0.11	11,168	11,272	9,868	10,819	8,630	10,569	8,228	10,295	8,036	10,078
0.12	11,194	11,288	9,898	10,848	8,656	10,612	8,282	10,328	8,086	10,105
0.13	11,228	11,326	9,939	10,886	8,692	10,647	8,315	10,377	8,132	10,167
0.14	11,260	11,346	9,987	10,918	8,726	10,679	8,356	10,419	8,192	10,210
0.15	11,286	11,373	10,014	10,964	8,765	10,719	8,396	10,474	8,234	10,269
0.16	11,312	11,389	10,068	10,978	8,827	10,754	8,421	10,511	8,264	10,318
0.17	11,326	11,418	10,106	10,996	8,867	10,802	8,466	10,542	8,307	10,360
0.18	11,351	11,438	10,139	11,017	8,914	10,834	8,515	10,590	8,340	10,407
0.19	11,362	11,452	10,168	11,056	8,952	10,874	8,558	10,630	8,386	10,424
0.20	11,376	11,471	10,205	11,082	8,984	10,900	8,611	10,692	8,426	10,467
0.21	11,386	11,482	10,234	11,130	9,014	10,926	8,665	10,725	8,464	10,528
0.22	11,410	11,494	10,254	11,154	9,066	10,961	8,706	10,765	8,492	10,579
0.23	11,422	11,504	10,290	11,200	9,116	10,982	8,722	10,815	8,518	10,625
0.24	11,434	11,520	10,317	11,218	9,146	11,018	8,757	10,844	8,576	10,661
0.25	11,451	11,541	10,332	11,239	9,179	11,046	8,814	10,868	8,606	10,695
0.26	11,472	11,562	10,351	11,274	9,192	11,065	8,849	10,887	8,636	10,769
0.27	11,491	11,570	10,376	11,287	9,219	11,091	8,870	10,931	8,656	10,798
0.28	11,502	11,582	10,401	11,307	9,258	11,141	8,912	10,951	8,666	10,821
0.29	11,515	11,601	10,419	11,325	9,284	11,176	8,959	10,986	8,702	10,844
0.30	11,529	11,612	10,435	11,341	9,322	11,209	8,983	11,009	8,735	10,877
0.31	11,538	11,624	10,451	11,351	9,350	11,233	9,038	11,042	8,793	10,899
0.32	11,546	11,632	10,467	11,367	9,366	11,256	9,079	11,063	8,833	10,929
0.33	11,566	11,642	10,481	11,384	9,389	11,275	9,104	11,093	8,850	10,979
0.34	11,579	11,657	10,501	11,401	9,404	11,299	9,125	11,133	8,879	11,019
0.35	11,588	11,668	10,523	11,434	9,423	11,323	9,153	11,166	8,903	11,042
0.36	11,595	11,687	10,549	11,468	9,457	11,354	9,170	11,186	8,958	11,076
0.37	11,610	11,702	10,591	11,497	9,495	11,371	9,197	11,225	8,975	11,117

0.38	11,618	11,715	10,601	11,516	9,514	11,387	9,226	11,251	9,014	11,161
0.39	11,628	11,722	10,616	11,534	9,538	11,400	9,248	11,281	9,038	11,192
0.40	11,636	11,736	10,630	11,559	9,550	11,426	9,287	11,316	9,073	11,223
0.41	11,649	11,750	10,653	11,574	9,579	11,442	9,318	11,348	9,105	11,242
0.42	11,668	11,761	10,662	11,589	9,604	11,463	9,334	11,373	9,123	11,268
0.43	11,678	11,770	10,680	11,624	9,634	11,488	9,359	11,394	9,157	11,292
0.44	11,688	11,776	10,708	11,641	9,673	11,509	9,384	11,416	9,167	11,310
0.45	11,706	11,787	10,732	11,661	9,693	11,529	9,411	11,444	9,182	11,340
0.46	11,719	11,796	10,753	11,672	9,715	11,560	9,448	11,476	9,203	11,374
0.47	11,728	11,808	10,765	11,682	9,739	11,590	9,465	11,506	9,229	11,404
0.48	11,737	11,820	10,776	11,705	9,767	11,619	9,497	11,531	9,250	11,444
