Report to Inform Appropriate Assessment: Appendix E Offshore Ornithology In-combination Assessment

MarramWind Offshore Wind Farm

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MarramWind

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1. Introduction

1.1 Project background

1.1.1.1 MarramWind Offshore Wind Farm (hereafter referred to as 'the Project') is wholly owned by ScottishPower Renewables UK Limited (SPR). MarramWind Limited, a subsidiary of SPR, is the Applicant for the Project.

1.1.1.2 The Applicant is proposing to develop the Project as a floating offshore wind development. The Project is located approximately 75 kilometres (km) offshore from the Aberdeenshire coast in northeast Scotland at its closest point, with the Option Agreement Area (OAA) covering an area of approximately 684km^2 will comprise both offshore and onshore infrastructure (see Chapter 2 of the **Report to Inform Appropriate Assessment (RIAA)** for full details on the project design).

1.2 In-combination assessment

1.2.1.1 This Appendix assesses the potential effects posed by the Project in relation to intertidal and offshore ornithology receptors. Potential effects posed by the Project in isolation are detailed within Section 6.2 of the **RIAA**. The focus of this Appendix to assess the potential effects from the Project in-combination with other developments on ornithological designated sites and features screened into assessment.

2. In-combination Assessment

2.1.1.1 As summarised within **Appendix A: Screening Assessment Table**, the potential for a likely significant effect (LSE) could not be ruled out for a number of designated sites and features when considering the potential effects from the Project in-combination. At the point of screening, a precautionary approach was taken whereby all effect pathways identified for the Project alone were taken through for assessment of potential effects in-combination. Following completion of assessment of potential effects from the Project alone and identification of other developments with the potential to effect designated sites and features (see Section 7.1 of the **RIAA**) a review of screening conclusions has been undertaken to identify where the potential for an in-combination effect may arise, the conclusions of which are summarised within **Table 2.1**.

2.1.1.2 For the in-combination assessments detailed within this Section, the developments screened in are the proposed, consented, under-construction and operating offshore wind farms in the UK waters of the North Sea (and English Channel where appropriate), as identified in Table 7.2 of the **RIAA** following the approach detailed in **Volume 1, Chapter 33: Cumulative Effects Assessment** of the **EIA Report**. They have been screened in on the basis of the species' sensitivity to the presence of the wind turbine generators (WTGs), the activities which will take place within those developments during operation and maintenance (O&M) stage and following review of the most recent in-combination assessments carried out for UK offshore wind farms in recent years.

2.1.1.3 In the absence of the cumulative effects framework, the Project has individually compiled quantitative impact predictions for other developments required to be included within in-combination assessments. A summary of the data source used for each development is provided in **Table 2.2** for clarity. For North Sea developments consented prior to the Berwick Bank application submission, totals for these developments were primarily sourced from Berwick Bank RIAA (Royal HaskoningDHV, 2022) providing consistency with other recent application submissions (such as Salamander, Ossian and Cenos Offshore Wind Farm). If values for North Sea developments consented prior to the Berwick Bank application submission were not provided within the Berwick Bank RIAA (Royal HaskoningDHV, 2022), impact predictions were derived from the Northeast and East ScotWind Projects (NEEOG) in-combination and cumulative totals (Royal HaskoningDHV, 2024).

2.1.1.4 Due to Berwick Bank Offshore Wind Farm presenting impact predictions for all UK North Sea developments consented prior to the Berwick Bank application submission combined, there is uncertainty regarding which projects are included within this total, the accuracy of the combined impact total and whether any correction has been applied to account for the latest collision risk modelling guidance (SNCBs, 2024). Nevertheless, these numbers are considered the most appropriate in-combination totals based on the recent advice provided to Cenos Offshore Wind Farm by NatureScot (Xodus Group Ltd.& APEM, 2024).

2.1.1.5 To account for potential uncertainty around the plans and projects considered within the in-combination assessment (**Table 2.2**), a tiering process has been used whereby projects are assigned a tier that reflects their current stage in the planning and development process. Descriptors of each tier are provided in Section 7.1 of the **RIAA**.

2.1.1.6 To note, minor rounding discrepancies may be apparent for the apportioned abundances / impact mortality predictions presented due to limited available information for some projects. However, this should not materially affect the overall assessment outcomes.

2.1.1.7 All assessments presented are assessed seasonally using the seasonal definition recommended by NatureScot (NatureScot, 2020).

Table 2.1 Summary of designated sites and features requiring an in-combination assessment

Designated site	Feature	Potential effect pathway(s)	Project alone annual maximum predicted mortality (breeding adults)	Potential for a likely significant effect in-combination?
Construction and decommissioning stages				
Buchan Ness to Collieston Coast Special Protection Area (SPA)	Guillemot (*Uria aalge*) and shag (*Phalacrocorax aristotelis*).	Direct temporary disturbance and displacement at the Scotstown landfall.	N/A – assessed on a qualitative basis only.	No - Effect pathway is both spatially and temporally limited, significantly limiting the potential for an in-combination effect to occur. The Project has also committed to installation using horizontal directional drilling (HDD) (see **Appendix B**; M-056) further reducing the potential for an in-combination effect to occur.
Ythan Estuary, Sands of Forvie and Meikle Loch SPA	Eider (*Somateria mollissima*).	Direct temporary disturbance and displacement at the Scotstown landfall.	N/A – assessed on a qualitative basis only.	No - Effect pathway is both spatially and temporally limited, significantly limiting the potential for an in-combination effect to occur. The Project has also committed to installation using HDD (see **Appendix B**; M-056) further reducing the potential for an in-combination effect to occur.
Buchan Ness to Collieston Coast SPA	Herring gull (*Larus argentatus*), kittiwake (*Rissa tridactyla*), guillemot, fulmar (*Fulmarus glacialis*) and shag.	Direct temporary habitat loss / disturbance within the offshore export cable corridor.	N/A – assessed on a qualitative basis only.	No - Effect pathway is both spatially and temporally limited, significantly limiting the potential for an in-combination effect to occur. The Project has also committed to installation using HDD (see **Appendix B**; M-056) further reducing the potential for an in-combination effect to occur.
Operation and maintenance stage				
Various SPAs (see Sections 6.2.22, 6.2.23,	Guillemot, razorbill (*Alca torda*), puffin (*Fratercula*	Entanglement	N/A – assessed on a qualitative basis only.	No – There is limited evidence to support the effect pathway that would lead to an LSE from the Project alone on designated sites

Designated site	Feature	Potential effect pathway(s)	Project alone annual maximum predicted mortality (breeding adults)	Potential for a likely significant effect in-combination?
6.2.24 and 6.2.27 of the RIAA)	*arctica*) and gannet (*Morus bassanus*).			and features, therefore limited potential for an in-combination effect to occur also.
Various SPAs (see Section 6.2.17 of the RIAA)	Fulmar.	Distributional responses.	N/A – assessed on a qualitative basis only.	No – There is limited evidence to support the effect pathway that would lead to an LSE from the Project alone or in-combination on designated sites and features, especially when considering their highly efficient flight behaviour.
Various SPAs (see Section 6.2.18 of the RIAA)	Storm petrel (*Hydrobates pelagicus*), Leach's storm petrel (*Hydrobates leucorhous*) and Manx shearwater (*Puffinus puffinus*).	light pollution, distributional responses and collision risk.	N/A – assessed on a qualitative basis only.	No - Limited evidence to support the effect pathways considered as leading to an impact for the Project alone on designated sites and features. Further, highly limited number of storm petrels and Manx shearwater were recorded within the 24 months of site-specific digital aerial surveys (DAS) for the Project providing further support that the Project will not tangibly impact petrel and shearwaters features either alone or in-combination.
Various SPAs (see Section 6.2.26 of the RIAA)	Migratory birds.	Collision risk.	<0.01-0.56	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible for each feature and would therefore would not materially contribute to any in-combination effect.
Hermaness, Saxa Vord and Valla Field SPA	Great skua (*Stercorarius skua*).	Collision risk.	0.03	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Fetlar SPA	Great skua.	Collision risk.	0.03	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.

Designated site	Feature	Potential effect pathway(s)	Project alone annual maximum predicted mortality (breeding adults)	Potential for a likely significant effect in-combination?
Noss SPA	Great skua.	Collision risk.	0.02	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Foula SPA	Great skua.	Collision risk.	0.07	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Fair Isle SPA	Great skua.	Collision risk.	0.04	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Hoy SPA	Great skua.	Collision risk.	0.10	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
St Kilda SPA	Great skua.	Collision risk.	0.00	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Handa SPA	Great skua.	Collision risk.	0.01	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
East Caithness Cliffs SPA	Great black-backed gull (*Larus marinus*).	Collision risk.	0.03	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.

Designated site	Feature	Potential effect pathway(s)	Project alone annual maximum predicted mortality (breeding adults)	Potential for a likely significant effect in-combination?
Copinsay SPA	Great black-backed gull.	Collision risk.	0.04	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Hoy SPA	Great black-backed gull.	Collision risk.	0.00	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Calf of Eday SPA	Great black-backed gull.	Collision risk.	0.01	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Buchan Ness to Collieston Coast SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	3.99	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Troup, Pennan and Lion's Heads SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	3.93	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Fowlsheugh SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	2.68	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
East Caithness Cliffs SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	5.65	Yes – Other developments identified leading to the potential for an in-combination effect to occur.

Designated site	Feature	Potential effect pathway(s)	Project alone annual maximum predicted mortality (breeding adults)	Potential for a likely significant effect in-combination?
North Caithness Cliffs SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.94	Yes – Assessed on a precautionary basis, though as the level of predicted impact is less than a single breeding adult per annum, the Project is unlikely to tangibly contribute an in-combination effect.
Forth Islands SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.57	Yes – Assessed on a precautionary basis, though as the level of predicted impact is less than a single breeding adult per annum, the Project is unlikely to tangibly contribute an in-combination effect.
Copinsay SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.16	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Hoy SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.04	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
St Abb's Head to Fast Castle SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.52	Yes – Assessed on a precautionary basis, though as the level of predicted impact is less than a single breeding adult per annum, the Project is unlikely to tangibly contribute an in-combination effect.
Fair Isle SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.07	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Calf of Eday SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.06	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.

Designated site	Feature	Potential effect pathway(s)	Project alone annual maximum predicted mortality (breeding adults)	Potential for a likely significant effect in-combination?
Rousay SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.08	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Marwick Head SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.08	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
West Westray SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.59	Yes – Assessed on a precautionary basis, though as the level of predicted impact is less than a single breeding adult per annum, the Project is unlikely to tangibly contribute an in-combination effect.
Farne Islands SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.39	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Sumburgh Head SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.08	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Noss SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.02	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Foula SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.03	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.

Designated site	Feature	Potential effect pathway(s)	Project alone annual maximum predicted mortality (breeding adults)	Potential for a likely significant effect in-combination?
Hermaness, Saxa Vord and Valla Field SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.02	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Cape Wrath SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	0.18	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Flamborough and Filey Coast SPA	Kittiwake.	Collision risk, distributional responses and combined effects.	1.15	No – theoretical connectivity limited to the non-breeding season only and the minimal predicted impact is likely a significant overestimate based on known migratory movements of kittiwakes in the non-breeding season (Frederikson *et al.* 2011; Furness, 2015). The project is therefore not expected to materially contribute to any in-combination effect.
Buchan Ness to Collieston Coast SPA	Guillemot.	Distributional responses.	141.15	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Troup, Pennan and Lion's Heads SPA	Guillemot.	Distributional responses.	121.31	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Copinsay SPA	Guillemot.	Distributional responses.	28.85	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Fair Isle SPA	Guillemot.	Distributional responses.	30.50	Yes – Other developments identified leading to the potential for an in-combination effect to occur.

Designated site	Feature	Potential effect pathway(s)	Project alone annual maximum predicted mortality (breeding adults)	Potential for a likely significant effect in-combination?
Calf of Eday SPA	Guillemot.	Distributional responses.	5.42	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Troup, Pennan and Lion's Heads SPA	Razorbill.	Distributional responses.	2.33	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Fowlsheugh SPA	Razorbill.	Distributional responses.	0.21	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
East Caithness Cliffs SPA	Razorbill.	Distributional responses.	0.75	Yes – Assessed on a precautionary basis, though as the level of predicted impact is less than a single breeding adult per annum, the Project is unlikely to tangibly contribute an in-combination effect.
North Caithness Cliffs SPA	Razorbill.	Distributional responses.	0.10	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Forth Islands SPA	Razorbill.	Distributional responses.	0.16	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
St Abb's Head to Fast Castle SPA	Razorbill.	Distributional responses.	0.07	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Fair Isle SPA	Razorbill.	Distributional responses.	0.34	Yes – Assessed on a precautionary basis, though as the level of predicted impact is less than a single breeding adult per annum,

Designated site	Feature	Potential effect pathway(s)	Project alone annual maximum predicted mortality (breeding adults)	Potential for a likely significant effect in-combination?
				the Project is unlikely to tangibly contribute an in-combination effect.
West Westray SPA	Razorbill.	Distributional responses.	0.03	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Foula SPA	Razorbill.	Distributional responses.	0.02	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Flamborough and Filey Coast SPA	Razorbill.	Distributional responses.	0.60	No – Theoretical connectivity limited to the non-breeding season only and maximum predicted impact annually is less than a single breeding adult per annum. Such a limited level of predicted impact and connectivity from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
North Caithness Cliffs SPA	Puffin.	Distributional responses.	0.56	Yes – Assessed on a precautionary basis, though as the level of predicted impact is less than a single breeding adult per annum, the Project is unlikely to tangibly contribute an in-combination effect.
Forth Islands SPA	Puffin.	Distributional responses.	7.01	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Hoy SPA	Puffin.	Distributional responses.	0.05	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.

Designated site	Feature	Potential effect pathway(s)	Project alone annual maximum predicted mortality (breeding adults)	Potential for a likely significant effect in-combination?
Fair Isle SPA	Puffin.	Distributional responses.	1.11	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Farne Islands SPA	Puffin.	Distributional responses.	0.16	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Sule Skerry and Sule Stack SPA	Puffin.	Distributional responses.	3.92	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Noss SPA	Puffin.	Distributional responses.	0.10	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Foula SPA	Puffin.	Distributional responses.	0.35	Yes – Assessed on a precautionary basis, though as the level of predicted impact is less than a single breeding adult per annum, the Project is unlikely to tangibly contribute an in-combination effect.
Hermaness, Saxa Vord and Valla Field SPA	Puffin.	Distributional responses.	0.03	No – Such a level of predicted impact from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.
Forth Islands SPA	Gannet.	Collision risk, distributional responses and combined effects.	16.89	Yes – Other developments identified leading to the potential for an in-combination effect to occur.

Designated site	Feature	Potential effect pathway(s)	Project alone annual maximum predicted mortality (breeding adults)	Potential for a likely significant effect in-combination?
Fair Isle SPA	Gannet.	Collision risk, distributional responses and combined effects.	1.51	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Sule Skerry and Sule Stack SPA	Gannet.	Collision risk, distributional responses and combined effects.	1.11	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Noss SPA	Gannet.	Collision risk, distributional responses and combined effects.	2.38	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
North Rona and Sula Sgeir SPA	Gannet.	Collision risk, distributional responses and combined effects.	0.83	Yes – Assessed on a precautionary basis, though as the level of predicted impact is less than a single breeding adult per annum, the Project is unlikely to tangibly contribute an in-combination effect.
Hermaness, Saxa Vord and Valla Field SPA	Gannet.	Collision risk, distributional responses and combined effects.	2.90	Yes – Other developments identified leading to the potential for an in-combination effect to occur.
Flamborough and Filey Coast SPA	Gannet.	Collision risk, distributional responses and combined effects.	0.28	No – Theoretical connectivity limited to the non-breeding season only and maximum predicted impact annually is significantly less than a single breeding adult per annum. Such a limited level of predicted impact and connectivity from the Project alone can confidently be concluded as non-tangible and would therefore would not materially contribute to any in-combination effect.

Table 2.2 Data sources used to inform in-combination assessments presented

Tier	Project	Data Source
1a to 1c	UK North Sea Projects up to the point of Berwick Bank.	Royal HaskoningDHV (2022) Berwick Bank Wind Farm Report to Inform Appropriate Assessment. Or Royal HaskoningDHV (2024a) In-combination and Cumulative Totals for Seabird Species of Key Importance to Northeast and East ScotWind Projects.
1c	Green Volt.	APEM (2023) Green Volt Offshore Wind Farm Offshore Environmental Impact Assessment: Supplementary Ornithological Assessment.
1c	Pentland Floating Offshore Wind Farm.	Xodus Group Ltd. (2022) Pentland Floating Offshore Wind Farm Habitats Regulations Appraisal: Offshore Report to Inform Appropriate Assessment.
1c	Berwick Bank.	Royal HaskoningDHV (2022) Berwick Bank Wind Farm Report to Inform Appropriate Assessment.
1c	Salamander.	Niras Group (UK) Ltd. (2024) Salamander Offshore Wind Farm Offshore Report to Inform Appropriate Assessment.
1c	Culzean.	Xodus Group Ltd. (2024) Culzean - Floating Offshore Wind Turbine Pilot Project HRA Report including HRA Screening and RIAA.
1c	West of Orkney.	MacArthur Green (2024) West of Orkney Windfarm Offshore Ornithology Additional Information Addendum to the Report to Inform Appropriate Assessment: HRA Stage 2 - SPA Appropriate Assessment.
1d	Ossian.	NIRAS Group (UK) Ltd. and RPS Energy (2024) Ossian Offshore Wind Farm Report to Inform Appropriate Assessment Part 3: Assessment of Special Protection Areas and Ramsar Sites.
1d	Cenos.	Xodus Group Ltd.& APEM (2024) Cenos Offshore Windfarm Report to Inform Appropriate Assessment.

Tier	Project	Data Source
1d	Dogger Bank South (East and West).	RWE Renewables (2025) Dogger Bank South Offshore Wind Farms Report to Inform Appropriate Assessment: Habitats Regulations Assessment, Volume 6, Part 4 of 4 – Marine Ornithological Features (Revision 5) (Clean).
1d	Five Estuaries.	Five Estuaries Offshore Wind Farm Environmental Statement Volume 5, Report 4: Report to Inform Appropriate Assessment (Tracked)
1d	North Falls.	Royal HaskoningDHV (2024b) North Falls Offshore Wind Farm Report to Inform Appropriate Assessment Part 4 Offshore Ornithology (Birds Directive Annex 1 and Migratory Species).
1d	Outer Dowsing.	GoBe (2025) Outer Dowsing Offshore Wind Farm Habitats Regulations Assessment: Report to Inform Appropriate Assessment.
1d	Caledonia (Offshore Wind Farm).	GoBe (2024) Caledonia Offshore Wind Farm Application Document 13 Part 4: Caledonia North Report to Inform Appropriate Assessment.
1d	Muir Mhor.	Natural Power Ltd. (2024) Muir Mhòr Offshore Wind Farm Environmental Impact Assessment Report Volume 3, Appendix 11.5: Population Viability Analysis Report.
1d	Buchan.	Natural Power Ltd. (2025) Buchan Offshore Windfarm Part 3 – Assessment on Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment.
2	Dogger Bank D.	Royal HaskoningDHV & APEM (2025) Dogger Bank D Report to Inform Appropriate Assessment.

2.2 Kittiwake

2.2.1 Buchan Ness to Collieston Coast SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.2.1.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.3** and **Table 2.4**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.5**. English offshore wind farm developments are excluded from consideration in relation to distributional response effects, as Natural England do not advise that such an effect pathway is required to be assessed for kittiwake.

2.2.1.2 The level of predicted displacement and consequent mortality assessed is based on the guidance approach rates presented within Section 6.2.7 of the **RIAA**, recommended by NatureScot. Information relating to the suitability of such rates at informing assessments is provided in Section 6.2.7 of the **RIAA**. A developer's approach is not presented, as the Applicant considers there is insufficient evidence to justify a requirement to assess kittiwake for distributional response effects (see Section 6.2.7 of the **RIAA** for further detail).

Table 2.3 In-combination predicted abundance apportioned to the Buchan Ness to Collieston Coast SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	1,322.2	877.8	2,200.0	2,200.0
Green Volt	28.4	2.0	2.7	4.7	33.1
Pentland Floating Offshore Wind Farm	-	-	-	-	-
Berwick Bank	221.5	201.4	330.4	531.8	753.3
Salamander	1,289.6	N/A	N/A	3.7	1,293.2
Culzean	-	-	-	-	-
West of Orkney	11.1	33.3	11.1	44.4	55.6
Ossian	341.7	13.9	10.2	24.1	365.8
Cenos	28.6	N/A	N/A	1.9	30.6

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Dogger Bank South (East and West)					
Five Estuaries					
North Falls					
Outer Dowsing					
Caledonia (Offshore Wind Farm)	67.9	N/A	N/A	8.8	76.7
Muir Mhor	N/A*	18.0	1.0	19.0	N/A
Buchan	N/A*	7.4	1.7	9.1	N/A
Dogger Bank D					
The Project	105.0	N/A	N/A	3.5	108.5
Total	2,093.9	1,598.3	1,234.9	2,851.0	4,916.7

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of Buchan Ness to Collieston Coast SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled out and therefore not assessed. Greyed-out cells denote English projects where there is no requirement to assess kittiwake for distributional response effects. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.4 In-combination predicted distributional response consequent mortality apportioned to the Buchan Ness to Collieston Coast SPA kittiwake feature

Project	Breeding		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
UK North Sea Projects up to the point of Berwick Bank	-	-	6.6	19.8	6.6	19.8
Green Volt	0.1	0.3	-	-	0.1	0.3
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-
Berwick Bank	0.7	2.0	1.6	4.8	2.3	6.8
Salamander	3.9	11.6	-	-	3.9	11.7
Culzean	-	-	-	-	-	-
West of Orkney Environmental Impact Assessment (EIA) Addendum	-	0.1	0.1	0.4	0.2	0.5
Ossian	1.0	3.1	0.1	0.2	1.1	3.3
Cenos	0.1	0.3	-	-	0.1	0.3
Dogger Bank South (East and West)						

Project	Breeding		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
Five Estuaries						
North Falls						
Outer Dowsing						
Caledonia (Offshore Wind Farm)	0.2	0.6	0.0	0.1	0.2	0.7
Muir Mhor	5.2*	5.2*	0.1	0.2	5.3	5.4
Buchan	0.6*	0.6*	<0.1	0.1	0.6	0.7
Dogger Bank D						
The Project	0.3	0.9	<0.1	<0.1	0.3	1.0
Total	12.1	24.8	8.5	25.6	20.7	50.4

Table note: *Impact prediction based on SeabORD modelling.

