

Addendum to the
Environmental Impact
Assessment Report

NISA
North Irish Sea Array

Volume 9 - Offshore Appendices

Appendix A15.6

Offshore Ornithology Population Viability Analysis



North Irish Sea Array Windfarm Ltd

Offshore Ornithology Population Viability Analysis

North Irish Sea Array Offshore Wind Farm



June 2026

GOBe
APEMGroup

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Acronyms

Term	Definition
CEA	Cumulative Effects Assessment
CGR	Counterfactual of Population Growth Rate
CPS	Counterfactual of Population Size
CRM	Collision Risk Modelling
DAS	Digital Ariel Survey
ECC	Export Cable Corridor
EIAR	Environmental Impact Assessment Report
NISA	North Irish Sea Array
NWIS	North West Irish Sea
OWF	Offshore Wind Farm
PVA	Population Viability Analysis
RFI	Request for Further Information
SD	Standard Deviation
SPA	Special Protected Area



1 Introduction

- 1.1.1 North Irish Sea Array Windfarm Ltd (NISA, hereafter referred to as ‘the Developer’) has been considering the Request for Further Information (RFI) issued by An Bord Pleanála (now An Coimisiún Pleanála) as well as the third-party submissions received following public consultation. At An Coimisiún Pleanála’s behest, the Developer has also continued to consult with stakeholders in respect of the 2024 planning application throughout 2024-2026. The Developer has refined elements of the design to respond to the third-party submissions, the continued public and stakeholder consultation and the RFI. Amendments are therefore required to Appendix 15.6 Offshore Ornithology Population Viability Analysis of the 2024 Environmental Impact Assessment Report (EIAR). Full details of consultation undertaken can be found in Appendix A.1.2 in the Addendum to the EIAR.
- 1.1.2 For the purpose of clarity, this document shall be read in conjunction with Appendix 15.6 Offshore Ornithology Population Viability Analysis submitted as part of the 2024 EIAR.
- 1.1.3 Any cross reference to a chapter, section, table, image, figure or appendix within this document is to another location within the Addendum to the EIAR unless explicitly stated otherwise. Any cross reference to anything included in the 2024 EIAR will be clearly labelled as such.
- 1.1.4 Text in bold is only used throughout this document to indicate where changes are required, and why they are required. Text in italics is text from a section of the 2024 EIAR which is deleted, or quotations from other documents (as explicitly stated). Replacement text is in normal font.
- 1.1.5 Tables which have been updated from the 2024 EIAR, or entirely new tables, have been included in the Addendum to the EIAR. These can be identified by the “A” prefix in the caption. Any changes within an updated table, in comparison to tables within the 2024 EIAR, are indicated by grey shading in the relevant cell, column or row, as necessary.
- 1.1.6 The sections relevant to Appendix A15.6 Offshore Ornithology Population Viability Analysis in the RFI are included below.



RFI Section	RFI	Relevance to Chapter
1 (b)	<p>The scientific information provided as part of the planning application documentation should be based on up-to-date survey reports and data. Accordingly, the applicant is requested to confirm/provide justification/verification that the information submitted in support of the planning application remains relevant and appropriate at the point of submitting further information or to update same as required.</p>	<p>The timeframes associated with the RFI have required a review of the datasets used in the 2024 EIAR to ensure that any necessary updates to the baseline environment are captured.</p> <p>The introduction of the Projected Footprint of Infrastructure (PFI)¹ has established a study area and therefore baseline for the ornithology assessments.</p> <p>As a result, updated density estimates for this area have been modelled for use in the Collision Risk Model (CRM) and updated abundances have been used for the displacement assessment.</p> <p>In addition, 12 further months of Digital Aerial Surveys (DAS) were completed across the full North West Irish Sea (NWIS) Candidate Special Protected Area (cSPA) (hereafter referred to as the NWIS DAS), providing more recent data on the distribution and abundance of birds between September 2024 and August 2025. This data has been combined with the original 29 months of DAS data within the Maritime Area Consent (MAC) boundary (hereafter referred to as the MAC DAS) carried out from May 2020 to September 2022 to produce an updated baseline with a total of 41 months of data.</p>
1 (c)	<p>The applicant is requested to confirm whether any on-going or additional surveying has been carried out since the application was lodged and, if so, the applicant is invited to submit any further survey data results and analysis and update the planning application documentation, as appropriate.</p>	<p>Additional ornithological surveys have been undertaken since submission of the Application. These additional surveys are described in Section 15.2.5 of Chapter 15: Offshore Ornithology.</p>

¹ The PFI represents a defined ornithology study sub-area within the overall array area, where all permanent offshore array infrastructure will be located. The PFI has been developed following design refinements to minimise spatial overlap with sensitive receptors and occupies just 57.7 km², representing 2.5% of the NWIS cSPA.



