



Hornsea Project Four

Technical Note: Impact of Protective Provisions on Seabird Modelling

Request for Further Information

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Table of Contents

1	Introduction.....	7
2	Hornsea Four’s Developable Area Approach.....	7
3	Protective provision scenarios.....	12
3.2	Methodology.....	14
3.3	Impact values for the protective provision scenarios.....	15
4	Conclusions regarding impacts apportioned to the FFC SPA for protective provision scenarios.....	18
4.1	Applicant’s HRA conclusions at the end of examination.....	18
4.2	Gannet FFC SPA conclusions relating to the protective provision scenarios.....	18
4.3	Kittiwake FFC SPA conclusions relating to the protective provision scenarios.....	19
4.4	Guillemot FFC SPA conclusions relating to the protective provision scenarios.....	19
4.5	Razorbill FFC SPA conclusions relating to the protective provision scenarios.....	19
5	Updated in-combination impacts apportioned to the FFC SPA and corresponding PVA results.....	46
6	References.....	80

List of Tables

Table 1: Screening summary of protective provision scenarios considered for updated offshore ornithology mortality assessment.....	13
Table 2: Gannet bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following the Applicant’s preferred apportioning approach.....	21

Table 3: Gannet bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following Natural England's preferred apportioning approach.	24
Table 4: Gannet bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following the Applicant's preferred apportioning approach and based on the Applicant's predicted impacts at the end of Examination.....	27
Table 5: Gannet bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following the Applicant's preferred apportioning approach and based on predicted impacts using Natural England's Annex 1: Interim guidance on collision risk modelling and avoidance rates (RFI#4 results).....	28
Table 6: Gannet bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following Natural England's preferred apportioning approach and based on Natural England's predicted impacts at the end of Examination.	29
Table 7: Gannet bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following Natural England's preferred apportioning approach and based on predicted impacts using Natural England's Annex 1: Interim guidance on collision risk modelling and avoidance rates (RFI#4 results).....	29
Table 8: Kittiwake bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following the Applicant's preferred apportioning approach and based on the Applicant's predicted impacts at the end of Examination.....	30
Table 9: Kittiwake bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following the Applicant's preferred apportioning approach and based on predicted impacts using Natural England's Annex 1: Interim guidance on collision risk modelling and avoidance rates (RFI#4 results).....	30
Table 10: Kittiwake bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following Natural England's preferred apportioning approach and based on Natural England's predicted impacts at the end of Examination.	31
Table 11: Kittiwake bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following Natural England's preferred apportioning approach and based on predicted impacts using Natural England's Annex 1: Interim guidance on collision risk modelling and avoidance rates (RFI#4 results).....	31
Table 12: Guillemot bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following the Applicant's preferred apportioning approach and weighted mean peak approach.....	32
Table 13: Guillemot bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following the Applicant's preferred apportioning approach and standard mean peak approach.....	34
Table 14: Guillemot bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following Natural England's standard apportioning approach.	36
Table 15: Guillemot bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following Natural England's bespoke apportioning approach.	38

Table 16: Razorbill bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following the Applicant's preferred apportioning approach.	40
Table 17: Razorbill bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following Natural England's standard apportioning approach.	42
Table 18: Razorbill bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following Natural England's bespoke apportioning approach.	44
Table 19: Gannet in-combination abundance totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.	47
Table 20: Gannet in-combination abundance totals apportioned to the FFC SPA following Natural England's approach to apportionment for the range of PP scenarios considered.	49
Table 21: Gannet in-combination collision impact totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.	51
Table 22: Gannet in-combination collision impact totals apportioned to the FFC SPA following Natural England's approach to apportionment for the range of PP scenarios considered.	54
Table 23: FFC SPA gannet population modelling results.	57
Table 24: Kittiwake in-combination collision impact totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.	58
Table 25: Kittiwake in-combination collision impact totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.	61
Table 26: FFC SPA kittiwake population modelling results.	63
Table 27: Guillemot in-combination abundance totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.	64
Table 28: Guillemot in-combination abundance totals apportioned to the FFC SPA following the Natural England's standard approach to apportionment for the range of PP scenarios considered.	66
Table 29: Guillemot in-combination abundance totals apportioned to the FFC SPA following the Natural England's bespoke approach to apportionment for the range of PP scenarios considered.	68
Table 30: FFC SPA guillemot population modelling results.	71
Table 31: Razorbill in-combination abundance totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.	73
Table 32: Razorbill in-combination abundance totals apportioned to the FFC SPA following Natural England's standard approach to apportionment for the range of PP scenarios considered.	75
Table 33: Razorbill in-combination abundance totals apportioned to the FFC SPA following Natural England's bespoke approach to apportionment for the range of PP scenarios considered.	77
Table 34: FFC SPA razorbill population modelling results.	79

List of Figures

Figure 1: Relative density of gannet within the Hornsea Four AfL plus 4 km buffer in contrast to the final DCO array area.	8
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Figure 2: Relative density of kittiwake within the Hornsea Four AfL plus 4 km buffer in contrast to the final DCO array area. 9

Figure 3: Relative density of guillemot within the Hornsea Four AfL plus 4 km buffer in contrast to the final DCO array area.10

Figure 4: Relative density of razorbill within the Hornsea Four AfL plus 4 km buffer in contrast to the final DCO array area.....11

1 Introduction

1.1.1.1 The Secretary of State (SoS) for the Department for Energy Security and Net Zero (DESNZ) issued a fifth Request For Information (RFI#5) letter to Orsted Hornsea Project Four Limited ("the Applicant") on the 5th April 2023. The RFI relates to 13 protective provision scenarios presented within **G11.4 Totality of impact of protective provisions on Hornsea Project Four** and changes to project impact totals. Within the RFI#5 the SoS requested the following information be provided by the Applicant:

1.1.1.2 *"The Applicant is asked to confirm whether any of the reductions in array area above, or any other changes to the development layout or footprint, would affect the conclusions in its Habitats Regulations Assessment. The Applicant is asked to present updated mortality assessments for the gannet, kittiwake, guillemot and razorbill features of the Flamborough and Filey Coast Special Protection Area ("SPA") if appropriate for each alternative scenario. All assessments should use Natural England's advised parameters, including the collision risk model interim avoidance rates. The Applicant should also confirm the in-combination mortality totals; and present the Population Viability Analysis with the Counter Factual Growth Rate and Counter Factual Population Size figures for each species for these scenarios."*

1.1.1.3 In response to the SoS request, the Applicant has reviewed the 13 scenarios originally presented and, where appropriate, undertaken revised mortality assessments for which the details are provided within this report.

2 Hornsea Four's Developable Area Approach

2.1.1.1 The Hornsea Four Agreement for Lease (AfL) area was 846 km² at the Scoping phase of project development. Through Hornsea Four's Developable Area Approach a marked reduction in the array area was taken forward at the point of DCO application. The narrative of the site reduction is captured in **Chapter 3: Site Selection and Consideration of Alternatives**. Hornsea Four adopted a major site reduction from the array area presented at Scoping (846 km²) to the Preliminary Environmental Information Report (PEIR) boundary (600 km²), with a further reduction adopted for the Environmental Statement (ES) and DCO application (468 km²) due to the results of the PEIR, technical considerations and stakeholder feedback.

2.1.1.2 The final array area taken through for DCO application was carefully selected to exclude the areas of highest concentration of the project's key ornithological features gannet (*morus bassanus*), kittiwake (*Rissa tridactyla*), guillemot (*Uria aalge*) and razorbill (*Alca torda*). This resulted in the removal of the southern part of the AfL and northwest corner, as depicted in **Figure 1** to **Figure 4**. Further detail regarding Hornsea Four's Developable Area Approach is provided within **Section 5.5** of **Volume A2 Chapter 5 Offshore and Intertidal Ornithology (APP-017)**. It should, therefore, be noted that the Applicant has already committed to significant reductions in the project array area and considers the key areas of interest for ornithological receptors are now excluded from the project design.

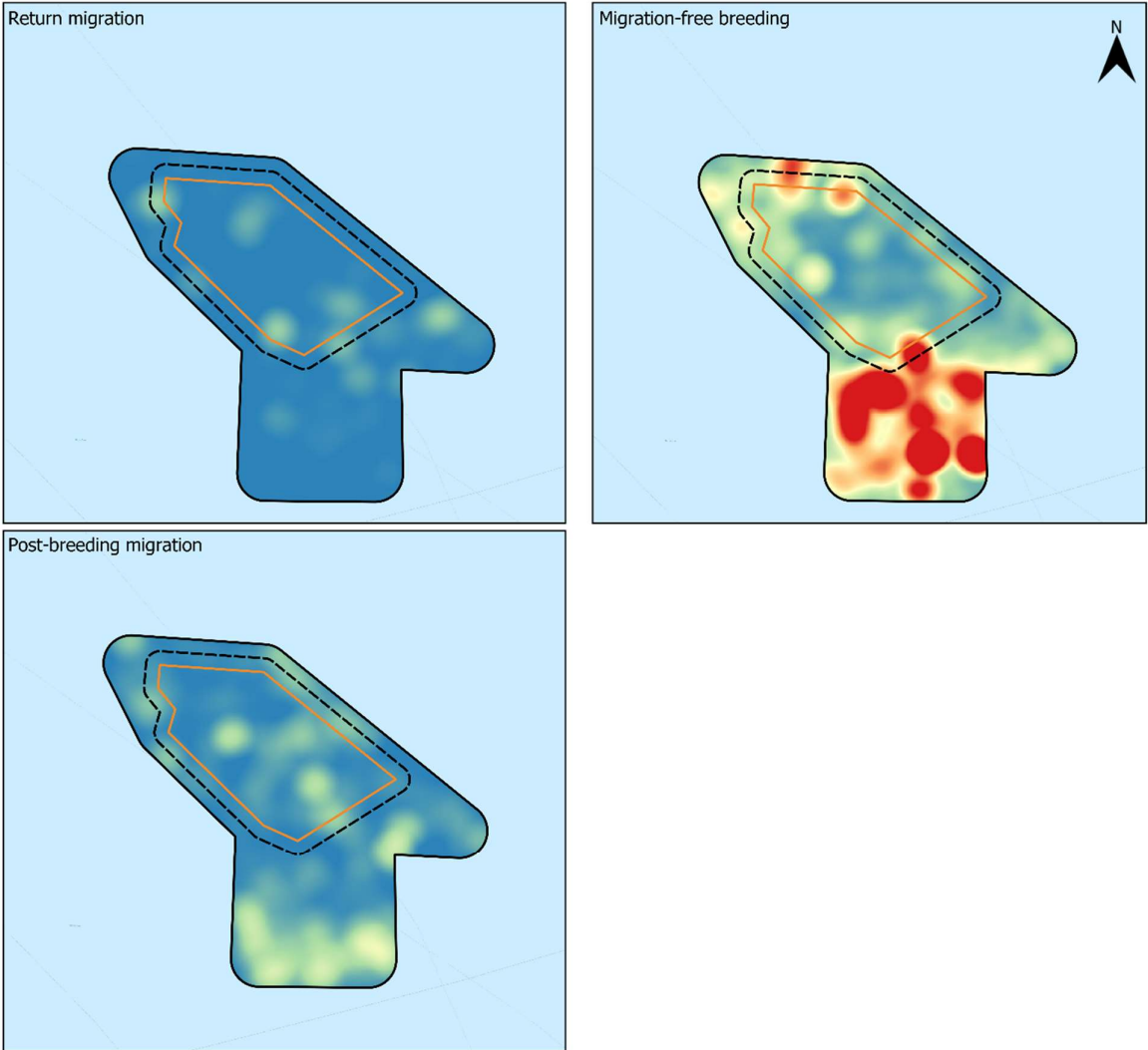
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Hornsea Four RFI#5 P11936

Gannet seasonal heatmap for AfL



Legend

- Array Area
- Array Area plus 2 km buffer
- AfL plus 4 km buffer
- Gannet relative density
- 87
- 1



Notes
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Figure 1

Figure Reference: P11936 gannet relative density heatmap for AfL

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Figure 1: Relative density of gannet within the Hornsea Four AfL plus 4 km buffer in contrast to the final DCO array area.

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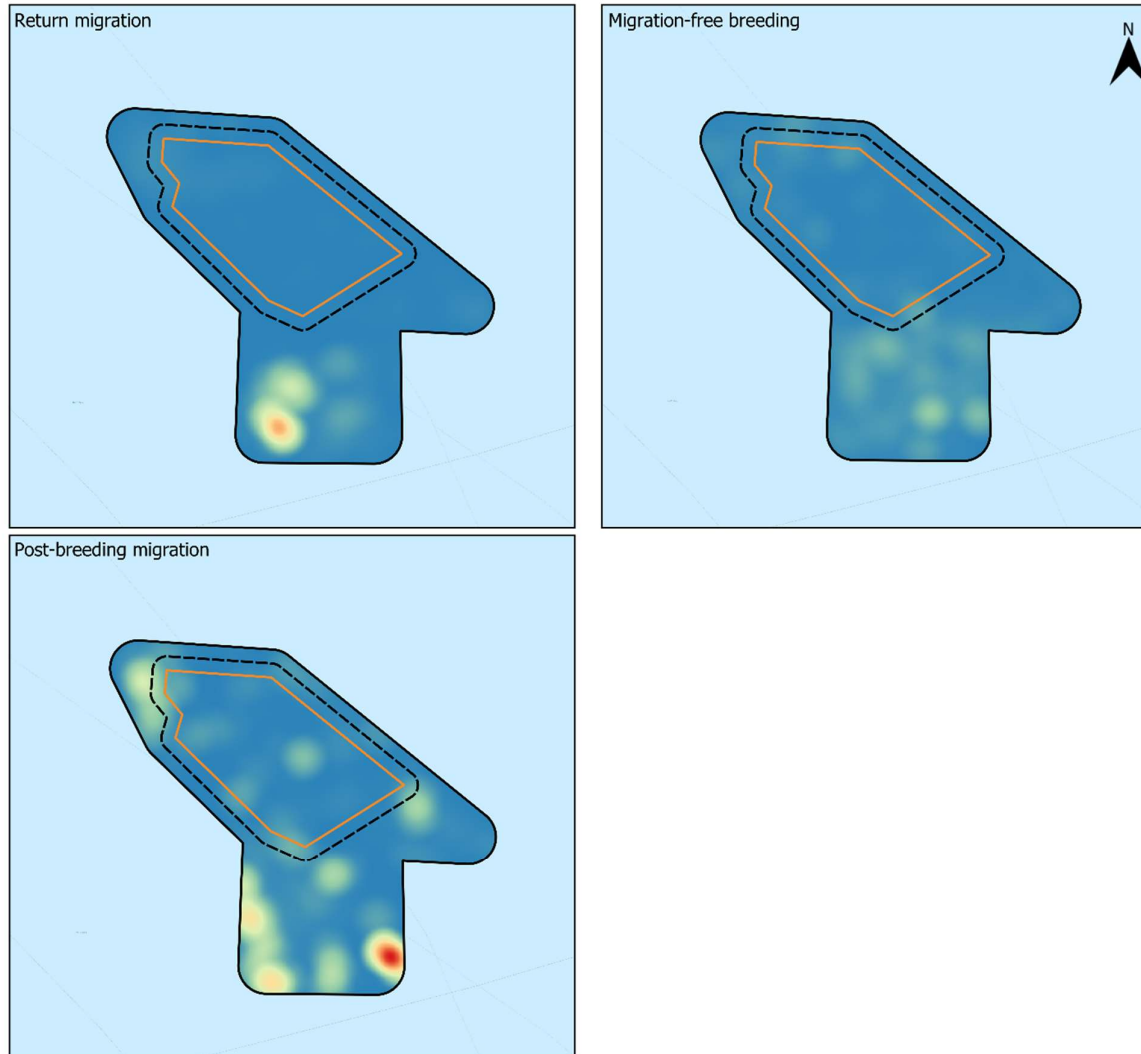
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Kittiwake seasonal heatmap for AfL

Legend

- Array Area
- Array Area plus 2 km buffer
- AfL plus 4 km buffer
- Kittiwake relative density
- 1,042
- 3



Notes

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Coordinate System: ETRS89 / UTM zone 31N

0 20 40 km

0 100 200 km

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Figure 2

Figure Reference: P11936 Kittiwake relative density heatmap for AfL © This drawing and its content are the copyright of APEM Ltd. and may not be reproduced or amended except by prior written permission.

Figure 2: Relative density of kittiwake within the Hornsea Four AfL plus 4 km buffer in contrast to the final DCO array area.

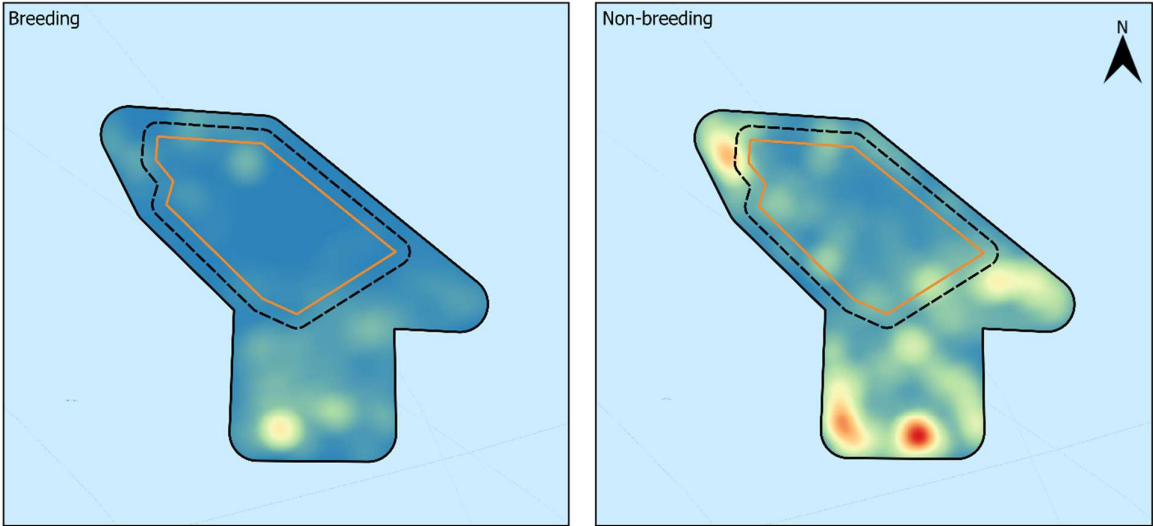
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Guillemot seasonal heatmap for Afl



Legend

- Array Area
- Array Area plus 2 km buffer
- Afl plus 4 km buffer
- Guillemot relative density
- 2,057
- 53

Notes
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Figure 3

Figure Reference: P11936 guillemot relative density heatmap for Afl. © This drawing and its content are the copyright of APEM Ltd. and may not be reproduced or amended except by prior written permission.
Figure 3: Relative density of guillemot within the Hornsea Four Afl plus 4 km buffer in contrast to the final DCO array area.