0.49	11,745	11,827	10,803	11,722	9,784	11,643	9,521	11,572	9,277	11,476
0.50	11,764	11,843	10,828	11,738	9,804	11,671	9,542	11,612	9,319	11,500
0.51	11,776	11,850	10,857	11,749	9,836	11,692	9,569	11,629	9,353	11,533
0.52	11,790	11,862	10,892	11,774	9,858	11,713	9,602	11,646	9,390	11,566
0.53	11,802	11,870	10,912	11,785	9,876	11,737	9,626	11,668	9,417	11,598
0.54	11,810	11,879	10,926	11,794	9,913	11,763	9,654	11,686	9,447	11,648
0.55	11,818	11,897	10,943	11,809	9,940	11,772	9,673	11,712	9,474	11,683
0.56	11,831	11,912	10,957	11,827	9,966	11,790	9,703	11,730	9,516	11,733
0.57	11,840	11,923	10,966	11,838	9,997	11,817	9,741	11,759	9,550	11,774
0.58	11,848	11,934	10,982	11,868	10,021	11,851	9,775	11,797	9,577	11,797
0.59	11,859	11,946	11,008	11,890	10,054	11,871	9,796	11,817	9,602	11,818
0.60	11,874	11,958	11,028	11,910	10,100	11,890	9,825	11,827	9,630	11,863
0.61	11,881	11,967	11,041	11,922	10,115	11,910	9,848	11,847	9,670	11,896
0.62	11,900	11,975	11,056	11,946	10,138	11,936	9,870	11,886	9,694	11,927
0.63	11,909	11,992	11,070	11,970	10,161	11,967	9,899	11,910	9,721	11,958
0.64	11,923	12,005	11,090	11,986	10,183	11,990	9,922	11,959	9,748	11,983
0.65	11,931	12,023	11,113	12,002	10,221	12,031	9,954	11,986	9,793	12,009
0.66	11,945	12,035	11,130	12,024	10,265	12,059	9,989	12,017	9,820	12,046
0.67	11,959	12,045	11,163	12,043	10,297	12,080	10,015	12,047	9,846	12,083
0.68	11,968	12,057	11,188	12,062	10,329	12,107	10,049	12,095	9,886	12,103
0.69	11,979	12,068	11,215	12,080	10,359	12,134	10,068	12,127	9,952	12,121
0.70	11,990	12,077	11,245	12,099	10,382	12,158	10,088	12,150	9,991	12,165
0.71	12,003	12,084	11,263	12,117	10,399	12,185	10,122	12,176	10,055	12,213
0.72	12,017	12,097	11,283	12,141	10,429	12,205	10,150	12,193	10,096	12,240
0.73	12,035	12,108	11,323	12,158	10,474	12,221	10,169	12,233	10,134	12,288
0.74	12,042	12,123	11,367	12,179	10,517	12,255	10,207	12,269	10,151	12,334
0.75	12,056	12,141	11,400	12,212	10,570	12,281	10,231	12,299	10,183	12,366
0.76	12,068	12,154	11,426	12,224	10,607	12,325	10,272	12,332	10,212	12,392
0.77	12,080	12,164	11,448	12,251	10,644	12,350	10,304	12,378	10,236	12,428
0.78	12,094	12,174	11,472	12,290	10,696	12,385	10,356	12,423	10,279	12,470
0.79	12,102	12,184	11,493	12,314	10,724	12,419	10,404	12,459	10,316	12,496
0.80	12,116	12,192	11,526	12,330	10,757	12,463	10,452	12,482	10,358	12,543
0.81	12,127	12,212	11,550	12,340	10,788	12,489	10,494	12,504	10,400	12,600
0.82	12,148	12,232	11,579	12,362	10,813	12,522	10,519	12,541	10,478	12,667
0.83	12,159	12,244	11,610	12,382	10,865	12,554	10,570	12,572	10,524	12,714
0.84	12,172	12,248	11,666	12,427	10,917	12,587	10,598	12,596	10,587	12,775