Table 2.5 Buchan Ness to Collieston Coast SPA kittiwake feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.4

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1-3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	22,590	12.1 to 24.8	8.5 to 25.6	20.7 to 50.4	0.054 to 0.110	0.038 to 0.113	0.092 to 0.223
	Latest Count (2025).	31,406				0.039 to 0.079	0.027 to 0.081	0.066 to 0.161
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	22,590	7.4 to 10.8	6.8 to 20.4	14.2 to 31.1	0.033 to 0.048	0.030 to 0.090	0.063 to 0.138
	Latest Count (2025).	31,406				0.024 to 0.034	0.022 to 0.065	0.045 to 0.099

2.2.1.3 As summarised in **Table 2.5**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Buchan Ness to Collieston Coast SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via Population Viability Analysis (PVA). The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage potential collision risk impacts on the qualifying feature in combination

2.2.1.4 The predicted consequent mortality in relation to collision risk in-combination apportioned to the kittiwake feature of Buchan Ness to Collieston Coast SPA is provided in **Table 2.6**. The predicted change in survival rate for scenarios considered are presented in **Table 2.7**.

Table 2.6 In-combination predicted collision mortality apportioned to the Buchan Ness to Collieston Coast SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	20.5	20.6	15.9	36.5	57.0
Green Volt	0.8	0.1	0.1	0.2	1.0
Pentland Floating Offshore Wind Farm	-	-	-	-	-
Berwick Bank*	4.6	3.2	2.2	5.5	10.0
Salamander	5.1	<0.1	<0.1	<0.1	5.1
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	0.1	0.5	0.3	0.8	0.9
Ossian	3.1	0.1	0.1	0.2	3.3
Cenos	1.1	0.0	0.1	0.1	1.2

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Dogger Bank South (East and West)	-	0.7	1.4	2.1	2.1
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	0.1	0.1	0.1	0.1
Caledonia (Offshore Wind Farm)	1.8	N/A	N/A	0.2	2.1
Muir Mhor	8.4	0.2	0.0	0.2	8.8
Buchan	0.5	0.1	0.1	0.2	0.7
Dogger Bank D	-	-	-	-	-
The Project	2.7	0.3	0.1	0.4	3.0
Total	48.6	25.9	20.5	46.6	95.4

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of Buchan Ness to Collieston Coast SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023).

Table 2.7 Buchan Ness to Collieston Coast SPA kittiwake feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.6

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al*. (2023).	22,590	48.6	46.6	95.4	0.215	0.206	0.422
	Latest Count (2025).	31,406				0.155	0.148	0.304
All projects excluding consented projects with a commitment to compensation	Burnell *et al*. (2023).	22,590	38.0	40.1	78.3	0.168	0.177	0.347
	Latest Count (2025).	31,406				0.121	0.128	0.249

2.2.1.5 As summarised in **Table 2.7**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Buchan Ness to Collieston Coast SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination

2.2.1.6 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.6**) and distributional responses (**Table 2.4**) in-combination is presented within **Table 2.8**. Predicted consequent change in survival rate for the kittiwake feature of Buchan Ness to Collieston Coast SPA for each scenario considered is also presented in **Table 2.8**.

2.2.1.7 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.8 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Buchan Ness to Collieston Coast SPA kittiwake feature

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1-3% mortality plus Collision Risk Modelling (CRM) (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	22,590	60.7 to 73.3	55.1 to 72.1	116.1 to 145.8	0.269 to 0.325	0.244 to 0.319	0.514 to 0.645
	Latest Count (2025).	31,406				0.193 to 0.234	0.175 to 0.230	0.370 to 0.464
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	22,590	45.4 to 48.	46.9 to 151.4	92.6 to 109.4	0.201 to 0.216	0.208 to 0.670	0.410 to 0.485
	Latest Count (2025).	31,406				0.145 to 0.155	0.149 to 0.482	0.295 to 0.348

2.2.1.8 As summarised in **Table 2.8**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Buchan Ness to Collieston Coast SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.2.1.9 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 31,406 breeding adults. Outputs are presented in **Table 2.9** below, including the predicted median reduction in annual growth rate (counterfactual growth rate (CGR) and median reduction in final population size (counterfactual population size (CPS)). PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix C: Offshore Ornithology HRA Apportionment Report**.

Table 2.9 PVA results for annual in-combination predicted impacts apportioned to the kittiwake feature of Buchan Ness to Collieston Coast SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
Distributional responses	30% displacement; 1% mortality for all projects.	20.7	0.999	0.08	0.972	2.79
	30% displacement; 3% mortality for all projects.	50.4	0.998	0.19	0.934	6.61
	30% displacement; 1% mortality for all projects excluding the Project.	20.4	0.999	0.08	0.973	2.74
	30% displacement; 3% mortality for all projects excluding the Project.	49.4	0.998	0.19	0.935	6.49
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	14.2	0.999	0.06	0.980	1.95
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	31.1	0.999	0.12	0.958	4.17
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	13.9	0.999	0.05	0.981	1.87
	30% displacement; 3% mortality for all projects excluding consented projects	30.1	0.999	0.11	0.960	4.01

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	with a commitment to compensation and the Project.					
Collision risk	All projects.	95.4	0.996	0.36	0.878	12.16
	All projects excluding the Project.	92.4	0.997	0.35	0.882	11.77
	All projects excluding consented projects with a commitment to compensation.	78.3	0.997	0.30	0.899	10.05
	All projects excluding consented projects with a commitment to compensation and the Project.	75.3	0.997	0.28	0.903	9.71
Combined effects	30% displacement; 1% mortality for all projects.	116.1	0.996	0.44	0.854	14.60
	30% displacement; 3% mortality for all projects.	145.8	0.995	0.55	0.820	17.97
	30% displacement; 1% mortality for all projects excluding the Project.	112.8	0.996	0.42	0.858	14.20
	30% displacement; 3% mortality for all projects excluding the Project.	141.8	0.995	0.53	0.825	17.54
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	92.6	0.997	0.35	0.882	11.81

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	109.4	0.996	0.41	0.862	13.76
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	89.2	0.997	0.34	0.885	11.46
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	105.5	0.996	0.40	0.867	13.31

2.2.1.10 The known recent and historic growth trends of the kittiwake feature of Buchan Ness SPA are presented within Section 6.2.7 of the **RIAA**. When interpreting the PVA outputs presented within **Table 2.9**, it is important to consider the following points:

- Although the colony underwent significant decline between 1998 and 2019, the two most recent colony counts in 2023 and 2025 have recorded significant increase in compound annual growth rate (5.65% and 7.66%, respectively; see Plate 6.1 and Table 6.11 of the **RIAA**).
- Declines during the 2000s are likely attributed to decreases in availability of primary food resources such as sandeel, specifically through impacts of climate change and sandeel fisheries (Burnell *et al.,* 2023).
- Recent population growth may reflect remedial actions such as the sandeel (Prohibition of Fishing) (Scotland) Order 2024 and indirect effects of Highly Pathogenic Avian Influenza (HPAI) reducing predation pressure by impacting species such as great skua (Burnell *et al.,* 2023).
- In Scotland the kittiwake population increased by 21% post-HPAI in contrast to pre-HPAI, despite a minimum of 760 positive cases of the virus recorded for kittiwake (Tremlett et al. 2024). Individual kittiwake colony growth rate changes varied considerably from -83% to +191%, suggesting infection may have been more localised in comparison to the infection spread reported for other species (Tremlett *et al*., 2024). In relation to Buchan Ness to Collieston Coast SPA, a 20% increase in population size was recorded post HPAI suggesting the colony was not significantly affected by HPAI, though further site-specific information on HPAI to support this conclusion is limited.
- The kittiwake feature of Buchan Ness to Collieston Coast SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), limited evidence to suggest kittiwake are sensitive to distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.2.1.11 If the recent population trends remain viable for the colony, the reduction in growth rates presented within **Table 2.9** would not significantly impede the long-term recovery of the feature. Though when considering the historic long-term decline of the colony there is uncertainty with respect to the future growth trend of the feature. However, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.02% per annum (**Table 2.9**). Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.2.1.12 Therefore, **the potential for an Adverse Effect of Site Integrity (AEoSI) in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, kittiwake will be maintained as a feature in the long term.

2.2.2 Troup, Pennan and Lion's Heads SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.2.2.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.10** and **Table 2.11**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.12**. English offshore wind farm developments are excluded from consideration in relation to distributional response effects, as Natural England do not advise that such an effect pathway is required to be assessed for kittiwake.

2.2.2.2 The level of predicted displacement and consequent mortality assessed is based on the guidance approach rates presented within Section 6.2.4 of the **RIAA**, recommended by NatureScot. Information relating to the suitability of such rates at informing assessments is provided in Section 6.2.4 of the **RIAA**. A developer's approach is not presented, as the Applicant considers there is insufficient evidence to justify a requirement to assess kittiwake for distributional response effects (see Section 6.2.4 of the **RIAA** for further detail).

Table 2.10 In-combination predicted abundance apportioned to the Troup, Pennan and Lion's Heads SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	1,166.7	1,566.7	1,044.4	2,611.1	3,777.8
Green Volt	21.3	2.3	3.2	5.6	26.8
Pentland Floating Offshore Wind Farm	-	-	-	-	-
Berwick Bank	92.3	385.4	246.2	631.6	723.9
Salamander	422.1	N/A	N/A	4.3	426.4
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	7.8	34.4	16.7	51.1	58.9
Ossian	154.0	16.3	12.5	28.7	182.7
Cenos	20.6	N/A	N/A	2.2	20.6
Dogger Bank South (East and West)					

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Five Estuaries					
North Falls					
Outer Dowsing					
Caledonia (Offshore Wind Farm)	204.6	N/A	N/A	10.4	215.0
Muir Mhor	N/A*	21.0	1.2	22.2	N/A
Buchan	N/A*	8.8	2.0	10.8	N/A
Dogger Bank D					
The Project	101.2	N/A	N/A	4.1	105.3
Total	2,190.6	2,034.9	1,326.2	3,382.1	5,537.4

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of Troup, Pennan and Lion's Heads SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. Greyed-out cells denote English projects where there is no requirement to assess kittiwake for distributional response effects. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.11 In-combination predicted distributional response consequent mortality apportioned to the Troup, Pennan and Lion's Heads SPA kittiwake feature

Project	Breeding		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
UK North Sea projects including Berwick Bank	3.8	11.3	9.8	29.2	13.5	40.6
UK North Sea Projects up to the point of Berwick Bank	3.5	10.5	8.0	23.5	11.3	34.1
Green Volt	0.1	0.2	-	-	0.1	0.2
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-
Berwick Bank	0.3	0.8	1.8	5.7	2.2	6.5
Salamander	1.3	3.8	-	0.1	1.3	3.8
Culzean	-	-	-	-	-	-
West of Orkney EIA Addendum	-	0.1	0.2	0.5	0.2	0.5
Ossian	0.5	1.4	0.1	0.3	0.5	1.6
Cenos	0.1	0.2	-	-	0.1	0.2
Dogger Bank South (East and West)						

Project	Breeding		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
Five Estuaries						
North Falls						
Outer Dowsing						
Caledonia (Offshore Wind Farm)	0.6	1.8	<0.1	0.1	0.6	1.9
Muir Mhor	4.8*	4.8*	0.1	0.2	4.9	5.0
Buchan	1.4*	1.4*	<0.1	0.1	1.4	1.5
Dogger Bank D						
The Project	0.3	0.9	<0.1	<0.1	0.3	0.9
Total	12.9	26.0	10.2	30.5	23.0	56.3

Table note: *Impact prediction based on SeabORD modelling.

Table 2.12 Troup, Pennan and Lion's Heads SPA kittiwake feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.11

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 30% displacement and 1 to 3% mortality (breeding adults)			Change In survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	21,232	12.9 to 26.0	10.2 to 30.5	23.0 to 56.3	0.061 to 0.122	0.048 to 0.144	0.108 to 0.265
	Latest Count (2017 to 2023).	27,344				0.047 to 0.095	0.037 to 0.112	0.084 to 0.206
Excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	21,232	11.2 to 21.2	8.4 to 24.7	19.4 to 45.8	0.053 to 0.100	0.040 to 0.116	0.091 to 0.216
	Latest Count (2017 to 2023).	27,344				0.041 to 0.077	0.031 to 0.090	0.071 to 0.167

2.2.2.3 As summarised in **Table 2.12**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Troup, Pennan and Lion's Heads SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed using PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage potential collision risk impacts on the qualifying feature in combination

2.2.2.4 The predicted consequent mortality in relation to collision risk in-combination apportioned to the kittiwake feature of Troup, Pennan and Lion's Heads SPA is provided in **Table 2.13**. The predicted change in survival rate for scenarios considered are presented in **Table 2.14**.

Table 2.13 In-combination predicted collision mortality apportioned to the Troup, Pennan and Lion's Heads SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	6.7	24.6	18.8	43.4	50.1
Green Volt	0.6	0.1	0.1	0.2	0.8
Pentland Floating Offshore Wind Farm	-	-	-	-	-
Berwick Bank*	1.9	3.7	2.7	6.4	8.3
Salamander	1.7	-	<0.1	<0.1	1.7
Ossian	1.4	0.2	0.1	0.3	1.7
Cenos	0.8	0.1	0.1	0.1	0.9
Dogger Bank South (East and West)	-	0.8	1.7	2.6	2.6
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	0.1	0.1	0.1	0.1
West of Orkney EIA Addendum	0.1	0.6	0.4	1.0	1.1

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Caledonia (Offshore Wind Farm)	5.6	N/A	N/A	0.3	5.8
Muir Mhor	4.1	0.2	<0.1	0.3	4.4
Buchan	0.5	0.1	0.5	0.6	1.1
Culzean	-	-	-	-	-
Dogger Bank D	-	-	-	-	-
The Project	2.6	0.3	0.1	0.4	3.0
Total	26.0	30.8	24.6	55.7	81.7

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of Troup, Pennan and Lion's Heads SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023).

Table 2.14 Troup, Pennan and Lion's Heads SPA kittiwake feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.13

<table>
<tr><th rowspan="2">Scenario</th><th rowspan="2">Population count</th><th rowspan="2">Population size (breeding adults)</th><th colspan="3">Prediction collision (breeding adults per annum)</th><th colspan="3">Change In survival rate (%)</th></tr>
<tr><th>Breeding</th><th>Non-breeding</th><th>Annual</th><th>Breeding</th><th>Non-breeding</th><th>Annual</th></tr>
<tr><td rowspan="2">**All projects**</td><td>Burnell *et al*. (2023).</td><td>21,232</td><td rowspan="2">26.0</td><td rowspan="2">55.7</td><td rowspan="2">81.7</td><td>0.122</td><td>0.263</td><td>0.385</td></tr>
<tr><td>Latest Count (2017 to 2023).</td><td>27,344</td><td>0.095</td><td>0.204</td><td>0.299</td></tr>
<tr><td rowspan="2">**Excluding consented projects with a commitment to compensation**</td><td>Burnell *et al*. (2023).</td><td>21,232</td><td rowspan="2">21.7</td><td rowspan="2">48.1</td><td rowspan="2">69.8</td><td>0.102</td><td>0.226</td><td>0.329</td></tr>
<tr><td>Latest Count (2017 to 2023).</td><td>27,344</td><td>0.079</td><td>0.176</td><td>0.255</td></tr>
</table>

2.2.2.5 As summarised in **Table 2.14**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Troup, Pennan and Lion's Heads SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed using PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination

2.2.2.6 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.13**) and distributional responses (**Table 2.11**) in-combination is presented within **Table 2.15**. Predicted consequent change in survival rate for the kittiwake feature of Troup, Pennan and Lion's Heads SPA for each scenario considered is also presented in **Table 2.15**.

2.2.2.7 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.15 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Troup, Pennan and Lion's Heads SPA kittiwake feature

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 30% displacement and 1-3% mortality plus CRM (breeding adults)			Change In survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al*. (2023).	21,232	38.9 to 51.9	66.0 to 86.3	104.7 to 138.0	0.183 to 0.245	0.311 to 0.406	0.493 to 0.650
	Latest Count (2017 to 2023).	27,344				0.142 to 0.190	0.241 to 0.315	0.383 to 0.505
Excluding consented projects with a commitment to compensation	Burnell *et al*. (2023).	21,232	32.9 to 42.8	56.5 to 72.8	89.1 to 115.6	0.155 to 0.202	0.266 to 0.343	0.420 to 0.544
	Latest Count (2017 to 2023).	27,344				0.120 to 0.157	0.207 to 0.266	0.326 to 0.423

2.2.2.8 As summarised in **Table 2.15**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Troup, Pennan and Lion's Heads SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.2.2.9 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 27,344 breeding adults. Outputs are presented in **Table 2.16** growth rate (CGR) and median reduction in final population size (CPS). PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.16 PVA results for annual in-combination predicted impacts apportioned to the kittiwake feature of Troup, Pennan and Lion's Heads SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
Distributional responses	30% displacement; 1% mortality for all projects.	23.0	0.999	0.10	0.965	3.52
	30% displacement; 3% mortality for all projects.	56.3	0.998	0.24	0.916	8.43
	30% displacement; 1% mortality for all projects excluding the Project.	22.6	0.999	0.10	0.966	3.41
	30% displacement; 3% mortality for all projects excluding the Project.	55.3	0.998	0.24	0.918	8.25
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	19.4	0.999	0.08	0.970	2.99
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	45.8	0.998	0.20	0.931	6.87
	30% displacement; 1% mortality for all projects excluding consented projects with a	19.0	0.999	0.08	0.971	2.95

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	commitment to compensation and the Project.					
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	44.8	0.998	0.19	0.933	6.75
Collision risk	All projects.	81.7	0.996	0.35	0.880	11.97
	All projects excluding the Project.	78.7	0.997	0.34	0.884	11.59
	All projects excluding consented projects with a commitment to compensation.	69.8	0.997	0.30	0.897	10.28
	All projects excluding consented projects with a commitment to compensation and the Project.	66.8	0.997	0.29	0.901	9.89
Combined effects	30% displacement; 1% mortality for all projects.	104.7	0.995	0.45	0.850	15.05
	30% displacement; 3% mortality for all projects.	138.0	0.994	0.60	0.807	19.34
	30% displacement; 1% mortality for all projects excluding the Project.	101.4	0.996	0.44	0.854	14.61

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	30% displacement; 3% mortality for all projects excluding the Project.	134.1	0.994	0.58	0.811	18.87
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	89.1	0.996	0.39	0.870	12.99
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	115.6	0.995	0.50	0.835	16.49
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	85.8	0.996	0.37	0.875	12.51
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	111.6	0.995	0.48	0.840	15.97

2.2.2.10 The known recent and historic growth trends of the kittiwake feature of Troup, Pennan and Lion's Heads SPA are presented within Section 6.2.8 of the **RIAA**. When interpreting the PVA outputs presented within **Table 2.16**, it is important to consider the following points:

- The population of the kittiwake colony has fluctuated, though with an overall decline between 1995 and 2017 based on the Troup, Pennan and Lion's Head Royal Society for the Protection of Birds (RSPB) count sector (see Plate 6.3 of the **RIAA**).
- Declines during the 2000s are likely attributed to decreases in availability of primary food resources such as sandeel, specifically through impacts of climate change and sandeel fisheries (Burnell *et al.,* 2023).
- The most recent colony counts since 2017 for the Troup, Pennan and Lion's Head RSPB count sector have recorded a slight increase in compound annual growth rate (6.38% from 2017 to 2023 and 0.79% from 2021 to 2023; see Table 6.24 of the **RIAA**).
- The recent population growth may reflect remedial actions such as the sandeel (Prohibition of Fishing) (Scotland) Order 2024 and indirect effects of HPAI reducing predication pressure by impacting species such as great skua (Burnell *et al.,* 2023).
- In Scotland the kittiwake population increased by 21% post-HPAI in contrast to pre-HPAI, despite a minimum of 760 positive cases of the virus recorded for kittiwake (Tremlett *et al*., 2024). Individual kittiwake colony growth rate changes varied considerably from -83% to +191%, suggesting infection may have been more localised in comparison to the infection spread reported for other species (Tremlett *et al*., 2024). In relation to Troup, Pennan and Lion's Head SPA, a 2% increase in population size was recorded post HPAI suggesting the colony was not significantly affected by HPAI, though further site-specific information on HPAI to support this conclusion is limited.
- The kittiwake feature of Troup, Pennan and Lion's Heads SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), limited evidence to suggest kittiwake are sensitive to distributional response effects (see Section 6.2.8 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.2.2.11 If the recent population trends remain viable for the colony, then the reduction in growth rates presented within **Table 2.16**, would not significantly impede the long-term recovery of the feature. Though when considering the historic long-term decline of the colony there is uncertainty with respect to the future growth trend of the feature. However, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.02% per annum (**Table 2.16)**. Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.2.2.12 Therefore, **the potential for an AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**.