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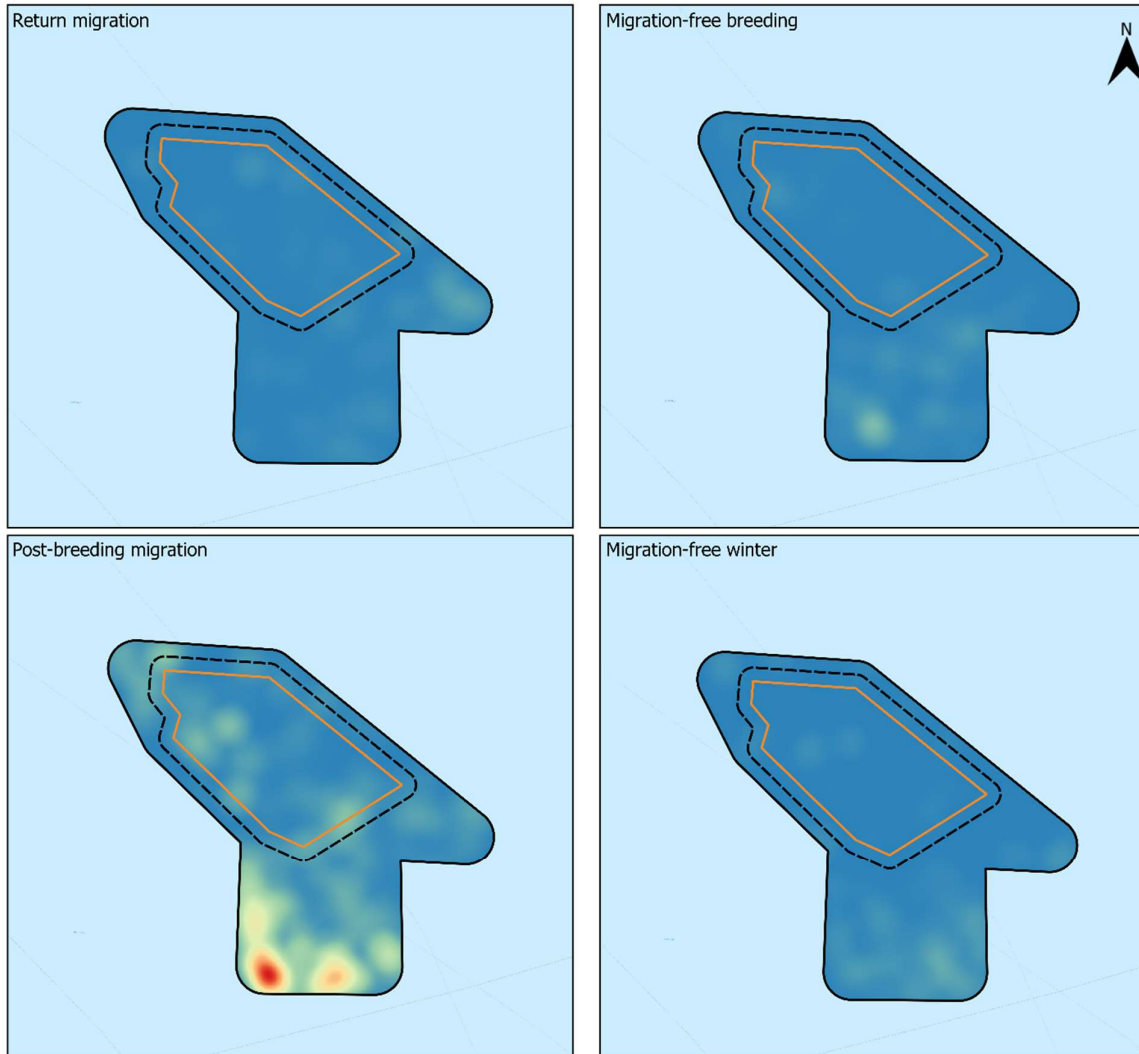
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Razorbill seasonal heatmap for Afl

Legend

- Array Area
- Array Area plus 2 km buffer
- Afl plus 4 km buffer
- Razorbill relative density
- 411
- 1



Notes

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Figure 4

Figure Reference: P11936 razorbill relative density heatmap for Afl

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Figure 4: Relative density of razorbill within the Hornsea Four Afl plus 4 km buffer in contrast to the final DCO array area.

3 Protective provision scenarios

- 3.1.1.1 A total of 13 protective provision scenarios were presented within [G11.4 Totality of impact of protective provisions on Hornsea Project Four](#). Each different scenario, if implemented, would result in a change in the size of the final array area's (and subsequent buffers) size as summarised in [Table 1](#) and visualised in the figures contained within [G13.3 Appendix to RFI#5 Response Technical Note](#). The different scenarios each, therefore, have the potential to change the level of impact from the project apportioned to the qualifying features of the FFC SPA, and subsequent compensation requirements.
- 3.1.1.2 In consultation with Natural England a screening exercise was undertaken to identify which of the 13 scenarios would be appropriate to present to the SoS to demonstrate the impact a change or reduction in the array area could have upon the key features of the FFC SPA. Heatmaps for the 13 scenarios were produced in order to identify which scenarios may result in a material difference in the ornithological baseline, as presented within [G13.3 Appendix to RFI#5 Response Technical Note](#) and summarised in [Table 1](#). In order to provide the SoS with the most succinct and informative data on the potential changes that may lead to a material difference in the impact assessments a screening process was undertaken to reduce the amount of scenarios taken through for updated modelling. Following the screening exercise Natural England and the Applicant concluded that a total of seven scenarios from the 13 were appropriate to take forward for revised modelling, in accordance with the request made by the SoS at RFI#5.

Table 1: Screening summary of protective provision scenarios considered for updated offshore ornithology mortality assessment.

Scenario	Description	Array area lost		Array area plus 2 km buffer lost		Screened in for consideration?
		Km ²	%	km ²	%	
1	BP	117	28%	135	23%	Yes
2	NEO PPs	9	2%	9	1%	Yes
3	Bridge PPs	13	3%	1	0%	No, as there is no discernible change (less than 1%) in the bird impact assessment area (i.e. array area +2km buffer) when compared to the Base Case Scenario (G13.3 RFI#5 Appendices).
4	Harbour PPs (Examination)	32	7%	1	0%	No, as there is no discernible change (less than 1%) in the bird impact assessment area (i.e. array area +2km buffer) when compared to the Base Case Scenario (see Appendix A).
5	Harbour Dec RFI solution d, ii	65	15%	19	3%	Yes
6	Harbour Dec RFI solution d, i	76	18%	40	6%	Yes
7	Harbour Dec RFI solution b	78	18%	41	6%	No, as there is no discernible change (less than 1%) in the bird impact assessment area (i.e. array area +2km buffer) when compared to the Scenario 6 (see Appendix A).
8	Harbour Dec RFI solution a	121	30%	118	19%	Yes
9	NEO + BP + Bridge + Harbour (Examination)	170	44%	145	25%	Yes
10	Neo + BP + Bridge + Harbour (RFI solution d, ii)	197	53%	170	29%	No, as it is considered that the project would be unviable
11	Neo + BP + Bridge + Harbour (RFI solution d, i)	207	57%	192	34%	No, as it is considered that the project would be unviable
12	Neo + BP + Bridge + Harbour (RFI solution b)	209	58%	192	34%	No, as it is considered that the project would be unviable
13	Neo + BP + Bridge + Harbour (RFI solution a)	250	73%	254	47%	Yes, by agreement with Natural England and to present the fullest extent of the 13 scenarios. It is considered the project would be unviable.

3.2 Methodology

3.2.1 Abundance estimation

- 3.2.1.1 In relation to gannet (CRM), kittiwake and guillemot, revised density estimates and subsequent abundance estimates were extracted from the 'Best Fit' MRSea (Scott-Hayward et al. 2017) model presented within [G5.9 Revised Ornithology Baseline \(REP5a-009\)](#), as agreed with Natural England through the PINS Examination as suitable for baseline characterisation ([REP5a-30](#)).
- 3.2.1.2 In relation to gannet (displacement) and razorbill, design-based abundance estimates were derived following the methods presented within [G5.9 Revised Ornithology Baseline \(REP5a-009\)](#), as agreed with Natural England through the PINS Examination as suitable for baseline characterisation ([REP5a-30](#)).
- 3.2.1.3 Following the above methods, revised monthly abundance estimates are presented within [G13.3 Appendix to RFI#5 Response Technical Note](#) for gannet, kittiwake, guillemot and razorbill, respectively. For the purpose of this report, gannet (CRM) and kittiwake density estimates presented are for flying birds within the array area, whereas the gannet (displacement), guillemot and razorbill abundance estimates provided are for the total behaviour of both sitting and flying birds within the array area plus 2km buffer.

3.2.2 Collision risk modelling

- 3.2.2.1 Due to time constraints collision risk has not been modelled for gannet and kittiwake protective provision scenarios considered. Instead, the proportional change in monthly densities between the monthly densities at the end of the PINS Examination and the protective provision scenarios has been applied to previous collision risk results to estimate the potential change in collision mortality rates for each scenario. This method of calculating potential change in collision mortality rates for impact assessment was discussed and agreed as appropriate with Natural England during a consultation meeting held on 27th April 2023. This approach has been considered for the predicted collision mortality rates and associated impacts assessed and concluded at the end of the PINS Examination as well as being predicted based on the revised modelling presented within RFI#4, using Natural England's Annex 1: interim guidance note (Natural England, 2023).
- 3.2.2.2 For clarity, this approach assumes that for all protective provision scenarios the number of wind turbine generators (WTGs) remains unchanged from the end of the PINS Examination, despite reductions in the overall array area size.
- 3.2.2.3 A summary of the predicted monthly EIA collision mortality rates prior to apportionment are presented in [G13.3 Appendix to RFI#5 Response Technical Note](#).

3.2.3 Displacement analysis

- 3.2.3.1 Revised displacement analysis has been carried out for gannet, guillemot and razorbill in accordance with the SNCBs (2022) updated interim guidance note on displacement. Due to disagreement between the Applicant and Natural England on several different elements of displacement analysis, separate displacement assessments have been undertaken following the preferred approach from each party. Details of how the Applicant's and

Natural England's approaches to displacement assessment differs are provided in [G5.25 Ornithology Environmental Impact Assessment \(EIA\) and Habitats Regulations Assessment \(HRA\) \(REP6-029\)](#).

3.2.3.2 Seasonal displacement matrices for gannet, guillemot and razorbill are provided in [G13.3 Appendix to RFI#5 Response Technical Note](#).

3.2.4 Apportionment of impacts to the FFC SPA

3.2.4.1 Revised collision and displacement impacts were apportioned to the gannet, kittiwake, guillemot and razorbill features of the FFC SPA. Due to disagreement between the Applicant and Natural England on the most appropriate seasonal apportioning rates, predicted impacts following both parties preferred apportionment approaches are presented within this report.

3.2.4.2 Further details on the two different apportioning approaches, including the evidence in support of the approaches, are provided within [G5.25 Ornithology Environmental Impact Assessment \(EIA\) and Habitats Regulations Assessment \(HRA\) \(REP6-029\)](#) and [G4.7 Ornithological Assessment Sensitivity Report \(REP6-026\)](#).

3.3 Impact values for the protective provision scenarios

3.3.1.1 Following the method set out in [Section 3.2](#) above, collision and displacement impacts apportioned to the gannet, kittiwake, guillemot and razorbill features are provided seasonally within [Table 2](#) to [Table 18](#) below. For clarity, where the level of impact presented within [Table 2](#) to [Table 18](#) is predicted to reduce for a specific scenario in comparison to the impact at the end of the PINS Examination (or based on impacts predicted within RFI#4 for collision risk), the cells have been colour coded green. Conversely, where the impact is predicted to increase for a specific scenario the table cells have been colour coded red.

3.3.1.2 Displacement assessments present both change in abundance and change in predicted mortality. The displacement rates presented are based on the Applicant's preferred rates based on the critical appraisal of all post consent monitoring studies ([REP1-069](#) and [REP2-045](#)) and displacement and mortality rates considered by Natural England for their end of PINS Examination position ([REP7-104](#)).

3.3.1.3 In summary the following is provided:

- **Gannet (displacement):**

- Applicant's preferred apportioning approach and seasonality ([Table 2](#)). This includes predicted displacement impacts when considering the Applicant's preferred rates of 60 – 80% Displacement and 1% Mortality ([REP2-045](#)) and Natural England's 60 – 80% displacement and 2% mortality considered within their Ornithology position paper ([REP7-104](#));
- Natural England's preferred apportioning approach and seasonality ([Table 3](#)). This includes predicted displacement impacts when considering the Applicant's preferred rates of 60 – 80% Displacement and 1% Mortality ([REP2-045](#)) and

Natural England's 60 – 80% displacement and 2% mortality considered within their Ornithology position paper ([REP7-104](#));

- **Gannet (collision):**
 - Applicant's preferred apportioning approach and Applicant's CRM input parameters ([Table 4](#));
 - Applicant's preferred apportioning approach and Natural England's Annex 1: Interim guidance input parameters ([Table 5](#));
 - Natural England's preferred apportioning approach and Natural England's CRM input parameters ([Table 6](#));
 - Natural England's preferred apportioning approach and Natural England's Annex 1: Interim guidance input parameters ([Table 7](#)).
- **Kittiwake (collision):**
 - Applicant's preferred apportioning approach and Applicant's end of PINS Examination CRM input parameters ([Table 8](#));
 - Applicant's preferred apportioning approach and Natural England's Annex 1: Interim guidance input parameters ([Table 9](#));
 - Natural England's preferred apportioning approach and Natural England's end of PINS Examination CRM input parameters ([Table 10](#));
 - Natural England's preferred apportioning approach and Natural England's Annex 1: Interim guidance input parameters ([Table 11](#)).
- **Guillemot (displacement)**
 - Applicant's preferred apportioning approach and weighted mean peak non-breeding bio-season abundance ([Table 12](#)). This includes predicted displacement impacts when considering the Applicant's preferred rate of up to 50% Displacement and 1% Mortality ([REP1-069](#)), Natural England's "reasonable scenario" of a 70% displacement rate and 2% mortality rate considered for other recent consent decisions and Natural England's 70% displacement 5% mortality rate considered within their Ornithology position paper ([REP7-104](#));
 - Applicant's preferred apportioning approach and standard mean peak bio-season abundance ([Table 13](#)). This includes predicted displacement impacts when considering the Applicant's preferred rate of up to 50% Displacement and 1% Mortality ([REP1-069](#)), Natural England's "reasonable scenario" of a 70% displacement rate and 2% mortality rate considered for other recent consent decisions and Natural England's 70% displacement 5% mortality rate considered within their Ornithology position paper ([REP7-104](#));
 - Natural England's standard apportioning approach ([Table 14](#)). This includes predicted displacement impacts when considering the Applicant's preferred rate of up to 50% Displacement and 1% Mortality ([REP1-069](#)), Natural England's

"reasonable scenario" of a 70% displacement rate and 2% mortality rate considered for other recent consent decisions and Natural England's 70% displacement 5% mortality rate considered within their Ornithology position paper (REP7-104);

- Natural England's bespoke approach to apportionment and seasonality (Table 15). This includes predicted displacement impacts when considering the Applicant's preferred rate of up to 50% Displacement and 1% Mortality (REP1-069), Natural England's "reasonable scenario" of a 70% displacement rate and 2% mortality rate considered for other recent consent decisions and Natural England's 70% displacement 5% mortality rate considered within their Ornithology position paper (REP7-104);
- **Razorbill (displacement)**
 - Applicant's preferred approach to apportionment (Table 16) This includes predicted displacement impacts when considering the Applicant's preferred rate of up to 50% Displacement and 1% Mortality (REP1-069), Natural England's "reasonable scenario" of a 70% displacement rate and 2% mortality rate considered for other recent consent decisions and Natural England's 70% displacement 5% mortality rate considered within their Ornithology position paper (REP7-104);
 - Natural England's standard apportioning approach (Table 17). This includes predicted displacement impacts when considering the Applicant's preferred rate of up to 50% Displacement and 1% Mortality (REP1-069), Natural England's "reasonable scenario" of a 70% displacement rate and 2% mortality rate considered for other recent consent decisions and Natural England's 70% displacement 5% mortality rate considered within their Ornithology position paper (REP7-104);
 - Natural England's bespoke apportionment approach (Table 18). This includes predicted displacement impacts when considering the Applicant's preferred rate of up to 50% Displacement and 1% Mortality (REP1-069), Natural England's "reasonable scenario" of a 70% displacement rate and 2% mortality rate considered for other recent consent decisions and Natural England's 70% displacement 5% mortality rate considered within their Ornithology position paper (REP7-104).