8 (a)	<p>The applicant has used the Ireland-wide populations of Black-headed Gull <i>Ichthyaetus ridibundus</i> and Common (Mew) Gull <i>Larus canus</i>, resulting in an overestimation of the reference population which may be affected by the project and, therefore, underestimation of potential impacts. The applicant is requested to apply more appropriate regional population estimates to these species and revise the baseline and assessment accordingly.</p>	<p>The reference population for common gull has been updated within Appendix A15.1 Offshore and Intertidal Ornithology Technical Baseline. As such the reference population used for common gull within the Population Viability Analysis (PVA) has been adjusted accordingly see (Table A1-1) (addressed in <i>Population Viability Analysis (PVA)</i>, page 10).</p>
8 (c)	<p>The Board is satisfied that the applicant has used the industry standard Displacement Matrix approach. However, the Board notes that the applicant has based conclusions in relation to displacement on its preferred rates for displacement and mortality of auks and Northern Gannet (50% displacement and 1% mortality for auks, 70% displacement and 1% mortality for Northern Gannet <i>Morus bassanus</i>) instead of on industry recommended rates, and has taken these rates forward to Population Viability Analysis (PVA). The Board queries the applicant's use of preferred rates in relation to auks, due to the proposed developments close proximity to the coast and to breeding Common Guillemot and Razorbill <i>Alca torda</i> colonies (NWIS cSPA, Lambay Island SPA, and Ireland's Eye SPA). The applicant is requested to review the EIAR and NIS to apply rates more appropriate to the location and scale of the development, and in line with industry recommendations (60% displacement and 1-5% mortality for auks; and 70% displacement and 1-3% mortality for Northern Gannet; NatureScot, 2023), to inform assessment and enable comprehensive conclusions. Where impacts with these rates result in a >1% increase in baseline mortality rate, the mortality estimates should be taken forward to PVA.</p>	<p>The Developer acknowledges the Board's queries and has assessed displacement for gannet and auks using the displacement and mortality rates advised in NatureScot (2023) Guidance Note 8. This has also been updated within Chapter 15 Offshore and Intertidal Ornithology. Therefore, species have been taken forward for PVA where the updated impacts exceed 1% increase in baseline mortality (addressed in <i>Population Viability Analysis (PVA)</i>, page 10).</p>
8 (d)	<p>Impacts on birds in the CEA (Section 15.9 of Chapter 15, and Chapter 38) are presented and assessed against annual populations only. Having regard to points a(vii) Regional Breeding Population and c(i) Displacement Methodology above, the applicant is requested to revise the CEA to ensure</p>	<p>The Developer has undertaken a re-assessment of CEA which includes both the breeding and non-breeding seasons impacts. As a result, further scenarios and species have been taken forward for PVA on the basis that impacts exceed 1% increase in baseline</p>



impacts are presented and assessed against the breeding and non-breeding season populations separately.

mortality (addressed in *Population Viability Analysis (PVA)*, page 10).



1.1 Project Background

- 1.1.1 This section has been updated to reflect the new study area covering the PFI plus a 10km buffer, and the ECC plus a 2km buffer in response to RFI 8(ciii). This updates the previous study area which covered a 4km buffer from the array area, and the ECC with no surrounding buffer.
- 1.1.2 The following paragraph of Appendix 15.6 Offshore Ornithology Population Viability Analysis of the 2024 EIAR shall be deleted:
- *The Northern Irish Sea Array (hereafter the ‘proposed development’) Offshore Wind Farm (OWF) is proposed for construction 11.3 km off the east coast of Ireland (at their nearest points to the mainland). The project will consist of offshore wind turbines, an offshore converter station, inter-array cables, interconnector cables and on- and offshore cables taking power to an onshore converter station. The area considered in the context of offshore ornithological receptors includes the entire proposed development array area, covering 89 km², an asymmetric 4 km buffer surrounding the array area, and the offshore Export Cable Corridor (ECC) covering a further 67.8 km².*
- 1.1.3 **And be replaced with:**
- The Northern Irish Sea Array (hereafter the ‘proposed development’) Offshore Wind Farm (OWF) is proposed for construction 11.3 km off the east coast of Ireland (at their nearest points to the mainland). The project will consist of offshore wind turbines, an offshore converter station, inter-array cables, interconnector cables and on- and offshore cables taking power to an onshore converter station. The area considered in the context of offshore ornithological receptors includes the entire proposed development array area, covering 89 km², a Projected Footprint of Infrastructure (PFI) plus 10km buffer (defined as area where wind turbines will be placed), and the offshore Export Cable Corridor (ECC) covering a further 67.8 km².
- 1.1.4 There are no further changes to this section. Refer to Section 1.1 of Appendix 15.6 of the 2024 EIAR.

1.2 Population Viability Analysis (PVA)

- 1.2.1 The PVA has been updated to reflect new abundance estimates reflecting the introduction of the Projected Footprint of Infrastructure (PFI) and additional site-specific DAS monitoring of the NWIS cSPA undertaken in response to RFI 1(b). In response to RFI 8 (c), the displacement assessment was also updated to apply the recommended industry-standard displacement and mortality rates.
- 1.2.2 In addition, the Cumulative Effects Assessment (CEA) was revised to include updated project impacts and to assess impacts in both the breeding and non-breeding seasons, in line with RFI 8 (d). These updates resulted in predicted cumulative impacts for razorbill (when considered alongside other projects) exceeding a 1% increase in baseline mortality, thereby triggering the need for PVA for these additional species.
- 1.2.3 The following paragraph of Appendix 15.6 Offshore Ornithology Population Viability Analysis of the 2024 EIAR shall be deleted:



- This report provides the modelling methodology and results using regional populations (as presented in the technical baseline) and wider biogeographic population scales (Furness, 2015). PVA was carried out for the following species, for which predicted impacts exceeded a 1% increase in baseline mortality for at least one assessment scenario (Table 1.1)

- Common gull (*Larus canus*);
- Great black-backed gull (*Larus marinus*);
- Herring gull (*Larus argentatus*);
- Lesser black-backed gull (*Larus fuscus*); and
- Common guillemot (*Uria aalge*).

1.2.4 **And be replaced with:**

- This report provides the modelling methodology and results using the breeding, non-breeding and regional populations (as presented in the technical baseline) and wider biogeographic population scales (Furness, 2015). PVA was carried out for the following species, for which predicted impacts exceeded a 1% increase in baseline mortality for at least one assessment scenario (see Table A1-1):

- Common gull (*Larus canus*);
- Great black-backed gull (*Larus marinus*);
- Herring gull (*Larus argentatus*);
- Lesser black-backed gull (*Larus fuscus*);
- Common guillemot (*Uria aalge*); and
- Razorbill (*Alca torda*).