2.2.3 Fowlsheugh SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.2.3.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.17** and **Table 2.18**, respectively with the predicted change in survival rate for scenarios considered presented in **Table 2.19**. English offshore wind farm developments are excluded from consideration in relation to distributional response effects, as Natural England do not advise that such an effect pathway is required to be assessed for kittiwake.

2.2.3.2 The level of predicted displacement and consequent mortality assessed is based on the rates presented within Section 6.2.4 of the **RIAA**, which were recommended by NatureScot. Information relating to the suitability of such rates at informing assessments is provided in Section 6.2.4 of the **RIAA**. A developer's approach is not presented, as the Applicant considers there is insufficient evidence to justify a requirement to assess kittiwake for distributional response effects (see Section 6.2.4 of the **RIAA** for further detail).

Table 2.17 In-combination predicted abundance apportioned to the Fowlsheugh SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea projects including Berwick Bank	-	-	-	-	-
UK North Sea Projects up to the point of Berwick Bank	3,466.7	988.9	655.6	1,644.4	5,111.1
Green Volt	16.8	1.5	2.0	3.5	20.3
Pentland Floating Offshore Wind Farm	-	-	-	-	-
Berwick Bank	3,174.4	247.8	145.5	393.3	3,567.7
Salamander	265.1	N/A	N/A	2.7	267.9
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	6.7	22.2	10.0	32.2	38.9
Ossian	527.0	10.5	7.4	17.8	544.8

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Cenos	41.5	N/A	N/A	1.6	41.5
Dogger Bank South (East and West)					
Five Estuaries					
North Falls					
Outer Dowsing					
Caledonia (Offshore Wind Farm)	50.0	N/A	N/A	6.5	56.5
Muir Mhor	N/A*	13.6	0.8	14.3	N/A*
Buchan	N/A*	5.6	1.3	6.9	N/A*
Dogger Bank D					
The Project	69.9	N/A	N/A	2.6	72.4
Total	7,618.0	1,290.0	822.6	2,125.8	9,721.1

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of Fowlsheugh SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. Greyed-out cells denote English projects where there is no requirement to assess kittiwake for distributional response effects. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.18 In-combination predicted distributional response consequent mortality apportioned to the Fowlsheugh SPA kittiwake feature

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
UK North Sea projects including Berwick Bank	20.0	59.8	3.7	11.1	2.4	7.2	6.1	18.3	26.1	78.1
UK North Sea Projects up to the point of Berwick Bank	10.4	31.2	3.0	8.9	2.0	5.9	5.0	14.8	15.3	46.0
Green Volt	0.1	0.2	-	-	-	-	-	-	0.1	0.2
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-	-	-	-	-
Berwick Bank	9.6	28.6	0.7	2.2	0.4	1.3	1.1	3.5	10.8	32.1
Salamander	0.8	2.4	N/A	N/A	N/A	N/A	-	-	0.8	2.4
Culzean	-	-	-	-	-	-	-	-	-	-
West of Orkney EIA Addendum	-	0.1	0.1	0.2	-	0.1	0.1	0.3	0.1	0.4
Ossian	1.6	4.8	-	0.1	-	0.1	0.1	0.2	1.6	4.9

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
Cenos	0.1	0.4	N/A	N/A	N/A	N/A	-	-	0.1	0.4
Dogger Bank South (East and West)										
Five Estuaries										
North Falls										
Outer Dowsing										
Caledonia (Offshore Wind Farm)	0.1	0.4	N/A	N/A	N/A	N/A	<0.1	0.1	0.2	0.5
Muir Mhor	-*	-*	<0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.1
Buchan	1.8*	1.8*	<0.1	0.1	0.0	0.0	0.0	0.1	1.8	1.9
Dogger Bank D										
The Project	0.2	0.6	N/A	N/A	N/A	N/A	0.0	0.0	0.2	0.7
Total	24.8	70.6	3.9	11.6	2.4	7.4	6.4	19.1	31.1	89.6

Table note: *Impact prediction based on SeabORD modelling.

Table 2.19 Fowlsheugh SPA kittiwake feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.18

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 30% displacement and 1 to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	28,078	24.8 to 70.6	6.4 to 19.1	31.1 to 89.6	0.088 to 0.251	0.023 to 0.068	0.111 to 0.319
	Latest Count (2023).	30,966				0.080 to 0.228	0.021 to 0.062	0.100 to 0.289
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	28,078	14.3 to 39.3	5.2 to 15.3	19.3 to 54.5	0.051 to 0.140	0.018 to 0.054	0.069 to 0.194
	Latest Count (2023).	30,966				0.046 to 0.127	0.017 to 0.049	0.062 to 0.176

2.2.3.3 As summarised in **Table 2.19**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Fowlsheugh SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed using PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage potential collision risk impacts on the qualifying feature in combination

2.2.3.4 The predicted consequent mortality in relation to collision risk in-combination apportioned to the kittiwake feature of Fowlsheugh SPA is provided in **Table 2.20**. The predicted change in survival rate for scenarios considered are presented in **Table 2.21**.

Table 2.20 In-combination predicted collision mortality apportioned to the Fowlsheugh SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	48.8	15.4	11.8	27.2	76.0
Green Volt	0.5	0.1	0.1	0.1	0.6
Pentland Floating Offshore Wind Farm	-	-	-	-	-
Berwick Bank*	64.8	2.4	1.6	4.0	68.8
Salamander	1.1	-	<0.1	<0.1	1.1
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	0.1	0.4	0.2	0.6	0.7
Ossian	4.7	0.1	0.1	0.2	4.9
Cenos	1.6	-	-	0.1	1.7

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Dogger Bank South (East and West)	-	0.5	1.0	1.6	1.6
Five Estuaries	-	-	-	-	-
North Falls	-	0.2	0.1	0.3	0.3
Outer Dowsing	-	0.1	<0.1	0.1	0.1
Caledonia (Offshore Wind Farm)	1.4	N/A	N/A	0.2	1.5
Muir Mhor	4.7	0.2	<0.1	0.2	4.9
Buchan	0.3	<0.1	0.2	0.3	0.6
Dogger Bank D	-	2.4	2.2	4.6	4.6
The Project	1.8	0.2	0.1	0.3	2.0
Total	129.6	21.9	17.5	39.6	169.2

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of Buchan Ness to Collieston Coast SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023).

Table 2.21 Fowlsheugh SPA kittiwake feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.20

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al*. (2023).	28,078	129.6	39.6	169.2	0.462	0.141	0.603
	Latest Count (2023).	30,966				0.419	0.128	0.546
All projects excluding consented projects with a commitment to compensation	Burnell *et al*. (2023).	28,078	63.2	34.8	98.0	0.225	0.124	0.349
	Latest Count (2023).	30,966				0.204	0.112	0.317

2.2.3.1 As summarised in **Table 2.21**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Fowlsheugh SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed using PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination

2.2.3.2 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.21**) and distributional responses (**Table 2.18**) in-combination is presented within **Table 2.22**. Predicted consequent change in survival rate for the kittiwake feature of Fowlsheugh SPA for each scenario considered is also presented in **Table 2.22**.

Table 2.22 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Fowlsheugh SPA kittiwake feature

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 30% displacement and 1% to 3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	28,078	154.4 to 200.2	46.0 to 58.6	200.3 to 258.8	0.550 to 0.713	0.164 to 0.209	0.713 to 0.922
	Latest Count (2023).	30,966				0.499 to 0.647	0.148 to 0.189	0.647 to 0.836
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	28,078	77.5 to 102.5	40.0 to 50.1	117.3 to 152.5	0.276 to 0.365	0.142 to 0.178	0.418 to 0.543
	Latest Count (2023).	30,966				0.250 to 0.331	0.129 to 0.162	0.379 to 0.492

2.2.3.3 As summarised in **Table 2.22**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Fowlsheugh SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.2.3.4 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 30,966 breeding adults. Outputs are presented in **Table 2.23** below, including the predicted median reduction CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix C: Offshore Ornithology HRA Apportionment Report**.

Table 2.23 PVA results for annual in-combination predicted impacts apportioned to the kittiwake feature of Fowlsheugh SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
Distributional responses	30% displacement; 1% mortality for all projects.	31.1	0.999	0.12	0.958	4.17
	30% displacement; 3% mortality for all projects.	89.6	0.997	0.34	0.884	11.58
	30% displacement; 1% mortality for all projects excluding the Project.	30.8	0.999	0.12	0.959	4.14
	30% displacement; 3% mortality for all projects excluding the Project.	88.9	0.997	0.34	0.885	11.51
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	19.3	0.999	0.07	0.974	2.61
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	54.5	0.998	0.21	0.928	7.22
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	19.0	0.999	0.07	0.974	2.57
	30% displacement; 3% mortality for all projects excluding consented projects	53.8	0.998	0.21	0.929	7.13

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	with a commitment to compensation and the Project.					
Collision risk	All projects.	169.2	0.994	0.65	0.792	20.79
	All projects excluding the Project.	167.2	0.994	0.64	0.794	20.60
	All projects excluding consented projects with a commitment to compensation.	98.0	0.996	0.38	0.873	12.66
	All projects excluding consented projects with a commitment to compensation and the Project.	96.0	0.996	0.37	0.876	12.38
Combined effects	30% displacement; 1% mortality for all projects.	200.3	0.992	0.77	0.759	24.15
	30% displacement; 3% mortality for all projects.	258.8	0.990	0.99	0.700	30.04
	30% displacement; 1% mortality for all projects excluding the Project.	198.0	0.992	0.76	0.761	23.89
	30% displacement; 3% mortality for all projects excluding the Project.	256.1	0.990	0.98	0.702	29.79
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	117.3	0.996	0.45	0.851	14.93

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	152.5	0.994	0.58	0.810	18.96
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	115.0	0.996	0.44	0.853	14.67
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	149.8	0.994	0.57	0.814	18.63

2.2.3.5 The known recent and historic growth trends of the kittiwake feature of Fowlsheugh SPA are presented within Section 6.2.10 of the **RIAA**. When interpreting the PVA outputs presented within **Table 2.23**, it is important to consider the following points:

- A significant decline was recorded between 1992 and 2012, based on the Fowlsheugh RSPB count sector (see Plate 6.8 of the **RIAA**).
- Declines during the 2000s are likely attributed to decreases in availability of primary food resources such as sandeel, specifically through impacts of climate change and sandeel fisheries (Burnell *et al.,* 2023).
- Recent colony counts for the Fowlsheugh RSPB count sector have shown increased growth, with a compound annual growth rate of 6.60% between 2012 and 2022.
- The recent population growth may reflect remedial actions such as the sandeel (Prohibition of Fishing) (Scotland) Order 2024.
- In Scotland the kittiwake population increased by 21% post-HPAI in contrast to pre-HPAI, despite a minimum of 760 positive cases of the virus recorded for kittiwake (Tremlett *et al.,* 2024). Individual kittiwake colony growth rate changes varied considerably from -83% to +191%, suggesting infection may have been more localised in comparison to the infection spread reported for other species (Tremlett *et al*., 2024). In relation to Fowlsheugh SPA, a 64% increase in population size was recorded post HPAI suggesting the colony was not significantly affected by HPAI, though further site-specific information on HPAI to support this conclusion is limited.
- The kittiwake feature of Fowlsheugh SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), limited evidence to suggest kittiwake are sensitive to distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.2.3.6 If the recent population trends remain viable for the colony, then the reduction in growth rates presented within **Table 2.23**, would not significantly impede the long-term recovery of the feature. Though when considering the historic long-term decline of the colony there is uncertainty with respect to the future growth trend of the feature. However, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.01% per annum (**Table 2.23**), under three birds per annum, which does not reach the threshold considered for PVA following NatureScot Guidance Note 11 (NatureScot, 2023g). Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.2.3.7 Therefore, **the potential for an AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**.

2.2.4 East Caithness Cliffs SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.2.4.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.24** and **Table 2.25**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.26**. English offshore wind farm developments are excluded from consideration in relation to distributional response effects, as Natural England do not advise that such an effect pathway is required to be assessed for kittiwake.

2.2.4.2 The level of predicted displacement and consequent mortality assessed is based on the rates presented within Section 6.2.4 of the **RIAA**, which were recommended by NatureScot. Information relating to the suitability of such rates at informing assessments is provided in Section 6.2.4 of the **RIAA**. A developer's approach is not presented, as the Applicant considers there is insufficient evidence to justify a requirement to assess kittiwake for distributional response effects (see Section 6.2.4 of the **RIAA** for further detail).

Table 2.24 In-combination predicted abundance apportioned to the East Caithness Cliffs SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea projects including Berwick Bank	-	-	-	-	-
UK North Sea Projects up to the point of Berwick Bank	10,844.4	4,277.8	2,833.3	7,111.1	17,955.6
Green Volt	19.1	6.4	8.7	15.1	34.1
Pentland Floating Offshore Wind Farm	53.3	-	-	-	53.3
Berwick Bank	18.5	1,060.0	649.0	1,709.0	1,727.5
Salamander	182.8	N/A	N/A	11.7	194.5
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	112.2	94.4	45.6	140.0	252.2
Ossian	154.0	44.7	32.8	77.6	231.6
Cenos	24.0	N/A	N/A	6.4	30.4

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Dogger Bank South (East and West)					
Five Estuaries					
North Falls					
Outer Dowsing					
Caledonia (Offshore Wind Farm)	498.9	N/A	N/A	28.2	527.2
Muir Mhor	N/A*	57.9	3.3	61.2	N/A*
Buchan	N/A*	24.0	5.6	29.6	N/A*
Dogger Bank D					
The Project	128.8	N/A	N/A	11.1	139.9
Total	12,036.0	5,565.2	3,578.3	9,201.0	21,146.3

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of East Caithness Cliffs SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. Greyed-out cells denote English projects where there is no requirement to assess kittiwake for distributional response effects. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.25 In-combination predicted distributional response consequent mortality apportioned to the East Caithness Cliffs SPA kittiwake feature

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
UK North Sea projects including Berwick Bank	32.6	97.7	16.0	48.0	10.5	31.4	26.5	79.4	59.1	177.1
UK North Sea Projects up to the point of Berwick Bank	32.6	97.6	12.8	38.5	8.5	25.5	21.3	64.0	53.9	161.5
Green Volt	0.1	0.2	-	0.1	-	0.1	-	0.1	0.1	0.3
Pentland Floating Offshore Wind Farm	0.2	0.5	-	-	-	-	-	-	0.2	0.5
Berwick Bank	-	0.1	3.2	9.5	2.0	5.9	5.2	15.4	5.2	15.6
Salamander	0.6	1.7	N/A	N/A	N/A	N/A	0.1	0.2	0.6	1.8
Culzean	-	-	-	-	-	-	-	-	-	-
West of Orkney EIA Addendum	0.3	1.0	0.3	0.9	0.1	0.4	0.4	1.3	0.7	2.3
Ossian	0.5	1.4	0.1	0.4	0.1	0.3	0.2	0.7	0.7	2.1

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	**30% disp.; 3% mort.**	**30% disp.; 1% mort.**	**30% disp.; 3% mort.**	**30% disp.; 1% mort.**	**30% disp.; 3% mort.**	**30% disp.; 1% mort.**	**30% disp.; 3% mort.**	**30% disp.; 1% mort.**	**30% disp.; 3% mort.**
Cenos	0.1	0.2	N/A	N/A	N/A	N/A	-	0.1	0.1	0.3
Dogger Bank South (East and West)										
Five Estuaries										
North Falls										
Outer Dowsing										
Caledonia (Offshore Wind Farm)	1.5	4.5	N/A	N/A	N/A	N/A	0.1	0.3	1.6	4.7
Muir Mhor	3.8*	3.8*	0.2	0.5	<0.1	<0.1	0.2	0.6	4.0	4.4
Buchan	0.8*	0.8*	0.1	0.2	<0.1	0.1	0.1	0.3	0.9	1.1
Dogger Bank D										
The Project	0.4	1.2	N/A	N/A	N/A	N/A	<0.1	0.1	0.4	1.3
Total	40.9	112.9	16.6	50.1	10.7	32.3	27.6	83.0	68.4	195.8

Table note: *Impact prediction based on SeabORD modelling.

Table 2.26 East Caithness Cliffs SPA kittiwake feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.25

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1% to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	48,958	40.9 to 112.9.	27.6 to 83.0.	68.4 to 195.8.	0.084 to 0.231.	0.056 to 0.169.	0.140 to 0.400.
	Latest Count (2024).	36,562				0.112 to 0.309.	0.075 to 0.227.	0.187 to 0.536.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	48,958	39.9 to 109.9.	21.9 to 66.0.	61.8 to 175.8.	0.081 to 0.225.	0.045 to 0.135.	0.126 to 0.359.
	Latest Count (2024).	36,562				0.109 to 0.301.	0.060 to 0.180.	0.169 to 0.481.

2.2.4.3 As summarised in **Table 2.26**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to East Caithness Cliffs SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed using PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage potential collision risk impacts on the qualifying feature in combination

2.2.4.4 The predicted consequent mortality in relation to collision risk in-combination apportioned to the kittiwake feature of East Caithness Cliffs SPA is provided in **Table 2.27**. The predicted change in survival rate for scenarios considered are presented in **Table 2.28**.

Table 2.27 In-combination predicted collision mortality apportioned to the East Caithness Cliffs SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	91.0	66.6	51.0	117.6	208.6
Green Volt	0.5	0.3	0.3	0.6	1.1
Pentland Floating Offshore Wind Farm *	0.4	-	-	-	0.4
Berwick Bank*	0.4	10.2	7.3	17.5	17.9
Salamander	0.7	<0.1	0.1	0.1	0.8
West of Orkney EIA Addendum	1.8	1.7	1.0	2.6	4.4
Culzean	-	-	-	-	-
Ossian	1.4	0.5	0.3	0.8	2.1
Cenos	0.9	0.2	0.2	0.3	1.3
Dogger Bank South (East and West)	-	2.3	4.6	6.9	6.9

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Five Estuaries	-	-	-	-	-
North Falls	-	0.9	0.2	1.1	1.1
Outer Dowsing	-	0.2	0.2	0.4	0.4
Caledonia (Offshore Wind Farm)	13.5	N/A	N/A	0.8	14.3
Muir Mhor	2.3	0.6	0.1	0.7	3.0
Buchan	0.6	0.2	1.0	1.3	1.9
Dogger Bank D	-	0.6	0.5	1.1	1.1
The Project	3.3	0.8	0.3	1.1	4.4
Total	116.9	85.1	67.0	152.9	269.6

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of East Caithness Cliffs SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023).

Table 2.28 East Caithness Cliffs SPA kittiwake feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.27

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	48,958	116.9	152.9	269.6	0.239	0.312	0.551
	Latest Count (2024).	36,562				0.320	0.418	0.737
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	48,958	113.4	132.1	245.4	0.232	0.270	0.501
	Latest Count (2024).	36,562				0.310	0.361	0.671

2.2.4.5 As summarised in **Table 2.28**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to East Caithness Cliffs SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination

2.2.4.6 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.27**) and distributional responses (**Table 2.25**) in-combination and estimated consequent change in survival rate for the kittiwake feature of East Caithness Cliffs SPA for each scenario considered are presented in **Table 2.29**.

2.2.4.7 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.29 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the East Caithness Cliffs SPA kittiwake feature

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1% to 3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	48,958	157.7 to 229.8.	180.5 to 235.8.	338.0 to 465.5.	0.322 to 0.469.	0.369 to 0.482.	0.690 to 0.951.
	Latest Count (2024).	36,562				0.431 to 0.629.	0.494 to 0.645.	0.924 to 1.273.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	48,958	153.3 to 223.4.	154.0 to 198.0.	307.2 to 421.2.	0.313 to 0.456.	0.314 to 0.404.	0.627 to 0.860.
	Latest Count (2024).	36,562				0.419 to 0.611.	0.421 to 0.542.	0.840 to 1.152.

2.2.4.8 As summarised in **Table 2.29**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to East Caithness Cliffs SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA.

2.2.4.9 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 36,562 breeding adults. Outputs are presented in **Table 2.32** below, including the predicted median reduction in CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.30 PVA results for annual in-combination predicted impacts apportioned to the kittiwake feature of East Caithness Cliffs SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
Distributional responses	30% displacement; 1% mortality for all projects.	68.4	0.998	0.23	0.920	7.99
	30% displacement; 3% mortality for all projects.	195.8	0.993	0.66	0.788	21.21
	30% displacement; 1% mortality for all projects excluding the Project.	68.0	0.998	0.23	0.921	7.94
	30% displacement; 3% mortality for all projects excluding the Project.	194.6	0.993	0.66	0.789	21.13
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	61.8	0.998	0.21	0.928	7.24
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	175.8	0.994	0.59	0.807	19.30
	30% displacement; 1% mortality for all projects excluding consented projects with a	61.4	0.998	0.21	0.928	7.22

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	commitment to compensation and the Project.					
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	174.6	0.994	0.59	0.808	19.22
Collision risk	All projects.	269.6	0.991	0.87	0.730	27.01
	All projects excluding the Project.	265.2	0.991	0.86	0.734	26.63
	All projects excluding consented projects with a commitment to compensation.	245.4	0.992	0.79	0.751	24.94
	All projects excluding consented projects with a commitment to compensation and the Project.	241.0	0.992	0.78	0.754	24.56
Combined effects	30% displacement; 1% mortality for all projects.	338.0	0.989	1.09	0.673	32.68
	30% displacement; 3% mortality for all projects.	465.5	0.985	1.51	0.579	42.09
	30% displacement; 1% mortality for all projects excluding the Project.	333.2	0.989	1.08	0.677	32.32

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	30% displacement; 3% mortality for all projects excluding the Project.	459.8	0.985	1.49	0.583	41.69
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	307.2	0.990	0.99	0.698	30.18
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	421.2	0.986	1.36	0.610	38.99
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	302.4	0.990	0.98	0.702	29.77
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	415.6	0.987	1.34	0.614	38.56

2.2.4.10 The known recent and historic growth trends of the kittiwake feature of East Caithness Cliffs SPA are presented within Section 6.2.11 of the **RIAA**. When interpreting the PVA outputs presented within **Table 2.30**, it is important to consider the following points:

- the kittiwake feature of East Caithness Cliffs SPA has been in continued decline since the early 2000s and appears to remain in decline based on the latest count in 2024;
- declines of the feature are likely attributed to decreases in availability of primary food resources such as sandeel, specifically through impacts of climate change and sandeel fisheries (Burnell *et al.* 2023);
- the sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for kittiwake, though due to the long-term declining trend of the colony, other factors may be impacting the colony such as adverse weather events or predation (Burnell *et al.* 2023);
- due to the 2024 colony count being unavailable at the time of the HPAI review undertaken by Tremlett et al. (2024), potential effects of HPAI on East Caithness Cliffs SPA kittiwake feature are uncertain;
- the kittiwake feature of East Caithness Cliffs SPA is currently classified as being in favourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population is maintained; and
- the potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), limited evidence to suggest kittiwake are sensitive to distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.2.4.11 Due to the historic long-term decline of the colony, there is uncertainty with respect to the colonies resilience in relation to maximum predicted annual reduction in growth rate (excluding projects with a commitment to compensation) of 1.42%. However, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.02% per annum (**Table 2.30**). Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.2.4.12 Therefore, **the potential for an AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**.