4 Conclusions regarding impacts apportioned to the FFC SPA for protective provision scenarios

4.1 Applicant's HRA conclusions at the end of examination

4.1.1.1 In relation to the gannet, kittiwake, guillemot and razorbill features of the FFC SPA the Applicant's position in relation to apportioned impacts at the end of the PINS Examination ([REP7-085](#)) were as follows:

- Gannet – no potential for an AEol in relation to displacement impacts from the project alone or in-combination;
- Gannet – no potential for an AEol in relation to collision impacts from the project alone or in-combination;
- Gannet – no potential for an AEol in relation to combined displacement and collision impacts from the project alone or in-combination;
- kittiwake – no potential for an AEol in relation to collision impacts from the project alone;
- kittiwake – an AEol was concluded in relation to collision impacts from the project in-combination, as detailed within [G1.5 Kittiwake Adverse Effects on Integrity \(AEol\) Conclusion \(AS-023\)](#);
- Guillemot – no potential for an AEol in relation to displacement impacts from the project alone or in-combination; and
- Razorbill – no potential for an AEol in relation to displacement impacts from the project alone or in-combination.

4.2 Gannet FFC SPA conclusions relating to the protective provision scenarios

4.2.1.1 As presented within [Table 2](#) and [Table 3](#), regardless of the apportioning approach, gannet abundance within the array area plus 2 km buffer was reduced in comparison to the apportioned abundance at the end of the PINS Examination. For scenarios two and five, the annual abundance decrease is only a minor reduction of less than -5%. For scenarios one, six, eight, nine and thirteen, the annual percentage reduction is calculated as between -7% and -38%, depending on the scenario. For all the protective provision scenarios displacement effects would be predicted to decrease in comparison to impacts predicted at the end of the PINS Examination. Therefore, the Applicant's position remains unchanged and continues to be that an AEol can be ruled out in relation to predicted displacement impacts apportioned to the gannet feature of the FFC SPA from the project alone or in-combination with other projects.

4.2.1.2 In relation to predicted change in collision impacts apportioned to the FFC SPA, for four of the seven scenarios considered (scenarios two, five, six and nine, [Table 4](#) to [Table 7](#)) only a minor change of up to +/- 5% was predicted. For scenarios one, nine and thirteen an increase in collision risk of 6% to 14% was predicted. Despite the majority of protective provision scenarios resulting in an increase in collision mortalities per annum, the predicted change in impact per annum apportioned to the FFC SPA is predicted to be at most an increase of two

(2.1) breeding adults per annum (Table 6) excluding macro avoidance or an increase of less than a single breeding adult per annum when considering a macro avoidance rate of 70% for any scenario. The Applicant considers that this would not materially change the conclusions and an AEol can be ruled out in relation to predicted collision impacts apportioned to the gannet feature of the FFC SPA from the project alone or in-combination with other projects.

- 4.2.1.3 For combined predicted displacement and collision impacts, due to the minimal changes in impacts, the Applicant's position remains unchanged and continues to be that an AEol can be ruled out in relation to predicted combined displacement and collision impacts apportioned to the gannet feature of the FFC SPA from the project alone or in-combination with other projects.

4.3 Kittiwake FFC SPA conclusions relating to the protective provision scenarios

- 4.3.1.1 As presented within Table 8 to Table 11, for the seven protective provision scenarios the level of change for each varied depending on the apportioning approach taken.
- 4.3.1.2 When considering the Applicant's approach presented within Table 8 to Table 9, five out of the seven scenarios (scenario one, two, five, six and thirteen) resulted in a minor change in predicted collisions of +/- 5% at most. Scenario eight resulted in an increase in predicted collision mortalities of 8% per annum, whereas scenario nine resulted in a decrease in predicted collision mortalities of -7% per annum at most.
- 4.3.1.3 Even when considering the scenarios resulting in predicted reductions in collision mortalities apportioned to the FFC SPA, no scenario resulted in a reduction which would mean Hornsea Four's contribution to an in-combination impact could be concluded as non-material, the Applicant therefore considers that the conclusions in the RIAA remain the same.

4.4 Guillemot FFC SPA conclusions relating to the protective provision scenarios

- 4.4.1.1 As presented within Table 12 to Table 15, regardless of the apportioning approach, guillemot abundance within the array area plus 2 km buffer was reduced in comparison to the apportioned abundance at the end of the PINS Examination. For scenarios two, five and six, the annual abundance decrease is only a minor reduction of less than -5%. For scenarios one, eight, nine and thirteen, the annual percentage reduction is calculated as between -14% and -45%, depending on the scenario. For all PP scenarios displacement effects would be predicted to decrease in comparison to impacts predicted at the end of the PINS Examination. The Applicant's position, therefore, remains unchanged and continues to be that an AEol can be ruled out in relation to predicted displacement impacts apportioned to the guillemot feature of the FFC SPA from the project alone or in-combination with other projects.

4.5 Razorbill FFC SPA conclusions relating to the protective provision scenarios

- 4.5.1.1 As presented within Table 16 to Table 18, regardless of the apportioning approach, razorbill abundance within the array area plus 2 km buffer was reduced in comparison to the apportioned abundance at the end of PINS Examination. For scenarios two and five, the annual abundance decrease is only a minor reduction of less than -5%. For scenarios one, six,

eight, nine and thirteen, the annual percentage reduction is calculated as between -9% and -39%, depending on the scenario. For all protective provision scenarios displacement effects would be predicted to decrease in comparison to impacts predicted at the end of the PINS Examination. The Applicant's position, therefore, remains unchanged and continues to be that an AEol can be ruled out in relation to predicted displacement impacts apportioned to the razorbill feature of the FFC SPA from the project alone or in-combination with other projects.

4.5.2 Gannet Displacement

Table 2: Gannet bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following the Applicant's preferred apportioning approach.

End of Examination											
Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Mar)	25.0	N/A	N/A	0.1	0.2	0.3	0.4	N/A	N/A	N/A	N/A
Migration-free breeding (Apr - Aug)	597.3	N/A	N/A	3.6	4.8	7.2	9.6	N/A	N/A	N/A	N/A
Post-breeding Migration (Sep - Nov)	38.3	N/A	N/A	0.2	0.3	0.5	0.6	N/A	N/A	N/A	N/A
Annual	660.6	N/A	N/A	4.0	5.3	7.9	10.6	N/A	N/A	N/A	N/A
Scenario 1											
Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Mar)	18.9	-6.1	-24%	0.1	0.2	0.2	0.3	-0.0	-0.0	-0.1	-0.1
Migration-free breeding (Apr - Aug)	541.0	-56.3	-9%	3.2	4.3	6.5	8.7	-0.3	-0.5	-0.7	-0.9
Post-breeding Migration (Sep - Nov)	33.4	-4.9	-13%	0.2	0.3	0.4	0.5	-0.0	-0.0	-0.1	-0.1
Annual	593.3	-67.3	-10%	3.6	4.7	7.1	9.5	-0.4	-0.5	-0.8	-1.1
Scenario 2											
Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Mar)	24.4	-0.6	-2%	0.1	0.2	0.3	0.4	-0.0	-0.0	-0.0	-0.0
Migration-free breeding (Apr - Aug)	595.2	-2.1	0%	3.6	4.8	7.1	9.5	-0.0	-0.0	-0.0	-0.0
Post-breeding Migration (Sep - Nov)	38.1	-0.2	-1%	0.2	0.3	0.5	0.6	-0.0	-0.0	-0.0	-0.0
Annual	657.7	-3.0	0%	3.9	5.3	7.9	10.5	-0.0	-0.0	-0.0	-0.0
Scenario 5											
Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference

Return Migration (Dec - Mar)	24.6	-0.3	-1%	0.1	0.2	0.3	0.4	-0.0	-0.0	-0.0	-0.0
Migration-free breeding (Apr - Aug)	572.5	-24.8	-4%	3.4	4.6	6.9	9.2	-0.1	-0.2	-0.3	-0.4
Post-breeding Migration (Sep - Nov)	38.0	-0.3	-1%	0.2	0.3	0.5	0.6	-0.0	-0.0	-0.0	-0.0
Annual	635.2	-25.4	-4%	3.8	5.1	7.6	10.2	-0.2	-0.2	-0.3	-0.4

Scenario 6

Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Mar)	23.9	-1.1	-4%	0.1	0.2	0.3	0.4	-0.0	-0.0	-0.0	-0.0
Migration-free breeding (Apr - Aug)	554.2	-43.1	-7%	3.3	4.4	6.6	8.9	-0.3	-0.3	-0.5	-0.7
Post-breeding Migration (Sep - Nov)	37.1	-1.2	-3%	0.2	0.3	0.4	0.6	-0.0	-0.0	-0.0	-0.0
Annual	615.2	-45.5	-7%	3.7	4.9	7.4	9.8	-0.3	-0.4	-0.5	-0.7

Scenario 8

Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Mar)	14.6	-10.3	-41%	0.1	0.1	0.2	0.2	-0.1	-0.1	-0.1	-0.2
Migration-free breeding (Apr - Aug)	437.9	-159.4	-27%	2.6	3.5	5.3	7.0	-1.0	-1.3	-1.9	-2.6
Post-breeding Migration (Sep - Nov)	34.2	-4.1	-11%	0.2	0.3	0.4	0.5	-0.0	-0.0	-0.0	-0.1
Annual	486.7	-173.9	-26%	2.9	3.9	5.8	7.8	-1.0	-1.4	-2.1	-2.8

Scenario 9

Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Mar)	18.3	-6.7	-27%	0.1	0.1	0.2	0.3	-0.0	-0.1	-0.1	-0.1
Migration-free breeding (Apr - Aug)	538.9	-58.4	-10%	3.2	4.3	6.5	8.6	-0.4	-0.5	-0.7	-0.9
Post-breeding Migration (Sep - Nov)	33.2	-5.1	-13%	0.2	0.3	0.4	0.5	-0.0	-0.0	-0.1	-0.1
Annual	590.4	-70.2	-11%	3.5	4.7	7.1	9.4	-0.4	-0.6	-0.8	-1.1

Scenario 13

Bio-season	Predicted abundance			Displacement impacts							
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	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Mar)	9.6	-15.4	-62%	0.1	0.1	0.1	0.2	-0.1	-0.1	-0.2	-0.2
Migration-free breeding (Apr - Aug)	372.7	-224.6	-38%	2.2	3.0	4.5	6.0	-1.3	-1.8	-2.7	-3.6
Post-breeding Migration (Sep - Nov)	29.3	-9.0	-24%	0.2	0.2	0.4	0.5	-0.1	-0.1	-0.1	-0.1
Annual	411.6	-249.0	-38%	2.5	3.3	4.9	6.6	-1.5	-2.0	-3.0	-4.0

Table 3: Gannet bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following Natural England's preferred apportioning approach.

End of Examination											
Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Feb)	25.0	N/A	N/A	0.1	0.2	0.3	0.4	N/A	N/A	N/A	N/A
Breeding (Mar - Sep)	883.1	N/A	N/A	5.3	7.1	10.6	14.1	N/A	N/A	N/A	N/A
Post-breeding Migration (Oct - Nov)	38.3	N/A	N/A	0.2	0.3	0.5	0.6	N/A	N/A	N/A	N/A
Annual	946.4	N/A	N/A	5.7	7.6	11.4	15.1	N/A	N/A	N/A	N/A
Scenario 1											
Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Feb)	18.9	-6.1	-24%	0.1	0.2	0.2	0.3	-0.0	-0.0	-0.1	-0.1
Breeding (Mar - Sep)	799.8	-83.2	-9%	4.8	6.4	9.6	12.8	-0.5	-0.7	-1.0	-1.3
Post-breeding Migration (Oct - Nov)	33.4	-4.9	-13%	0.2	0.3	0.4	0.5	-0.0	-0.0	-0.1	-0.1
Annual	852.2	-94.2	-10%	5.1	6.8	10.2	13.6	-0.6	-0.8	-1.1	-1.5
Scenario 2											
Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Feb)	24.4	-0.6	-2%	0.1	0.2	0.3	0.4	-0.0	-0.0	-0.0	-0.0
Breeding (Mar - Sep)	879.9	-3.2	0%	5.3	7.0	10.6	14.1	-0.0	-0.0	-0.0	-0.1
Post-breeding Migration (Oct - Nov)	38.1	-0.2	-1%	0.2	0.3	0.5	0.6	-0.0	-0.0	-0.0	-0.0
Annual	942.4	-4.0	0%	5.7	7.5	11.3	15.1	-0.0	-0.0	-0.0	-0.1
Scenario 5											
Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Feb)	24.6	-0.3	-1%	0.1	0.2	0.3	0.4	-0.0	-0.0	-0.0	-0.0
Breeding (Mar - Sep)	846.4	-36.6	-4%	5.1	6.8	10.2	13.5	-0.2	-0.3	-0.4	-0.6

Post-breeding Migration (Oct - Nov)	38.0	-0.3	-1%	0.2	0.3	0.5	0.6	-0.0	-0.0	-0.0	-0.0
Annual	909.1	-37.3	-4%	5.5	7.3	10.9	14.5	-0.2	-0.3	-0.4	-0.6

Scenario 6

Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Feb)	23.9	-1.1	-4%	0.1	0.2	0.3	0.4	-0.0	-0.0	-0.0	-0.0
Breeding (Mar - Sep)	819.3	-63.8	-7%	4.9	6.6	9.8	13.1	-0.4	-0.5	-0.8	-1.0
Post-breeding Migration (Oct - Nov)	37.1	-1.2	-3%	0.2	0.3	0.4	0.6	-0.0	-0.0	-0.0	-0.0
Annual	880.3	-66.1	-7%	5.3	7.0	10.6	14.1	-0.4	-0.5	-0.8	-1.1

Scenario 8

Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Feb)	12.1	-12.9	-52%	0.1	0.1	0.1	0.2	-0.1	-0.1	-0.2	-0.2
Breeding (Mar - Sep)	647.4	-235.7	-27%	3.9	5.2	7.8	10.4	-1.4	-1.9	-2.8	-3.8
Post-breeding Migration (Oct - Nov)	34.2	-4.1	-11%	0.2	0.3	0.4	0.5	-0.0	-0.0	-0.0	-0.1
Annual	693.6	-252.8	-27%	4.2	5.5	8.3	11.1	-1.5	-2.0	-3.0	-4.0

Scenario 9

Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Feb)	18.3	-6.7	-27%	0.1	0.1	0.2	0.3	-0.0	-0.1	-0.1	-0.1
Breeding (Mar - Sep)	796.7	-86.4	-10%	4.8	6.4	9.6	12.7	-0.5	-0.7	-1.0	-1.4
Post-breeding Migration (Oct - Nov)	33.2	-5.1	-13%	0.2	0.3	0.4	0.5	-0.0	-0.0	-0.1	-0.1
Annual	848.2	-98.2	-10%	5.1	6.8	10.2	13.6	-0.6	-0.8	-1.2	-1.6

Scenario 13

Bio-season	Predicted abundance			Displacement impacts							
	Predicted abundance (breeding adults)	Difference	% change	60% Displacement; 1% Mortality	80% Displacement; 1% Mortality	60% Displacement; 2% Mortality	80% Displacement; 2% Mortality	60% Displacement; 1% Mortality Difference	80% Displacement; 1% Mortality Difference	60% Displacement; 2% Mortality Difference	80% Displacement; 2% Mortality Difference
Return Migration (Dec - Feb)	7.7	-17.3	-69%	0.0	0.1	0.1	0.1	-0.1	-0.1	-0.2	-0.3

Breeding (Mar - Sep)	551.0	-332.1	-38%	3.3	4.4	6.6	8.8	-2.0	-2.7	-4.0	-5.3
Post-breeding Migration (Oct - Nov)	29.3	-9.0	-24%	0.2	0.2	0.4	0.5	-0.1	-0.1	-0.1	-0.1
Annual	588.0	-358.4	-38%	3.5	4.7	7.1	9.4	-2.2	-2.9	-4.3	-5.7

4.5.3 Gannet collision risk

Table 4: Gannet bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following the Applicant's preferred apportioning approach and based on the Applicant's predicted impacts at the end of Examination.

Bio-season	End of Examination	Scenario 1			Scenario 2			Scenario 5			Scenario 6			Scenario 8			Scenario 9			Scenario 13		
		Predicted Collisions (BO2)	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference
Return Migration (Dec - Mar)	0.1	0.1	0.0	16%	0.1	0.0	-2%	0.1	0.0	17%	0.1	0.0	16%	0.1	0.0	11%	0.1	0.0	9%	0.2	0.1	48%
Migration-free breeding (Apr - Aug)	6.7	7.1	0.3	5%	6.7	-0.1	-1%	6.7	-0.1	-1%	7.0	0.2	3%	6.8	0.1	2%	7.2	0.4	6%	7.1	0.4	6%
Post-breeding Migration (Sep - Nov)	0.2	0.2	0.0	-2%	0.2	0.0	1%	0.2	0.0	2%	0.2	0.0	1%	0.2	0.0	13%	0.2	0.0	1%	0.2	0.0	16%
Annual	7.1	7.4	0.3	5%	7.0	-0.1	-1%	7.0	0.0	0%	7.3	0.3	4%	7.2	0.1	2%	7.5	0.4	6%	7.5	0.5	7%
Annual Incl. 70% macro avoidance	2.1	2.2	0.1	5%	2.1	0.0	-1%	2.1	0.0	0%	2.2	0.1	4%	2.2	0.0	2%	2.2	0.1	6%	2.3	0.1	7%

Table 5: Gannet bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following the Applicant’s preferred apportioning approach and based on predicted impacts using Natural England’s Annex 1: Interim guidance on collision risk modelling and avoidance rates (RFI#4 results).

Bio-season	Annex 1 (RFI#4) results	Scenario 1			Scenario 2			Scenario 5			Scenario 6			Scenario 8			Scenario 9			Scenario 13		
	Predicted Collisions (BO2)	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change
Return Migration (Dec - Mar)	0.3	0.4	0.1	33%	0.4	0.0	8%	0.4	0.1	18%	0.4	0.1	20%	0.4	0.1	24%	0.5	0.1	42%	0.6	0.3	78%
Migration-free breeding (Apr - Aug)	5.0	5.3	0.3	6%	4.9	-0.1	-1%	4.9	-0.1	-2%	5.0	0.1	2%	4.9	0.0	-1%	5.3	0.3	7%	5.2	0.2	4%
Post-breeding Migration (Sep - Nov)	0.2	0.2	0.0	-3%	0.2	0.0	1%	0.2	0.0	2%	0.2	0.0	1%	0.2	0.0	13%	0.2	0.0	0%	0.2	0.0	16%
Annual	5.5	5.9	0.4	8%	5.4	0.0	-1%	5.4	0.0	-1%	5.6	0.1	3%	5.5	0.1	1%	5.9	0.5	9%	6.0	0.5	9%
Annual Incl. 70% macro avoidance	1.6	1.8	0.1	8%	1.6	0.0	-1%	1.6	0.0	-1%	1.7	0.0	3%	1.7	0.0	1%	1.8	0.1	9%	1.8	0.2	9%

Table 6: Gannet bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following Natural England's preferred apportioning approach and based on Natural England's predicted impacts at the end of Examination.