1.2.5 **The following Table A1-1 has replaced Table 1-1 of the 2024 EIAR, following RFI 8 (a) (viii) and RFI 8 (d) (i) so that it presents reference populations for the breeding and non-breeding seasons separately. The largest population was used when assessing the annual total impact.**

Table A1-1: Reference population sizes for species for which impacts exceed 1% increase in baseline mortality (replaces Table 1-1 of Appendix 15.6 of the 2024 EIAR).

Species	Breeding (Individuals) (SMP, 2025)	Regional non-breeding population size (Individuals)	Biogeographic Population (Individuals) (Furness, 2015)
Common gull	-	11,030	525,000
Great black-backed gull	2,685	53,406	235,000
Herring gull	26,459	187,094	1,098,000
Lesser black-backed gull	75,470	171,500	864,000
Guillemot	190,073	1,332,623	4,125,000
Razorbill	49,298	632,453	1,707,000



1.2.6 There are no further changes to this section. Refer to Section 1.2 of Appendix 15.6 of the 2024 EIAR.



2 Methodology

2.1 Guidance and Models

2.1.1 There are no changes to this section. Refer to 2.1 of Appendix 15.6 of the 2024 EIAR.

2.2 PVA Modelling Approach and Demographic Parameters

Modelling Approach

Simulation Type

2.2.1 There are no changes to this section. Refer to 2.2 of Appendix 15.6 of the 2024 EIAR.

Demographic Parameters

2.2.2 In response to RFI 1 (b) and 8 (d), the key change in this section is the updated use of the Horswill and Robinson (2015) demographic rates as well as the inclusion of razorbill (Table A2-1). All parameters were derived solely from Horswill and Robinson (2015), resulting only in very minor changes (Table A2-1). In some cases, values were also updated to include additional decimal places for consistency and precision. This approach is in line with recently submitted Scottish projects and NatureScot.

2.2.3 The following paragraph of Appendix 15.6 Offshore Ornithology Population Viability Analysis of the 2024 EIAR shall be deleted:

- *The input parameters were primarily taken from Horswill and Robinson (2015), with some parameters provided within the tool. Where the parameters differ from this it has been highlighted (Table 2.1).*

2.2.4 **And be replaced with:**

- The input parameters were taken from Horswill and Robinson (2015), where standard deviation (SD) is absent from this report, the standard error has been used instead, in line with recently submitted Scottish projects and NatureScot guidance (2023) (Table A2-1). Natural England and Natural Resources Wales have issued an interim advice note on demographic rates, EIA-scale mortality, and reference populations for use in offshore wind impact assessments (Natural England, 2024). In this advice, the immature survival rates were revised to reflect that some Horswill and Robinson (2015) values are not age-specific; instead, they represent survival across multiple immature years. These updates have been highlighted within Table A2-1 accordingly.



Table A2-1: Summary of demographic rates for PVA species. Source: Horswill and Robinson (2015) unless highlighted (replaces Table 2-1 of Appendix 15.6).

Demographic Parameter	Great black-backed gull	Herring gull	Lesser black-backed gull	Common gull	Guillemot	Razorbill
Adult survival	0.930 (0.0001)	0.834 (0.034)	0.885 (0.022)	0.828 (0.050)	0.939 (0.015)	0.895 (0.067)
Productivity (SD) (per pair)	1.139 (0.533)	0.920 (0.477)	0.530 (0.325)	0.54 (0.39)	0.672 (0.147)	0.57 (0.247)
Age of recruitment	5	5	5	3	6	5
Brood size (per pair)	3	3	3	1	1	1
Survival 0-1	0.798 (0.092)	0.798 (0.092)	0.820 (0.022)	0.410 (0.050)	0.560 (0.013)	0.794 (0.209)
Survival 1-2	0.834 (0.034)	0.834 (0.034)	0.885 (0.022)	0.710 (0.050)	0.792 (0.034)	0.794 (0.209)
Survival 2-3	0.834 (0.034)	0.834 (0.034)	0.885 (0.022)	0.828 (0.050)	0.917 (0.022)	0.895 (0.067)
Survival 3-4	0.834 (0.034)	0.834 (0.034)	0.885 (0.022)	-	0.939 (0.015)	0.895 (0.067)
Survival 4-5	0.834 (0.034)	0.834 (0.034)	0.885 (0.022)	-	0.939 (0.015)	0.895 (0.067)
Survival 5-6	-	-	-	-	0.939 (0.015)	-

2.2.5 There are no further changes to this section. Refer to Section 2.2 of Appendix 15.6 of the 2024 EIAR.

PVA Species-Specific Outputs

2.2.6 There are no changes to this section. Refer to 2.2 of Appendix 15.6 of the 2024 EIAR.



3 Impacts Assessed

3.1 Magnitude of Impact

- 3.1.1 All impact values and tables in this Section have been updated. These changes arise from the updates described in the introduction and methodology, primarily (1) the introduction of the PFI and (2) the addition of the NWIS DAS data collected across the full extent of NWIS cSPA, which are primarily in response to RFI 1 (b). As a result, the baseline (mean peak abundance and monthly average densities in the PFI) as well as the resulting mortality and impact on adult survival rate have been updated since the 2024 EIAR. The results section of Appendix A15.6 Offshore Ornithology Population Viability Analysis is therefore entirely new, including the tables, with all values updated accordingly. As such, grey shading has not been used considering every entry has been updated.
- 3.1.2 Each impact scenario has an additional population-level mortality due to the presence of turbines and therefore imposed risk of collision and of displacement effects. This additional mortality impacts the survival rate and therefore predicts the magnitude of impact on the population for different scenarios. The model used relative harvest which was calculated using the predicted mortalities and the initial regional population size see (Table A1-1). These scenarios are presented in Table A3-1 to Table A3-5 and include the updated magnitude of impact.
- 3.1.3 In addition, alternative approaches to defining bio-seasons are presented for both guillemot and razorbill based on site-specific survey data. For both guillemot and razorbill, the 2025 breeding season excludes July 2025, reflecting trends observed in the site-specific dataset. Both approaches are described in detail within Appendix A15.1: Offshore and Intertidal Ornithology Technical Baseline.