2.2.5 North Caithness Cliffs SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.2.5.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.31** and **Table 2.32**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.33**. English offshore wind farm developments are excluded from consideration in relation to distributional response effects, as Natural England do not advise that such an effect pathway is required to be assessed for kittiwake.

2.2.5.2 The level of predicted displacement and consequent mortality assessed is based on the rates presented within Section 6.2.4 of the **RIAA** which were recommended by NatureScot. Information relating to the suitability of such rates at informing assessments is provided in

Section 6.2.4 of the **RIAA**. A developer's approach is not presented, as the Applicant considers there is insufficient evidence to justify a requirement to assess kittiwake for distributional response effects (see Section 6.2.4 of the **RIAA** for further detail).

Table 2.31 In-combination predicted abundance apportioned to the North Caithness Cliffs SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea projects including Berwick Bank	-	-	-	-	-
UK North Sea Projects up to the point of Berwick Bank	333.3	1,066.7	711.1	1,777.8	2,111.1
Green Volt	2.8	1.6	2.2	3.8	6.6
Pentland Floating Offshore Wind Farm	288.9	-	-	-	288.9
Berwick Bank	-	261.6	167.9	429.4	429.4
Salamander	28.3	N/A	N/A	2.9	31.2
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	177.8	23.3	11.1	34.4	212.2
Ossian	4.8	11.0	8.5	19.5	24.3
Cenos	7.5	N/A	N/A	1.6	7.5
Dogger Bank South (East and West)					
Five Estuaries					
North Falls					

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Outer Dowsing					
Caledonia (Offshore Wind Farm)	56.0	N/A	N/A	7.1	63.0
Muir Mhor	19.4	14.2	0.9	15.1	34.6
Buchan	N/A*	6.0	1.4	7.4	N/A*
Dogger Bank D					
The Project	18.3	N/A	N/A	2.8	21.0
Total	937.0	1,384.4	903.1	2,301.8	3,229.8

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of North Caithness Cliffs SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. Greyed-out cells denote English projects where there is no requirement to assess kittiwake for distributional response effects. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.32 In-combination predicted distributional response consequent mortality apportioned to the North Caithness Cliffs SPA kittiwake feature

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
UK North Sea projects including Berwick Bank	1.0	3.0	4.0	12.0	2.6	7.9	6.6	19.9	7.6	22.9
UK North Sea Projects up to the point of Berwick Bank	1.0	3.0	3.2	9.6	2.1	6.4	5.3	16.0	6.3	19.0
Green Volt	-	-	-	-	-	-	-	-	-	0.1
Pentland Floating Offshore Wind Farm	2.6	2.6	-	-	-	-	-	-	2.6	2.6
Berwick Bank	-	-	0.8	2.4	0.5	1.5	1.3	3.9	1.3	3.9
Salamander	0.1	0.2	N/A	N/A	N/A	N/A	-	-	0.1	0.3
Culzean	-	-	-	-	-	-	-	-	-	-
West of Orkney EIA Addendum	0.5	1.6	0.1	0.2	-	0.1	0.1	0.3	0.6	1.9
Ossian	-	-	-	0.1	-	0.1	0.1	0.2	0.1	0.2

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
Cenos	-	0.1	N/A	N/A	N/A	N/A	-	-	-	0.1
Dogger Bank South (East and West)										
Five Estuaries										
North Falls										
Outer Dowsing										
Caledonia (Offshore Wind Farm)	0.2	0.5	N/A	N/A	N/A	N/A	<0.1	0.1	0.2	0.6
Muir Mhor	0.1	0.2	<0.1	0.1	<0.1	<0.1	<0.1	0.1	0.1	0.3
Buchan	3.2*	3.2*	<0.1	0.1	<0.1	<0.1	<0.1	0.1	3.2	3.3
Dogger Bank D										
The Project	0.1	0.2	N/A	N/A	N/A	N/A	<0.1	<0.1	0.1	0.2
Total	7.7	11.5	4.2	12.5	2.6	8.1	6.9	20.7	14.6	32.4

Table note: *Impact prediction based on SeabORD modelling.

Table 2.33 North Caithness Cliffs SPA kittiwake feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.32

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1% to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	11,142	7.7 to 11.5.	6.9 to 20.7.	14.6 to 32.4.	0.069 to 0.104.	0.062 to 0.186.	0.131 to 0.291.
	Latest Count (2023).	18,608				0.041 to 0.062.	0.037 to 0.111.	0.078 to 0.174.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	11,142	7.1 to 9.7.	5.5 to 16.5.	12.6 to 26.3.	0.064 to 0.087.	0.049 to 0.148.	0.113 to 0.236.
	Latest Count (2023).	18,608				0.038 to 0.052.	0.030 to 0.089.	0.068 to 0.141.

2.2.5.3 As summarised in **Table 2.33**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to North Caithness Cliffs SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed using PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage potential collision risk impacts on the qualifying feature in combination

2.2.5.4 The predicted consequent mortality in relation to collision risk in-combination apportioned to the kittiwake feature of North Caithness Cliffs SPA is provided in **Table 2.34**. The predicted change in survival rate for scenarios considered are presented in **Table 2.35**.

Table 2.34 In-combination predicted collision mortality apportioned to the North Caithness Cliffs SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	3.7	16.7	12.8	29.5	33.2
Green Volt	0.1	0.1	0.1	0.1	0.2
Pentland Floating Offshore Wind Farm *	3.4	-	-	-	3.4
Berwick Bank*	-	2.5	1.9	4.4	4.4
Salamander	0.1	-	<0.1	<0.1	0.1
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	2.9	0.4	0.2	0.7	3.5
Ossian	-	0.1	0.1	0.2	0.2
Cenos	0.3	<0.1	<0.1	0.1	0.4
Dogger Bank South (East and West)	-	0.6	1.2	1.8	1.8

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	1.9	1.5	3.4	3.4
Caledonia (Offshore Wind Farm)	1.5	N/A	N/A	0.2	1.7
Muir Mhor	0.4	0.2	<0.1	0.2	0.5
Buchan	0.1	0.1	-	0.1	0.2
Dogger Bank D	-	-	-	-	-
The Project	0.5	0.2	0.1	0.3	0.8
Total	12.9	22.8	17.9	40.9	53.8

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of North Caithness Cliffs SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023).

Table 2.35 North Caithness Cliffs SPA kittiwake feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.34

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	11,142	12.9	40.9	53.8	0.116%	0.367%	0.483%
	Latest Count (2023).	18,608				0.069%	0.220%	0.289%
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	11,142	9.9	35.8	45.8	0.089%	0.322%	0.411%
	Latest Count (2023).	18,608				0.053%	0.193%	0.246%

2.2.5.5 As summarised in **Table 2.35**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to North Caithness Cliffs SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination

2.2.5.6 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.34**) and distributional responses (**Table 2.31**) in-combination and estimated consequent change in survival rate for the kittiwake feature of North Caithness Cliffs SPA for each scenario considered are presented in **Table 2.36**.

2.2.5.7 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.36 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the North Caithness Cliffs SPA kittiwake feature

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1% to 3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	11,142	20.6 to 24.4.	47.8 to 61.6.	68.4 to 86.2.	0.185 to 0.219.	0.429 to 0.553.	0.614 to 0.774.
	Latest Count (2024).	18,608				0.111 to 0.131.	0.257 to 0.331.	0.368 to 0.463.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	11,142	17.0 to 19.7.	41.3 to 52.3.	58.4 to 72.1.	0.153 to 0.177.	0.371 to 0.470.	0.524 to 0.647.
	Latest Count (2024).	18,608				0.091 to 0.106.	0.222 to 0.281.	0.314 to 0.387.

2.2.5.8 As summarised in **Table 2.36**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to North Caithness Cliffs SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA.

2.2.5.9 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 18,608 breeding adults. Outputs are presented in **Table 2.37** below, including the predicted median reduction in annual growth rate CGR and median reduction in final population size CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.37 PVA results for annual in-combination predicted impacts apportioned to the kittiwake feature of North Caithness Cliffs SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
Distributional responses	30% displacement; 1% mortality for all projects.	14.6	0.999	0.09	0.967	3.27
	30% displacement; 3% mortality for all projects.	32.4	0.998	0.21	0.929	7.12
	30% displacement; 1% mortality for all projects excluding the Project.	14.5	0.999	0.09	0.968	3.22
	30% displacement; 3% mortality for all projects excluding the Project.	32.2	0.998	0.20	0.929	7.10
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	12.6	0.999	0.08	0.971	2.85
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	26.3	0.998	0.17	0.942	5.82
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	12.5	0.999	0.08	0.972	2.84
	30% displacement; 3% mortality for all projects excluding consented projects	26.1	0.998	0.17	0.942	5.77

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	with a commitment to compensation and the Project.					
Collision risk	All projects.	53.8	0.997	0.34	0.883	11.66
	All projects excluding the Project.	53.1	0.997	0.34	0.886	11.44
	All projects excluding consented projects with a commitment to compensation.	45.8	0.997	0.29	0.900	9.96
	All projects excluding consented projects with a commitment to compensation and the Project	45.0	0.997	0.29	0.902	9.79
Combined effects	30% displacement; 1% mortality for all projects.	68.4	0.996	0.43	0.855	14.47
	30% displacement; 3% mortality for all projects.	86.2	0.995	0.55	0.820	17.96
	30% displacement; 1% mortality for all projects excluding the Project.	67.6	0.996	0.43	0.856	14.41
	30% displacement; 3% mortality for all projects excluding the Project.	85.3	0.995	0.54	0.822	17.76
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	58.4	0.996	0.37	0.875	12.52

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	72.1	0.995	0.46	0.847	15.28
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	57.5	0.996	0.37	0.876	12.36
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	71.1	0.995	0.45	0.849	15.07

2.2.5.10 When interpreting the PVA outputs presented within **Table 2.37**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015 to 2021 the kittiwake feature has declined by an annual compound growth rate of -3.7% (Burnell *et al*., 2023).
- Declines during the 2000s are attributed to decreases in availability of primary food resources such as sandeel, specifically through impacts of climate change and sandeel fisheries (Burnell *et al*., 2023).
- Since the Seabird Count the population has undergone further decline based on the latest 2024 colony census.
- The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for kittiwake, though due to the long-term declining trend of the colony, other factors may be impacting the colony such as adverse weather events or predation (Burnell *et al.,* 2023).
- In Scotland the kittiwake population increased by 21% post-HPAI in contrast to pre-HPAI, despite a minimum of 760 positive cases of the virus recorded for kittiwake (Tremlett *et al.,* 2024). Individual kittiwake colony growth rate changes varied considerably from -83% to +191%, suggesting infection may have been more localised in comparison to the infection spread reported for other species (Tremlett *et al*., 2024). In relation to North Caithness Cliffs SPA a 41% increase in population size was recorded post HPAI suggesting the colony was not significantly affected by HPAI, though further site-specific information on HPAI to support this conclusion is limited.
- The kittiwake feature of North Caithness Cliffs SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), limited evidence to suggest kittiwake are sensitive to distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.2.5.11 Due to the historic long-term decline of the colony and unfavourable condition, there is uncertainty with respect to the colonies resilience in relation to maximum predicted annual reduction in growth rate (excluding projects with a commitment to compensation) of 0.45%. However, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.01% per annum (**Table 2.37**). Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.2.5.12 Therefore, **the potential for an AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**.

2.2.6 Forth Islands SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.2.6.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.38** and **Table 2.39**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.40**. English offshore wind farm developments are excluded from consideration in relation to distributional response effects, as Natural England do not advise that such an effect pathway is required to be assessed for kittiwake.

2.2.6.2 The level of predicted displacement and consequent mortality assessed is based on the rates presented within Section 6.2.4 of the **RIAA**, which were recommended by NatureScot. Information relating to the suitability of such rates at informing assessments is provided in Section 6.2.4 of the **RIAA**. A developer's approach is not presented, as the Applicant considers there is insufficient evidence to justify a requirement to assess kittiwake for distributional response effects (see Section 6.2.4 of the **RIAA** for further detail).

Table 2.38 In-combination predicted abundance apportioned to the Forth Islands SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea projects including Berwick Bank	-	-	-	-	-
UK North Sea Projects up to the point of Berwick Bank	1,900.0	333.3	222.2	555.6	2,455.6
Green Volt	2.2	0.5	0.7	1.2	3.4
Pentland Floating Offshore Wind Farm	-	-	-	-	-
Berwick Bank	1,052.0	82.6	44.8	127.4	1,179.4
Salamander	28.3	N/A	N/A	0.9	29.2
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	1.1	7.8	3.3	11.1	12.2
Ossian	108.3	3.5	2.3	5.8	114.0
Cenos	10.7	N/A	N/A	0.6	11.4
Dogger Bank South					

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
(East and West)					
Five Estuaries					
North Falls					
Outer Dowsing					
Caledonia (Offshore Wind Farm)	7.8	N/A	N/A	2.2	10.0
Muir Mhor	N/A*	4.6	0.2	4.8	N/A*
Buchan	N/A*	1.9	0.4	2.3	N/A*
Dogger Bank D					
The Project	13.9	N/A	N/A	0.9	14.7
Total	3,124.3	434.1	274.0	712.7	3,829.9

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of Forth Islands SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. Greyed-out cells denote English projects where there is no requirement to assess kittiwake for distributional response effects. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.39 In-combination predicted distributional response consequent mortality apportioned to the Forth Islands SPA kittiwake feature

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
UK North Sea projects including Berwick Bank	8.9	26.6	1.2	3.7	0.8	2.4	2.0	6.1	10.9	32.7
UK North Sea Projects up to the point of Berwick Bank	5.7	17.1	1.0	3.0	0.7	2.0	1.7	5.0	7.3	22.0
Green Volt	-	-	-	-	-	-	-	-	-	-
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-	-	-	-	-
Berwick Bank	3.2	9.5	0.2	0.7	0.1	0.4	0.3	1.1	3.6	10.7
Salamander	0.1	0.2	N/A	N/A	N/A	N/A	-	-	0.1	0.3
Culzean	-	-	-	-	-	-	-	-	-	-
West of Orkney EIA Addendum	-	-	<0.1	0.1	-	-	<0.1	0.1	<0.1	0.1

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
Ossian	0.3	1.0	-	-	-	-	-	0.1	0.3	1.0
Cenos	-	0.1	N/A	N/A	N/A	N/A	-	-	-	0.1
Dogger Bank South (East and West)										
Five Estuaries										
North Falls										
Outer Dowsing										
Caledonia (Offshore Wind Farm)	<0.1	0.1	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1	0.1
Muir Mhor	1.0*	1.0*	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.0	1.0
Buchan	0.2*	0.2*	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2
Dogger Bank D										
The Project	<0.1	0.1	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1	0.1
Total	10.6	29.3	1.2	3.9	0.8	2.4	2.0	6.4	12.6	35.7

Table note: *Impact prediction based on SeabORD modelling.

Table 2.40 Forth Islands SPA kittiwake feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.39

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1%to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	9,084	10.6 to 29.3.	2.0 to 6.4.	12.6 to 35.7.	0.116 to 0.322.	0.022 to 0.070.	0.139 to 0.393.
	Latest Count (2024).	14,216				0.074 to 0.206.	0.014 to 0.045.	0.089 to 0.251.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	9,084	7.3 to 19.6.	1.7 to 5.2.	8.9 to 24.6.	0.080 to 0.216.	0.019 to 0.057.	0.098 to 0.271.
	Latest Count (2024).	14,216				0.051 to 0.138.	0.012 to 0.037.	0.063 to 0.173.

2.2.6.3 As summarised in **Table 2.40**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Forth Islands SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage potential collision risk impacts on the qualifying feature in combination

2.2.6.4 The predicted consequent mortality in relation to collision risk in-combination apportioned to the kittiwake feature of Forth Islands SPA is provided in **Table 2.41**. The predicted change in survival rate for scenarios considered are presented in **Table 2.42**.

Table 2.41 In-combination predicted collision mortality apportioned to the Forth Islands SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	15.6	5.2	3.9	9.1	24.7
Green Volt	0.09	<0.1	<0.1	<0.1	0.12
Pentland Floating Offshore Wind Farm	-	-	-	-	-
Berwick Bank	21.5*	0.8*	0.5*	1.3*	22.8*
Salamander	0.1	-	<0.1	<0.1	0.1
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	<0.1	0.1	0.1	0.2	0.2
Ossian	1.0	-	-	-	1.0
Cenos	0.4	<0.1	<0.1	<0.1	0.4
Dogger Bank South (East and West)	-	0.2	0.3	0.5	0.5

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	0.6	0.5	1.0	1.0
Caledonia (Offshore Wind Farm)	0.2	N/A	N/A	0.1	0.3
Muir Mhor	0.7	0.1	<0.1	0.1	0.8
Buchan	<0.1	<0.1	0.1	0.2	0.2
Dogger Bank D	-	-	-	-	-
The Project	0.4	0.1	<0.1	0.1	0.4
Total	40.1	7.0	5.4	12.5	52.6

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of Forth Islands SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023).

Table 2.42 Forth Islands SPA kittiwake feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.41

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	9,084	40.1	12.5	52.6	0.441%	0.138%	0.579%
	Latest Count (2024).	14,216				0.282%	0.088%	0.370%
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	9,084	18.4	11.1	29.5	0.203%	0.122%	0.325%
	Latest Count (2024).	14,216				0.130%	0.078%	0.207%

2.2.6.5 As summarised in **Table 2.42**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Forth Islands SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination

2.2.6.6 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.41**) and distributional responses (**Table 2.39**) in-combination and estimated consequent change in survival rate for the kittiwake feature of Forth Islands SPA for each scenario considered are presented in **Table 2.43**.

2.2.6.7 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It’s important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can’t consequently collide with a WTG and vice versa.

Table 2.43 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Forth Islands SPA kittiwake feature

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1% to 3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	**Non-breeding**	**Annual**	**Breeding**	**Non-breeding**	**Annual**
All projects	Burnell *et al.* (2023).	9,084	50.6 to 69.3.	14.6 to 18.9.	65.2 to 88.3.	0.557 to 0.763.	0.160 to 0.208.	0.717 to 0.972.
	Latest Count (2024).	14,216				0.356 to 0.488.	0.102 to 0.133.	0.458 to 0.621.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	9,084	25.7 to 38.0.	12.8 to 16.2.	38.4 to 54.1.	0.283 to 0.419.	0.141 to 0.179.	0.423 to 0.595.
	Latest Count (2024).	14,216				0.181 to 0.268.	0.090 to 0.114.	0.270 to 0.380.

2.2.6.8 As summarised in **Table 2.45**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Forth Islands SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA.