Bio-season	End of Examination	Scenario 1			Scenario 2			Scenario 5			Scenario 6			Scenario 8			Scenario 9			Scenario 13		
	Predicted Collisions (BO2)	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change
Return Migration (Dec - Feb)	0.1	0.1	0.0	8%	0.1	0.0	-5%	0.1	0.0	19%	0.1	0.0	14%	0.1	0.0	-1%	0.1	0.0	-14%	0.1	0.0	4%
Breeding (Mar - Sep)	14.3	15.3	1.0	7%	14.1	-0.1	-1%	14.4	0.1	1%	14.8	0.6	4%	14.7	0.4	3%	15.6	1.3	9%	16.3	2.0	14%
Post-breeding Migration (Oct - Nov)	0.3	0.2	0.0	-8%	0.3	0.0	1%	0.3	0.0	3%	0.3	0.0	2%	0.3	0.0	16%	0.2	0.0	-5%	0.3	0.0	13%
Annual	14.6	15.6	1.0	7%	14.5	-0.1	-1%	14.7	0.1	1%	15.2	0.6	4%	15.1	0.5	3%	15.9	1.3	9%	16.6	2.1	14%
Annual Incl. 70% macro avoidance	4.4	4.7	0.3	7%	4.3	0.0	-1%	4.4	0.0	1%	4.6	0.2	4%	4.5	0.1	3%	4.8	0.4	9%	5.0	0.6	14%

Table 7: Gannet bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following Natural England's preferred apportioning approach and based on predicted impacts using Natural England's Annex 1: Interim guidance on collision risk modelling and avoidance rates (RFI#4 results).

Bio-season	Annex 1 (RFI#4) results	Scenario 1			Scenario 2			Scenario 5			Scenario 6			Scenario 8			Scenario 9			Scenario 13		
	Predicted Collisions (BO2)	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change
Return Migration (Dec - Feb)	0.3	0.4	0.1	23%	0.3	0.0	0%	0.3	0.0	8%	0.3	0.0	10%	0.4	0.0	14%	0.4	0.1	32%	0.5	0.2	61%
Breeding (Mar - Sep)	8.6	9.3	0.7	8%	8.5	-0.1	-1%	8.6	-0.1	-1%	8.9	0.2	3%	8.7	0.1	1%	9.4	0.8	9%	9.7	1.1	12%
Post-breeding Migration (Oct - Nov)	0.1	0.1	0.0	-7%	0.1	0.0	1%	0.1	0.0	3%	0.1	0.0	2%	0.2	0.0	16%	0.1	0.0	-5%	0.1	0.0	13%
Annual	9.1	9.9	0.8	8%	9.0	-0.1	-1%	9.1	0.0	0%	9.3	0.3	3%	9.2	0.2	2%	10.0	0.9	10%	10.4	1.3	14%
Annual Incl. 70% macro avoidance	2.7	3.0	0.2	8%	2.7	0.0	-1%	2.7	0.0	0%	2.8	0.1	3%	2.8	0.0	2%	3.0	0.3	10%	3.1	0.4	14%

4.5.4 Kittiwake

Table 8: Kittiwake bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following the Applicant's preferred apportioning approach and based on the Applicant's predicted impacts at the end of Examination.

Bio-season	End of Examination	Scenario 1			Scenario 2			Scenario 5			Scenario 6			Scenario 8			Scenario 9			Scenario 13		
	Predicted Collisions (BO2)	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change
Return Migration (Jan - Apr)	1.0	0.6	-0.4	-38%	1.0	0.0	1%	1.1	0.1	11%	1.1	0.1	13%	1.2	0.2	19%	0.6	-0.3	-35%	0.7	-0.3	-31%
Migration-free breeding (May - Jul)	20.6	20.9	0.3	1%	20.4	-0.2	-1%	21.0	0.4	2%	21.3	0.7	3%	22.1	1.5	7%	19.9	-0.7	-3%	21.3	0.7	3%
Post-breeding Migration (Aug - Dec)	1.7	1.2	-0.5	-30%	1.7	0.0	-1%	1.8	0.1	5%	1.8	0.1	4%	2.1	0.3	19%	1.4	-0.4	-20%	1.5	-0.2	-12%
Annual	23.3	22.7	-0.6	-3%	23.1	-0.2	-1%	23.9	0.6	2%	24.2	0.9	4%	25.3	2.0	8%	21.9	-1.4	-6%	23.4	0.1	1%

Table 9: Kittiwake bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following the Applicant's preferred apportioning approach and based on predicted impacts using Natural England's Annex 1: Interim guidance on collision risk modelling and avoidance rates (RFI#4 results).

Bio-season	Annex 1 (RFI#4) results	Scenario 1			Scenario 2			Scenario 5			Scenario 6			Scenario 8			Scenario 9			Scenario 13		
	Predicted Collisions (BO2)	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change
Return Migration (Jan - Apr)	0.7	0.4	-0.3	-38%	0.7	0.0	0%	0.8	0.1	10%	0.8	0.1	12%	0.8	0.1	18%	0.5	-0.2	-35%	0.5	-0.2	-31%
Migration-free breeding (May - Jul)	13.8	13.9	0.1	1%	13.6	-0.2	-1%	14.0	0.2	2%	14.2	0.5	3%	14.7	1.0	7%	13.2	-0.5	-4%	14.1	0.4	3%
Post-breeding Migration (Aug - Dec)	1.2	0.9	-0.3	-28%	1.2	0.0	-2%	1.3	0.1	4%	1.3	0.0	3%	1.4	0.2	17%	1.0	-0.2	-20%	1.1	-0.1	-12%
Annual	15.7	15.2	-0.5	-3%	15.5	-0.2	-1%	16.1	0.4	2%	16.3	0.6	4%	17.0	1.3	8%	14.7	-1.0	-7%	15.7	0.0	0%

Table 10: Kittiwake bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following Natural England's preferred apportioning approach and based on Natural England's predicted impacts at the end of Examination.

Bio-season	End of Examination	Scenario 1			Scenario 2			Scenario 5			Scenario 6			Scenario 8			Scenario 9			Scenario 13		
	Predicted Collisions (BO2)	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change
Return Migration (Jan - Feb)	0.3	0.4	0.0	13%	0.3	0.0	0%	0.4	0.0	13%	0.4	0.0	14%	0.4	0.0	9%	0.4	0.1	35%	0.5	0.1	40%
Breeding (Mar - Aug)	70.3	53.7	-16.6	-24%	70.0	-0.3	0%	73.1	2.8	4%	74.1	3.8	5%	82.3	12.0	17%	56.6	-13.8	-20%	61.3	-9.0	-13%
Post-breeding Migration (Sep - Dec)	0.8	0.8	0.1	7%	0.7	0.0	-3%	0.8	0.1	7%	0.8	0.0	3%	0.7	0.0	-3%	0.7	-0.1	-10%	0.7	0.0	-1%
Annual	71.4	54.9	-16.5	-23%	71.1	-0.3	0%	74.3	2.8	4%	75.2	3.8	5%	83.4	12.0	17%	57.7	-13.7	-19%	62.5	-8.9	-12%

Table 11: Kittiwake bio-season collision risk comparison of protective provision scenario predicted collision impacts apportioned to the FFC SPA following Natural England's preferred apportioning approach and based on predicted impacts using Natural England's Annex 1: Interim guidance on collision risk modelling and avoidance rates (RFI#4 results).

Bio-season	Annex 1 (RFI#4) results	Scenario 1			Scenario 2			Scenario 5			Scenario 6			Scenario 8			Scenario 9			Scenario 13		
	Predicted Collisions (BO2)	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change	Predicted Collisions	Difference	% change
Return Migration (Jan - Feb)	0.2	0.2	0.0	13%	0.2	0.0	0%	0.2	0.0	12%	0.2	0.0	14%	0.2	0.0	9%	0.2	0.1	35%	0.3	0.1	40%
Breeding (Mar - Aug)	42.4	32.4	-10.0	-24%	42.2	-0.2	0%	44.1	1.7	4%	44.7	2.3	5%	49.7	7.2	17%	34.0	-8.4	-20%	36.9	-5.5	-13%
Post-breeding Migration (Sep - Dec)	0.5	0.5	0.0	8%	0.4	0.0	-3%	0.5	0.0	6%	0.5	0.0	2%	0.4	0.0	-5%	0.4	0.0	-9%	0.4	0.0	-2%
Annual	43.1	33.1	-9.9	-23%	42.9	-0.2	0%	44.8	1.7	4%	45.4	2.3	5%	50.3	7.2	17%	34.7	-8.4	-19%	37.6	-5.5	-13%

4.5.5 Guillemot

Table 12: Guillemot bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following the Applicant's preferred apportioning approach and weighted mean peak approach.

End of Examination									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	5,235.0	N/A	N/A	26.2	73.3	183.2	N/A	N/A	N/A
Non-breeding (Aug - Feb)	2,665.9	N/A	N/A	13.3	37.3	93.3	N/A	N/A	N/A
Annual	7,900.9	N/A	N/A	39.5	110.6	276.5	N/A	N/A	N/A
Scenario 1									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	3,663.3	-1,571.7	-30%	18.3	51.3	128.2	-7.9	-22.0	-55.0
Non-breeding (Aug - Feb)	1,846.8	-819.1	-31%	9.2	25.9	64.6	-4.1	-11.5	-28.7
Annual	5,510.1	-2,390.8	-30%	27.6	77.1	192.9	-12.0	-33.5	-83.7
Scenario 2									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	5,175.2	-59.8	-1%	25.9	72.5	181.1	-0.3	-0.8	-2.1
Non-breeding (Aug - Feb)	2,632.1	-33.8	-1%	13.2	36.8	92.1	-0.2	-0.5	-1.2
Annual	7,807.3	-93.6	-1%	39.0	109.3	273.3	-0.5	-1.3	-3.3
Scenario 5									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	5,110.6	-124.4	-2%	25.6	71.5	178.9	-0.6	-1.7	-4.4
Non-breeding (Aug - Feb)	4,723.6	-124.6	-3%	13.0	36.3	90.9	-0.3	-1.0	-2.4
Annual	9,834.2	-249.0	-2%	38.5	107.9	269.7	-1.0	-2.7	-6.8
Scenario 6									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference

Breeding (Mar - Jul)	4,990.0	-245.0	-5%	25.0	69.9	174.7	-1.2	-3.4	-8.6
Non-breeding (Aug - Feb)	4,620.1	-228.1	-5%	12.7	35.5	88.7	-0.7	-1.8	-4.6
Annual	9,610.1	-473.1	-5%	37.6	105.4	263.4	-1.9	-5.3	-13.2

Scenario 8

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	4,495.6	-739.4	-14%	22.5	62.9	157.3	-3.7	-10.4	-25.9
Non-breeding (Aug - Feb)	4,201.6	-646.6	-13%	11.5	32.1	80.2	-1.9	-5.2	-13.1
Annual	8,697.3	-1,386.0	-14%	33.9	95.0	237.6	-5.6	-15.6	-39.0

Scenario 9

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	3,598.9	-1,636.2	-31%	18.0	50.4	126.0	-8.2	-22.9	-57.3
Non-breeding (Aug - Feb)	3,258.0	-1,590.2	-33%	9.0	25.3	63.3	-4.3	-12.0	-30.0
Annual	6,856.8	-3,226.4	-32%	27.0	75.7	189.3	-12.5	-34.9	-87.3

Scenario 13

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	2,913.0	-2,322.0	-44%	14.6	40.8	102.0	-11.6	-32.5	-81.3
Non-breeding (Aug - Feb)	2,675.7	-2,172.5	-45%	7.4	20.6	51.5	-6.0	-16.7	-41.8
Annual	5,588.7	-4,494.5	-45%	21.9	61.4	153.4	-17.6	-49.2	-123.1

Table 13: Guillemot bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following the Applicant's preferred apportioning approach and standard mean peak approach.

End of Examination									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	5,235.0	N/A	N/A	26.2	73.3	183.2	N/A	N/A	N/A
Non-breeding (Aug - Feb)	4,848.2	N/A	N/A	24.2	67.9	169.7	N/A	N/A	N/A
Annual	10,083.2	N/A	N/A	50.4	141.2	352.9	N/A	N/A	N/A
Scenario 1									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	3,663.3	-1,571.7	-30%	18.3	51.3	128.2	-7.9	-22.0	-55.0
Non-breeding (Aug - Feb)	3,325.5	-1,522.7	-31%	16.6	46.6	116.4	-7.6	-21.3	-53.3
Annual	6,988.8	-3,094.4	-31%	34.9	97.8	244.6	-15.5	-43.3	-108.3
Scenario 2									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	5,175.2	-59.8	-1%	25.9	72.5	181.1	-0.3	-0.8	-2.1
Non-breeding (Aug - Feb)	4,786.8	-61.4	-1%	23.9	67.0	167.5	-0.3	-0.9	-2.1
Annual	9,962.0	-121.2	-1%	49.8	139.5	348.7	-0.6	-1.7	-4.2
Scenario 5									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	5,110.6	-124.4	-2%	25.6	71.5	178.9	-0.6	-1.7	-4.4
Non-breeding (Aug - Feb)	4,723.6	-124.6	-3%	23.6	66.1	165.3	-0.6	-1.7	-4.4
Annual	9,834.2	-249.0	-2%	49.2	137.7	344.2	-1.2	-3.5	-8.7
Scenario 6									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	4,990.0	-245.0	-5%	25.0	69.9	174.7	-1.2	-3.4	-8.6

Non-breeding (Aug - Feb)	4,620.1	-228.1	-5%	23.1	64.7	161.7	-1.1	-3.2	-8.0
Annual	9,610.1	-473.1	-5%	48.1	134.5	336.4	-2.4	-6.6	-16.6

Scenario 8

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	4,495.6	-739.4	-14%	22.5	62.9	157.3	-3.7	-10.4	-25.9
Non-breeding (Aug - Feb)	4,201.6	-646.6	-13%	21.0	58.8	147.1	-3.2	-9.1	-22.6
Annual	8,697.3	-1,386.0	-14%	43.5	121.8	304.4	-6.9	-19.4	-48.5

Scenario 9

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	3,598.9	-1,636.2	-31%	18.0	50.4	126.0	-8.2	-22.9	-57.3
Non-breeding (Aug - Feb)	3,258.0	-1,590.2	-33%	16.3	45.6	114.0	-8.0	-22.3	-55.7
Annual	6,856.8	-3,226.4	-32%	34.3	96.0	240.0	-16.1	-45.2	-112.9

Scenario 13

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	2,913.0	-2,322.0	-44%	14.6	40.8	102.0	-11.6	-32.5	-81.3
Non-breeding (Aug - Feb)	2,675.7	-2,172.5	-45%	13.4	37.5	93.6	-10.9	-30.4	-76.0
Annual	5,588.7	-4,494.5	-45%	27.9	78.2	195.6	-22.5	-62.9	-157.3

Table 14: Guillemot bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following Natural England's standard apportioning approach.

End of Examination									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	9,381.8	N/A	N/A	46.9	131.3	328.4	N/A	N/A	N/A
Non-breeding (Aug - Feb)	1,630.2	N/A	N/A	8.2	22.8	57.1	N/A	N/A	N/A
Annual	11,011.9	N/A	N/A	55.1	154.2	385.4	N/A	N/A	N/A
Scenario 1									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	6,565.0	-2,816.7	-30%	32.8	91.9	229.8	-14.1	-39.4	-98.6
Non-breeding (Aug - Feb)	1,118.2	-512.0	-31%	5.6	15.7	39.1	-2.6	-7.2	-17.9
Annual	7,683.2	-3,328.7	-30%	38.4	107.6	268.9	-16.6	-46.6	-116.5
Scenario 2									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	9,274.6	-107.2	-1%	46.4	129.8	324.6	-0.5	-1.5	-3.8
Non-breeding (Aug - Feb)	1,609.5	-20.6	-1%	8.0	22.5	56.3	-0.1	-0.3	-0.7
Annual	10,884.1	-127.8	-1%	54.4	152.4	380.9	-0.6	-1.8	-4.5
Scenario 5									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	9,158.8	-222.9	-2%	45.8	128.2	320.6	-1.1	-3.1	-7.8
Non-breeding (Aug - Feb)	1,588.3	-41.9	-3%	7.9	22.2	55.6	-0.2	-0.6	-1.5
Annual	10,747.1	-264.8	-2%	53.7	150.5	376.1	-1.3	-3.7	-9.3
Scenario 6									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	8,942.7	-439.0	-5%	44.7	125.2	313.0	-2.2	-6.1	-15.4

Non-breeding (Aug - Feb)	1,553.5	-76.7	-5%	7.8	21.7	54.4	-0.4	-1.1	-2.7
Annual	10,496.2	-515.7	-5%	52.5	146.9	367.4	-2.6	-7.2	-18.1

Scenario 8

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	8,056.7	-1,325.1	-14%	40.3	112.8	282.0	-6.6	-18.6	-46.4
Non-breeding (Aug - Feb)	1,412.8	-217.4	-13%	7.1	19.8	49.4	-1.1	-3.0	-7.6
Annual	9,469.5	-1,542.5	-14%	47.3	132.6	331.4	-7.7	-21.6	-54.0

Scenario 9

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	6,449.6	-2,932.2	-31%	32.2	90.3	225.7	-14.7	-41.1	-102.6
Non-breeding (Aug - Feb)	1,095.5	-534.7	-33%	5.5	15.3	38.3	-2.7	-7.5	-18.7
Annual	7,545.0	-3,466.9	-31%	37.7	105.6	264.1	-17.3	-48.5	-121.3

Scenario 13

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	5,220.5	-4,161.3	-44%	26.1	73.1	182.7	-20.8	-58.3	-145.6
Non-breeding (Aug - Feb)	899.7	-730.5	-45%	4.5	12.6	31.5	-3.7	-10.2	-25.6
Annual	6,120.2	-4,891.8	-44%	30.6	85.7	214.2	-24.5	-68.5	-171.2

Table 15: Guillemot bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following Natural England's bespoke apportioning approach.