0.85	12,180	12,262	11,713	12,457	10,954	12,611	10,639	12,628	10,649	12,875
0.86	12,190	12,286	11,762	12,485	10,997	12,640	10,716	12,681	10,710	12,910
0.87	12,212	12,301	11,789	12,523	11,026	12,717	10,750	12,767	10,760	12,953
0.88	12,234	12,328	11,814	12,564	11,085	12,750	10,806	12,837	10,850	13,062
0.89	12,254	12,342	11,893	12,604	11,153	12,786	10,895	12,880	10,939	13,104
0.90	12,268	12,362	11,930	12,644	11,215	12,871	10,972	12,928	11,006	13,187

0.91	12,290	12,384	11,978	12,692	11,299	12,956	11,016	12,974	11,057	13,284
0.92	12,314	12,402	12,008	12,762	11,396	13,004	11,126	13,032	11,156	13,420
0.93	12,332	12,428	12,048	12,816	11,487	13,096	11,224	13,113	11,281	13,475
0.94	12,378	12,458	12,079	12,862	11,580	13,150	11,299	13,202	11,415	13,610
0.95	12,410	12,482	12,174	12,945	11,694	13,308	11,401	13,308	11,515	13,733
0.96	12,444	12,516	12,219	13,030	11,842	13,411	11,538	13,423	11,642	13,956
0.97	12,508	12,584	12,365	13,122	11,978	13,544	11,720	13,607	11,874	14,194
0.98	12,576	12,646	12,474	13,290	12,202	13,704	12,069	13,774	12,054	14,455
0.99	12,650	12,752	12,632	13,397	12,654	14,178	12,434	14,198	12,525	14,710

Table A-14: Centiles for disturbed and undisturbed population sizes of grey seal for the cumulative/in-combination pile-driving scenario.

Centile	Year 1		Year 6		Year 12		Year 18		Year 24	
	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.	Dist.	Undist.
0.01	8,695	8,716	6,380	8,270	4,628	7,950	4,440	7,726	4,344	7,489
0.02	8,882	8,946	6,674	8,480	4,800	8,303	4,605	7,986	4,638	7,756
0.03	8,965	9,009	6,928	8,625	4,918	8,432	4,840	8,124	4,744	8,069
0.04	9,024	9,066	7,120	8,710	5,092	8,482	4,996	8,396	4,916	8,380
0.05	9,068	9,118	7,300	8,772	5,215	8,624	5,135	8,524	5,059	8,567
0.06	9,094	9,140	7,356	8,856	5,284	8,674	5,205	8,632	5,242	8,650
0.07	9,118	9,160	7,470	8,898	5,423	8,766	5,260	8,721	5,371	8,850
0.08	9,134	9,188	7,530	8,950	5,503	8,864	5,334	8,876	5,438	8,990
0.09	9,167	9,204	7,620	8,980	5,566	8,905	5,405	8,950	5,515	9,090
0.10	9,180	9,247	7,678	9,016	5,669	8,959	5,464	9,044	5,580	9,210
0.11	9,218	9,266	7,732	9,056	5,724	9,026	5,521	9,120	5,662	9,300
0.12	9,244	9,291	7,768	9,108	5,797	9,093	5,618	9,158	5,746	9,379
0.13	9,260	9,316	7,822	9,155	5,868	9,163	5,684	9,224	5,822	9,459
0.14	9,274	9,332	7,841	9,185	5,918	9,199	5,793	9,323	5,897	9,546
0.15	9,288	9,353	7,884	9,224	5,972	9,244	5,848	9,391	5,988	9,612
0.16	9,304	9,368	7,932	9,264	6,028	9,309	5,914	9,484	6,082	9,655
0.17	9,326	9,378	7,975	9,280	6,078	9,361	5,954	9,528	6,133	9,706
0.18	9,332	9,388	8,039	9,309	6,130	9,412	6,003	9,573	6,212	9,745
0.19	9,344	9,400	8,090	9,334	6,168	9,453	6,106	9,615	6,278	9,840
0.20	9,354	9,412	8,119	9,360	6,242	9,479	6,141	9,649	6,328	9,883
0.21	9,364	9,424	8,142	9,405	6,316	9,512	6,214	9,685	6,379	9,972