2.2.6.9 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 14,216 breeding adults. Outputs are presented in **Table 2.44** below, including the predicted median reduction in annual growth rate CGR and median reduction in final population size CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.44 PVA results for annual in-combination predicted impacts apportioned to the kittiwake feature of Forth Islands SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
Distributional responses	30% displacement; 1% mortality for all projects.	12.6	0.999	0.10	0.963	3.70
	30% displacement; 3% mortality for all projects.	35.7	0.997	0.30	0.899	10.14
	30% displacement; 1% mortality for all projects excluding the Project.	12.6	0.999	0.10	0.963	3.71
	30% displacement; 3% mortality for all projects excluding the Project.	35.6	0.997	0.30	0.899	10.10
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	8.9	0.999	0.07	0.974	2.61
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	24.6	0.998	0.20	0.930	7.00
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	8.9	0.999	0.07	0.974	2.61

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project	24.5	0.998	0.20	0.930	7.02
Collision risk	All projects.	52.6	0.996	0.44	0.854	14.58
	All projects excluding the Project.	52.1	0.996	0.43	0.856	14.45
	All projects excluding consented projects with a commitment to compensation.	29.5	0.998	0.24	0.915	8.51
	All projects excluding consented projects with a commitment to compensation and the Project.	29.0	0.998	0.24	0.917	8.32
Combined effects	30% displacement; 1% mortality for all projects.	65.2	0.995	0.54	0.822	17.77
	30% displacement; 3% mortality for all projects.	88.3	0.993	0.73	0.767	23.28
	30% displacement; 1% mortality for all projects excluding the Project.	64.7	0.995	0.54	0.824	17.60
	30% displacement; 3% mortality for all projects excluding the Project.	87.7	0.993	0.73	0.769	23.12
	30% displacement; 1% mortality for all projects excluding consented	38.4	0.997	0.32	0.891	10.91

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	projects with a commitment to compensation.					
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	54.1	0.996	0.45	0.850	14.96
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	37.9	0.997	0.31	0.892	10.75
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	53.5	0.996	0.45	0.852	14.79

2.2.6.10 When interpreting the PVA outputs presented within **Table 2.44**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015-2021 the razorbill feature has declined by 1.2% per annum (Burnell *et al*., 2023).
- Declines during the 2000s are likely attributed to decreases in availability of primary food resources such as sandeel, specifically through impacts of climate change and sandeel fisheries (Burnell *et al.,* 2023).
- When comparing Seabird Count to the latest count in 2024, the colony has undergone significant growth of 4.62% per annum.
- Recent population growth may reflect remedial actions such as the sandeel (Prohibition of Fishing) (Scotland) Order 2024 and indirect effects of HPAI reducing predication pressure by impacting species such as great skua (Burnell *et al.,* 2023).
- In Scotland the kittiwake population increased by 21% post-HPAI in contrast to pre-HPAI, despite a minimum of 760 positive cases of the virus recorded for kittiwake (Tremlett *et al.,* 2024). Individual kittiwake colony growth rate changes varied considerably from -83% to +191%, suggesting infection may have been more localised in comparison to the infection spread reported for other species (Tremlett *et al*., 2024). In relation to Forth Islands SPA, a 29% decrease in population size was recorded post HPAI suggesting the colony was affected by HPAI. Overall the colony has recorded significant growth when comparing pre and post HPAI counts.
- The kittiwake feature of Forth Islands SPA is currently classified as being in unfavourable condition therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), limited evidence to suggest kittiwake are sensitive to distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.2.6.11 If the recent population trends remain viable for the colony, the reduction in growth rates presented within **Table 2.44** would not significantly impede the long-term recovery of the feature. Though when considering the historic long-term decline of the colony there is uncertainty with respect to the future growth trend of the feature. However, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.02% per annum (**Table 2.44**). Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.2.6.12 Therefore, **the potential for an AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**.

2.2.7 St Abb's Head to Fast Castle SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.2.7.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.45** and **Table 2.46**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.47**. English offshore wind farm developments are excluded from consideration in relation to distributional response effects, as Natural England do not advise that such an effect pathway is required to be assessed for kittiwake.

2.2.7.2 The level of predicted displacement and consequent mortality assessed is based on the rates presented within Section 6.2.4 of the **RIAA**, which were recommended by NatureScot. Information relating to the suitability of such rates at informing assessments is provided in Section 6.2.4 of the **RIAA**. A developer's approach is not presented, as the Applicant considers there is insufficient evidence to justify a requirement to assess kittiwake for distributional response effects (see Section 6.2.4 of the **RIAA** for further detail).

Table 2.45 In-combination predicted abundance apportioned to the St Abb's Head to Fast Castle SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea projects including Berwick Bank	-	-	-	-	-
UK North Sea Projects up to the point of Berwick Bank	1,022.2	355.6	244.4	600.0	1,622.2
Green Volt	2.4	0.5	0.7	1.3	3.7
Pentland Floating Offshore Wind Farm	-	-	-	-	-
Berwick Bank	9,634.1	96.4	56.0	152.3	9,786.4
Salamander	25.7	N/A	N/A	1.1	26.8
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	-	7.8	3.3	11.1	11.1
Ossian	142.0	4.1	2.8	6.9	148.9
Cenos	8.1	N/A	N/A	0.6	8.1
Dogger Bank South					

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
(East and West)					
Five Estuaries					
North Falls					
Outer Dowsing					
Caledonia (Offshore Wind Farm)	4.8	N/A	N/A	2.4	7.2
Muir Mhor	N/A*	5.2	0.3	5.6	N/A*
Buchan	N/A*	2.0	0.4	2.4	N/A*
Dogger Bank D					
The Project	12.2	N/A	N/A	0.9	13.1
Total	10,851.5	471.6	308.0	784.7	11,627.5

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of St Abb's Head to Fast Castle SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. Greyed-out cells denote English projects where there is no requirement to assess kittiwake for distributional response effects. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.46 In-combination predicted distributional response consequent mortality apportioned to the St Abb's Head to Fast Castle SPA kittiwake feature

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
UK North Sea projects including Berwick Bank	32.2	96.2	1.4	4.1	0.9	2.7	2.3	6.8	34.5	103.0
UK North Sea Projects up to the point of Berwick Bank	3.1	9.2	1.1	3.2	0.7	2.2	1.8	5.4	4.9	14.6
Green Volt	-	-	-	-	-	-	-	-	-	-
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-	-	-	-	-
Berwick Bank	29.1	87.0	0.3	0.9	0.2	0.5	0.5	1.4	29.6	88.4
Salamander	0.1	0.2	N/A	N/A	N/A	N/A	-	-	0.1	0.3
Culzean	-	-	-	-	-	-	-	-	-	-
West of Orkney EIA Addendum	-	-	<0.1	0.1	-	-	<0.1	0.1	<0.1	0.1
Ossian	0.4	1.3	-	-	-	-	-	0.1	0.4	1.3

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
Cenos	-	0.1	N/A	N/A	N/A	N/A	-	-	-	0.1
Dogger Bank South (East and West)										
Five Estuaries										
North Falls										
Outer Dowsing										
Caledonia (Offshore Wind Farm)	<0.1	<0.1	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1	0.1
Muir Mhor	-*	-*	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1
Buchan	<0.1*	<0.1*	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dogger Bank D										
The Project	<0.1	0.1	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1	0.1
Total	32.8	98.0	1.4	4.3	0.9	2.7	2.3	7.1	35.1	105.1

Table note: *Impact prediction based on SeabORD modelling.

Table 2.47 St Abb's Head to Fast Castle SPA kittiwake feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.46

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1% to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	10,300	32.8 to 98.0.	2.3 to 7.1.	35.1 to 105.1.	0.318 to 0.951.	0.023 to 0.069.	0.341 to 1.020.
	Latest Count (2024).	11,992				0.273 to 0.817.	0.019 to 0.059.	0.293 to 0.876.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	10,300	3.6 to 10.8.	1.8 to 5.7.	5.4 to 16.4.	0.035 to 0.105.	0.018 to 0.055.	0.052 to 0.159.
	Latest Count (2024).	11,992				0.030 to 0.090.	0.015 to 0.048.	0.045 to 0.137.

2.2.7.3 As summarised in **Table 2.47**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to St Abb's Head to Fast Castle SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage potential collision risk impacts on the qualifying feature in combination

2.2.7.4 The predicted consequent mortality in relation to collision risk in-combination apportioned to the kittiwake feature of St Abb's Head to Fast Castle SPA is provided in **Table 2.48**. The predicted change in survival rate for scenarios considered are presented in **Table 2.49**.

Table 2.48 In-combination predicted collision mortality apportioned to the St Abb's Head to Fast Castle SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	6.3	5.6	4.3	9.9	16.3
Green Volt	0.1	<0.1	<0.1	<0.1	0.14
Pentland Floating Offshore Wind Farm	-	-	-	-	-
Berwick Bank*	196.6	0.9	0.6	1.5	198.2
Salamander	0.1	-	<0.1	<0.1	0.1
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	-	0.1	0.1	0.2	0.2
Ossian	1.3	-	-	-	1.3
Cenos	0.3	<0.1	<0.1	<0.1	0.3
Dogger Bank South (East and West)	3.8	0.2	0.4	0.6	4.4

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	<0.1	<0.1	<0.1	-
Caledonia (Offshore Wind Farm)	0.1	N/A	N/A	0.1	0.2
Muir Mhor	0.5	0.1	<0.1	0.1	0.6
Buchan	<0.1	<0.1	<0.1	<0.1	0.1
Dogger Bank D	-	-	-	-	-
The Project	0.3	0.1	<0.1	0.1	0.4
Total	209.6	7.1	5.5	12.6	222.2

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of St Abb's Head to Fast Castle SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023).

Table 2.49 St Abb's Head to Fast Castle SPA kittiwake feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.48

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	10,300	209.6	12.6	222.2	2.035%	0.123%	2.158%
	Latest Count (2024).	11,992				1.748%	0.105%	1.853%
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	10,300	12.8	11.1	24.0	0.125%	0.108%	0.233%
	Latest Count (2024).	11,992				0.107%	0.092%	0.200%

2.2.7.5 As summarised in **Table 2.49**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to St Abb's Head to Fast Castle SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination

2.2.7.6 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.48**) and distributional responses (**Table 2.46**) in-combination and estimated consequent change in survival rate for the kittiwake feature of St Abb's Head to Fast Castle SPA for each scenario considered are presented in **Table 2.50**.

2.2.7.7 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.50 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the St Abb's Head to Fast Castle SPA kittiwake feature

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1% to 3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	10,300	242.3 to 307.5.	15.0 to 19.7.	257.3 to 327.3.	2.353 to 2.986.	0.145 to 0.192.	2.498 to 3.178.
	Latest Count (2024).	11,992				2.021 to 2.565.	0.125 to 0.165.	2.146 to 2.729.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	10,300	16.4 to 23.6.	12.9 to 16.8.	29.4 to 40.3.	0.159 to 0.229.	0.125 to 0.163.	0.285 to 0.392.
	Latest Count (2024).	11,992				0.137 to 0.197.	0.108 to 0.140.	0.245 to 0.336.

2.2.7.8 As summarised in **Table 2.50**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to St Abb's Head to Fast Castle SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA.

2.2.7.9 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 11,992 breeding adults. Outputs are presented in **Table 2.51** below, including the predicted median reduction in annual growth rate CGR and median reduction in final population size CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.51 PVA results for annual in-combination predicted impacts apportioned to the kittiwake feature of St Abb's Head to Fast Castle SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
Distributional responses	30% displacement; 1% mortality for all projects.	35.1	0.997	0.35	0.882	11.77
	30% displacement; 3% mortality for all projects.	105.1	0.990	1.04	0.687	31.27
	30% displacement; 1% mortality for all projects excluding the Project.	35.1	0.997	0.35	0.883	11.73
	30% displacement; 3% mortality for all projects excluding the Project.	105.0	0.990	1.03	0.688	31.22
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	5.4	0.999	0.05	0.981	1.89
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	16.4	0.998	0.16	0.944	5.64
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	5.4	0.999	0.05	0.982	1.83

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	16.3	0.998	0.16	0.944	5.64
Collision risk	All projects.	222.2	0.978	2.19	0.450	54.98
	All projects excluding the Project.	221.8	0.978	2.19	0.451	54.90
	All projects excluding consented projects with a commitment to compensation.	24.0	0.998	0.24	0.918	8.22
	All projects excluding consented projects with a commitment to compensation and the Project.	23.6	0.998	0.23	0.920	8.02
Combined effects	30% displacement; 1% mortality for all projects.	257.3	0.975	2.54	0.396	60.39
	30% displacement; 3% mortality for all projects.	327.3	0.968	3.23	0.307	69.32
	30% displacement; 1% mortality for all projects excluding the Project.	256.9	0.975	2.53	0.397	60.27
	30% displacement; 3% mortality for all projects excluding the Project.	326.8	0.968	3.22	0.307	69.27
	30% displacement; 1% mortality for all projects excluding consented	29.4	0.997	0.29	0.901	9.94

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	projects with a commitment to compensation.					
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	40.3	0.996	0.40	0.867	13.35
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	28.9	0.997	0.28	0.903	9.72
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	39.8	0.996	0.39	0.868	13.16

2.2.7.10 When interpreting the PVA outputs presented within **Table 2.51**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015 to 2021 the kittiwake feature has declined by 6.5% per annum (Burnell *et al*., 2023).
- Declines during the 2000s are likely attributed to decreases in availability of primary food resources such as sandeel, specifically through impacts of climate change and sandeel fisheries (Burnell *et al.,* 2023).
- When comparing Seabird Count to the latest count in 2024, the colony has undergone growth of 5.2% per annum.
- Recent population growth may reflect remedial actions such as the sandeel (Prohibition of Fishing) (Scotland) Order 2024 and indirect effects of HPAI reducing predication pressure by impacting species such as great skua (Burnell *et al*., 2023).
- In Scotland the kittiwake population increased by 21% post-HPAI in contrast to pre-HPAI, despite a minimum of 760 positive cases of the virus recorded for kittiwake (Tremlett *et al.,* 2024). Individual kittiwake colony growth rate changes varied considerably from -83% to +191%, suggesting infection may have been more localised in comparison to the infection spread reported for other species (Tremlett *et al*., 2024). In relation to St Abb's Head to Fast Castle SPA, a 9% increase in population size was recorded post HPAI suggesting the colony was not significantly affected by HPAI, though further site-specific information on HPAI to support this conclusion is limited.
- The kittiwake feature of St Abb's Head to Fast Castle SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), limited evidence to suggest kittiwake are sensitive to distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.
- The majority of predicted impact in-combination is attributed by a single project (Berwick Bank) which is required to provide compensation to the feature as part of its consent conditions.

2.2.7.11 If the recent population trends remain viable for the colony the reduction in growth rates presented within **Table 2.51** (excluding projects with a commitment to compensation) would not significantly impede the long-term recovery of the feature. Though when considering the historic long-term decline of the colony there is uncertainty with respect to the future growth trend of the feature. However, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.01% per annum (**Table 2.51**). Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.2.7.12 Therefore, **the potential for an AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**.

2.2.8 West Westray SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.2.8.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.52** and **Table 2.53**, respectively with the predicted change in survival rate for scenarios considered presented in **Table 2.54**.

2.2.8.2 The level of predicted displacement and consequent mortality assessed is based on the rates presented within Section 6.2.4 of the **RIAA**, which were recommended by NatureScot. Information relating to the suitability of such rates at informing assessments is provided in Section 6.2.4 of the **RIAA**. A developer's approach is not presented, as the Applicant considers there is insufficient evidence to justify a requirement to assess kittiwake for distributional response effects (see Section 6.2.4 of the **RIAA** for further detail).

Table 2.52 In-combination predicted abundance apportioned to the West Westray SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea projects including Berwick Bank	-	-	-	-	-
UK North Sea Projects up to the point of Berwick Bank	-	1,266.7	844.4	2,111.1	2,111.1
Green Volt	0.9	1.9	2.6	4.5	5.4
Pentland Floating Offshore Wind Farm	-	-	-	-	-
Berwick Bank	-	316.6	190.2	506.8	506.8
Salamander	7.7	N/A	N/A	3.5	11.2
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	17.8	27.8	13.3	41.1	58.9
Ossian	-	-	-	-	-

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Cenos	-	N/A	N/A	1.9	1.9
Dogger Bank South (East and West)					
Five Estuaries					
North Falls					
Outer Dowsing					
Caledonia (Offshore Wind Farm)	5.6	N/A	N/A	8.4	14.0
Muir Mhor	5.9	17.2	1.0	18.2	24.1
Buchan	1.4	7.1	1.7	8.8	10.2
Dogger Bank D					
The Project	6.5	N/A	N/A	3.3	9.8
Total	45.9	1,637.3	1,053.2	2,707.6	2,753.5

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of West Westray SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. Greyed-out cells denote English projects where there is no requirement to assess kittiwake for distributional response effects.

Table 2.53 In-combination predicted distributional response consequent mortality apportioned to the West Westray SPA kittiwake feature

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
UK North Sea projects including Berwick Bank	-	-	4.8	14.3	3.1	9.3	7.9	23.6	7.9	23.6
UK North Sea Projects up to the point of Berwick Bank	-	-	3.9	11.4	2.5	7.6	6.4	19.0	6.4	19.0
Green Volt	-	-	-	-	-	-	-	-	-	-
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-	-	-	-	-
Berwick Bank	-	-	0.9	2.9	0.6	1.7	1.5	4.6	1.5	4.6
Salamander	-	0.1	N/A	N/A	N/A	N/A	-	-	-	0.1
Culzean	-	-	-	-	-	-	-	-	-	-
West of Orkney EIA Addendum	0.1	0.2	0.1	0.3	<0.1	0.1	0.1	0.4	0.2	0.5
Ossian	-	-	-	-	-	-	-	-	-	-

Project	Breeding		Return migration		Post-breeding migration		Non-breeding		Annual	
	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.	30% disp.; 1% mort.	30% disp.; 3% mort.
Cenos	-	-	N/A	N/A	N/A	N/A	-	-	-	-
Dogger Bank South (East and West)										
Five Estuaries										
North Falls										
Outer Dowsing										
Caledonia (Offshore Wind Farm)	<0.1	0.1	N/A	N/A	N/A	N/A	<0.1	0.1	0.1	0.1
Muir Mhor	<0.1	0.1	0.1	0.2	<0.1	<0.1	0.1	0.2	0.1	0.2
Buchan	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1
Dogger Bank D										
The Project	<0.1	0.1	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1	0.1
Total	0.2	0.5	5.0	14.8	3.1	9.4	8.1	24.3	8.3	24.7

Table 2.54 West Westray SPA kittiwake feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.53

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1% to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	1,932	0.2 to 0.5.	8.1 to 24.3.	8.3 to 24.7.	0.008 to 0.025.	0.420 to 1.260.	0.427 to 1.280.
	Latest Count (2017-2023).	4,838				0.003 to 0.010.	0.168 to 0.503.	0.171 to 0.511
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	1,932	0.1 to 0.3.	6.5 to 19.3.	6.6 to 19.6.	0.003 to 0.014.	0.337 to 1.001.	0.340 to 1.016.
	Latest Count (2017-2023).	4,838				0.001 to 0.006.	0.135 to 0.400.	0.136 to 0.406.

2.2.8.3 As summarised in **Table 2.54**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to West Westray SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage potential collision risk impacts on the qualifying feature in combination

2.2.8.4 The predicted consequent mortality in relation to collision risk in-combination apportioned to the kittiwake feature of Werst Westray SPA is provided in **Table 2.55**. The predicted change in survival rate for scenarios considered are presented in **Table 2.56**.

Table 2.55 In-combination predicted collision mortality apportioned to the West Westray SPA kittiwake feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	19.8	15.3	35.1	35.1
Green Volt	<0.1	0.1	0.1	0.1	0.2
Pentland Floating Offshore Wind Farm*	0.3	-	-	-	0.3
Berwick Bank*	-	3.1	2.1	5.2	5.2
Salamander	<0.1	-	<0.1	<0.1	0.1
Culzean	-	-	-	-	-
West of Orkney EIA Addendum	0.3	0.5	0.3	0.8	1.1
Ossian	-	-	-	-	-
Cenos	-	<0.1	0.1	0.1	0.1
Dogger Bank South (East and West)	-	0.7	1.3	2.0	2.0

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	0.1	0.1	0.1	0.1
Caledonia (Offshore Wind Farm)	0.2	N/A	N/A	0.2	0.4
Muir Mhor	0.1	0.2	<0.1	0.2	0.3
Buchan	<0.1	0.1	<0.1	0.1	0.1
Dogger Bank D	-	-	-	-	-
The Project	0.2	0.2	0.1	0.3	0.5
Total	1.1	24.8	19.3	44.3	45.4

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the kittiwake feature of West Westray SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023).

Table 2.56 West Westray SPA kittiwake feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.55

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	1,932	1.1	44.3	45.4	0.056	2.292	2.350
	Latest Count (2017 to 2023).	4,838				0.023	0.915	0.938
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	1,932	0.8	38.3	39.1	0.041	1.983	2.026
	Latest Count (2017 to 2023).	4,838				0.017	0.792	0.809

2.2.8.5 As summarised in **Table 2.56**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to West Westray SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA. The results and interpretation of PVA are presented within the O&M stage combined distributional response and collision risk impacts on the qualifying features in-combination.

Operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination

2.2.8.6 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.55**) and distributional responses (**Table 2.53**) in-combination is presented within **Table 2.57**. Predicted consequent change in survival rate for the kittiwake feature of West Westray SPA for each scenario considered is also presented in **Table 2.57**.

2.2.8.7 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.57 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the West Westray SPA kittiwake feature

Scenario	Population count	Population size (breeding adults)	Predicted impact using 30% displacement and 1% to3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	1,932	1.2 to 1.6.	52.4 to 68.6.	53.7 to 70.1.	0.065 to 0.081.	2.712 to 3.552.	2.777 to 3.630.
	Latest Count (2017 to 2023).	4,838				0.026 to 0.032.	1.083 to 1.418.	1.109 to 1.449.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	1,932	0.9 to 1.1.	44.8 to 57.7.	45.7 to 58.8.	0.044 to 0.056.	2.320 to 2.984.	2.366 to 3.042.
	Latest Count (2017 to 2023).	4,838				0.018 to 0.022.	0.926 to 1.192.	0.945 to 1.215.

2.2.8.8 As summarised in **Table 2.57**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to West Westray SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) further consideration of the predicted impact is required via PVA.

2.2.8.9 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 4,838 breeding adults. Outputs are presented in **Table 2.58** below, including the predicted median reduction in annual growth rate CGR and median reduction in final population size CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D** of the **RIAA**.