End of Examination									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	9,381.8	N/A	N/A	46.9	131.3	328.4	N/A	N/A	N/A
Non-breeding (Oct - Feb)	748.0	N/A	N/A	3.7	10.5	26.2	N/A	N/A	N/A
Chick rearing/ moult (Aug - Sep)	22,179.1	N/A	N/A	110.9	310.5	776.3	N/A	N/A	N/A
Annual	32,308.9	N/A	N/A	161.5	452.3	1,130.8	N/A	N/A	N/A
Scenario 1									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	6,565.0	-2,816.7	-30%	32.8	91.9	229.8	-14.1	-39.4	-98.6
Non-breeding (Oct - Feb)	503.7	-244.3	-33%	2.5	7.1	17.6	-1.2	-3.4	-8.5
Chick rearing/ moult (Aug - Sep)	15,213.2	-6,965.9	-31%	76.1	213.0	532.5	-34.8	-97.5	-243.8
Annual	22,282.0	-10,026.9	-31%	111.4	311.9	779.9	-50.1	-140.4	-350.9
Scenario 2									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	9,274.6	-107.2	-1%	46.4	129.8	324.6	-0.5	-1.5	-3.8
Non-breeding (Oct - Feb)	738.4	-9.6	-1%	3.7	10.3	25.8	-0.0	-0.1	-0.3
Chick rearing/ moult (Aug - Sep)	21,898.3	-280.8	-1%	109.5	306.6	766.4	-1.4	-3.9	-9.8
Annual	31,911.3	-397.6	-1%	159.6	446.8	1,116.9	-2.0	-5.6	-13.9
Scenario 5									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	9,158.8	-222.9	-2%	45.8	128.2	320.6	-1.1	-3.1	-7.8
Non-breeding (Oct - Feb)	729.5	-18.5	-2%	3.6	10.2	25.5	-0.1	-0.3	-0.6
Chick rearing/ moult (Aug - Sep)	21,609.1	-570.1	-3%	108.0	302.5	756.3	-2.9	-8.0	-20.0
Annual	31,497.4	-811.5	-3%	157.5	441.0	1,102.4	-4.1	-11.4	-28.4
Scenario 6									
Bio-season	Predicted abundance			Displacement impacts					

	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	8,942.7	-439.0	-5%	44.7	125.2	313.0	-2.2	-6.1	-15.4
Non-breeding (Oct - Feb)	712.7	-35.3	-5%	3.6	10.0	24.9	-0.2	-0.5	-1.2
Chick rearing/ moult (Aug - Sep)	21,135.6	-1,043.6	-5%	105.7	295.9	739.7	-5.2	-14.6	-36.5
Annual	30,791.0	-1,517.9	-5%	154.0	431.1	1,077.7	-7.6	-21.3	-53.1

Scenario 8

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	8,056.7	-1,325.1	-14%	40.3	112.8	282.0	-6.6	-18.6	-46.4
Non-breeding (Oct - Feb)	652.1	-95.9	-13%	3.3	9.1	22.8	-0.5	-1.3	-3.4
Chick rearing/ moult (Aug - Sep)	19,221.1	-2,958.0	-13%	96.1	269.1	672.7	-14.8	-41.4	-103.5
Annual	27,929.9	-4,379.0	-14%	139.6	391.0	977.5	-21.9	-61.3	-153.3

Scenario 9

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	6,449.6	-2,932.2	-31%	32.2	90.3	225.7	-14.7	-41.1	-102.6
Non-breeding (Oct - Feb)	493.3	-254.7	-34%	2.5	6.9	17.3	-1.3	-3.6	-8.9
Chick rearing/ moult (Aug - Sep)	14,904.2	-7,274.9	-33%	74.5	208.7	521.6	-36.4	-101.8	-254.6
Annual	21,847.2	-10,461.8	-32%	109.2	305.9	764.7	-52.3	-146.5	-366.2

Scenario 13

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Breeding (Mar - Jul)	5,220.5	-4,161.3	-44%	26.1	73.1	182.7	-20.8	-58.3	-145.6
Non-breeding (Oct - Feb)	407.7	-340.3	-45%	2.0	5.7	14.3	-1.7	-4.8	-11.9
Chick rearing/ moult (Aug - Sep)	12,240.4	-9,938.7	-45%	61.2	171.4	428.4	-49.7	-139.1	-347.9
Annual	17,868.7	-14,440.3	-45%	89.3	250.2	625.4	-72.2	-202.2	-505.4

4.5.6 Razorbill

Table 16: Razorbill bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following the Applicant's preferred apportioning approach.

End of Examination									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	15.2	N/A	N/A	0.1	0.2	0.5	N/A	N/A	N/A
Migration free breeding (Apr - Jul)	215.1	N/A	N/A	1.1	3.0	7.5	N/A	N/A	N/A
Post-breeding (Aug-Oct)	145.7	N/A	N/A	0.7	2.0	5.1	N/A	N/A	N/A
Migration free winter (Nov- Dec)	12.5	N/A	N/A	0.1	0.2	0.4	N/A	N/A	N/A
Annual	388.5	N/A	N/A	1.9	5.4	13.6	N/A	N/A	N/A
Scenario 1									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	13.1	-2.0	-13%	0.1	0.2	0.5	-0.0	-0.0	-0.1
Migration free breeding (Apr - Jul)	159.1	-56.0	-26%	0.8	2.2	5.6	-0.3	-0.8	-2.0
Post-breeding (Aug-Oct)	132.2	-13.5	-9%	0.7	1.9	4.6	-0.1	-0.2	-0.5
Migration free winter (Nov- Dec)	11.4	-1.1	-9%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	315.8	-72.6	-19%	1.6	4.4	11.1	-0.4	-1.0	-2.5
Scenario 2									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	14.3	-0.8	-5%	0.1	0.2	0.5	-0.0	-0.0	-0.0
Migration free breeding (Apr - Jul)	215.4	0.3	0%	1.1	3.0	7.5	0.0	0.0	0.0
Post-breeding (Aug-Oct)	144.5	-1.3	-1%	0.7	2.0	5.1	-0.0	-0.0	-0.0
Migration free winter (Nov- Dec)	12.5	0.0	0%	0.1	0.2	0.4	0.0	0.0	0.0
Annual	386.7	-1.8	0%	1.9	5.4	13.5	-0.0	-0.0	-0.1
Scenario 5									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	14.4	-0.8	-5%	0.1	0.2	0.5	-0.0	-0.0	-0.0
Migration free breeding (Apr - Jul)	214.7	-0.5	0%	1.1	3.0	7.5	-0.0	-0.0	-0.0
Post-breeding (Aug-Oct)	136.8	-9.0	-6%	0.7	1.9	4.8	-0.0	-0.1	-0.3
Migration free winter (Nov- Dec)	12.3	-0.2	-2%	0.1	0.2	0.4	-0.0	-0.0	-0.0

Annual	378.1	-10.4	-3%	1.9	5.3	13.2	-0.1	-0.1	-0.4
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Scenario 6

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	14.3	-0.8	-6%	0.1	0.2	0.5	-0.0	-0.0	-0.0
Migration free breeding (Apr - Jul)	188.0	-27.1	-13%	0.9	2.6	6.6	-0.1	-0.4	-0.9
Post-breeding (Aug-Oct)	132.7	-13.0	-9%	0.7	1.9	4.6	-0.1	-0.2	-0.5
Migration free winter (Nov- Dec)	11.9	-0.6	-4%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	346.9	-41.5	-11%	1.7	4.9	12.1	-0.2	-0.6	-1.5

Scenario 8

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	11.6	-3.6	-24%	0.1	0.2	0.4	-0.0	-0.1	-0.1
Migration free breeding (Apr - Jul)	175.4	-39.7	-18%	0.9	2.5	6.1	-0.2	-0.6	-1.4
Post-breeding (Aug-Oct)	119.0	-26.7	-18%	0.6	1.7	4.2	-0.1	-0.4	-0.9
Migration free winter (Nov- Dec)	11.8	-0.6	-5%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	317.8	-70.6	-18%	1.6	4.4	11.1	-0.4	-1.0	-2.5

Scenario 9

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	13.1	-2.0	-13%	0.1	0.2	0.5	-0.0	-0.0	-0.1
Migration free breeding (Apr - Jul)	159.3	-55.9	-26%	0.8	2.2	5.6	-0.3	-0.8	-2.0
Post-breeding (Aug-Oct)	130.9	-14.8	-10%	0.7	1.8	4.6	-0.1	-0.2	-0.5
Migration free winter (Nov- Dec)	11.4	-1.1	-9%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	314.7	-73.8	-19%	1.6	4.4	11.0	-0.4	-1.0	-2.6

Scenario 13

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	10.8	-4.4	-29%	0.1	0.2	0.4	-0.0	-0.1	-0.2
Migration free breeding (Apr - Jul)	120.0	-95.1	-44%	0.6	1.7	4.2	-0.5	-1.3	-3.3
Post-breeding (Aug-Oct)	105.6	-40.1	-28%	0.5	1.5	3.7	-0.2	-0.6	-1.4
Migration free winter (Nov- Dec)	10.7	-1.7	-14%	0.1	0.2	0.4	-0.0	-0.0	-0.1
Annual	247.2	-141.3	-36%	1.2	3.5	8.7	-0.7	-2.0	-4.9

Table 17: Razorbill bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following Natural England's standard apportioning approach.

End of Examination									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	15.2	N/A	N/A	0.1	0.2	0.5	N/A	N/A	N/A
Migration free breeding (Apr - Jul)	385.5	N/A	N/A	1.9	5.4	13.5	N/A	N/A	N/A
Post-breeding (Aug-Oct)	145.7	N/A	N/A	0.7	2.0	5.1	N/A	N/A	N/A
Migration free winter (Nov- Dec)	12.5	N/A	N/A	0.1	0.2	0.4	N/A	N/A	N/A
Annual	558.9	N/A	N/A	2.8	7.8	19.6	N/A	N/A	N/A
Scenario 1									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	13.1	-2.0	-13%	0.1	0.2	0.5	-0.0	-0.0	-0.1
Migration free breeding (Apr - Jul)	285.2	-100.3	-26%	1.4	4.0	10.0	-0.5	-1.4	-3.5
Post-breeding (Aug-Oct)	132.2	-13.5	-9%	0.7	1.9	4.6	-0.1	-0.2	-0.5
Migration free winter (Nov- Dec)	11.4	-1.1	-9%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	441.9	-117.0	-21%	2.2	6.2	15.5	-0.6	-1.6	-4.1
Scenario 2									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	14.3	-0.8	-5%	0.1	0.2	0.5	-0.0	-0.0	-0.0
Migration free breeding (Apr - Jul)	386.1	0.6	0%	1.9	5.4	13.5	0.0	0.0	0.0
Post-breeding (Aug-Oct)	144.5	-1.3	-1%	0.7	2.0	5.1	-0.0	-0.0	-0.0
Migration free winter (Nov- Dec)	12.5	0.0	0%	0.1	0.2	0.4	0.0	0.0	0.0
Annual	557.4	-1.5	0%	2.8	7.8	19.5	-0.0	-0.0	-0.1
Scenario 5									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	14.4	-0.8	-5%	0.1	0.2	0.5	-0.0	-0.0	-0.0
Migration free breeding (Apr - Jul)	384.7	-0.8	0%	1.9	5.4	13.5	-0.0	-0.0	-0.0
Post-breeding (Aug-Oct)	136.8	-9.0	-6%	0.7	1.9	4.8	-0.0	-0.1	-0.3
Migration free winter (Nov- Dec)	12.3	-0.2	-2%	0.1	0.2	0.4	-0.0	-0.0	-0.0

Annual	548.1	-10.7	-2%	2.7	7.7	19.2	-0.1	-0.2	-0.4
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Scenario 6

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	14.3	-0.8	-6%	0.1	0.2	0.5	-0.0	-0.0	-0.0
Migration free breeding (Apr - Jul)	336.9	-48.6	-13%	1.7	4.7	11.8	-0.2	-0.7	-1.7
Post-breeding (Aug-Oct)	132.7	-13.0	-9%	0.7	1.9	4.6	-0.1	-0.2	-0.5
Migration free winter (Nov- Dec)	11.9	-0.6	-4%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	495.8	-63.0	-11%	2.5	6.9	17.4	-0.3	-0.9	-2.2

Scenario 8

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	11.6	-3.6	-24%	0.1	0.2	0.4	-0.0	-0.1	-0.1
Migration free breeding (Apr - Jul)	314.4	-71.2	-18%	1.6	4.4	11.0	-0.4	-1.0	-2.5
Post-breeding (Aug-Oct)	119.0	-26.7	-18%	0.6	1.7	4.2	-0.1	-0.4	-0.9
Migration free winter (Nov- Dec)	11.8	-0.6	-5%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	456.8	-102.1	-18%	2.3	6.4	16.0	-0.5	-1.4	-3.6

Scenario 9

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	13.1	-2.0	-13%	0.1	0.2	0.5	-0.0	-0.0	-0.1
Migration free breeding (Apr - Jul)	285.4	-100.1	-26%	1.4	4.0	10.0	-0.5	-1.4	-3.5
Post-breeding (Aug-Oct)	130.9	-14.8	-10%	0.7	1.8	4.6	-0.1	-0.2	-0.5
Migration free winter (Nov- Dec)	11.4	-1.1	-9%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	440.8	-118.0	-21%	2.2	6.2	15.4	-0.6	-1.7	-4.1

Scenario 13

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	10.8	-4.4	-29%	0.1	0.2	0.4	-0.0	-0.1	-0.2
Migration free breeding (Apr - Jul)	215.1	-170.4	-44%	1.1	3.0	7.5	-0.9	-2.4	-6.0
Post-breeding (Aug-Oct)	105.6	-40.1	-28%	0.5	1.5	3.7	-0.2	-0.6	-1.4
Migration free winter (Nov- Dec)	10.7	-1.7	-14%	0.1	0.2	0.4	-0.0	-0.0	-0.1
Annual	342.2	-216.6	-39%	1.7	4.8	12.0	-1.1	-3.0	-7.6

Table 18: Razorbill bio-season array area plus 2km buffer comparison of protective provision scenario predicted abundance apportioned to the FFC SPA following Natural England's bespoke apportioning approach.

End of Examination									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	15.2	N/A	N/A	0.1	0.2	0.5	N/A	N/A	N/A
Migration free breeding (Apr - Jul)	385.5	N/A	N/A	1.9	5.4	13.5	N/A	N/A	N/A
Post-breeding (Aug-Oct)	2,845.4	N/A	N/A	14.2	39.8	99.6	N/A	N/A	N/A
Migration free winter (Nov- Dec)	12.5	N/A	N/A	0.1	0.2	0.4	N/A	N/A	N/A
Annual	3,258.5	N/A	N/A	16.3	45.6	114.0	N/A	N/A	N/A
Scenario 1									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	13.1	-2.0	-13%	0.1	0.2	0.5	-0.0	-0.0	-0.1
Migration free breeding (Apr - Jul)	285.2	-100.3	-26%	1.4	4.0	10.0	-0.5	-1.4	-3.5
Post-breeding (Aug-Oct)	2,581.0	-264.3	-9%	12.9	36.1	90.3	-1.3	-3.7	-9.3
Migration free winter (Nov- Dec)	11.4	-1.1	-9%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	2,890.7	-367.8	-11%	14.5	40.5	101.2	-1.8	-5.1	-12.9
Scenario 2									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	14.3	-0.8	-5%	0.1	0.2	0.5	-0.0	-0.0	-0.0
Migration free breeding (Apr - Jul)	386.1	0.6	0%	1.9	5.4	13.5	0.0	0.0	0.0
Post-breeding (Aug-Oct)	2,820.8	-24.6	-1%	14.1	39.5	98.7	-0.1	-0.3	-0.9
Migration free winter (Nov- Dec)	12.5	0.0	0%	0.1	0.2	0.4	0.0	0.0	0.0
Annual	3,233.7	-24.9	-1%	16.2	45.3	113.2	-0.1	-0.3	-0.9
Scenario 5									
Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	14.4	-0.8	-5%	0.1	0.2	0.5	-0.0	-0.0	-0.0
Migration free breeding (Apr - Jul)	384.7	-0.8	0%	1.9	5.4	13.5	-0.0	-0.0	-0.0
Post-breeding (Aug-Oct)	2,670.5	-174.9	-6%	13.4	37.4	93.5	-0.9	-2.4	-6.1
Migration free winter (Nov- Dec)	12.3	-0.2	-2%	0.1	0.2	0.4	-0.0	-0.0	-0.0

Annual	3,081.9	-176.7	-5%	15.4	43.1	107.9	-0.9	-2.5	-6.2
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Scenario 6

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	14.3	-0.8	-6%	0.1	0.2	0.5	-0.0	-0.0	-0.0
Migration free breeding (Apr - Jul)	336.9	-48.6	-13%	1.7	4.7	11.8	-0.2	-0.7	-1.7
Post-breeding (Aug-Oct)	2,591.6	-253.8	-9%	13.0	36.3	90.7	-1.3	-3.6	-8.9
Migration free winter (Nov- Dec)	11.9	-0.6	-4%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	2,954.7	-303.8	-9%	14.8	41.4	103.4	-1.5	-4.3	-10.6