0.22	9,372	9,432	8,176	9,429	6,362	9,543	6,264	9,708	6,408	10,025
0.23	9,384	9,442	8,226	9,446	6,419	9,584	6,317	9,753	6,474	10,075
0.24	9,398	9,448	8,248	9,489	6,458	9,631	6,358	9,798	6,541	10,110
0.25	9,405	9,458	8,289	9,516	6,508	9,676	6,426	9,862	6,581	10,198
0.26	9,412	9,465	8,315	9,537	6,534	9,720	6,510	9,905	6,634	10,237
0.27	9,422	9,478	8,341	9,566	6,593	9,742	6,558	9,938	6,667	10,275
0.28	9,427	9,491	8,377	9,588	6,631	9,765	6,601	9,973	6,726	10,301
0.29	9,438	9,504	8,419	9,617	6,673	9,782	6,658	10,021	6,783	10,329
0.30	9,449	9,511	8,449	9,633	6,700	9,812	6,739	10,059	6,839	10,374
0.31	9,460	9,520	8,491	9,656	6,747	9,843	6,775	10,091	6,870	10,399
0.32	9,476	9,532	8,525	9,671	6,789	9,884	6,817	10,129	6,897	10,429
0.33	9,491	9,539	8,539	9,691	6,839	9,914	6,867	10,179	6,950	10,465
0.34	9,497	9,546	8,567	9,708	6,889	9,946	6,894	10,236	7,017	10,511
0.35	9,502	9,553	8,587	9,722	6,923	9,972	6,949	10,266	7,091	10,561

0.36	9,509	9,564	8,608	9,744	6,963	10,000	6,989	10,308	7,195	10,624
0.37	9,524	9,575	8,630	9,762	7,003	10,027	7,058	10,347	7,263	10,677
0.38	9,530	9,581	8,645	9,777	7,034	10,058	7,101	10,407	7,288	10,706
0.39	9,540	9,589	8,664	9,801	7,068	10,079	7,146	10,445	7,335	10,763
0.40	9,549	9,595	8,690	9,830	7,109	10,114	7,159	10,481	7,373	10,804
0.41	9,556	9,602	8,723	9,862	7,153	10,136	7,189	10,515	7,418	10,839
0.42	9,565	9,612	8,742	9,888	7,203	10,161	7,229	10,544	7,443	10,903
0.43	9,574	9,626	8,792	9,898	7,230	10,196	7,293	10,572	7,476	10,973
0.44	9,584	9,633	8,812	9,913	7,264	10,216	7,339	10,620	7,533	11,016
0.45	9,591	9,639	8,834	9,931	7,311	10,266	7,384	10,661	7,563	11,062
0.46	9,603	9,652	8,858	9,949	7,356	10,299	7,423	10,700	7,606	11,092
0.47	9,610	9,662	8,883	9,971	7,386	10,313	7,457	10,770	7,665	11,129
0.48	9,614	9,670	8,900	9,994	7,430	10,346	7,512	10,815	7,695	11,156
0.49	9,624	9,680	8,915	10,024	7,500	10,378	7,548	10,845	7,737	11,219
0.50	9,635	9,692	8,953	10,042	7,519	10,427	7,577	10,876	7,793	11,260
0.51	9,640	9,697	8,981	10,066	7,555	10,466	7,619	10,917	7,840	11,326
0.52	9,655	9,708	8,996	10,098	7,589	10,501	7,666	10,958	7,885	11,399
0.53	9,666	9,717	9,027	10,115	7,653	10,530	7,697	10,987	7,920	11,433
0.54	9,678	9,729	9,045	10,141	7,688	10,567	7,742	11,013	7,946	11,474
0.55	9,688	9,741	9,084	10,156	7,714	10,610	7,792	11,058	8,034	11,522
0.56	9,699	9,753	9,100	10,168	7,766	10,637	7,824	11,094	8,081	11,554
0.57	9,706	9,762	9,113	10,198	7,801	10,666	7,850	11,131	8,129	11,614
0.58	9,716	9,770	9,131	10,216	7,826	10,694	7,884	11,172	8,191	11,696
0.59	9,728	9,777	9,154	10,242	7,865	10,753	7,924	11,213	8,243	11,726
0.60	9,736	9,785	9,180	10,267	7,903	10,781	7,971	11,249	8,302	11,768
0.61	9,747	9,795	9,222	10,283	7,962	10,828	8,019	11,275	8,362	11,820