Table A3-1: Common gull collision risk magnitude of impact (replaces Table 3-1 of Appendix 15.6 of the 2024 EIAR).

Scenario	Mortalities	Impact on adult survival rate
Non-breeding		
Proposed development alone	3.01	0.000
Cumulative	122.03	0.011
Regional		
Proposed development alone	3.07	0.000
Cumulative	122.55	0.011



Table A3-2: Greater black-backed gull collision risk magnitude of impact (replaces Table 3-2 of Appendix 15.6 of the 2024 EIAR).

Scenario	Mortalities	Impact on adult survival rate
Breeding		
Proposed development alone	2.08	0.001
Cumulative	25.16	0.009
Non-breeding		
Proposed development alone	11.30	0.000
Cumulative	166.29	0.003
Regional		
Proposed development alone	13.38	0.000
Cumulative	204.80	0.004
Biogeographic		
Proposed development alone	13.38	0.000
Cumulative	204.80	0.001

Table A3-3: Herring gull collision magnitude of impact (replaces Table 3-3 of Appendix 15.6 of the 2024 EIAR).

Scenario	Mortalities	Impact on adult survival rate
Breeding		
Proposed development alone	15.90	0.001
Cumulative	90.60	0.003
Non-breeding		
Proposed development alone	26.45	0.000
Cumulative	192.06	0.001
Regional		
Proposed development alone	42.35	0.000
Cumulative	282.66	0.002
Biogeographic		
Proposed development alone	42.35	0.000
Cumulative	282.66	0.000

Table A3-4: Lesser black-backed gull collision risk magnitude of impact (replaces Table 3-4 of Appendix 15.6 of the 2024 EIAR).

Scenario	Mortalities	Impact on adult survival rate
Breeding		
Proposed development alone	1.01	0.000
Cumulative	28.17	0.000
Autumn migration		
Proposed development alone	0.00	0.000
Cumulative	8.03	0.000
Spring migration		
Proposed development alone	0.00	0.000
Cumulative	18.26	0.000
Migration free winter		
Proposed development alone	0.00	0.000



Scenario	Mortalities	Impact on adult survival rate
Cumulative	11.17	0.000
Regional		
Proposed development alone	1.01	0.000
Cumulative	305.42	0.002
Biogeographic		
Proposed development alone	1.01	0.000
Cumulative	305.42	0.000

Table A3-5: Guillemot Project bio-season approach displacement magnitude of impact (replaces Table 3-5 of Appendix 15.6 of the 2024 EIAR).

Scenario	Mortalities	Impact on adult survival rate
Breeding		
Proposed development alone 50, 1	4.90	0.000
Proposed development alone 60, 1 and 3	17.80	0.000
Proposed development alone 60, 3 and 5	29.60	0.000
Cumulative 50, 1	165.60	0.001
Cumulative 60, 1 and 3	596.30	0.003
Cumulative 60, 3 and 5	993.80	0.005
Non-breeding		
Proposed development alone 50, 1	105.40	0.000
Proposed development alone 60, 1 and 3	126.40	0.000
Proposed development alone 60, 3 and 5	379.30	0.000
Cumulative 50, 1	578.20	0.000
Cumulative 60, 1 and 3	693.80	0.001
Cumulative 60, 3 and 5	2,081.50	0.002
Regional		
Proposed development alone 50, 1	110.30	0.000
Proposed development alone 60, 1 and 3	132.40	0.000
Proposed development alone 60, 3 and 5	397.10	0.000
Cumulative 50, 1	743.80	0.001
Cumulative 60, 1 and 3	892.60	0.001
Cumulative 60, 3 and 5	2,677.80	0.002
Biogeographic		
Proposed development alone 50, 1	110.30	0.000
Proposed development alone 60, 1 and 3	132.40	0.000
Proposed development alone 60, 3 and 5	397.10	0.000
Cumulative 50, 1	743.80	0.000
Cumulative 60, 1 and 3	892.60	0.000
Cumulative 60, 3 and 5	2,677.80	0.001



Table A3-6: Guillemot Furness (2015) bio-season approach displacement magnitude of impact.

Scenario	Mortalities	Impact on adult survival rate
Breeding		
Proposed development alone 50, 1	81.60	0.000
Proposed development alone 60, 1 and 3	293.70	0.002
Proposed development alone 60, 3 and 5	489.50	0.003
Cumulative 50, 1	242.30	0.001
Cumulative 60, 1 and 3	872.30	0.005
Cumulative 60, 3 and 5	1,453.80	0.008
Non-breeding		
Proposed development alone 50, 1	93.80	0.000
Proposed development alone 60, 1 and 3	112.60	0.000
Proposed development alone 60, 3 and 5	337.80	0.000
Cumulative 50, 1	566.70	0.000
Cumulative 60, 1 and 3	680.00	0.001
Cumulative 60, 3 and 5	2,039.90	0.002
Regional		
Proposed development alone 50, 1	175.40	0.000
Proposed development alone 60, 1 and 3	210.50	0.000
Proposed development alone 60, 3 and 5	631.50	0.000
Cumulative 50, 1	808.90	0.001
Cumulative 60, 1 and 3	970.70	0.001
Cumulative 60, 3 and 5	2,912.20	0.002
Biogeographic		
Proposed development alone 50, 1	175.40	0.000
Proposed development alone 60, 1 and 3	210.50	0.000
Proposed development alone 60, 3 and 5	631.50	0.000
Cumulative 50, 1	808.90	0.000
Cumulative 60, 1 and 3	970.70	0.000
Cumulative 60, 3 and 5	2,912.20	0.001



Table A3-7: Razorbill Project bio-season approach displacement magnitude of impact.