Scenario 8

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	11.6	-3.6	-24%	0.1	0.2	0.4	-0.0	-0.1	-0.1
Migration free breeding (Apr - Jul)	314.4	-71.2	-18%	1.6	4.4	11.0	-0.4	-1.0	-2.5
Post-breeding (Aug-Oct)	2,323.9	-521.5	-18%	11.6	32.5	81.3	-2.6	-7.3	-18.3
Migration free winter (Nov- Dec)	11.8	-0.6	-5%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	2,661.6	-596.9	-18%	13.3	37.3	93.2	-3.0	-8.4	-20.9

Scenario 9

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	13.1	-2.0	-13%	0.1	0.2	0.5	-0.0	-0.0	-0.1
Migration free breeding (Apr - Jul)	285.4	-100.1	-26%	1.4	4.0	10.0	-0.5	-1.4	-3.5
Post-breeding (Aug-Oct)	2,555.5	-289.9	-10%	12.8	35.8	89.4	-1.4	-4.1	-10.1
Migration free winter (Nov- Dec)	11.4	-1.1	-9%	0.1	0.2	0.4	-0.0	-0.0	-0.0
Annual	2,865.4	-393.1	-12%	14.3	40.1	100.3	-2.0	-5.5	-13.8

Scenario 13

Bio-season	Predicted abundance			Displacement impacts					
	Predicted abundance (breeding adults)	Difference	% change	50% Displacement; 1% Mortality	70% Displacement; 2% Mortality	70% Displacement; 5% Mortality	50% Displacement; 1% Mortality Difference	70% Displacement; 2% Mortality Difference	70% Displacement; 5% Mortality Difference
Return migration (Jan - Mar)	10.8	-4.4	-29%	0.1	0.2	0.4	-0.0	-0.1	-0.2
Migration free breeding (Apr - Jul)	215.1	-170.4	-44%	1.1	3.0	7.5	-0.9	-2.4	-6.0
Post-breeding (Aug-Oct)	2,062.6	-782.8	-28%	10.3	28.9	72.2	-3.9	-11.0	-27.4
Migration free winter (Nov- Dec)	10.7	-1.7	-14%	0.1	0.2	0.4	-0.0	-0.0	-0.1
Annual	2,299.2	-959.3	-29%	11.5	32.2	80.5	-4.8	-13.4	-33.6

5 Updated in-combination impacts apportioned to the FFC SPA and corresponding PVA results

- 5.1.1.1 The Applicant previously submitted updated in-combination totals with respect to impacts apportioned to qualifying features of the FFC SPA within Appendix D of the [G9.2 Applicant's Response to RFI dated 16 December](#). Since then, one additional project (Berwick Bank offshore wind farm) has submitted a consent application of relevance. Predicted impacts for Berwick Bank, for inclusion within in-combination totals presented below, are based on the values presented within the Berwick Bank Report to Inform Appropriate Assessment (RIAA) (SSER, 2022a). With respect to the kittiwake feature of the FFC SPA, as detailed within the Berwick Bank derogation case (SSER, 2022b) the project has proposed to compensate for all impacts and therefore all impacts have been presented including and excluding Berwick Bank's in-combination impact contribution, in accordance with other projects where compensation has been committed to. Additionally, razorbill predicted abundance values apportioned to the FFC SPA have also been updated for Dudgeon and Sheringham Shoal Extension following the values presented within the Apportioning and Habitats Regulations Assessment Updates Technical Note (Equinor, 2023) submitted at Deadline two of their PINS Examination. The latest in-combination totals for the four qualifying features of the FFC SPA are provided in [Table 19](#) to [Table 33](#) below, including the range of predicted impacts following the protective provision scenarios modelled.
- 5.1.1.2 Due to Natural England's Interim guidance note (Natural England, 2023) now advocating significantly different avoidance rates than previously modelled, Dudgeon and Sheringham Shoal Extension have adjusted and produced updated in-combination collision impact totals for the gannet and kittiwake feature of the FFC SPA for all projects (Equinor, 2023). The adjusted annual in-combination totals accounting for the interim guidance note advice (Natural England, 2023) for all projects are provided within [Table 21](#) to [Table 25](#), alongside the agreed upon impact totals provided previously for in the Applicant's response to RFI#4 on 17th April 2023. It should be noted that the adjusted annual in-combination totals are still an area of ongoing discussion between Dudgeon and Sheringham Shoal Extension and Natural England, however the values further highlight the level of potential over precaution in assessments.
- 5.1.1.3 As detailed within the [G4.7 Ornithological Assessment Sensitivity Report \(REP6-026\)](#), the Applicant ran a wide range of generic impact scenarios on the FFC SPA population for PVA to account for any potential changes in the in-combination totals through the PINS Examination and pre-decision period. A summary of the closest generic impact scenario results are presented in [Table 23](#),
- 5.1.1.4 [Table 26](#), [Table 30](#) and [Table 34](#) below for the updated in-combination totals for gannet and kittiwake, guillemot and razorbill, respectively. Details of the CRM parameters, model validation and appropriate model interpretation are provided in [G4.7 Ornithological Assessment Sensitivity Report \(REP6-026\)](#).

Table 19: Gannet in-combination abundance totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Autumn	Spring	Annual	Tier
Beatrice	0	0	0	0	1a
Blyth Demonstration Site	-	-	-	-	1a
Dudgeon	53	1	1	55	1a
EOWDC	0	0	0	0	1a
Galloper	0	44	17	61	1a
Greater Gabbard	0	3	7	10	1a
Gunfleet Sands	0	1	1	1	1a
Humber Gateway	-	-	-	-	1a
Hywind 2 Demonstration	0	0	0	0	1a
Kentish Flats	-	-	-	-	1a
Kentish Flats Extension	0	1	0	1	1a
Lincs	-	-	-	-	1a
London Array	-	-	-	-	1a
Lynn and Inner Dowsing	-	-	-	-	1a
Methil	0	0	0	0	1a
Race Bank	92	2	2	95	1a
Rampion	0	28	0	28	1a
Scroby Sands	-	-	-	-	1a
Sheringham Shoal	47	2	0	49	1a
Teesside	1	0	0	1	1a
Thanet	-	-	-	-	1a
Westermost Rough	-	-	-	-	1a
East Anglia One	161	175	5	340	1b
Hornsea Project One	671	33	16	720	1b
Hornsea Project Two	457	55	8	519	1b
Moray East	0	14	2	16	1b
Triton Knoll	211	1	2	213	1b
Kincardine	0	0	0	0	1b
Dogger Bank A	259	44	11	314	1c
Dogger Bank B	319	54	14	386	1c
Dogger Bank C	484	18	14	516	1c
East Anglia Three	412	61	33	505	1c
Inch Cape	0	34	13	47	1c
Moray West	0	21	9	30	1c
Neart na Gaoithe	0	27	17	44	1c
Seagreen Alpha	0	14	9	23	1c
Seagreen Bravo	0	18	12	30	1c
Sofia	641	24	15	680	1c
Hornsea Three	844	47	33	924	1c

Project	Breeding	Autumn	Spring	Annual	Tier
Norfolk Boreas	1,229	83	33	1,344	1c
Norfolk Vanguard	271	118	27	416	1c
East Anglia ONE North	149	23	3	174	1c
East Anglia TWO	192	43	12	247	1c
Total (Consented Projects Only)	6,492	986	311	7,789	
Hornsea Four PP Scenarios (Applicant's Approach)	373 - 595	29 - 38	10 - 24	412 - 658	1d
Total (Hornsea Four plus all consented projects only)	6,865 – 7,087	1,015 – 1,024	321 - 336	8,200 – 8,447	
Dudgeon Extension Project	320	17	3	339	1d
Sheringham Shoal Extension Project	18	14	1	32	1d
Berwick Bank	62	30	11	102	1d
Rampion 2	0	4	3	7	2
Total (All Projects)	7,264 – 7,486	1,080 – 1,088	338 - 353	8,681 – 8,927	

Table 20: Gannet in-combination abundance totals apportioned to the FFC SPA following Natural England’s approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Autumn	Spring	Annual	Tier
Beatrice	0	0	0	0	1a
Blyth Demonstration Site	-	-	-	-	1a
Dudgeon	53	1	1	55	1a
EOWDC	0	0	0	0	1a
Galloper	0	44	17	61	1a
Greater Gabbard	0	3	7	10	1a
Gunfleet Sands	0	1	1	1	1a
Humber Gateway	-	-	-	-	1a
Hywind 2 Demonstration	0	0	0	0	1a
Kentish Flats	-	-	-	-	1a
Kentish Flats Extension	0	1	0	1	1a
Lincs	-	-	-	-	1a
London Array	-	-	-	-	1a
Lynn and Inner Dowsing	-	-	-	-	1a
Methil	0	0	0	0	1a
Race Bank	92	2	2	95	1a
Rampion	0	28	0	28	1a
Scroby Sands	-	-	-	-	1a
Sheringham Shoal	47	2	0	49	1a
Teesside	1	0	0	1	1a
Thanet	-	-	-	-	1a
Westermost Rough	-	-	-	-	1a
East Anglia One	161	175	5	340	1b
Hornsea Project One	671	33	16	720	1b
Hornsea Project Two	457	55	8	519	1b
Moray East	0	14	2	16	1b
Triton Knoll	211	1	2	213	1b
Kincardine	0	0	0	0	1b
Dogger Bank A	259	44	11	314	1c
Dogger Bank B	319	54	14	386	1c
Dogger Bank C	484	18	14	516	1c
East Anglia Three	412	61	33	505	1c
Inch Cape	0	34	13	47	1c
Moray West	0	21	9	30	1c
Neart na Gaoithe	0	27	17	44	1c
Seagreen Alpha	0	14	9	23	1c
Seagreen Bravo	0	18	12	30	1c
Sofia	641	24	15	680	1c
Hornsea Three	844	47	33	924	1c

Project	Breeding	Autumn	Spring	Annual	Tier
Norfolk Boreas	1,229	83	33	1,344	1c
Norfolk Vanguard	271	118	27	416	1c
East Anglia ONE North	149	23	3	174	1c
East Anglia TWO	192	43	12	247	1c
Total (Consented Projects Only)	6,492	986	311	7,789	
Hornsea Four PP Scenarios (Natural England's Approach)	551	29	8	588	1d
Total (Hornsea Four plus all consented projects only)	7,043 – 7,372	1,015 – 1,010	319 - 349	8,377 – 8,731	
Dudgeon Extension Project	320	17	3	339	1d
Sheringham Shoal Extension Project	18	14	1	32	1d
Berwick Bank	62	30	11	102	1d
Rampion 2	0	4	3	7	2
Total (All Projects)	7,380 – 7,709	1,050 – 1,045	325 - 356	8,755 – 9,110	

Hornsea 4



Table 21: Gannet in-combination collision impact totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Autumn	Spring	Annual	Annual (including macro avoidance rate of 70%)	DEP & SEP updated annual value	Tier
Beatrice	0.0	2.3	0.6	2.9	0.9	0.6	1a
Blyth Demonstration Site	0.0	0.1	0.2	0.3	0.1	0.1	1a
Dudgeon	22.3	1.9	1.2	25.3	7.6	5.5	1a
East Anglia One	3.4	6.3	0.4	10.1	3.0	2.2	1a
EOWDC	0.0	0.3	0.0	0.3	0.1	0.1	1a
Gallopier	0.0	1.5	0.8	2.3	0.7	0.5	1a
Greater Gabbard	0.0	0.4	0.3	0.7	0.2	0.2	1a
Gunfleet Sands	-	-	-	-	-	-	1a
Hornsea Project One	11.5	1.5	1.4	14.4	4.3	3.1	1a
Humber Gateway	1.9	0.1	0.1	2.0	0.6	0.4	1a
Hywind Demonstration 2	0.0	0.0	0.1	0.1	0.0	0.0	1a
Kentish Flats	0.0	0.0	0.1	0.1	0.0	0.0	1a
Kentish Flats Extension	-	-	-	-	-	-	1a
Kincardine	0.0	0.0	0.0	0.0	0.0	0.0	1a
Lincs, Lynn & Inner Dowsing	2.3	0.1	0.1	2.5	0.8	0.5	1a
London Array	0.0	0.1	0.1	0.2	0.1	0.0	1a
Methil	0.0	0.0	0.0	0.0	0.0	0.0	1a
Race Bank	33.7	0.6	0.3	34.5	10.4	7.5	1a
Rampion	0.0	3.1	0.1	3.2	1.0	0.7	1a
Scroby Sands	-	-	-	-	-	-	1a
Sheringham Shoal	14.1	0.2	0.0	14.3	4.3	3.1	1a
Teesside	2.4	0.1	0.0	2.5	0.8	0.6	1a
Thanet	0.0	0.0	0.0	0.0	0.0	0.0	1a

Hornsea 4



Project	Breeding	Autumn	Spring	Annual	Annual (including macro avoidance rate of 70%)	DEP & SEP updated annual value	Tier
Westermost Rough	0.2	0.0	0.0	0.2	0.1	0.0	1a
Hornsea Project Two	7.0	0.7	0.4	8.0	2.4	1.8	1b
Moray East	0.0	1.7	0.6	2.3	0.7	0.5	1b
Nearth na Gaoithe	0.0	2.3	1.4	3.7	1.1	0.8	1b
Seagreen Alpha & Bravo	0.0	2.4	4.1	6.4	1.9	1.4	1b
Triton Knoll	26.8	3.1	1.9	31.7	9.5	6.9	1b
Dogger Bank A & B	40.6	4.0	3.4	47.9	14.4	10.5	1c
Dogger Bank C & Sofia	7.4	0.5	0.7	8.5	2.6	1.9	1c
East Anglia Three	6.1	1.6	0.6	8.3	2.5	1.8	1c
Hornsea Three	6.4	0.2	0.3	6.9	2.1	1.5	1c
Inch Cape	0.0	1.4	0.3	1.7	0.5	0.4	1c
Moray West	0.0	0.1	0.1	0.2	0.1	0.0	1c
Norfolk Boreas	14.2	0.6	0.2	15.1	4.5	3.3	1c
Norfolk Vanguard	8.2	0.9	0.3	9.4	2.8	2.1	1c
East Anglia ONE North	12.4	0.5	0.1	13.0	3.9	2.8	1c
East Anglia TWO	12.5	1.1	0.2	13.8	4.1	3.0	1c
Total (Consented Projects Only)	233.4	39.4	20.1	292.8	87.8	63.9	
Hornsea Four PP Scenarios (Applicant's Approach)	4.9 – 5.2	0.2	0.4 – 0.5	5.4 – 6.0	1.6 – 1.8	1.6 – 1.8	1d
Total (Hornsea Four plus all consented projects only)	238.3 – 238.6	39.6	20.5 – 20.6	298.2 – 298.8	89.4 – 89.6	65.5 – 65.7	
Berwick Bank	2.0	0.4	0.1	2.5	0.8	1.7	1d
Dudgeon Extension Project	1.4	0.1	0.0	1.6	0.5	0.3	1d

Hornsea 4



Project	Breeding	Autumn	Spring	Annual	Annual (including macro avoidance rate of 70%)	DEP & SEP updated annual value	Tier
Sheringham Shoal Extension Project	0.2	0.0	0.0	0.2	0.1	0.0	1d
Rampion 2	0.0	16.6	8.9	25.5	7.7	0.1	2
Total (All Projects)	241.9 – 242.2	56.7	29.5 – 29.6	328.0 – 328.6	98.4 – 98.6	66.4 – 66.6	

Hornsea 4



Table 22: Gannet in-combination collision impact totals apportioned to the FFC SPA following Natural England’s approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Autumn	Spring	Annual	Annual (including macro avoidance rate of 70%)	DEP & SEP updated annual value	Tier
Beatrice	0.0	2.3	0.6	2.9	0.9	0.6	1a
Blyth Demonstration Site	0.0	0.1	0.2	0.3	0.1	0.1	1a
Dudgeon	22.3	1.9	1.2	25.3	7.6	5.5	1a
East Anglia One	3.4	6.3	0.4	10.1	3.0	2.2	1a
EOWDC	0.0	0.3	0.0	0.3	0.1	0.1	1a
Galloper	0.0	1.5	0.8	2.3	0.7	0.5	1a
Greater Gabbard	0.0	0.4	0.3	0.7	0.2	0.2	1a
Gunfleet Sands	-	-	-	-	-	-	1a
Hornsea Project One	11.5	1.5	1.4	14.4	4.3	3.1	1a
Humber Gateway	1.9	0.1	0.1	2.0	0.6	0.4	1a
Hywind Demonstration 2	0.0	0.0	0.1	0.1	0.0	0.0	1a
Kentish Flats	0.0	0.0	0.1	0.1	0.0	0.0	1a
Kentish Flats Extension	-	-	-	-	-	-	1a
Kincardine	0.0	0.0	0.0	0.0	0.0	0.0	1a
Lincs, Lynn & Inner Dowsing	2.3	0.1	0.1	2.5	0.8	0.5	1a
London Array	0.0	0.1	0.1	0.2	0.1	0.0	1a
Methil	0.0	0.0	0.0	0.0	0.0	0.0	1a
Race Bank	33.7	0.6	0.3	34.5	10.4	7.5	1a
Rampion	0.0	3.1	0.1	3.2	1.0	0.7	1a
Scroby Sands	-	-	-	-	-	-	1a
Sheringham Shoal	14.1	0.2	0.0	14.3	4.3	3.1	1a
Teesside	2.4	0.1	0.0	2.5	0.8	0.6	1a
Thanet	0.0	0.0	0.0	0.0	0.0	0.0	1a

Hornsea 4



Project	Breeding	Autumn	Spring	Annual	Annual (including macro avoidance rate of 70%)	DEP & SEP updated annual value	Tier
Westermost Rough	0.2	0.0	0.0	0.2	0.1	0.0	1a
Hornsea Project Two	7.0	0.7	0.4	8.0	2.4	1.8	1b
Moray East	0.0	1.7	0.6	2.3	0.7	0.5	1b
Nearth na Gaoithe	0.0	2.3	1.4	3.7	1.1	0.8	1b
Seagreen Alpha & Bravo	0.0	2.4	4.1	6.4	1.9	1.4	1b
Triton Knoll	26.8	3.1	1.9	31.7	9.5	6.9	1b
Dogger Bank A & B	40.6	4.0	3.4	47.9	14.4	10.5	1c
Dogger Bank C & Sofia	7.4	0.5	0.7	8.5	2.6	1.9	1c
East Anglia Three	6.1	1.6	0.6	8.3	2.5	1.8	1c
Hornsea Three	6.4	0.2	0.3	6.9	2.1	1.5	1c
Inch Cape	0.0	1.4	0.3	1.7	0.5	0.4	1c
Moray West	0.0	0.1	0.1	0.2	0.1	0.0	1c
Norfolk Boreas	14.2	0.6	0.2	15.1	4.5	3.3	1c
Norfolk Vanguard	8.2	0.9	0.3	9.4	2.8	2.1	1c
East Anglia ONE North	12.4	0.5	0.1	13.0	3.9	2.8	1c
East Anglia TWO	12.5	1.1	0.2	13.8	4.1	3.0	1c
Total (Consented Projects Only)	233.4	39.4	20.1	292.8	87.8	63.9	
Hornsea Four PP Scenarios (Natural England's Approach)	8.5 – 9.7	0.1	0.3 – 0.5	9.0 – 10.4	2.7 – 3.1	2.7 – 3.1	1d
Total (Hornsea Four plus all consented projects only)	241.9 – 243.1	39.5	20.4 – 20.6	301.8 – 303.2	90.5 – 90.9	66.6 – 67.0	
Berwick Bank	2.0	0.4	0.1	2.5	0.8	0.5	1d
Dudgeon Extension Project	1.4	0.1	0.0	1.6	0.5	0.3	1d

Hornsea 4



Project	Breeding	Autumn	Spring	Annual	Annual (including macro avoidance rate of 70%)	DEP & SEP updated annual value	Tier
Sheringham Shoal Extension Project	0.2	0.0	0.0	0.2	0.1	0.0	1d
Rampion 2	0.0	16.6	8.9	25.5	7.7	0.1	2
Total (All Projects)	245.5 – 246.7	56.6	29.4 – 29.6	331.6 – 333.0	99.5 – 99.9	67.5 – 67.9	

Hornsea 4



Table 23: FFC SPA gannet population modelling results.