0.62	9,758	9,807	9,256	10,305	7,986	10,842	8,064	11,321	8,404	11,870
0.63	9,764	9,815	9,288	10,318	8,029	10,871	8,105	11,367	8,432	11,933
0.64	9,774	9,830	9,330	10,342	8,075	10,900	8,159	11,394	8,472	11,994
0.65	9,783	9,838	9,357	10,359	8,136	10,928	8,203	11,435	8,515	12,048
0.66	9,792	9,848	9,400	10,383	8,175	10,948	8,262	11,475	8,553	12,104
0.67	9,800	9,860	9,431	10,395	8,203	10,971	8,310	11,516	8,603	12,165
0.68	9,812	9,870	9,451	10,430	8,235	11,019	8,353	11,537	8,652	12,200
0.69	9,821	9,879	9,486	10,453	8,284	11,048	8,395	11,575	8,736	12,235
0.70	9,828	9,888	9,525	10,477	8,321	11,084	8,457	11,635	8,793	12,275
0.71	9,839	9,898	9,567	10,498	8,385	11,114	8,488	11,692	8,837	12,338
0.72	9,855	9,904	9,588	10,522	8,450	11,153	8,535	11,760	8,902	12,398
0.73	9,866	9,916	9,602	10,542	8,507	11,199	8,620	11,818	8,939	12,490
0.74	9,876	9,924	9,624	10,577	8,532	11,235	8,663	11,862	8,975	12,545
0.75	9,886	9,932	9,645	10,599	8,570	11,300	8,721	11,915	9,011	12,616
0.76	9,898	9,942	9,677	10,633	8,637	11,332	8,760	11,975	9,077	12,678
0.77	9,906	9,952	9,715	10,669	8,736	11,368	8,815	12,058	9,116	12,721
0.78	9,916	9,961	9,733	10,696	8,799	11,436	8,855	12,118	9,181	12,794
0.79	9,928	9,974	9,762	10,732	8,862	11,482	8,900	12,178	9,256	12,836
0.80	9,938	9,986	9,790	10,778	8,911	11,546	8,949	12,238	9,311	12,926
0.81	9,948	9,994	9,822	10,806	8,942	11,620	9,013	12,261	9,385	13,045
0.82	9,959	10,004	9,865	10,822	9,013	11,663	9,065	12,332	9,486	13,133
0.83	9,974	10,019	9,904	10,841	9,083	11,720	9,110	12,401	9,592	13,252
0.84	9,983	10,030	9,937	10,875	9,119	11,782	9,180	12,475	9,678	13,328
0.85	9,996	10,043	9,968	10,903	9,173	11,814	9,294	12,546	9,817	13,448
0.86	10,008	10,062	10,008	10,924	9,198	11,860	9,337	12,639	9,961	13,525
0.87	10,034	10,074	10,059	10,954	9,243	11,960	9,443	12,703	10,031	13,588
0.88	10,050	10,090	10,094	10,970	9,312	12,004	9,529	12,846	10,110	13,719

0.89	10,074	10,112	10,131	10,992	9,404	12,069	9,669	12,944	10,226	13,810
0.90	10,096	10,138	10,188	11,034	9,465	12,145	9,761	13,005	10,334	13,933
0.91	10,110	10,148	10,247	11,106	9,566	12,237	9,847	13,146	10,386	14,063
0.92	10,132	10,170	10,288	11,156	9,698	12,289	9,964	13,234	10,541	14,273
0.93	10,150	10,192	10,379	11,199	9,748	12,392	10,065	13,354	10,670	14,453
0.94	10,184	10,234	10,464	11,259	9,850	12,466	10,235	13,474	10,820	14,712
0.95	10,222	10,284	10,532	11,360	9,963	12,557	10,329	13,652	11,100	14,902
0.96	10,276	10,322	10,614	11,420	10,168	12,699	10,509	13,957	11,408	15,165
0.97	10,338	10,392	10,710	11,580	10,313	12,854	10,830	14,170	11,613	15,410
0.98	10,414	10,450	10,917	11,736	10,583	13,030	11,107	14,708	11,930	15,856
0.99	10,472	10,534	11,070	11,920	10,861	13,294	11,590	15,171	12,623	16,435