Scenario	Mortalities	Impact on adult survival rate
Breeding		
Proposed development alone 50, 1	0.90	0.000
Proposed development alone 60, 1 and 3	3.20	0.000
Proposed development alone 60, 3 and 5	5.30	0.000
Cumulative 50, 1	14.80	0.000
Cumulative 60, 1 and 3	53.10	0.000
Cumulative 60, 3 and 5	88.60	0.000
Autumn migration		
Proposed development alone 50, 1	24.50	0.000
Proposed development alone 60, 1 and 3	29.40	0.000
Proposed development alone 60, 3 and 5	88.10	0.000
Cumulative 50, 1	106.80	0.000
Cumulative 60, 1 and 3	128.10	0.000
Cumulative 60, 3 and 5	384.40	0.001
Spring migration		
Proposed development alone 50, 1	4.60	0.000
Proposed development alone 60, 1 and 3	5.50	0.000
Proposed development alone 60, 3 and 5	16.50	0.000
Cumulative 50, 1	59.50	0.000
Cumulative 60, 1 and 3	71.40	0.000
Cumulative 60, 3 and 5	214.20	0.000
Migration free winter		
Proposed development alone 50, 1	6.10	0.000
Proposed development alone 60, 1 and 3	7.40	0.000
Proposed development alone 60, 3 and 5	22.10	0.000
Cumulative 50, 1	66.10	0.000
Cumulative 60, 1 and 3	79.40	0.000
Cumulative 60, 3 and 5	238.10	0.001
Regional		
Proposed development alone 50, 1	36.10	0.000
Proposed development alone 60, 1 and 3	45.40	0.000
Proposed development alone 60, 3 and 5	131.90	0.000
Cumulative 50, 1	247.20	0.000
Cumulative 60, 1 and 3	332.10	0.001
Cumulative 60, 3 and 5	925.30	0.001
Biogeographic		
Proposed development alone 50, 1	36.10	0.000
Proposed development alone 60, 1 and 3	45.40	0.000
Proposed development alone 60, 3 and 5	131.90	0.000
Cumulative 50, 1	247.20	0.000
Cumulative 60, 1 and 3	332.10	0.000
Cumulative 60, 3 and 5	925.30	0.001



Table A3-8: Razorbill Furness (2015) bio-season approach displacement magnitude of impact.

Scenario	Mortalities	Impact on adult survival rate
Breeding		
Proposed development alone 50, 1	5.50	0.000
Proposed development alone 60, 1 and 3	20.00	0.000
Proposed development alone 60, 3 and 5	33.30	0.001
Cumulative 50, 1	19.30	0.000
Cumulative 60, 1 and 3	69.30	0.001
Cumulative 60, 3 and 5	115.60	0.002
Autumn migration		
Proposed development alone 50, 1	24.50	0.000
Proposed development alone 60, 1 and 3	29.40	0.000
Proposed development alone 60, 3 and 5	88.10	0.000
Cumulative 50, 1	106.80	0.000
Cumulative 60, 1 and 3	128.10	0.000
Cumulative 60, 3 and 5	384.40	0.001
Spring migration		
Proposed development alone 50, 1	4.60	0.000
Proposed development alone 60, 1 and 3	5.50	0.000
Proposed development alone 60, 3 and 5	16.50	0.000
Cumulative 50, 1	59.50	0.000
Cumulative 60, 1 and 3	71.40	0.000
Cumulative 60, 3 and 5	214.20	0.000
Migration free winter		
Proposed development alone 50, 1	6.10	0.000
Proposed development alone 60, 1 and 3	7.40	0.000
Proposed development alone 60, 3 and 5	22.10	0.000
Cumulative 50, 1	66.10	0.000
Cumulative 60, 1 and 3	79.40	0.000
Cumulative 60, 3 and 5	238.10	0.001
Regional		
Proposed development alone 50, 1	40.70	0.000
Proposed development alone 60, 1 and 3	48.90	0.000
Proposed development alone 60, 3 and 5	146.60	0.000
Cumulative 50, 1	251.70	0.000
Cumulative 60, 1 and 3	302.00	0.000
Cumulative 60, 3 and 5	906.10	0.001
Biogeographic		
Proposed development alone 50, 1	40.70	0.000
Proposed development alone 60, 1 and 3	48.90	0.000
Proposed development alone 60, 3 and 5	146.60	0.000
Cumulative 50, 1	251.70	0.000
Cumulative 60, 1 and 3	302.00	0.000
Cumulative 60, 3 and 5	906.10	0.001



4 PVA Results

4.1 Introduction

- 4.1.1 All impact values in this Section have been updated. These changes arise from the updates described in the introduction and methodology, primarily (1) the introduction of the PFI and (2) the addition of the NWIS DAS data collected across the NWIS cSPA, primarily in response to RFI 1 (b). As a result, the baseline (mean peak abundance and monthly average densities in the PFI) as well as the resulting mortality and impact on adult survival rate have been updated since the 2024 EIAR. The results section of Appendix A15.6 Offshore Ornithology Population Viability Analysis is therefore entirely new, with all values and tables, updated accordingly.
- 4.1.2 The outputs of the Seabird PVA Tool are set out in Table A4-1 to Table A4-5 below for all six species. The metrics used to summarise the PVA results are based on the CGR calculated as the median of the ratio of the annual growth rate of the impacted to un-impacted population, expressed as a percentage decrease.