Table 2.58 PVA results for annual in-combination predicted impacts apportioned to the kittiwake feature of West Westray SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
Distributional responses	30% displacement; 1% mortality for all projects.	8.3	0.998	0.20	0.929	7.10
	30% displacement; 3% mortality for all projects.	24.7	0.994	0.60	0.804	19.62
	30% displacement; 1% mortality for all projects excluding the Project.	8.2	0.998	0.20	0.930	6.95
	30% displacement; 3% mortality for all projects excluding the Project.	24.6	0.994	0.60	0.805	19.50
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	6.6	0.998	0.16	0.943	5.65
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	19.6	0.995	0.48	0.841	15.88
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	6.5	0.998	0.16	0.944	5.64
	30% displacement; 3% mortality for all projects excluding consented projects	19.5	0.995	0.48	0.841	15.89

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	with a commitment to compensation and the Project.					
Collision risk	All projects.	45.4	0.989	1.11	0.670	33.05
	All projects excluding the Project.	44.9	0.989	1.10	0.672	32.80
	All projects excluding consented projects with a commitment to compensation.	39.1	0.990	0.96	0.708	29.24
	All projects excluding consented projects with a commitment to compensation and the Project.	38.6	0.991	0.94	0.711	28.93
Combined effects	30% displacement; 1% mortality for all projects.	53.7	0.987	1.31	0.621	37.88
	30% displacement; 3% mortality for all projects.	70.1	0.983	1.72	0.536	46.42
	30% displacement; 1% mortality for all projects excluding the Project.	53.1	0.987	1.30	0.624	37.62
	30% displacement; 3% mortality for all projects excluding the Project.	69.5	0.983	1.70	0.539	46.11
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation.	45.7	0.989	1.12	0.668	33.20

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation.	58.8	0.986	1.44	0.594	40.63
	30% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	45.2	0.989	1.10	0.670	32.95
	30% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project.	58.2	0.986	1.42	0.597	40.31

2.2.8.10 When interpreting the PVA outputs presented within **Table 2.58**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015 to 2021 the kittiwake feature has declined by 13.2% per annum (Burnell *et al.,* 2023).
- Declines during the 2000s are likely attributed to decreases in availability of primary food resources such as sandeel, specifically through impacts of climate change and sandeel fisheries (Burnell *et al.,* 2023).
- When comparing Seabird Count to the latest count, the colony has undergone growth of 58.2% per annum. To note, there is uncertainty regarding the latest count due to some of the RSPB sub sites not being surveyed since 1999. It is unclear it this is due to change in sub-colony sites surveyed or an absence of birds.
- Recent population growth may reflect remedial actions such as the sandeel (Prohibition of Fishing) (Scotland) Order 2024 and indirect effects of HPAI reducing predication pressure by impacting species such as great skua (Burnell *et al*., 2023).
- In Scotland the kittiwake population increased by 21% post-HPAI in contrast to pre-HPAI, despite a minimum of 760 positive cases of the virus recorded for kittiwake (Tremlett *et al.,* 2024). Individual kittiwake colony growth rate changes varied considerably from -83% to +191%, suggesting infection may have been more localised in comparison to the infection spread reported for other species (Tremlett *et al.,* 2024). In relation to West Westray SPA, a 18% decrease in population size was recorded post HPAI suggesting the colony was affected by HPAI. Overall, the colony has recorded significant growth when comparing pre and post HPAI counts.
- The kittiwake feature of West Westray SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), limited evidence to suggest kittiwake are sensitive to distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.2.8.11 If the recent population trends remain viable for the colony, the reduction in growth rates presented within **Table 2.58** would not significantly impede the long-term recovery of the feature. Though when considering the historic long-term decline of the colony there is uncertainty with respect to the future growth trend of the feature. However, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.02% per annum and under 0.5 birds per annum (**Table 2.58**). Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.2.8.12 Therefore, **the potential for an AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**.

2.3 Guillemot

2.3.1 Buchan Ness to Collieston Coast SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.3.1.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.59** and **Table 2.60**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.61** following the developer's approach and **Table 2.62** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.59 In-combination predicted abundance apportioned to the Buchan Ness to Collieston Coast SPA guillemot feature

Project	Breeding	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	436.7	338.9	775.6
Berwick Bank	319.6	682.4	1,002.1
Pentland Floating Offshore Wind Farm	-	-	-
Green Volt	815.0	206.0	1,021.0
Salamander	2,737.3	2,591.4	5,328.7
Culzean	-	-	-
West of Orkney	-	-	-
Ossian	-	-	-
Muir Mhor	N/A*	3,457.7	N/A*
Caledonia (Offshore Wind Farm)	-	-	-
Buchan	N/A*	953.3	N/A*
Dogger Bank South (East and West)	-	325.7	325.7
Five Estuaries	-	-	-

Project	Breeding	Non-breeding	Annual
North Falls	-	-	-
Cenos	-	-	-
Outer Dowsing	-	54.7	54.7
Dogger Bank D	-	-	-
The Project	3,988.0	1,195.1	5,183.2
Total	8,296.6	9,805.2	13,690.8

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the guillemot feature of Buchan Ness to Collieston Coast SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.60 In-combination predicted distributional response consequent mortality apportioned to the Buchan Ness to Collieston Coast SPA guillemot feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1 to 3% mort (guidance approach)	60% disp.; 3 to 5% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank	2.2	7.8	13.1	1.7	2.1	6.1	3.9	9.9	19.1
Berwick Bank	1.6	5.5	9.1	3.4	4.1	12.4	5.0	9.6	21.5
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-	-	-	-
Green Volt	4.1	14.7	24.4	1.0	1.2	3.7	5.1	15.9	28.2
Salamander	13.7	49.3	82.1	13.0	15.5	46.6	26.6	64.8	128.8
West of Orkney	-	-	-	-	-	-	-	-	-
Culzean	-	-	-	-	-	-	-	-	-
Ossian	-	-	-	-	-	-	-	-	-
Muir Mhor	-*	-*	-*	17.3	20.7	62.2	17.3	20.7	62.2

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1 to 3% mort (guidance approach)	60% disp.; 3 to 5% mort (guidance approach)
Caledonia (Offshore Wind Farm)	0.0	-	-	0.0	-	-	0.0	-	-
Buchan	-*	-*	-*	4.8	5.7	17.2	4.8	5.7	17.2
Dogger Bank South (East and West)	0.0	-	-	1.6	2.0	5.9	1.6	2.0	5.9
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-
Cenos	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	0.3	0.3	1.0	0.3	0.3	1.0
Dogger Bank D	-	-	-	-	-	-	-	-	-
The Project	19.9	71.8	119.6	6.0	7.2	21.5	25.9	79.0	141.2
Total	41.5	162.3	270.6	49.0	65.1	195.1	90.5	227.4	465.5

Table note: Projects highlighted in green are those which are consented with a requirement to compensate for their impact on this species at this site. *Impact predictions for the project were based on SeabORD modelling.

Table 2.61 Buchan Ness to Collieston Coast SPA guillemot feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.60

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 0% to 50% displacement and 0% to 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	39,440	0.0 to 41.5	0.0 to 49.0	0.0 to 90.5	0.105%	0.124%	0.229%
	Latest Count (2025).	33,225				0.125%	0.148%	0.272%
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	39,440	0.0 to 27.8	0.0 to 36.1	0.0 to 63.9	0.070%	0.091%	0.162%
	Latest Count (2025).	33,225				0.084%	0.109%	0.192%

Table 2.62 Buchan Ness to Collieston Coast SPA guillemot feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on guidance approach impact predictions within Table 2.60

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	39,440	162.3 to 270.6.	65.1 to 195.1.	227.4 to 465.5.	0.412 to 0.686.	0.165 to 0.495.	0.577 to 1.180.
	Latest Count (2025).	33,225				0.489 to 0.814.	0.196 to 0.587.	0.685 to 1.401.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	39,440	99.8 to 166.3.	43.4 to 130.0.	143.1 to 296.2.	0.253 to 0.422.	0.110 to 0.330.	0.363 to 0.751.
	Latest Count (2025).	33,225				0.300 to 0.500.	0.130 to 0.391.	0.431 to 0.891.

2.3.1.2 As summarised in **Table 2.61** and **Table 2.62**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Buchan Ness to Collieston Coast SPA, exceeds a 0.02% change in adult survival rate for both the Guidance approach and Developer approach. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed using PVA.

2.3.1.3 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 33,225 breeding adults. Outputs are presented in **Table 2.63** below, including the predicted median CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.63 PVA results for annual in-combination predicted impacts apportioned to the guillemot feature of Buchan Ness to Collieston Coast SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
50% displacement, 1% mortality for all projects	90.5	0.997	0.31	0.896	10.43
60% displacement, 3% mortality (breeding), 1% mortality (non-breeding) for all projects	227.4	0.992	0.77	0.757	24.30
60% displacement, 5% mortality (breeding), 3% mortality (non-breeding) for all projects	465.5	0.984	1.58	0.564	43.55
50% displacement, 1% mortality for all projects excluding consented projects with a commitment to compensation	63.9	0.998	0.22	0.925	7.50
60% displacement, 5% mortality (breeding), 3% mortality (non-breeding) for all projects excluding consented projects with a commitment to compensation	143.1	0.995	0.48	0.840	16.04
60% displacement, 3% mortality (breeding), 1% mortality (non-breeding) for all projects excluding consented projects with a commitment to compensation	296.2	0.990	1.00	0.696	30.42

2.3.1.4 The known recent and historic growth trends of the guillemot feature of Buchan Ness to Collieston Coast SPA are presented within Section 6.2.7 of the **RIAA**. When interpreting the PVA outputs presented within **Table 2.63**, it is important to consider the following points:

- Since citation in 1988, the colony has fluctuated in size, with significant decline recorded in the early 2000s, followed by recovery and growth up until 2023 (see Plate 6.2 of the **RIAA**). The reason for such a decline in the population is likely due to a reduction in key prey abundance and adverse weather event leading to a significant auk wreck within the early 2000s (Burnell *et al*., 2023).
- The latest count in 2025 recorded a reduction in population size compared to 2023 (see Table 6.16 of the **RIAA**), though the cause of decline is unknown.
- The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for guillemot.
- The effect of HPAI on guillemot colonies in Scotland varied considerably, though northeast Scotland mainland colonies (such as Buchan Ness to Collieston Coast SPA) primarily recorded positive growth when comparing pre and post HPAI surveys (Tremlett *et al.,* 2024). However, it is unclear whether this suggests HPAI had a limited impact on such colonies, or the change is related to other factors (such as population redistribution or survey error) (Tremlett *et al.,* 2024).
- The guillemot feature of Buchan Ness to Collieston Coast SPA is currently classified as being in favourable condition.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.7 of the **RIAA**).

2.3.1.5 When considering the favourable condition status and the minor decrease in population trend for the developer's preferred approach, the colony is likely resilient enough to withstand such a reduction in growth whilst maintaining the population size. This is supported by the rate of annual compound growth from 2007 to 2019 of 3.56% and from 1986 to 1995 of 8.95%, following records of previous historic declines.

2.3.1.6 However, it is acknowledged that the upper guidance approach equates to a 1.00% reduction in annual growth rate, including compensated projects (**Table 2.63**). Although when compared to recent growth trends the population would remain in positive growth, there is uncertainty around the impact of such a sustained reduction in growth over a long-term period.

2.3.1.7 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage cannot be ruled out for the Project in-combination**.

2.3.2 Troup, Pennan and Lion's Heads SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.3.2.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.64** and **Table 2.65**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.66** following the developer's approach and **Table 2.67** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.64 In-combination predicted abundance apportioned to the Troup, Pennan and Lion's Head SPA guillemot feature

Project	Breeding	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	319.6	682.4	1,002.1
Berwick Bank	177.6	591.4	769.0
Pentland Floating Offshore Wind Farm	-	-	-
Green Volt	301.1	152.5	453.6
Salamander	824.4	2,096.7	2,921.1
West of Orkney	-	-	-
Culzean	-	-	-
Ossian	-	-	-
Muir Mhor	N/A*	2,094.2	N/A*
Caledonia (Offshore Wind Farm)	874.0	452.8	1,326.8
Buchan	N/A*	1,409.2	N/A*
Dogger Bank South (East and West)	-	225.5	225.5
Five Estuaries	-	-	-
North Falls	-	51.0	51.0
Cenos	-	-	-
Outer Dowsing	-	40.5	40.5
Dogger Bank D	-	-	-
The Project	3,427.3	1,027.1	4,454.4
Total	5,924.1	8,823.3	11,244.0

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the guillemot feature of Troup, Pennan and Lion's Heads SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.65 In-combination predicted distributional response consequent mortality apportioned to the Troup, Pennan and Lion's Head SPA guillemot feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1 to 3% mort (guidance approach)	60% disp.; 3 to 5% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank	1.6	11.2	18.5	3.4	5.9	17.9	5.0	17.1	36.4
Berwick Bank	0.9	3.3	5.6	3.0	1.9	5.5	3.8	5.2	11.1
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-	-	-	-
Green Volt	1.5	5.4	9.0	0.8	0.9	2.7	2.3	6.3	11.8
Salamander	4.1	14.8	24.7	10.5	12.6	37.7	14.6	27.4	62.4
West of Orkney	-	-	-	-	-	-	-	-	-
Culzean	-	-	-	-	-	-	-	-	-
Ossian	-	-	-	-	-	-	-	-	-
Muir Mhor	0.1*	0.1*	0.1*	10.5	12.6	37.7	10.6	12.7	37.8

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1 to 3% mort (guidance approach)	60% disp.; 3 to 5% mort (guidance approach)
Caledonia (Offshore Wind Farm)	4.4	15.7	26.2	2.3	2.7	8.2	6.6	18.4	34.4
Buchan	1.7*	1.7*	1.7*	7.0	8.5	25.4	8.7	10.2	27.1
Dogger Bank South (East and West)	-	-	-	1.1	1.4	4.1	1.1	1.4	4.1
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	0.3	0.3	0.9	0.3	0.3	0.9
Cenos	0.0	-	-	0.0	-	-	0.0	-	-
Outer Dowsing	-	-	-	0.2	0.2	0.7	0.2	0.2	0.7
Dogger Bank D	-	-	-	-	-	-	-	-	-
The Project	17.1	61.7	102.8	5.1	6.2	18.5	22.3	67.9	121.3
Total	31.4	114.0	188.7	44.1	53.1	159.2	75.5	167.0	347.9

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the guillemot feature of Troup, Pennan and Lion's Heads SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling.

Table 2.66 Troup, Pennan and Lion's Head SPA guillemot feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.65

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 0% to 50% displacement and 0% to 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al*. (2023)	31,893	0.0 to 31.4.	0.0 to 44.1.	0.0 to 75.5.	0.000 to 0.099.	0.000 to 0.138.	0.000 to 0.237.
	Latest Count (2017 to 2023)	47,719				0.000 to 0.066.	0.000 to 0.092	0.000 to 0.158.
All projects excluding consented projects with a commitment to compensation	Burnell *et al*. (2023)	31,893	0.0 to 27.3.	0.0 to 33.6.	0.0 to 60.9.	0.000 to 0.086.	0.000 to 0.105.	0.000 to 0.191.
	Latest Count (2017 to 2023)	47,719				0.000 to 0.057.	0.000 to 0.070.	0.000 to 0.128.

Table 2.67 Troup, Pennan and Lion's Head SPA guillemot feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on guidance approach impact predictions within Table 2.65

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	31,893	114.0 to 188.7.	53.1 to 159.2.	167.0 to 347.9.	0.357 to 0.592.	0.166 to 0.499.	0.524 to 1.091.
	Latest Count (2017 to 2023)	47,719				0.239 to 0.395.	0.111 to 0.334.	0.350 to 0.729.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	31,893	99.1 to 164.0.	40.5 to 121.5.	139.7 to 285.5.	0.311 to 0.514.	0.127 to 0.381.	0.438 to 0.895.
	Latest Count (2017 to 2023)	47,719				0.208 to 0.344.	0.085 to 0.255.	0.293 to 0.598.

2.3.2.2 As summarised in **Table 2.66** and **Table 2.67**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Troup, Pennan and Lion's Head SPA, exceeds a 0.02% change in adult survival rate for both the Guidance approach and Developer approach. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed using PVA.

2.3.2.3 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 47,719 breeding adults. Outputs are presented in **Table 2.68** below, including the predicted median CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.68 PVA results for annual in-combination predicted impacts apportioned to the guillemot feature of Troup, Pennan and Lion's Head SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR (standard deviation (SD))	Reduction in annual growth rate (%)	Median CPS (SD)	Reduction in final population size after 35 years (%)
50% displacement, 1% mortality for all projects	75.5	0.998	0.18	0.938	6.20
60% displacement, 3% mortality (breeding), 1% mortality (non-breeding) for all projects	167.0	0.996	0.39	0.868	13.23
60% displacement, 5% mortality (breeding), 3% mortality (non-breeding) for all projects	347.9	0.992	0.82	0.743	25.65
50% displacement, 0 - 1% mortality for all projects excluding consented projects with a commitment to compensation	60.9	0.999	0.14	0.950	5.02
60% displacement, 3% mortality (breeding), 1% mortality (non-breeding) for all projects excluding consented projects with a commitment to compensation	139.7	0.997	0.33	0.888	11.19
60% displacement, 5% mortality (breeding), 3% mortality (non-breeding) for all projects excluding consented projects with a commitment to compensation	285.5	0.993	0.67	0.784	21.57

2.3.2.4 The known recent and historic growth trends of the guillemot feature of Troup, Pennan and Lion's Heads SPA are presented within Section 6.2.8 of the **RIAA**. When interpreting the PVA outputs presented within **Table 2.68**, it is important to consider the following points:

- From 1986 to 2001 the colony underwent considerable growth, following which a significant crash in the population was recorded in 2007 based on census data for the Troup, Pennan and Lion's Heads RSPB count sector (see Plate 6.4 of the **RIAA**). The reason for such a decline in the population is likely due to a reduction in key prey abundance and adverse weather event leading to a significant auk wreck within the early 2000s (Burnell *et al.,* 2023).
- The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for guillemot.
- Within recent years the colony has undergone a steady increase in population size based on the census records for the Troup, Pennan and Lion's Heads RSPB count sector. An annual compound growth rate of 1.54% was recorded from 2007 to 2017 and 8.44% was recorded from 2017 to 2023 (see Table 6.30 of the **RIAA**).
- The effect of HPAI on guillemot colonies in Scotland varied considerably, though northeast Scotland mainland colonies (such as Troup, Pennan and Lion's Heads SPA) primarily recorded positive growth when comparing pre and post HPAI surveys (Tremlett *et al*., 2024). However, it is unclear whether this suggests HPAI had a limited impact on such colonies, or the change is related to other factors (such as population redistribution or survey error) (Tremlett *et al.,* 2024).
- The kittiwake feature of Troup, Pennan and Lion's Heads SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.3.2.5 The predicted in-combination impact is most realistically considered against the developer's preferred approach, excluding projects with compensated impacts which results in a 0.14% reduction in annual population growth rate. This impact is sufficiently small that it would be indistinguishable from natural fluctuations in the population and can confidently be concluded as not resulting in an AEoSI.

2.3.2.6 However, it is acknowledged that the upper guidance approach equates to a 0.67% reduction in annual growth rate, including compensated projects (**Table 2.68**), and though this would likely be indistinguishable from the outlined fluctuations in the population that have occurred in the last ~20 years, any further tangible reduction in growth rate will further impede the recovery of the feature based on the unfavourable condition of the guillemot feature.

2.3.2.7 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage cannot be ruled out** for the Project in-combination.

2.3.3 Copinsay SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.3.3.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.69** and **Table 2.70**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.71** following the developer's approach and **Table 2.72** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.69 In-combination predicted abundance apportioned to the Copinsay SPA guillemot feature

Project	Breeding	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	-	-
Berwick Bank	-	-	-
Pentland Floating Offshore Wind Farm	-	-	-
Green Volt	71.9	78.2	150.0
Salamander	-	-	-
West of Orkney	-	117.8	117.8
Culzean	-	-	-
Ossian	-	-	-
Muir Mhor	-	-	-
Caledonia (Offshore Wind Farm)	82.2	104.1	186.3
Buchan	N/A*	265.7	N/A*
Dogger Bank South (East and West)	-	125.3	125.3
Five Estuaries	-	-	-
North Falls	-	-	-
Cenos	-	-	-
Outer Dowsing	-	20.8	20.8

Project	Breeding	Non-breeding	Annual
Dogger Bank D	-	-	-
The Project	1,233.2	369.6	1,602.8
Total	1,387.2	1,081.4	2,202.9

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the guillemot feature of Copinsay SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.70 In-combination predicted distributional response consequent mortality apportioned to the Copinsay SPA guillemot feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1 - 3% mort (guidance approach)	60% disp.; 3 - 5% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank	-	-	-	-	-	-	-	-	-
Berwick Bank	-	-	-	-	-	-	-	-	-
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-	-	-	-
Green Volt	0.4	1.3	2.2	0.4	0.5	1.4	0.8	1.8	3.6
Salamander	-	-	-	-	-	-	-	-	-
West of Orkney	-	-	-	0.6	0.7	2.1	0.6	0.7	2.1
Culzean	-	-	-	-	-	-	-	-	-
Ossian	-	-	-	-	-	-	-	-	-
Muir Mhor	-	-	-	-	-	-	-	-	-

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1 - 3% mort (guidance approach)	60% disp.; 3 - 5% mort (guidance approach)
Caledonia (Offshore Wind Farm)	0.4	1.5	2.5	0.5	0.6	1.9	0.9	2.1	4.3
Buchan	4.9*	4.9*	4.9*	1.3	1.6	4.8	6.2	6.5	9.7
Dogger Bank South (East and West)	-	-	-	0.6	0.8	2.3	0.6	0.8	2.3
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-
Cenos	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	0.1	0.1	0.4	0.1	0.1	0.4
Dogger Bank D	-	-	-	-	-	-	-	-	-
The Project	6.2	22.2	37.0	1.8	2.2	6.7	8.0	24.4	43.6
Total	11.8	29.9	46.5	5.4	6.5	19.5	17.2	36.4	66.0

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the guillemot feature of Copinsay SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling.