Increase in mortality (per annum)	Total mortality (per annum)	Density independent counterfactual		Reduction in the final population size compared to baseline population (after 35 years)	Reduction in growth rate (per annum)
		Final population size (CFPS)	Growth rate (CFGR)		
50	2,220	0.998	0.923	0.22%	7.65%
75	2,245	0.997	0.887	0.33%	11.27%
100	2,270	0.996	0.853	0.44%	14.71%
125	2,295	0.994	0.819	0.55%	18.06%
150	2,320	0.993	0.787	0.66%	21.29%
175	2,345	0.992	0.756	0.77%	24.36%
200	2,370	0.991	0.727	0.88%	27.33%
225	2,395	0.990	0.698	0.99%	30.19%
250	2,420	0.989	0.671	1.10%	32.95%
275	2,445	0.988	0.644	1.21%	35.56%
300	2,470	0.987	0.619	1.33%	38.14%
325	2,495	0.986	0.594	1.43%	40.56%
350	2,520	0.985	0.571	1.55%	42.92%
375	2,545	0.983	0.549	1.65%	45.14%
400	2,570	0.982	0.526	1.77%	47.35%
425	2,595	0.981	0.506	1.88%	49.43%
450	2,620	0.980	0.485	1.99%	51.45%
475	2,645	0.979	0.466	2.10%	53.36%
500	2,670	0.978	0.448	2.21%	55.23%
600	2,770	0.974	0.380	2.65%	61.95%
700	2,870	0.969	0.323	3.09%	67.70%
800	2,970	0.965	0.274	3.53%	72.60%

Hornsea 4



Table 24: Kittiwake in-combination collision impact totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Autumn	Spring	Annual	DEP & SEP updated annual value	Tier
Beatrice	0.0	0.6	2.9	3.5	2.5	1a
Blyth Demonstration Site	0.0	0.1	0.1	0.2	0.1	1a
Dudgeon	-	-	-	-	-	1a
East Anglia One	0.0	8.7	3.4	12.0	8.7	1a
EOWDC	0.0	0.3	0.1	0.4	0.3	1a
Galloper	0.0	1.5	2.3	3.8	2.8	1a
Greater Gabbard	0.0	0.8	0.8	1.6	1.2	1a
Gunfleet Sands	-	-	-	-	-	1a
Hornsea Project One	36.5	3.0	1.5	41.0	29.8	1a
Humber Gateway	1.9	0.2	0.1	2.2	1.6	1a
Hywind 2 Demonstration	0.0	0.1	0.1	0.1	0.1	1a
Kentish Flats	0.0	0.1	0.1	0.1	0.1	1a
Kentish Flats Extension	0.0	0.0	0.2	0.2	0.1	1a
Kincardine	0.0	0.5	0.1	0.6	0.4	1a
Lincs, Lynn & Inner Dowsing	0.7	0.1	0.1	0.8	0.6	1a
London Array	0.0	0.1	0.1	0.3	0.2	1a
Methil	0.0	0.0	0.0	0.0	0.0	1a
Race Bank	1.9	1.3	0.4	3.6	2.6	1a
Rampion	0.0	2.0	2.1	4.2	3.1	1a
Scroby Sands	-	-	-	-	-	1a
Sheringham Shoal	-	-	-	-	-	1a
Teesside	0.0	1.3	0.2	1.5	1.1	1a
Thanet	0.0	0.0	0.0	0.1	0.1	1a
Westermost Rough	0.1	0.0	0.0	0.1	0.1	1a

Hornsea 4



Project	Breeding	Autumn	Spring	Annual	DEP & SEP updated annual value	Tier
Hornsea Project Two	13.3	0.5	0.2	14.0	10.2	1b
Moray East	0.0	0.1	1.4	1.5	1.1	1b
Nearth na Gaoithe	0.0	3.0	0.3	3.4	2.5	1b
Seagreen Alpha & Bravo	0.0	16.9	17.8	34.7	25.2	1b
Triton Knoll	24.6	7.5	3.3	35.4	25.7	1b
Dogger Bank A & B	55.8	7.3	21.3	84.3	61.3	1c
Dogger Bank C & Sofia	26.4	4.9	15.6	46.9	34.1	1c
East Anglia Three	0.0	3.7	2.7	6.4	4.7	1c
Hornsea Three	0.0 (72.0)	0.0	0.0	0.0	0.0	1c
Inch Cape	0.0	12.1	4.6	16.7	12.1	1c
Moray West	0.0	1.3	0.5	1.8	1.3	1c
Norfolk Boreas	0.0 (11.4)	0.0	0.0	0.0	0.0	1c
Norfolk Vanguard	0.0 (18.7)	0.0	0.0	0.0	0.0	1c
East Anglia ONE North	0.0 (0.0)	0.0	0.0	0.0	0.0	1c
East Anglia TWO	0.0 (0.0)	0.0	0.0	0.0	0.0	1c
Total (Consented Projects Only)	161.2 (263.3)	78.0 (83.3)	82.3 (86.4)	321.4 (432.9)	233.7 (314.8)	
Hornsea Four PP Scenarios (Applicant's Approach)	0.0 (13.2 – 14.7)	0.0 (1.0 – 1.4)	0.0 (0.5 – 0.8)	0.0 (14.7 – 17.0)	0.0 (14.7 – 17.0)	1d
Total (Hornsea Four plus all consented projects only)	161.2 (276.5 – 278.0)	78.0 (84.3 – 84.7)	82.3 (86.9 – 87.2)	321.4 (447.6 – 449.9)	233.7 (329.5 – 331.8)	
Dudgeon Extension Project	7.6	0.3	0.1	8.1	5.8	1d
Berwick Bank	0.0	0.0	0.0	0.0	17.4	
Sheringham Shoal Extension Project	0.7	0.1	0.0	0.8	0.6	1d
Rampion 2	0.0	0.0	0.0	0.6	0.4	2

Hornsea 4



Project	Breeding	Autumn	Spring	Annual	DEP & SEP updated annual value	Tier
Total (All Projects)	169.5 (285.3 – 286.8)	78.4 (94.5 – 94.9)	82.4 (101.2 – 101.5)	330.9 (481.0 – 483.3)	240.7 (353.6 – 355.9)	

Hornsea 4



Table 25: Kittiwake in-combination collision impact totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Autumn	Spring	Annual	DEP & SEP updated annual value	Tier
Beatrice	0.0	0.6	2.9	3.5	2.5	1a
Blyth Demonstration Site	0.0	0.1	0.1	0.2	0.1	1a
Dudgeon	-	-	-	-	-	1a
East Anglia One	0.0	8.7	3.4	12.0	8.7	1a
EOWDC	0.0	0.3	0.1	0.4	0.3	1a
Galloper	0.0	1.5	2.3	3.8	2.8	1a
Greater Gabbard	0.0	0.8	0.8	1.6	1.2	1a
Gunfleet Sands	-	-	-	-	-	1a
Hornsea Project One	36.5	3.0	1.5	41.0	29.8	1a
Humber Gateway	1.9	0.2	0.1	2.2	1.6	1a
Hywind 2 Demonstration	0.0	0.1	0.1	0.1	0.1	1a
Kentish Flats	0.0	0.1	0.1	0.1	0.1	1a
Kentish Flats Extension	0.0	0.0	0.2	0.2	0.1	1a
Kincardine	0.0	0.5	0.1	0.6	0.4	1a
Lincs, Lynn & Inner Dowsing	0.7	0.1	0.1	0.8	0.6	1a
London Array	0.0	0.1	0.1	0.3	0.2	1a
Methil	0.0	0.0	0.0	0.0	0.0	1a
Race Bank	1.9	1.3	0.4	3.6	2.6	1a
Rampion	0.0	2.0	2.1	4.2	3.1	1a
Scroby Sands	-	-	-	-	-	1a
Sheringham Shoal	-	-	-	-	-	1a
Teesside	0.0	1.3	0.2	1.5	1.1	1a
Thanet	0.0	0.0	0.0	0.1	0.1	1a
Westermost Rough	0.1	0.0	0.0	0.1	0.1	1a

Hornsea 4



Project	Breeding	Autumn	Spring	Annual	DEP & SEP updated annual value	Tier
Hornsea Project Two	13.3	0.5	0.2	14.0	10.2	1b
Moray East	0.0	0.1	1.4	1.5	1.1	1b
Neart na Gaoithe	0.0	3.0	0.3	3.4	2.5	1b
Seagreen Alpha & Bravo	0.0	16.9	17.8	34.7	25.2	1b
Triton Knoll	24.6	7.5	3.3	35.4	25.7	1b
Dogger Bank A & B	55.8	7.3	21.3	84.3	61.3	1c
Dogger Bank C & Sofia	26.4	4.9	15.6	46.9	34.1	1c
East Anglia Three	0.0	3.7	2.7	6.4	4.7	1c
Hornsea Three	0.0	0.0	0.0	0.0	0.0	1c
Inch Cape	0.0	12.1	4.6	16.7	12.1	1c
Moray West	0.0	1.3	0.5	1.8	1.3	1c
Norfolk Boreas	0.0	0.0	0.0	0.0	0.0	1c
Norfolk Vanguard	0.0	0.0	0.0	0.0	0.0	1c
East Anglia ONE North	0.0	0.0	0.0	0.0	0.0	1c
East Anglia TWO	0.0	0.0	0.0	0.0	0.0	1c
Total (Consented Projects Only)	161.2 (263.3)	78.0 (83.3)	82.3 (86.4)	321.4 (432.9)	233.7 (314.8)	
Hornsea Four PP Scenarios (Natural England's Approach)	0.0 (32.4 - 49.7)	0.0 (0.5 - 0.4)	0.0 (0.2)	0.0 (33.1 - 50.3)	0.0 (33.1 - 50.3)	1d
Total (Hornsea Four plus all consented projects only)	161.2 (295.7 - 313.0)	78.0 (83.8 - 83.7)	82.3 (86.6)	321.4 (466.0 - 483.2)	233.7 (347.9 - 365.1)	
Dudgeon Extension Project	7.6	0.3	0.1	8.1	5.8	1d
Berwick Bank	0.0 (0.5)	0.0 (9.7)	0.0 (13.7)	0.0 (23.9)	0.0 (17.4)	
Sheringham Shoal Extension Project	0.7	0.1	0.0	0.8	0.6	1d
Rampion 2	0.0	0.0	0.0	0.6	0.4	2

Hornsea 4



Project	Breeding	Autumn	Spring	Annual	DEP & SEP updated annual value	Tier
Total (All Projects)	169.5 (304.5 – 321.8)	78.4 (94.0 – 93.9)	82.4 (100.9)	330.9 (499.4 – 516.6)	240.7 (372.0 – 389.2)	

Table 26: FFC SPA kittiwake population modelling results.

Increase in mortality (per annum)	Total mortality (per annum)	Density independent counterfactual		Reduction in the final population size compared to baseline population (after 35 years)	Reduction in growth rate (per annum)
		Final population size (CFPS)	Growth rate (CFGR)		
225	15,273	0.997	0.907	0.27%	9.26%
250	15,298	0.997	0.898	0.30%	10.24%
275	15,323	0.997	0.888	0.33%	11.22%
300	15,348	0.996	0.878	0.36%	12.20%
325	15,373	0.996	0.869	0.39%	13.10%
350	15,398	0.996	0.859	0.42%	14.09%
375	15,423	0.996	0.850	0.45%	14.96%
400	15,448	0.995	0.841	0.48%	15.94%
425	15,473	0.995	0.832	0.51%	16.82%
450	15,498	0.995	0.823	0.54%	17.72%
475	15,523	0.994	0.814	0.57%	18.62%
500	15,548	0.994	0.805	0.60%	19.50%

Table 27: Guillemot in-combination abundance totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Non-breeding	Annual	Tier
Beatrice	0	121	121	1a
Blyth Demonstration Site	0	58	58	1a
Dudgeon	0	24	24	1a
EOWDC	0	10	10	1a
Galloper	0	26	26	1a
Greater Gabbard	0	24	24	1a
Gunfleet Sands	0	16	16	1a
Humber Gateway	99	6	105	1a
Hywind Demonstration	2 0	94	94	1a
Kentish Flats Extension	0	0	0	1a
Kentish Flats	0	0	0	1a
Lincs, Lynn & Inner Dowsing	0	36	36	1a
London Array	0	17	17	1a
Methil	0	0	0	1a
Race Bank	0	31	31	1a
Rampion	0	684	684	1a
Scroby Sands	-	-	-	1a
Sheringham Shoal	0	32	32	1a
Teesside	267	40	307	1a
Thanet	0	6	6	1a
Westermost Rough	347	21	368	1a
East Anglia One	0	28	28	1b
Hornsea Project One	4,554	356	4,910	1b
Hornsea Project Two	3,581	579	4,161	1b
Moray East	0	24	24	1b
Triton Knoll	425	33	458	1b
Kincardine	0	0	0	1b
Dogger Bank Creyke Beck A	1,893	270	2,163	1c
Dogger Bank Creyke Beck B	3,318	467	3,785	1c

Project	Breeding	Non-breeding	Annual	Tier
Dogger Bank Teesside A	1,149	100	1,249	1c
East Anglia Three	0	126	126	1c
Inch Cape	0	140	140	1c
Moray West	0	1,680	1,680	1c
Near na Gaoithe	0	166	166	1c
Seagreen Alpha	0	206	206	1c
Seagreen Bravo	0	181	181	1c
Sofia	1,824	163	1,987	1c
Hornsea Three*	0	782	782	1c
Norfolk Boreas	0	606	606	1c
Norfolk Vanguard	0	210	210	1c
East Anglia ONE North	0	83	83	1c
East Anglia TWO	0	74	74	1c
Total (Consented Projects Only)	17,457	7,519	24,975	
Hornsea Four PP Scenarios (Applicant's Approach)	2,913 – 5,175	1,471 – 2,632	4,384 – 7,807	1d
Total (Hornsea Four plus all consented projects only)	20,370 – 22,632	8,990 – 10,151	29,359 – 32,783	
Dudgeon Extension Project	0	655	655	1d
Sheringham Shoal Extension Project	0	48	48	1d
Berwick Bank	-	-	-	1d
Rampion 2	0	574	574	2
Total (All Projects)	20,370 – 22,632	10,266 – 11,428	30,636 – 34,059	

Table 28: Guillemot in-combination abundance totals apportioned to the FFC SPA following the Natural England’s standard approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Non-breeding	Annual	Tier
Beatrice	0	121	121	1a
Blyth Demonstration Site	0	58	58	1a
Dudgeon	0	24	24	1a
EOWDC	0	10	10	1a
Galloper	0	26	26	1a
Greater Gabbard	0	24	24	1a
Gunfleet Sands	0	16	16	1a
Humber Gateway	99	6	105	1a
Hywind Demonstration	2 0	94	94	1a
Kentish Flats Extension	0	0	0	1a
Kentish Flats	0	0	0	1a
Lincs, Lynn & Inner Dowsing	0	36	36	1a
London Array	0	17	17	1a
Methil	0	0	0	1a
Race Bank	0	31	31	1a
Rampion	0	684	684	1a
Scroby Sands	-	-	-	1a
Sheringham Shoal	0	32	32	1a
Teesside	267	40	307	1a
Thanet	0	6	6	1a
Westermost Rough	347	21	368	1a
East Anglia One	0	28	28	1b
Hornsea Project One	4,554	356	4,910	1b
Hornsea Project Two	3,581	579	4,161	1b
Moray East	0	24	24	1b
Triton Knoll	425	33	458	1b
Kincardine	0	0	0	1b
Dogger Bank Creyke Beck A	1,893	270	2,163	1c
Dogger Bank Creyke Beck B	3,318	467	3,785	1c