4.2 Common gull

Table A4-1: Metrics and counterfactuals for 5000 simulations over 35 years of the common gull PVA (replaces Table 4-1 of Appendix 15.6 of the 2024 EIAR).

Scenario/Approach	Median CGR	Median CPS	Difference in GR (%)	Difference in PS (%)
Non-breeding				
Proposed development alone	1.000 (0.008)	0.984 (0.318)	0.043	1.607
Cumulative	0.985 (0.009)	0.583 (0.217)	1.485	41.689
Regional				
Proposed development alone	1.000 (0.008)	0.983 (0.330)	0.040	1.739
Cumulative	0.985 (0.022)	0.589 (0.233)	1.463	41.084

4.3 Great black-backed gull

Table A4-2: Metrics and counterfactuals for 5000 simulations over 35 years of the great black-backed gull PVA (replaces Table 4-2 of Appendix 15.6 of the 2024 EIAR).

Scenario/Approach	Median CGR	Median CPS	Difference in GR (%)	Difference in PS (%)
Breeding				
Proposed development alone	0.999 (<0.001)	0.968 (0.038)	0.088	3.236
Cumulative	0.989 (<0.001)	0.681 (0.027)	1.064	31.929
Non-breeding				
Proposed development alone	1.000 (<0.001)	0.992 (0.009)	0.024	0.849
Cumulative	0.997 (<0.001)	0.912 (0.008)	0.255	8.769
Regional				
Proposed development alone	1.000 (<0.001)	0.990 (0.008)	0.028	1.013
Cumulative	0.996 (<0.001)	0.854 (0.007)	0.436	14.553
Biogeographic				
Proposed development alone	1.000 (<0.001)	0.998 (0.004)	0.006	0.246
Cumulative	0.999 (<0.001)	0.965 (0.004)	0.099	3.500



4.4 Herring gull

Table A4-3: Metrics and counterfactuals for 5000 simulations over 35 years of the herring gull PVA (replaces Table 4-3 of Appendix 15.6 of the 2024 EIAR).

Scenario/Approach	Median CGR	Median CPS	Difference in GR (%)	Difference in PS (%)
Breeding				
Proposed development alone	0.999 (<0.001)	0.974 (0.028)	0.072	2.561
Cumulative	0.996 (<0.001)	0.862 (0.025)	0.412	13.828
Non-breeding				
Proposed development alone	1.000 (<0.001)	0.994 (0.011)	0.017	0.611
Cumulative	0.999 (<0.001)	0.956 (0.011)	0.124	4.373
Regional				
Proposed development alone	1.000 (<0.001)	0.990 (0.011)	0.027	0.985
Cumulative	0.998 (<0.001)	0.937 (0.011)	0.182	6.348
Biogeographic				
Proposed development alone	1.000 (<0.001)	0.998 (0.005)	0.005	0.176
Cumulative	1.000 (<0.001)	0.989 (0.005)	0.031	1.104

4.5 Lesser black-backed gull

Table A4-4: Metrics and counterfactuals for 5000 simulations over 35 years of the lesser black-backed gull PVA (replaces Table 4-5 of Appendix 15.6 of the 2024 EIAR).

Scenario/Approach	Median CGR	Median CPS	Difference in GR (%)	Difference in PS (%)
Breeding				
Proposed development alone	1.000 (<0.001)	0.999 (0.013)	0.002	0.054
Cumulative	1.000 (<0.001)	0.985 (0.013)	0.043	1.540
Autumn migration				
Proposed development alone	1.000 (<0.001)	1.000 (0.009)	0.000	0.000
Cumulative	1.000 (<0.001)	0.998 (0.009)	0.006	0.189
Spring migration				
Proposed development alone	1.000 (<0.001)	1.000 (0.009)	0.000	0.000
Cumulative	1.000 (<0.001)	0.996 (0.009)	0.013	0.443
Migration free winter				
Proposed development alone	1.000 (<0.001)	1.000 (0.017)	0.000	0.000
Cumulative	1.000 (<0.001)	0.991 (0.016)	0.024	0.889
Regional				
Proposed development alone	1.000 (<0.001)	1.000 (0.009)	0.001	0.043
Cumulative	0.998 (<0.001)	0.929 (0.009)	0.203	7.065
Biogeographic				
Proposed development alone	1.000 (<0.001)	1.000 (0.004)	0.000	0.009
Cumulative	1.000 (<0.001)	0.986 (0.004)	0.040	1.443



4.6 Guillemot

Table A4-5: Metrics and counterfactuals for 5000 simulations over 35 years of the guillemot Project bio-season approach PVA (replaces Table 4-5 of Appendix 15.6 of the 2024 EIAR).