Table 2.71 Copinsay SPA guillemot feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.70

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 0% to 50% displacement and 0% to1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	24,761	11.8	5.4	17.2	0.048%	0.022%	0.070%
	Latest Count (2015 to 2023).	10,991				0.108%	0.049%	0.157%
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	24,761	0.0 to 11.8	0.0 to 4.8	0.0 to 16.7	0.000 to 0.048	0.000 to 0.019	0.000 to 0.067
	Latest Count (2015 to 2023)	10,991				0.000 to 0.108	0.000 to 0.044	0.000 to 0.152

Table 2.72 Copinsay SPA guillemot feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on guidance approach impact predictions within Table 2.70

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	24,761	29.9 to 46.5.	6.5 to 19.5.	36.4 to 66.0.	0.121 to 0.188.	0.026 to 0.079.	0.147 to 0.266.
	Latest Count (2015 to 2023).	10,991				0.272 to 0.423.	0.059 to 0.177.	0.331 to 0.600.
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	24,761	29.9 to 46.5.	5.8 to 17.3.	35.7 to 63.9.	0.121 to 0.188.	0.023 to 0.070.	0.144 to 0.258.
	Latest Count (2015 to 2023).	10,991				0.272 to 0.423.	0.053 to 0.158.	0.324 to 0.581.

2.3.3.2 As summarised in **Table 2.71** and **Table 2.72**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Copinsay SPA, exceeds a 0.02% change in adult survival rate for both the Guidance approach and Developer approach. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed using PVA.

2.3.3.3 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 10,991 breeding adults. Outputs are presented in **Table 2.73** below, including the predicted median CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.73 PVA results for annual in-combination predicted impacts apportioned to the guillemot feature of Copinsay SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
50% displacement, 1% mortality for all projects	17.2	0.998	0.18	0.938	6.18
60% displacement, 3% mortality (breeding), 1% mortality (non-breeding) for all projects	36.4	0.996	0.37	0.874	12.59
60% displacement, 5% mortality (breeding), 3% mortality (non-breeding) for all projects	66.0	0.993	0.68	0.783	21.67
50% displacement, 1% mortality for all projects excluding consented projects with a commitment to compensation	16.7	0.998	0.17	0.940	5.99
60% displacement, 5% mortality (breeding), 3% mortality (non-breeding) for all projects excluding consented projects with a commitment to compensation	35.7	0.996	0.37	0.876	12.36
60% displacement, 3% mortality (breeding), 1% mortality (non-breeding) for all projects excluding consented projects with a commitment to compensation	63.9	0.993	0.65	0.790	21.01

2.3.3.4 The known recent and historic growth trends of the guillemot feature of Copinsay SPA are presented within Section 6.2.12 of the **RIAA**. When interpreting the PVA outputs presented within **Table 2.73**, it is important to consider the following points:

- From 1986 to 2005 the colony underwent considerable decline. The reason for such a decline in the population is likely due to a reduction in key prey abundance and adverse weather event leading to a significant auk wreck within the early 2000s (Burnell *et al.,* 2023).
- Since 2005, the population has fluctuated with an overall minor population growth trend. Between 2012 and 2015, the population had an annual increase of 30.16%, while between 2015 to 2023 there was an annual decline of 9.64%.
- The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for guillemot.
- The guillemot feature of Copinsay SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- The effect of HPAI on guillemot colonies in Scotland varied considerably, though an overall decline of 56% was recorded between pre and post HPAI counts for Copinsay SPA (Tremlett *et al*., 2024). However, it is unclear to what degree this is due to HPAI, or if the change is related to other factors (such as population redistribution, adverse weather, change in prey availability or survey error) (Tremlett *et al*., 2024).
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.3.3.5 When considering the large fluctuations in the population in the last ~20 years, the reduction in growth rates presented within **Table 2.73**, is not likely to cause any material changes to ongoing trends.

2.3.3.6 The predicted in-combination impact is most realistically considered against the developer approach excluding projects with compensated impacts, which results in a 0.17% reduction in annual population growth rate. This impact is sufficiently small that it would be indistinguishable from natural fluctuations in the population and can confidently be concluded as not resulting in an AEoSI.

2.3.3.7 However, it is acknowledged that the upper guidance approach equates to a 0.68% reduction in annual growth rate, including compensated projects (**Table 2.73**), and though this would likely be indistinguishable from the outlined fluctuations in the population that have occurred in the last ~20 years, any further tangible reduction in growth rate will further impede the recovery of the feature based on the unfavourable condition of the guillemot feature.

2.3.3.8 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage cannot be ruled out for the Project in-combination**.

2.3.4 Fair Isle SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.3.4.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.74** and **Table 2.75**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.76** following the developer's approach and **Table 2.77** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.74 In-combination predicted abundance apportioned to the Fair Isle SPA guillemot feature

Project	Breeding	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	-	-
Berwick Bank	-	-	-
Pentland Floating Offshore Wind Farm	-	-	-
Green Volt	42.6	182.2	224.8
Salamander	-	-	-
West of Orkney	-	116.1	116.1
Culzean	-	-	-
Ossian	-	-	-
Muir Mhor	-	-	-
Caledonia (Offshore Wind Farm)	-	-	-
Buchan	N/A*	329.9	N/A*
Dogger Bank South (East and West)	-	275.6	275.6
Five Estuaries	-	-	-
North Falls	-	-	-
Cenos	-	-	-
Outer Dowsing	-	48.4	48.4

Project	Breeding	Non-breeding	Annual
Dogger Bank D	-	-	-
The Project	861.8	258.3	1,120.1
Total	904.4	1,210.5	1,784.9

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.75 In-combination predicted distributional response consequent mortality apportioned to the Fair Isle SPA guillemot feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1 - 3% mort (guidance approach)	60% disp.; 3 - 5% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank	-	-	-	-	-	-	-	-	-
Berwick Bank	-	-	-	-	-	-	-	-	-
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-	-	-	-
Green Volt	0.2	0.8	1.3	0.9	1.1	3.3	1.1	1.9	4.6
Salamander	-	-	-	-	-	-	-	-	-
Ossian	-	-	-	-	-	-	-	-	-
Muir Mhor	-	-	-	-	-	-	-	-	-
Caledonia (Offshore Wind Farm)	-	-	-	-	-	-	-	-	-

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1 - 3% mort (guidance approach)	60% disp.; 3 - 5% mort (guidance approach)
West of Orkney	-	-	-	0.6	0.7	2.1	0.6	0.7	2.1
Culzean	-	-	-	-	-	-	-	-	-
Buchan	1.5*	1.5*	1.5*	1.6	2.0	5.9	3.1	3.5	7.4
Dogger Bank South (East and West)	-	-	-	1.4	1.7	5.0	1.4	1.7	5.0
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-
Cenos	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	0.2	0.3	0.9	0.2	0.3	0.9
Dogger Bank D	-	-	-	-	-	-	-	-	-
The Project	4.3	15.5	25.9	1.3	1.5	4.6	5.6	17.1	30.5
Total	6.0	17.8	28.6	6.1	7.3	21.8	12.1	25.0	50.4

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling.

Table 2.76 Fair Isle SPA guillemot feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.75

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 0% to 50% displacement and 0% to 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al*. (2023).	24,515	0.0 to 6.0	0.0 to 6.1	0.0 to 12.1	0.000 to 0.025	0.000 to 0.025	0.000 to 0.049

Table 2.77 Fair Isle SPA guillemot feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on guidance approach impact predictions within Table 2.75

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al*. (2023).	24,515	17.8 to 28.6	7.3 to 21.8	25.0 to 50.4	0.073 to 0.117	0.030 to 0.089	0.102 to 0.206

2.3.4.2 As summarised in **Table 2.76** and **Table 2.77**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Fair Isle SPA, exceeds a 0.02% change in adult survival rate for both the Guidance approach and Developer approach. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed using PVA.

2.3.4.3 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 24,515 breeding adults. Outputs are presented in **Table 2.78** below, including the predicted median CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.78 PVA results for annual in-combination predicted impacts apportioned to the guillemot feature of Fair Isle SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
50% displacement, 1% mortality for all projects	12.1	0.999	0.06	0.980	1.98
60% displacement, 3% mortality (breeding), 1% mortality (non-breeding) for all projects	25.0	0.999	0.11	0.959	4.07
60% displacement, 5% mortality (breeding), 3% mortality (non-breeding) for all projects	50.4	0.998	0.23	0.920	8.01

2.3.4.4 The known recent and historic growth trends of the guillemot feature of Fair Isle SPA are presented within Section 6.2.13 of the **RIAA**. When interpreting the PVA outputs presented within **Table 2.78**, it is important to consider the following points:

- Between 1986 to 1999, the colony population trend was relatively stable to increasing. During the early 2000s the colony underwent significant decline before stabilising in 2010 (see Plate 6.11 of the **RIAA**). Between 2003 to 2007 Scottish guillemot colonies recorded a drop in productivity that is believed to correlate with a reduction in sandeel abundance at the time (Burnell *et al.,* 2023), which likely explains the population decline observed at Fair Isle SPA.
- In recent years the colony trend has stabilised, though a slight decline is noted in the most recent count in 2021 (see Plate 6.11 of the **RIAA**).
- The effect of HPAI on guillemot colonies in Scotland varied considerably, which is also reflected at colonies across Shetland, such as Noss and Hermaness, Saxa Vord and Valla Field (-17% and +10% population change post HPAI respectively), though guillemots on Fair Isle SPA were not monitored in Tremlett *et al.* (2024). Therefore, the extent of impact on the guillemot colony at Fair Isle SPA as a result of HPAI is unclear.
- The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for guillemot.
- The guillemot feature of Fair Isle SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.3.4.5 The predicted in-combination impact is most realistically considered against the developer approach, which results in a 0.06% reduction in annual population growth rate (**Table 2.78**). This impact is sufficiently small that it would be indistinguishable from natural fluctuations in the population and can confidently be concluded as not resulting in an AEoSI.

2.3.4.6 Even the upper guidance approach, which equates to a 0.23% reduction in annual growth rate (**Table 2.78**), is expected to be sufficiently small that it would be indistinguishable from natural fluctuations in the population and therefore not expected to hinder the long-term recovery of the population.

2.3.4.7 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage can be confidently ruled out for the Project in-combination**.

2.3.5 Calf of Eday SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.3.5.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.79** and **Table 2.80** respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.81** following the developer's approach and **Table 2.82** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within

Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.79 In-combination predicted abundance apportioned to the Calf of Eday SPA guillemot feature

Project	Breeding	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	-	-
Berwick Bank	-	-	-
Pentland Floating Offshore Wind Farm	-	13.3	13.3
Green Volt	-	-	-
Salamander	-	-	-
West of Orkney	-	22.2	22.2
Culzean	-	-	-
Ossian	-	-	-
Muir Mhor	-	-	-
Caledonia (Offshore Wind Farm)	23.9	70.2	94.1
Buchan	90.0	89.9	179.9
Dogger Bank South (East and West)	-	125.3	125.3
Five Estuaries	-	-	-
North Falls	-	-	-
Cenos	-	-	-
Outer Dowsing	-	23.3	23.3
Dogger Bank D	-	-	-
The Project	153.3	45.9	199.2
Total	267.1	390.3	657.4

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.80 In-combination predicted distributional response consequent mortality apportioned to the Calf of Eday SPA guillemot feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1 - 3% mort (guidance approach)	60% disp.; 3 - 5% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank	-	-	-	-	-	-	-	-	-
Berwick Bank	-	-	-	-	-	-	-	-	-
Pentland Floating Offshore Wind Farm	<0.1	<0.1	<0.1	0.1	0.1	0.2	0.1	0.1	0.2
Green Volt	-	-	-	-	-	-	-	-	-
Salamander	-	-	-	-	-	-	-	-	-
Ossian	-	-	-	-	-	-	-	-	-
Muir Mhor	-	-	-	-	-	-	-	-	-
Caledonia (Offshore Wind Farm)	0.1	0.4	0.7	0.4	0.4	1.3	0.5	0.9	2.0
West of Orkney	-	-	-	0.1	0.1	0.4	0.1	0.1	0.4

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1 - 3% mort (guidance approach)	60% disp.; 3 - 5% mort (guidance approach)
Culzean	-	-	-	-	-	-	-	-	-
Buchan	0.4	1.6	2.7	0.4	0.5	1.6	0.9	2.2	4.3
Dogger Bank South (East and West)	-	-	-	0.6	0.8	2.3	0.6	0.8	2.3
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-
Cenos	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	0.1	0.1	0.4	0.1	0.1	0.4
Dogger Bank D	-	-	-	-	-	-	-	-	-
The Project	0.8	2.8	4.6	0.2	0.3	0.8	1.0	3.0	5.4
Total	1.3	4.8	8.0	2.0	2.3	7.0	3.3	7.1	15.0

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.81 Calf of Eday SPA guillemot feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on Developer Approach impact predictions within Table 2.80

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 0-50% displacement and 0% to 1% mortality (breeding adults)			Change In survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	4,681	0.0 to 1.3	0.0 to 2.0	0.0 to 3.3	0.000 to 0.029	0.000 to 0.042	0.000 to 0.070

Table 2.82 Calf of Eday SPA guillemot feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on Guidance Approach impact predictions within Table 2.80

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change In survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	4,681	4.8 to 8.0	2.3 to 7.0	7.1 to 15.0	0.103 to 0.171	0.050 to 0.150	0.153 to 0.321

2.3.5.2 As summarised in **Table 2.81** and **Table 2.82**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Calf of Eday SPA, exceeds a 0.02% change in adult survival rate for both the Guidance approach and Developer approach. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed using PVA.

2.3.5.3 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 4,681 breeding adults. Outputs are presented in **Table 2.83** below, including the predicted median CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.83 PVA results for annual in-combination predicted impacts apportioned to the guillemot feature of Calf of Eday SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR (SD)	Reduction in annual growth rate (%)	Median CPS (SD)	Reduction in final population size after 35 years (%)
50% displacement, 1% mortality for all projects	3.3	0.999	0.08	0.972	2.81
60% displacement, 3% mortality (breeding), 1% mortality (non-breeding) for all projects	7.1	0.998	0.17	0.940	5.98
60% displacement, 5% mortality (breeding), 3% mortality (non-breeding) for all projects	15.0	0.996	0.36	0.878	12.17

2.3.5.4 The known recent and historic growth trends of the guillemot feature of Calf of Eday SPA are presented within Section 6.2.14 of the **RIAA**. When interpreting the PVA outputs presented within **Table 2.83**, it is important to consider the following points:

- Between 1998 and 2002 the colony population has experienced a declining trend before stabilising in 2002 (see Plate 6.12 of the **RIAA**).
- Though no data more recent than 2018 exists for the Calf of Eday SPA for guillemot, recent trends show a significant positive population growth rate, with an annual increase of 4.90% per annum between 2002 and 2018. This growth has accelerated in recent years, with the annual increase being 25.89% between 2016 and 2018 (see Table 6.87 of the **RIAA**).
- As identified within Burnell *et al.* (2023) a key driver of historic population decline in the Scottish guillemot population related to availability of key prey abundance. The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of reduction in key prey abundance for guillemot.
- The guillemot feature of Calf of Eday SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.3.5.5 The predicted in-combination impact is most realistically considered against the developer approach, which results in a 0.08% reduction in annual population growth rate (**Table 2.83**). This impact is sufficiently small that it would be indistinguishable from natural fluctuations in the population and can confidently be concluded as not resulting in an AEoSI.

2.3.5.6 Even the upper guidance approach, which equates to a 0.36% reduction in annual growth rate (**Table 2.83**), is expected to be sufficiently small that it would be indistinguishable from natural fluctuations in the population and therefore not expected to hinder the long-term recovery of the population.

2.3.5.7 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage can be confidently ruled out for the Project in-combination**.

2.4 Razorbill

2.4.1 Troup, Pennan and Lion's Heads SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.4.1.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.84** and **Table 2.85**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.86** following the developer's approach and **Table 2.87** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.84 In-combination predicted abundance apportioned to the Troup, Pennan and Lion's Heads SPA razorbill feature

Project	Breeding	Post-breeding migration	Migration-free winter / non-breeding	Return migration	Total non-breeding	Annual
UK North Sea projects including Berwick Bank	103.3	322.2	133.3	244.4	700.0	803.3
UK North Sea Projects up to the point of Berwick Bank	57.6	269.1	126.3	199.6	595.0	652.6
Berwick Bank	45.8	53.1	7.0	44.9	105.0	150.7
Pentland Floating Offshore Wind Farm	-	N/A	N/A	N/A	-	-
Green Volt	39.6	N/A	N/A	N/A	0.1	39.7
Salamander	51.8	N/A	N/A	N/A	2.4	54.2
Ossian	-	-	-	-	-	-
Muir Mhor	N/A*	8.3	0.2	0.7	8.6	N/A
Caledonia (Offshore Wind Farm)	104.4	N/A	N/A	N/A	11.4	115.8
West of Orkney	-	N/A	N/A	N/A	1.1	1.1
Culzean	-	-	-	-	-	-
Buchan	N/A*	0.4	0.6	0.1	1.1	N/A
Dogger Bank South (East and West)	0.0	57.4	16.9	48.2	122.5	122.5
Five Estuaries	-	-	-	-	-	-
North Falls	-	-	-	-	-	-

Project	Breeding	Post-breeding migration	Migration-free winter / non-breeding	Return migration	Total non-breeding	Annual
Cenos	-	-	-	-	-	-
Outer Dowsing	-	12.9	8.5	30.2	51.6	-
Dogger Bank D	-	-	-	-	-	-
The Project	74.1	N/A	N/A	N/A	6.8	81.0
Total	373.3	401.2	159.5	323.7	905.6	1,217.6

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the razorbill feature of Troup, Pennan and Lion's Heads SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.85 In-combination predicted distributional response consequent mortality apportioned to the Troup, Pennan and Lion's Head SPA razorbill feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1-3% mort (guidance approach)	60% disp.; 3-5% mort (guidance approach)
UK North Sea projects including Berwick Bank	-	1.8	3.1	-	4.2	12.6	-	6.0	15.7
UK North Sea Projects up to the point of Berwick Bank	0.3	1.0	1.7	3.0	3.6	10.7	3.3	4.5	12.4
Berwick Bank	0.2	0.8	1.4	0.5	0.6	1.9	0.8	1.5	3.3
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-	-	-	-
Green Volt	0.2	0.7	1.2	0.0	-	-	0.2	0.7	1.2
Salamander	0.3	0.9	1.6	-	-	-	-	0.9	1.6
Ossian	-	-	-	-	-	-	-	-	-
Muir Mhor	0.8*	0.8*	0.8*	-	0.1	0.2	0.8	0.9	1.6

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1-3% mort (guidance approach)	60% disp.; 3-5% mort (guidance approach)
Caledonia (Offshore Wind Farm)	0.5	1.9	3.1	0.1	0.1	0.2	0.6	2.0	3.3
West of Orkney	-	-	-	-	-	-	-	-	-
Culzean	-	-	-	-	-	-	-	-	-
Buchan	0.9*	0.9*	0.9*	-	-	-	0.9	0.9	0.9
Dogger Bank South (East and West)	-	-	-	0.6	0.7	2.2	0.6	0.7	2.2
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-
Cenos	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	0.3	0.3	0.9	0.3	0.3	0.9
Dogger Bank D	-	-	-	-	-	-	-	-	-
The Project	0.4	1.3	2.2	-	-	0.1	0.4	1.4	2.3

Project	**Breeding**			**Non-breeding**			**Annual**		
	50% disp.; 1% mort (developer approach)	**60% disp.; 3% mort (guidance approach)**	**60% disp.; 5% mort (guidance approach)**	**50% disp.; 1% mort (developer approach)**	**60% disp.; 3% mort (guidance approach)**	**60% disp.; 5% mort guidance approach)**	**50% disp.; 1% mort (developer approach)**	**60% disp.; 1-3% mort (guidance approach)**	**60% disp.; 3-5% mort (guidance approach)**
Total	3.6	8.4	12.9	4.5	5.4	16.3	8.1	13.9	29.8

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the razorbill feature of Troup, Pennan and Lion's Heads SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling.