Project	Breeding	Non-breeding	Annual	Tier
Dogger Bank Teesside A	1,149	100	1,249	1c
East Anglia Three	0	126	126	1c
Inch Cape	0	140	140	1c
Moray West	0	1,680	1,680	1c
Nearf na Gaoithe	0	166	166	1c
Seagreen Alpha	0	206	206	1c
Seagreen Bravo	0	181	181	1c
Sofia	1,824	163	1,987	1c
Hornsea Three*	0	782	782	1c
Norfolk Boreas	0	606	606	1c
Norfolk Vanguard	0	210	210	1c
East Anglia ONE North	0	83	83	1c
East Anglia TWO	0	74	74	1c
Total (Consented Projects Only)	17,457	7,519	24,975	
Hornsea Four PP Scenarios (Natural England's Standard Approach)	5,221 – 9,275	900 – 1,610	6,120 – 10,884	1d
Total (Hornsea Four plus all consented projects only)	22,677 – 26,731	8,418 – 9,128	31,096 – 35,859	
Dudgeon Extension Project	0	655	655	1d
Sheringham Shoal Extension Project	0	48	48	1d
Berwick Bank	-	-	-	1d
Rampion 2	0	574	574	2
Total (All Projects)	22,677 – 26,731	9,695 – 10,405	32,372 – 37,136	

Table 29: Guillemot in-combination abundance totals apportioned to the FFC SPA following the Natural England’s bespoke approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Chick Rearing / Molt	Non-breeding	Annual	Tier
Beatrice	0	N/A	121	121	1a
Blyth Demonstration Site	0	N/A	58	58	1a
Dudgeon	0	N/A	24	24	1a
EOWDC	0	N/A	10	10	1a
Galloper	0	N/A	26	26	1a
Greater Gabbard	0	N/A	24	24	1a
Gunfleet Sands	0	N/A	16	16	1a
Humber Gateway	99	N/A	6	105	1a
Hywind 2 Demonstration	0	N/A	94	94	1a
Kentish Flats Extension	0	N/A	0	0	1a
Kentish Flats	0	N/A	0	0	1a
Lincs, Lynn & Inner Dowsing	0	N/A	36	36	1a
London Array	0	N/A	17	17	1a
Methil	0	N/A	0	0	1a
Race Bank	0	N/A	31	31	1a
Rampion	0	N/A	684	684	1a
Scroby Sands	-	N/A	-	-	1a
Sheringham Shoal	0	N/A	32	32	1a
Teesside	267	N/A	40	307	1a
Thanet	0	N/A	6	6	1a
Westermost Rough	347	N/A	21	368	1a
East Anglia One	0	N/A	28	28	1b
Hornsea Project One	4,554	N/A	356	4,910	1b
Hornsea Project Two	3,581	N/A	579	4,161	1b
Moray East	0	N/A	24	24	1b

Project	Breeding	Chick Rearing / Moulting	Non-breeding	Annual	Tier
Triton Knoll	425	N/A	33	458	1b
Kincardine	0	N/A	0	0	1b
Dogger Bank Creyke Beck A	1,893	N/A	270	2,163	1c
Dogger Bank Creyke Beck B	3,318	N/A	467	3,785	1c
Dogger Bank Teesside A	1,149	N/A	100	1,249	1c
East Anglia Three	0	N/A	126	126	1c
Inch Cape	0	N/A	140	140	1c
Moray West	0	N/A	1,680	1,680	1c
Nearta na Gaoithe	0	N/A	166	166	1c
Seagreen Alpha	0	N/A	206	206	1c
Seagreen Bravo	0	N/A	181	181	1c
Sofia	1,824	N/A	163	1,987	1c
Hornsea Three*	0	N/A	782	782	1c
Norfolk Boreas	0	N/A	606	606	1c
Norfolk Vanguard	0	N/A	210	210	1c
East Anglia ONE North	0	N/A	83	83	1c
East Anglia TWO	0	N/A	74	74	1c
Total (Consented Projects Only)	17,457	N/A	7,519	24,975	
Hornsea Four PP Scenarios (Natural England's Bespoke Approach)	5,221 – 9,275	12,240 – 21,898	408 - 738	17,869 – 31,911	1d
Total (Hornsea Four plus all	22,677 – 26,731	12,240 – 21,898	7,926 – 8,257	42,844 – 56,887	

Project	Breeding	Chick Rearing / Molt	Non-breeding	Annual	Tier
consented projects only)					
Dudgeon Extension Project	0	N/A	655	655	1d
Sheringham Shoal Extension Project	0	N/A	48	48	1d
Berwick Bank	-	N/A	-	-	1d
Rampion 2	0	N/A	574	574	2
Total (All Projects)	22,677 – 26,731	12,240 – 21,898	9,203 – 9,534	44,121 – 58,163	

Table 30: FFC SPA guillemot population modelling results.

Increase in mortality (per annum)	Total mortality (per annum)	Density independent counterfactual		Reduction in the final population size compared to baseline population (after 35 years)	Reduction in growth rate (per annum)
		Final population size (CFPS)	Growth rate (CFGR)		
100	7,527	0.999	0.968	0.09%	3.24%
125	7,552	0.999	0.959	0.11%	4.05%
150	7,577	0.999	0.952	0.14%	4.84%
175	7,602	0.998	0.944	0.16%	5.63%
200	7,627	0.998	0.936	0.18%	6.42%
225	7,652	0.998	0.928	0.21%	7.18%
250	7,677	0.998	0.920	0.23%	7.95%
275	7,702	0.997	0.913	0.25%	8.71%
300	7,727	0.997	0.905	0.28%	9.47%
325	7,752	0.997	0.898	0.30%	10.21%
350	7,777	0.997	0.890	0.32%	10.96%
375	7,802	0.997	0.883	0.34%	11.69%
400	7,827	0.996	0.876	0.37%	12.43%
425	7,852	0.996	0.868	0.39%	13.15%
450	7,877	0.996	0.861	0.41%	13.86%
475	7,902	0.996	0.854	0.44%	14.58%
500	7,927	0.995	0.847	0.46%	15.28%
750	8,177	0.993	0.780	0.69%	22.05%
1000	8,427	0.991	0.717	0.92%	28.29%
1250	8,677	0.989	0.660	1.15%	34.04%
1500	8,927	0.986	0.607	1.38%	39.34%
1750	9,177	0.984	0.558	1.61%	44.22%
2000	9,427	0.982	0.513	1.84%	48.74%
2250	9,677	0.979	0.471	2.07%	52.88%
2500	9,927	0.977	0.433	2.30%	56.70%
2750	10,177	0.975	0.398	2.53%	60.22%

Hornsea 4



Increase in mortality (per annum)	Total mortality (per annum)	Density independent counterfactual		Reduction in the final population size compared to baseline population (after 35 years)	Reduction in growth rate (per annum)
		Final population size (CFPS)	Growth rate (CFGR)		
3000	10,427	0.972	0.365	2.76%	63.46%
3250	10,677	0.970	0.336	2.99%	66.45%
3500	10,927	0.968	0.308	3.22%	69.19%
4000	11,427	0.963	0.260	3.68%	74.05%

Table 31: Razorbill in-combination abundance totals apportioned to the FFC SPA following the Applicant's approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Autumn	Winter	Spring	Annual Total	Tier
Beatrice	0	28	15	28	72	1a
Blyth Demonstration Site	0	3	2	3	8	1a
Dudgeon	0	12	20	12	44	1a
EOWDC	0	2	0	1	3	1a
Gallopier	0	2	3	13	18	1a
Greater Gabbard	0	0	11	3	13	1a
Gunfleet Sands	0	0	1	0	1	1a
Humber Gateway	0	1	0	1	2	1a
Hywind 2 Demonstration	0	24	0		25	1a
Kentish Flats	-	-	-	-	-	1a
Kentish Flats Extension	-	-	-	-	-	1a
Lincs, Lynn & Inner Dowsing	0	1	1	1	3	1a
London Array	0	1	0	1	2	1a
Methil	0	0	0	0	0	1a
Race Bank	0	1	1	1	4	1a
Rampion	0	2	34	113	149	1a
Scroby Sands	-	-	-	-	-	1a
Sheringham Shoal	0	46	6	1	52	1a
Teesside	0	2	0	1	3	1a
Thanet	0	0	0	1	1	1a
Westermost Rough	91	4	4	3	102	1a
East Anglia One	0	1	4	11	17	1b
Hornsea Project One	535	164	41	61	800	1b
Hornsea Project Two	1,210	144	19	57	1,430	1b
Moray East	0	38	1	6	44	1b
Triton Knoll	0	9	23	4	36	1b
Kincardine	0	0	0	0	0	1b
Dogger Bank A	375	54	47	141	616	1c
Dogger Bank B	461	71	58	174	765	1c
Dogger Bank C	250	11	26	65	352	1c
East Anglia Three	0	38	41	52	130	1c

Ver. A

Project	Breeding	Autumn	Winter	Spring	Annual Total	Tier
Inch Cape	0	98	18	-	115	1c
Moray West	0	121	5	122	247	1c
Nearr na Gaoithe	0	187	14	-	200	1c
Seagreen Alpha	0	0	30	-	30	1c
Seagreen Bravo	0	0	34	-	34	1c
Sofia	346	20	39	100	505	1c
Hornsea Three	0	69	99	72	240	1c
Norfolk Boreas	0	9	29	12	49	1c
Norfolk Vanguard	0	30	23	31	84	1c
East Anglia ONE North	0	3	2	7	11	1c
East Anglia TWO	0	2	4	8	13	1c
Total (Consented Projects Only)	3,268	1,194	652	1,106	6,220	
Hornsea Four PP Scenarios (Applicant's Approach)	120 - 215	106 - 145	11 - 13	11 - 14	247 - 387	1d
Total (Hornsea Four plus all consented projects only)	3,388 – 3,484	1,299 – 1,338	662 - 664	1,117 – 1,121	6,467 – 6,606	
Dudgeon & Sheringham Shoal Extension	86	153	41	16	296	1d
Berwick Bank	0	301	38	254	593	1d
Rampion 2	0	1	1	72	74	2
Total (All Projects)	3,474 – 3,569	1,754 – 1,793	742 - 744	1,459 – 1,463	7,429 – 7,569	

Table 32: Razorbill in-combination abundance totals apportioned to the FFC SPA following Natural England’s standard approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Autumn	Winter	Spring	Annual Total	Tier
Beatrice	0	28	15	28	72	1a
Blyth Demonstration Site	0	3	2	3	8	1a
Dudgeon	0	12	20	12	44	1a
EOWDC	0	2	0	1	3	1a
Galloper	0	2	3	13	18	1a
Greater Gabbard	0	0	11	3	13	1a
Gunfleet Sands	0	0	1	0	1	1a
Humber Gateway	0	1	0	1	2	1a
Hywind Demonstration	2	0	24	0	25	1a
Kentish Flats	-	-	-	-	-	1a
Kentish Flats Extension	-	-	-	-	-	1a
Lincs, Lynn & Inner Dowsing	0	1	1	1	3	1a
London Array	0	1	0	1	2	1a
Methil	0	0	0	0	0	1a
Race Bank	0	1	1	1	4	1a
Rampion	0	2	34	113	149	1a
Scroby Sands	-	-	-	-	-	1a
Sheringham Shoal	0	46	6	1	52	1a
Teesside	0	2	0	1	3	1a
Thanet	0	0	0	1	1	1a
Westermost Rough	91	4	4	3	102	1a
East Anglia One	0	1	4	11	17	1b
Hornsea Project One	535	164	41	61	800	1b
Hornsea Project Two	1,210	144	19	57	1,430	1b
Moray East	0	38	1	6	44	1b
Triton Knoll	0	9	23	4	36	1b
Kincardine	0	0	0	0	0	1b
Dogger Bank A	375	54	47	141	616	1c
Dogger Bank B	461	71	58	174	765	1c
Dogger Bank C	250	11	26	65	352	1c
East Anglia Three	0	38	41	52	130	1c

Project	Breeding	Autumn	Winter	Spring	Annual Total	Tier
Inch Cape	0	98	18	-	115	1c
Moray West	0	121	5	122	247	1c
Nearr na Gaoithe	0	187	14	-	200	1c
Seagreen Alpha	0	0	30	-	30	1c
Seagreen Bravo	0	0	34	-	34	1c
Sofia	346	20	39	100	505	1c
Hornsea Three	0	69	99	72	240	1c
Norfolk Boreas	0	9	29	12	49	1c
Norfolk Vanguard	0	30	23	31	84	1c
East Anglia ONE North	0	3	2	7	11	1c
East Anglia TWO	0	2	4	8	13	1c
Total (Consented Projects Only)	3,268	1,194	652	1,106	6,220	
Hornsea Four PP Scenarios (Natural England's standard Approach)	215 - 386	106 - 145	11 - 13	11 - 14	342 - 557	1d
Total (Hornsea Four plus all consented projects only)	3,483 - 3,654	1,299 - 1,338	662 - 664	1,117 - 1,121	6,562 - 6,777	
Dudgeon & Sheringham Shoal Extension	86	153	41	16	296	1d
Berwick Bank	0	301	38	254	593	1d
Rampion 2	0	1	1	72	74	2
Total (All Projects)	3,569 - 3,740	1,754 - 1,793	742 - 744	1,459 - 1,463	7,524 - 7,739	

Table 33: Razorbill in-combination abundance totals apportioned to the FFC SPA following Natural England’s bespoke approach to apportionment for the range of PP scenarios considered.

Project	Breeding	Autumn	Winter	Spring	Annual Total	Tier
Beatrice	0	28	15	28	72	1a
Blyth Demonstration Site	0	3	2	3	8	1a
Dudgeon	0	12	20	12	44	1a
EOWDC	0	2	0	1	3	1a
Galloper	0	2	3	13	18	1a
Greater Gabbard	0	0	11	3	13	1a
Gunfleet Sands	0	0	1	0	1	1a
Humber Gateway	0	1	0	1	2	1a
Hywind 2 Demonstration	0	24	0		25	1a
Kentish Flats	-	-	-	-	-	1a
Kentish Flats Extension	-	-	-	-	-	1a
Lincs, Lynn & Inner Dowsing	0	1	1	1	3	1a
London Array	0	1	0	1	2	1a
Methil	0	0	0	0	0	1a
Race Bank	0	1	1	1	4	1a
Rampion	0	2	34	113	149	1a
Scroby Sands	-	-	-	-	-	1a
Sheringham Shoal	0	46	6	1	52	1a
Teesside	0	2	0	1	3	1a
Thanet	0	0	0	1	1	1a
Westermost Rough	91	4	4	3	102	1a
East Anglia One	0	1	4	11	17	1b
Hornsea Project One	535	164	41	61	800	1b
Hornsea Project Two	1,210	144	19	57	1,430	1b
Moray East	0	38	1	6	44	1b
Triton Knoll	0	9	23	4	36	1b
Kincardine	0	0	0	0	0	1b
Dogger Bank A	375	54	47	141	616	1c
Dogger Bank B	461	71	58	174	765	1c
Dogger Bank C	250	11	26	65	352	1c
East Anglia Three	0	38	41	52	130	1c

Ver. A

Project	Breeding	Autumn	Winter	Spring	Annual Total	Tier
Inch Cape	0	98	18	-	115	1c
Moray West	0	121	5	122	247	1c
Nearr na Gaoithe	0	187	14	-	200	1c
Seagreen Alpha	0	0	30	-	30	1c
Seagreen Bravo	0	0	34	-	34	1c
Sofia	346	20	39	100	505	1c
Hornsea Three	0	69	99	72	240	1c
Norfolk Boreas	0	9	29	12	49	1c
Norfolk Vanguard	0	30	23	31	84	1c
East Anglia ONE North	0	3	2	7	11	1c
East Anglia TWO	0	2	4	8	13	1c
Total (Consented Projects Only)	3,268	1,194	652	1,106	6,220	
Hornsea Four PP Scenarios (Natural England's bespoke Approach)	215 - 386	2,063 - 1,194	11 - 13	11 - 14	2,299 - 6,220	1d
Total (Hornsea Four plus all consented projects only)	3,483 - 3,654	3,256 - 4,015	662 - 664	1,117 - 1,121	8,519 - 9,453	
Dudgeon & Sheringham Shoal Extension	86	153	41	16	296	1d
Berwick Bank	0	301	38	254	593	1d
Rampion 2	0	1	1	72	74	2
Total (All Projects)	3,569 - 3,740	3,711 - 4,469	742 - 744	1,459 - 1,463	9,481 - 10,416	

Hornsea 4



Table 34: FFC SPA razorbill population modelling results.

Increase in mortality (per annum)	Total mortality (per annum)	Density independent counterfactual		Reduction in the final population size compared to baseline population (after 35 years)	Reduction in growth rate (per annum)
		Final population size (CFPS)	Growth rate (CFGR)		
30	4,283	0.999	0.969	0.09%	3.11%
40	4,293	0.999	0.959	0.12%	4.13%
50	4,303	0.999	0.949	0.15%	5.10%
75	4,328	0.998	0.924	0.22%	7.61%
100	4,353	0.997	0.900	0.29%	9.98%
125	4,378	0.996	0.877	0.37%	12.34%
150	4,403	0.996	0.854	0.44%	14.61%
175	4,428	0.995	0.832	0.51%	16.83%
200	4,453	0.994	0.810	0.58%	18.98%
225	4,478	0.993	0.789	0.66%	21.10%
250	4,503	0.993	0.769	0.73%	23.14%
275	4,528	0.992	0.749	0.80%	25.12%
300	4,553	0.991	0.729	0.87%	27.12%
325	4,578	0.991	0.710	0.95%	28.97%
350	4,603	0.990	0.692	1.02%	30.85%
375	4,628	0.989	0.673	1.09%	32.67%
400	4,653	0.988	0.655	1.17%	34.45%
425	4,678	0.988	0.638	1.24%	36.17%
450	4,703	0.987	0.622	1.31%	37.83%
475	4,728	0.986	0.605	1.38%	39.46%
500	4,753	0.985	0.589	1.46%	41.05%
550	4,803	0.984	0.559	1.60%	44.11%
600	4,853	0.983	0.530	1.75%	47.02%
650	4,903	0.981	0.502	1.89%	49.77%
700	4,953	0.980	0.476	2.04%	52.39%
750	5,003	0.978	0.451	2.19%	54.89%

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