Scenario	Median CGR	Median CPS	Difference in GR (%)	Difference in PS (%)
Breeding				
Proposed development alone 50, 1	1.000 (<0.001)	0.999 (0.005)	0.003	0.102
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.996 (0.005)	0.011	0.390
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.994 (0.005)	0.018	0.625
Cumulative 50, 1	0.999 (<0.001)	0.965 (0.005)	0.098	3.461
Cumulative 60, 1 and 3	0.996 (<0.001)	0.881 (0.005)	0.353	11.949
Cumulative 60, 3 and 5	0.994 (<0.001)	0.809 (0.004)	0.589	19.133
Non-breeding				
Proposed development alone 50, 1	1.000 (<0.001)	0.997 (0.002)	0.009	0.322
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.996 (0.002)	0.011	0.384
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.989 (0.002)	0.032	1.149
Cumulative 50, 1	1.000 (<0.001)	0.983 (0.002)	0.049	1.744
Cumulative 60, 1 and 3	0.999 (<0.001)	0.979 (0.002)	0.059	2.089
Cumulative 60, 3 and 5	0.998 (<0.001)	0.939 (0.002)	0.176	6.135
Regional				
Proposed development alone 50, 1	1.000 (<0.001)	0.997 (0.002)	0.009	0.339
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.996 (0.002)	0.012	0.437
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.988 (0.002)	0.035	1.238
Cumulative 50, 1	0.999 (<0.001)	0.978 (0.002)	0.063	2.241
Cumulative 60, 1 and 3	0.999 (<0.001)	0.961 (0.002)	0.109	3.851
Cumulative 60, 3 and 5	0.997 (<0.001)	0.911 (0.002)	0.260	8.934
Biogeographic				
Proposed development alone 50, 1	1.000 (<0.001)	0.999 (0.001)	0.003	0.106



Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.999 (0.001)	0.004	0.139
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.996 (0.001)	0.011	0.402
Cumulative 50, 1	1.000 (<0.001)	0.993 (0.001)	0.020	0.725
Cumulative 60, 1 and 3	1.000 (<0.001)	0.987 (0.001)	0.035	1.259
Cumulative 60, 3 and 5	0.999 (<0.001)	0.970 (0.001)	0.084	2.975

Table A4-6: Metrics and counterfactuals for 5000 simulations over 35 years of the guillemot Furness (2015) bio-season approach PVA.

Scenario	Median CGR	Median CPS	Difference in GR (%)	Difference in PS (%)
Breeding				
Proposed development alone 50, 1	1.000 (<0.001)	0.983 (0.005)	0.048	1.744
Proposed development alone 60, 1 and 3	0.998 (<0.001)	0.939 (0.005)	0.174	6.077
Proposed development alone 60, 3 and 5	0.997 (<0.001)	0.901 (0.005)	0.290	9.923
Cumulative 50, 1	0.999 (<0.001)	0.949 (0.005)	0.144	5.052
Cumulative 60, 1 and 3	0.995 (<0.001)	0.830 (0.004)	0.516	17.008
Cumulative 60, 3 and 5	0.991 (<0.001)	0.733 (0.004)	0.860	26.738
Non-breeding				
Proposed development alone 50, 1	1.000 (<0.001)	0.997 (0.002)	0.008	0.282
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.997 (0.002)	0.009	0.340
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.990 (0.002)	0.028	1.023
Cumulative 50, 1	1.000 (<0.001)	0.983 (0.002)	0.048	1.708
Cumulative 60, 1 and 3	0.999 (<0.001)	0.980 (0.002)	0.057	2.038
Cumulative 60, 3 and 5	0.998 (<0.001)	0.940 (0.002)	0.172	6.017
Regional				
Proposed development alone 50, 1	1.000 (<0.001)	0.995 (0.002)	0.015	0.534
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.995 (0.002)	0.015	0.534
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.988 (0.002)	0.034	1.232



Cumulative 50, 1	0.999 (<0.001)	0.975 (0.002)	0.070	2.486
Cumulative 60, 1 and 3	0.999 (<0.001)	0.976 (0.002)	0.068	2.433
Cumulative 60, 3 and 5	0.999 (<0.001)	0.954 (0.002)	0.131	4.616
Biogeographic				
Proposed development alone 50, 1	1.000 (<0.001)	0.998 (0.001)	0.005	0.175
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.996 (0.001)	0.011	0.397
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.992 (0.001)	0.023	0.811
Cumulative 50, 1	1.000 (<0.001)	0.992 (0.001)	0.022	0.792
Cumulative 60, 1 and 3	1.000 (<0.001)	0.985 (0.001)	0.042	1.512
Cumulative 60, 3 and 5	0.999 (<0.001)	0.966 (0.001)	0.095	3.375



4.7 Razorbill

Table A4-7: Metrics and counterfactuals for 5000 simulations over 35 years of the razorbill Project bio-season approach PVA.

Scenario	Median CGR	Median CPS	Difference in GR (%)	Difference in PS (%)
Breeding				
Proposed development alone 50, 1	1.000 (<0.001)	1.000 (0.006)	0.000	0.018
Proposed development alone 60, 1 and 3	1.000 (<0.001)	1.000 (0.006)	0.001	0.050
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.999 (0.006)	0.002	0.068
Cumulative 50, 1	1.000 (<0.001)	0.998 (0.006)	0.005	0.174
Cumulative 60, 1 and 3	1.000 (<0.001)	0.994 (0.006)	0.017	0.604
Cumulative 60, 3 and 5	1.000 (<0.001)	0.990 (0.006)	0.028	1.012
Autumn migration				
Proposed development alone 50, 1	1.000 (<0.001)	0.998 (0.004)	0.004	0.156
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.998 (0.004)	0.005	0.188
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.994 (0.004)	0.016	0.573
Cumulative 50, 1	1.000 (<0.001)	0.993 (0.004)	0.019	0.693
Cumulative 60, 1 and 3	1.000 (<0.001)	0.992 (0.004)	0.023	0.832
Cumulative 60, 3 and 5	0.999 (<0.001)	0.975 (0.004)	0.070	2.482
Spring migration				
Proposed development alone 50, 1	1.000 (<0.001)	1.000 (0.004)	0.001	0.041
Proposed development alone 60, 1 and 3	1.000 (<0.001)	1.000 (0.004)	0.001	0.040
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.999 (0.004)	0.003	0.108
Cumulative 50, 1	1.000 (<0.001)	0.996 (0.004)	0.011	0.387
Cumulative 60, 1 and 3	1.000 (<0.001)	0.995 (0.004)	0.013	0.472
Cumulative 60, 3 and 5	1.000 (<0.001)	0.986 (0.004)	0.039	1.387
Migration free winter				
Proposed development alone 50, 1	1.000 (<0.001)	0.999 (0.006)	0.002	0.077



Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.999 (0.006)	0.002	0.085
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.997 (0.006)	0.007	0.259
Cumulative 50, 1	1.000 (<0.001)	0.993 (0.006)	0.020	0.731
Cumulative 60, 1 and 3	1.000 (<0.001)	0.991 (0.006)	0.025	0.905
Cumulative 60, 3 and 5	0.999 (<0.001)	0.974 (0.006)	0.074	2.649

Regional

Proposed development alone 50, 1	1.000 (<0.001)	0.998 (0.004)	0.006	0.221
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.997 (0.004)	0.008	0.299
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.991 (0.004)	0.024	0.853
Cumulative 50, 1	1.000 (<0.001)	0.984 (0.004)	0.045	1.590
Cumulative 60, 1 and 3	0.999 (<0.001)	0.979 (0.004)	0.060	2.125
Cumulative 60, 3 and 5	0.998 (<0.001)	0.942 (0.004)	0.167	5.830

Biogeographic

Proposed development alone 50, 1	1.000 (<0.001)	0.999 (0.003)	0.002	0.083
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.999 (0.003)	0.003	0.110
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.997 (0.003)	0.009	0.318
Cumulative 50, 1	1.000 (<0.001)	0.994 (0.003)	0.017	0.594
Cumulative 60, 1 and 3	1.000 (<0.001)	0.992 (0.003)	0.022	0.801
Cumulative 60, 3 and 5	0.999 (<0.001)	0.978 (0.003)	0.062	2.207



Table A4-8: Metrics and counterfactuals for 5000 simulations over 35 years of the razorbill Furness (2015) bio-season approach PVA.

Scenario	Median CGR	Median CPS	Difference in GR (%)	Difference in PS (%)
Breeding				
Proposed development alone 50, 1	1.000 (<0.001)	0.996 (0.014)	0.013	0.437
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.983 (0.014)	0.046	1.658
Proposed development alone 60, 3 and 5	0.999 (<0.001)	0.973 (0.015)	0.077	2.742
Cumulative 50, 1	1.000 (<0.001)	0.984 (0.015)	0.045	1.601
Cumulative 60, 1 and 3	0.998 (<0.001)	0.944 (0.014)	0.160	5.605
Cumulative 60, 3 and 5	0.997 (<0.001)	0.908 (0.014)	0.268	9.199
Autumn migration				
Proposed development alone 50, 1	1.000 (<0.001)	0.998 (0.004)	0.004	0.156
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.998 (0.004)	0.005	0.188
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.994 (0.004)	0.016	0.573
Cumulative 50, 1	1.000 (<0.001)	0.993 (0.004)	0.019	0.693
Cumulative 60, 1 and 3	1.000 (<0.001)	0.992 (0.004)	0.023	0.832
Cumulative 60, 3 and 5	0.999 (<0.001)	0.975 (0.004)	0.070	2.482
Spring migration				
Proposed development alone 50, 1	1.000 (<0.001)	1.000 (0.004)	0.001	0.041
Proposed development alone 60, 1 and 3	1.000 (<0.001)	1.000 (0.004)	0.001	0.040
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.999 (0.004)	0.003	0.108
Cumulative 50, 1	1.000 (<0.001)	0.996 (0.004)	0.011	0.387
Cumulative 60, 1 and 3	1.000 (<0.001)	0.995 (0.004)	0.013	0.472
Cumulative 60, 3 and 5	1.000 (<0.001)	0.986 (0.004)	0.039	1.387
Migration free winter				
Proposed development alone 50, 1	1.000 (<0.001)	0.999 (0.006)	0.002	0.077
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.999 (0.006)	0.002	0.085



Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.997 (0.006)	0.007	0.259
Cumulative 50, 1	1.000 (<0.001)	0.993 (0.006)	0.020	0.731
Cumulative 60, 1 and 3	1.000 (<0.001)	0.991 (0.006)	0.025	0.905
Cumulative 60, 3 and 5	0.999 (<0.001)	0.974 (0.006)	0.074	2.649

Regional

Proposed development alone 50, 1	1.000 (<0.001)	0.997 (0.004)	0.007	0.253
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.996 (0.004)	0.011	0.408
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.990 (0.004)	0.029	1.023
Cumulative 50, 1	1.000 (<0.001)	0.984 (0.004)	0.046	1.629
Cumulative 60, 1 and 3	0.999 (<0.001)	0.978 (0.004)	0.063	2.240
Cumulative 60, 3 and 5	0.998 (<0.001)	0.940 (0.004)	0.172	6.022

Biogeographic

Proposed development alone 50, 1	1.000 (<0.001)	0.999 (0.001)	0.003	0.106
Proposed development alone 60, 1 and 3	1.000 (<0.001)	0.999 (0.001)	0.004	0.139
Proposed development alone 60, 3 and 5	1.000 (<0.001)	0.996 (0.001)	0.011	0.402
Cumulative 50, 1	1.000 (<0.001)	0.993 (0.001)	0.020	0.725
Cumulative 60, 1 and 3	1.000 (<0.001)	0.987 (0.001)	0.035	1.259
Cumulative 60, 3 and 5	0.999 (<0.001)	0.970 (0.001)	0.084	2.975



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