Table 2.86 Troup, Pennan and Lion's Heads SPA razorbill feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.85

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 50% Displacement and 0-1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	6,054	0.0 to 3.6	0.0 to 4.5	0.0 to 8.1	0.000 to 0.059	0.000 to 0.075	0.000 to 0.134
	Latest Count (2025).	8,801				0.000 to 0.041	0.000 to 0.051	0.000 to 0.092
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	6,054	0.0 to 3.3	0.0 to 4.5	0.0 to 7.8	0.000 to 0.055	0.000 to 0.075	0.000 to 0.129
	Latest Count (2025).	8,801				0.000 to 0.038	0.000 to 0.051	0.000 to 0.089

Table 2.87 Troup, Pennan and Lion's Heads SPA razorbill feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the guidance approach impact predictions within Table 2.85

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	6,054	8.4 to 12.9	5.4 to 16.3	13.9 to 29.8	0.138 to 0.213	0.090 to 0.269	0.230 to 0.493
	Latest Count (2025).	8,801				0.095 to 0.147	0.062 to 0.185	0.158 to 0.339
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	6,054	7.4 to 11.3	5.4 to 16.3	12.9 to 28.2	0.123 to 0.187	0.090 to 0.268	0.214 to 0.467
	Latest Count (2025).	8,801				0.084 to 0.129	0.062 to 0.185	0.147 to 0.321

2.4.1.2 As summarised in **Table 2.86** and **Table 2.87**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Troup Pennan and Lion's Head SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.4.1.3 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 8,801 breeding adults. Outputs are presented in **Table 2.88** below, including the predicted median CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.88 PVA results for annual in-combination distributional response predicted impacts apportioned to the razorbill feature of Troup, Pennan and Lion's Heads SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
50% displacement; 1% mortality for all projects	8.1	0.999	0.11	0.960	3.99
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects	13.9	0.998	0.18	0.935	6.50
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects	29.8	0.996	0.40	0.865	13.50
50% displacement; 1% mortality for all projects excluding the Project	7.7	0.999	0.10	0.963	3.70
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects excluding the Project	12.5	0.998	0.17	0.941	5.93
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects excluding the Project	27.5	0.996	0.37	0.875	12.47
50% displacement; 1% mortality for a excluding consented projects with a commitment to compensation	7.8	0.999	0.11	0.964	3.64

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) excluding consented projects with a commitment to compensation	12.9	0.998	0.18	0.939	6.11
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) excluding consented projects with a commitment to compensation	28.2	0.996	0.38	0.872	12.76
50% displacement; 1% mortality excluding consented projects with a commitment to compensation excluding the Project	7.4	0.999	0.10	0.964	3.60
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) excluding consented projects with a commitment to compensation excluding the Project	11.6	0.998	0.16	0.945	5.53
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) excluding consented projects with a commitment to compensation excluding the Project	25.9	0.997	0.35	0.882	11.76

2.4.1.4 The known recent and historic growth trends of the razorbill feature of Troup, Pennan and Lion's Heads SPA are presented within Section 6.2.8 of the **RIAA**. When interpreting the PVA outputs presented within **Table 2.88**, it is important to consider the following points:

- From 1986-1995 the colony underwent considerable growth, following which a continued decline in the population was recorded before stabilising in 2015 based on the Troup, Pennan and Lion's Heads RSPB count sector (see Plate 6.3 of the **RIAA**). The reason for such a decline in the population is likely due to a reduction in key prey abundance and adverse weather event leading to a significant auk wreck within the early 2000s (Burnell *et al.,* 2023).
- The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for razorbill.
- Since 2015 the colony has undergone considerable growth with compound annual growth rate predictions of 6.69% from 2017 to 2023 and 26.80% from 2021 to 2023 based on the Troup, Pennan and Lion's Heads RSPB count sector (see Table 6.37 of the **RIAA**).
- The razorbill feature of Troup, Pennan and Lion's Heads SPA is currently classified as being in favourable condition.
- No detailed consideration of the potential effect of HPAI on razorbills is provided within Tremlett *et al*. (2024) due to low mortality from HPAI recorded for razorbill.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.4.1.5 When considering the significant positive growth trend in the last ten years, the reduction in growth rates presented within **Table 2.88** would not significantly impede the long-term integrity of the feature. Further, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.03% per annum (**Table 2.88**). Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.4.1.6 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, razorbill will be maintained as a feature in the long term.

2.4.2 East Caithness Cliffs SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.4.2.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.89** and **Table 2.90**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.91** following the developer's approach and **Table 2.92** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.89 In-combination predicted abundance apportioned to the East Caithness Cliffs SPA razorbill feature

Project	Breeding	Post-breeding migration	Migration-free winter / non-breeding	Return migration	Total non-breeding	Annual
UK North Sea projects including Berwick Bank	4,616.7	2,288.9	944.4	1,766.7	5,000.0	9,616.7
UK North Sea Projects up to the point of Berwick Bank	4,566.5	1,917.2	896.9	1,452.5	4,266.6	8,833.2
Berwick Bank	50.1	371.7	47.6	314.2	733.4	783.5
Pentland Floating Offshore Wind Farm	53.3	N/A	N/A	N/A	-	53.3
Green Volt	140.7	N/A	N/A	N/A	0.7	141.5
Salamander	0.0	N/A	N/A	N/A	16.5	16.5
West of Orkney	-	N/A	N/A	N/A	9.4	9.4
Culzean	-	-	-	-	-	-
Ossian	-	-	-	-	-	-
Muir Mhor	N/A*	-	-	-	-	N/A*
Caledonia (Offshore Wind Farm)	639.8	N/A	N/A	N/A	81.5	721.3
Buchan	N/A*	2.8	4.1	0.8	7.7	N/A
Dogger Bank South (East and West)	-	402.0	109.8	337.4	849.2	849.2
Five Estuaries	-	-	-	-	-	-

Project	Breeding	Post-breeding migration	Migration-free winter / non-breeding	Return migration	Total non-breeding	Annual
North Falls	-	10.5	61.1	73.5	145.0	145.0
Cenos	-	-	-	-	-	-
Outer Dowsing	-	92.3	61.0	216.9	370.2	370.2
Dogger Bank D	-	-	-	-	-	-
The Project	-	N/A	N/A	N/A	42.0	42.0
Total	5,450.5	2,796.5	1,180.4	2,395.2	6,522.2	11,965.1

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the razorbill feature of East Caithness Cliffs SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.90 In-combination predicted distributional response consequent mortality apportioned to the East Caithness Cliffs SPA razorbill feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1-3% mort (guidance approach)	60% disp.; 3-5% mort (guidance approach)
UK North Sea projects including Berwick Bank	22.8	83.1	138.5	21.3	29.9	90.0	44.2	113.0	228.4
UK North Sea Projects up to the point of Berwick Bank	22.8	82.2	137.0	21.3	25.5	76.8	44.2	107.7	213.6
Berwick Bank	0.3	0.9	1.5	3.7	4.4	13.2	3.9	5.3	14.8
Pentland Floating Offshore Wind Farm	0.3	1.0	1.6	-	-	-	0.3	1.0	1.6
Green Volt	0.7	2.5	4.2	<0.1	<0.1	<0.1	0.7	2.5	4.2
Salamander	-	-	-	0.1	0.1	0.3	0.1	0.1	0.3
West of Orkney	-	0.5	0.7	-	0.1	0.2	-	0.6	0.8
Culzean	-	-	-	-	-	-	-	-	-

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1-3% mort (guidance approach)	60% disp.; 3-5% mort (guidance approach)
Ossian	-	-	-	-	-	-	-	-	-
Muir Mhor	-*	-*	-*	-	-	-	-	-	-
Caledonia (Offshore Wind Farm)	3.2	11.5	19.2	0.4	0.5	1.5	3.6	12.0	20.7
Buchan	9.5*	9.5*	9.5*	<0.1	<0.1	0.1	9.5	9.5	9.6
Dogger Bank South (East and West)	-	-	-	4.2	5.1	15.3	4.2	5.1	15.3
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	0.7	0.9	2.6	0.7	0.9	2.6
Cenos	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	1.9	2.2	6.7	1.9	2.2	6.7
Dogger Bank D	-	-	-	-	-	-	-	-	-
The Project	-	-	-	0.2	0.3	0.8	0.2	0.3	0.8
Total	36.8	108.1	173.7	32.6	39.1	117.4	69.4	147.2	291.0

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1-3% mort (guidance approach)	60% disp.; 3-5% mort (guidance approach)
Total excluding consented projects with a commitment to compensation	35.8	104.7	168.0	28.9	34.6	103.9	64.7	139.2	271.7

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the razorbill feature of East Caithness Cliffs SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling.

Table 2.91 East Caithness Cliffs SPA razorbill feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.90

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 50% displacement and 0% to 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	**Non-breeding**	**Annual**	**Breeding**	**Non-breeding**	**Annual**
All projects	Burnell *et al.* (2023).	40,373	0.0 to 36.8	0.0 to 32.6	0.0 to 69.4	0.000 to 0.091	0.000 to 0.081	0.000 to 0.172
	Latest Count (2024).	33,023				0.000 to 0.111	0.000 to 0.099	0.000 to 0.210
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	40,373	0.0 to 35.8	0.0 to 28.9	0.0 to 64.7	0.000 to 0.089	0.000 to 0.071	0.000 to 0.160
	Latest Count (2024).	33,023				0.000 to 0.108	0.000 to 0.087	0.000 to 0.196

Table 2.92 East Caithness Cliffs SPA razorbill feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on guidance approach impact predictions within Table 2.90

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	40,373	108.1 to 173.7	39.1 to 117.4	147.2 to 291.0	0.268 to 0.430	0.097 to 0.291	0.365 to 0.721
	Latest Count (2024).	33,023				0.327 to 0.526	0.118 to 0.356	0.446 to 0.881
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	40,373	104.7 to 168.0	34.6 to 103.9	139.2 to 271.7	0.259 to 0.416	0.086 to 0.257	0.345 to 0.673
	Latest Count (2024).	33,023				0.317 to 0.509	0.105 to 0.315	0.422 to 0.823

2.4.2.2 As summarised in **Table 2.91** and **Table 2.92**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to East Caithness Cliffs SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.4.2.3 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 33,023 breeding adults. Outputs are presented in **Table 2.93** below, including the predicted median reduction in CGR and median reduction in CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.93 PVA results for annual in-combination predicted impacts apportioned to the razorbill feature of East Caithness Cliffs SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
50% displacement; 1% mortality for all projects	69.4	0.998	0.25	0.915	8.49
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects	147.2	0.995	0.53	0.827	17.32
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects	291.0	0.990	1.04	0.686	31.42
50% displacement; 1% mortality for all projects excluding the Project	69.2	0.998	0.25	0.915	8.50
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects excluding the Project	146.9	0.995	0.53	0.827	17.33
60% displacement; 5% mortality (breeding, 3% mortality (non-breeding) for all projects excluding the Project	290.2	0.990	1.04	0.687	31.34
50% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	64.7	0.998	0.23	0.920	8.03
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) excluding consented projects with a commitment to compensation	139.2	0.995	0.50	0.836	16.44

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
60% displacement; 5% mortality (breeding, 3% mortality (non-breeding) excluding consented projects with a commitment to compensation	271.7	0.990	0.97	0.703	29.66
50% displacement; 1% mortality excluding consented projects with a commitment to compensation excluding the Project	64.4	0.998	0.23	0.920	8.04
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) excluding consented projects with a commitment to compensation excluding the Project	139.0	0.995	0.50	0.836	16.44
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) excluding consented projects with a commitment to compensation excluding the Project	270.9	0.990	0.97	0.704	29.61

2.4.2.4 When interpreting the PVA outputs presented within **Table 2.93**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015 to 2021 the razorbill feature has recorded an annual compound growth rate of 3.3% (Burnell *et al.,* 2023)
- Although the colony underwent a decline between the Seabird Count (Burnell *et al.,* 2023) and the latest 2024 count (SMP, 2025), it is speculated that the 2024 count does not represent a normal breeding year for the feature. This is due to the late arrival of birds recorded in poor breeding condition linked to winter storms as noted at other Scottish colonies (NatureScot, 2025).
- As identified within Burnell *et al.* (2023) a key driver of historic population decline in the Scottish razorbill population related to availability of key prey abundance. The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of reduction in key prey abundance for razorbill.
- The razorbill feature of East Caithness Cliffs SPA is currently classified as being in favourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population is maintained.
- No detailed consideration of the potential effect of HPAI on razorbills is provided within Tremlett *et al.* (2024) due to low mortality from HPAI recorded for razorbill.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.4.2.5 When comparing the long-term annual compound growth rate of 3.3% per annum, to the predicted reductions in growth rates within **Table 2.93**, the colony would remain in significant growth under all scenarios (over 2% per annum). Further, as presented within **Table 2.93** the Project provides no contribution to the in-combination reduction in growth rate per annum. The Project's predicted impact does not tangibly contribute to an in-combination effect.

2.4.2.6 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, razorbill will be maintained as a feature in the long term.

2.4.3 Fair Isle SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.4.3.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.94** and **Table 2.95**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.96** following the developer's approach and **Table 2.97** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.94 In-combination predicted abundance apportioned to the Fair Isle SPA razorbill feature

Project	Breeding	Post-breeding migration	Migration-free winter / non-breeding	Return migration	Total non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	128.9	62.7	98.2	289.8	289.8
Berwick Bank	-	-	-	-	-	-
Pentland Floating Offshore Wind Farm	-	N/A	N/A	N/A	-	-
Green Volt	0.6	N/A	N/A	N/A	0.1	0.6
Salamander	-	N/A	N/A	N/A	-	-
Ossian	-	-	-	-	-	-
Muir Mhor	N/A*	-	-	-	-	N/A*
Caledonia (Offshore Wind Farm)	2.7	N/A	N/A	N/A	5.7	8.4
West of Orkney	0.3	N/A	N/A	N/A	0.6	0.9
Culzean	-	-	-	-	-	-
Buchan	N/A*	0.2	0.3	0.1	0.6	N/A*
Dogger Bank South (East and West)	-	28.7	25.3	24.1	78.1	78.1
Five Estuaries	-	-	-	-	-	-
North Falls	-	-	-	-	-	-
Cenos	-	-	-	-	-	-
Outer Dowsing	-	6.4	4.5	15.1	26.0	26.0

Project	Breeding	Post-breeding migration	Migration-free winter / non-breeding	Return migration	Total non-breeding	Annual
Dogger Bank D	-	-	-	-	-	-
The Project	9.0	N/A	N/A	N/A	3.0	12.0
Total	12.6	164.2	92.8	137.5	403.7	415.8

Table note : Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. * Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.95 In-combination predicted distributional response consequent mortality apportioned to the Fair Isle SPA razorbill feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1-3% mort (guidance approach)	60% disp.; 3-5% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank	-	-	-	1.4	1.7	5.2	1.4	1.7	5.2
Berwick Bank	-	-	-	-	-	-	-	-	-
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-	-	-	-
Green Volt	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Salamander	-	-	-	-	-	-	-	-	-
Ossian	-	-	-	-	-	-	-	-	-
Muir Mhor	-*	-*	-*	-	-	-	-	-	-
Caledonia (Offshore Wind Farm)	<0.1	<0.1	0.1	<0.1	<0.1	0.1	<0.1	0.1	0.2

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1-3% mort (guidance approach)	60% disp.; 3-5% mort (guidance approach)
West of Orkney	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Culzean	-	-	-	-	-	-	-	-	-
Buchan	-*	0.3*	0.3*	<0.1	<0.1	<0.1	<0.1	0.3	0.3
Dogger Bank South (East and West)	-	-	-	0.4	0.5	1.4	0.4	0.5	1.4
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-
Cenos	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	0.1	0.2	0.5	0.1	0.2	0.5
Dogger Bank D	-	-	-	-	-	-	-	-	-
The Project	<0.1	0.2	0.3	<0.1	<0.1	0.1	0.1	0.2	0.3
Total	0.1	0.5	0.7	2.0	2.4	7.3	2.1	3.0	7.9

Table note: *Impact prediction based on SeabORD modelling.

Table 2.96 Fair Isle SPA razorbill feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.95

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 50% displacement and 0% to 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	2,580	0.0 to 0.1	0.0 to 2.0	0.0 to 2.1	0.000 to 0.002	0.000 to 0.078	0.000 to 0.081

Table 2.97 Fair Isle SPA razorbill feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on guidance approach impact predictions within Table 2.95

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	2,580	0.5 to 0.7	2.4 to 7.3	3.0 to 7.9	0.021 to 0.026	0.094 to 0.282	0.114 to 0.308

2.4.3.2 As summarised in **Table 2.96** and **Table 2.97**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Fair Isle SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.4.3.3 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 2,580 breeding adults. Outputs are presented in **Table 2.98** below, including the predicted median reduction in CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.98 PVA results for annual in-combination predicted impacts apportioned to the razorbill feature of Fair Isle SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
50% displacement; 1% mortality for all projects	2.1	0.999	0.09	0.969	3.11
60% displacement; 3% mortality (breeding, 1% mortality (non-breeding) for all projects	3.0	0.999	0.13	0.954	4.62
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects	7.9	0.996	0.36	0.878	12.22
50% displacement; 1% mortality for all projects excluding the Project	2.0	0.999	0.09	0.970	3.05
60% displacement; 3% mortality (breeding, 1% mortality (non-breeding) for all projects for all projects excluding the Project	2.8	0.999	0.12	0.957	4.32
60% displacement; 5% mortality (breeding, 3% mortality (non-breeding) for all projects for all projects excluding the Project	7.6	0.997	0.34	0.882	11.77

2.4.3.4 When interpreting the PVA outputs presented within **Table 2.98**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015 to 2021 the razorbill feature has declined by an annual compound growth rate of -2.9% (Burnell *et al.,* 2023). The reason for such a decline in the population is likely due to a reduction in key prey abundance and adverse weather event leading to a significant auk wreck within the early 2000s (Burnell *et al.,* 2023).
- The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for razorbill.
- The recent population trend for the colony is unknown.
- The razorbill feature of Fair Isle SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- No detailed consideration of the potential effect of HPAI on razorbills is provided within Tremlett *et al.* (2024) due to low mortality from HPAI recorded for razorbill.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.4.3.5 When considering the unfavourable condition status and declining population trend for the razorbill feature of Fair Isle SPA, it cannot be ruled out that the reduction in growth rates presented within **Table 2.98**, would not impede the long-term recovery of the feature. However, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.02% per annum. Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.4.3.6 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, razorbill will be maintained as a feature in the long term.

2.5 Puffin

2.5.1 North Caithness Cliffs SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.5.1.1 The predicted apportioned mean seasonal peak abundances for each project's projects OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.99** and **Table 2.100**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.101** following the developer's approach and **Table 2.102** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.99 In-combination predicted abundance apportioned to the North Caithness Cliffs SPA puffin feature

Project	Breeding	Total non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	1,626.7	9.2	1,635.8
Green Volt	2.9	0.1	2.9
Pentland Floating Offshore Wind Farm	N/A	-	N/A
Berwick Bank	47.9	-	47.9
Salamander	6.8	-	6.8
West of Orkney	-	2.8	2.8
Culzean	-	-	-
Ossian	-	-	-
Cenos	-	-	-
Dogger Bank South (East and West)	-	0.4	0.4
Five Estuaries	-	-	-
North Falls	-	-	-
Outer Dowsing	-	3.5	3.5
Caledonia (Offshore Wind Farm)	54.3	1.7	56.0
Muir Mhor	12.5	-	12.5
Buchan	19.0	-	19.0
Dogger Bank D	-	-	-
The Project	18.7	0.1	18.7
Total	1,788.7	17.7	1,806.3

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.100 In-combination predicted distributional response consequent mortality apportioned to the North Caithness Cliffs SPA Puffin feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1% mort (guidance approach)	60% disp.; 3% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank	8.1	29.3	48.8	<0.1	0.1	0.2	8.2	29.3	49.0
Green Volt	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1
Pentland Floating Offshore Wind Farm	1.8	1.8	1.8	-	-	-	1.8	1.8	1.8
Berwick Bank	0.2	-	0.1	-	-	-	0.2	-	0.1
Salamander	<0.1	0.1	0.2	-	-	-	<0.1	0.1	0.2
West of Orkney	-	-	-	<0.1	<0.1	0.1	<0.1	<0.1	0.1
Culzean	-	-	-	-	-	-	-	-	-
Ossian	-	-	-	-	-	-	-	-	-
Cenos	-	-	-	-	-	-	-	-	-

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1% mort (guidance approach)	60% disp.; 3% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)
Dogger Bank South (East and West)	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	<0.1	<0.1	0.1	<0.1	<0.1	0.1
Caledonia (Offshore Wind Farm)	0.3	1.0	1.6	<0.1	<0.1	<0.1	0.3	1.0	1.7
Muir Mhor	0.1	0.2	0.4	-	-	-	0.1	0.2	0.4
Buchan	0.1	0.3	0.6	-	-	-	0.1	0.3	0.6
Dogger Bank D	-	-	-	-	-	-	-	-	-
The Project	0.1	0.3	0.6	<0.1	<0.1	<0.1	0.1	0.3	0.6
Total	10.7	33.1	54.1	0.1	0.1	0.3	10.8	33.2	54.4

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling.

Table 2.101 North Caithness Cliffs SPA puffin feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.100

Scenario	Population count	Population size (breeding adults)	Predicted impact using 50% displacement and 0% to 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	6,078	0.0 to 10.7	0.0 to 0.1	0.0 to 10.8	0.000 to 0.177	0.000 to 0.001	0.000 to 0.178
	Latest Count (2016 to 2024).	6,766				0.000 to 0.159	0.000 to 0.001	0.000 to 0.160
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	6,078	0.0 to 10.7	0.0 to 0.1	0.0 to 10.8	0.000 to 0.177	0.000 to 0.001	0.000 to 0.178
	Latest Count (2016 to 2024)	6,766				0.000 to 0.159	0.000 to 0.001	0.000 to 0.160

Table 2.102 North Caithness Cliffs SPA puffin feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on guidance approach impact predictions within Table 2.100

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	6,078	33.1 to 54.1	0.1 to 0.3	33.2 to 54.4	0.545 to 0.890	0.002 to 0.005	0.547 to 0.896
	Latest Count (2016 to 2024)	6,766				0.490 to 0.800	0.002 to 0.005	0.491 to 0.805
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	6,078	33.1 to 54.1	0.1 to 0.3	33.2 to 54.4	0.545 to 0.890	0.002 to 0.005	0.547 to 0.896
	Latest Count (2016 to 2024).	6,766				0.490 to 0.800	0.002 to 0.005	0.491 to 0.805

2.5.1.2 As summarised in **Table 2.101** and **Table 2.102**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to North Caithness Cliffs SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.5.1.3 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 6,766 breeding adults. Outputs are presented in **Table 2.103** below, including the predicted median CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.103 PVA results for annual in-combination distributional response predicted impacts apportioned to the puffin feature of North Caithness Cliffs SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
50% displacement; 1% mortality for all projects	10.8	0.998	0.19	0.935	6.52
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects	33.2	0.994	0.58	0.810	18.95
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects	54.4	0.990	0.95	0.708	29.16
50% displacement; 1% mortality for all projects excluding the Project	10.7	0.998	0.19	0.935	6.46
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects excluding the Project	32.9	0.994	0.58	0.813	18.75
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects excluding the Project	53.9	0.991	0.94	0.712	28.84

2.5.1.4 When interpreting the PVA outputs presented within **Table 2.103**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015 to 2021 the puffin feature has declined by 1.4% per annum (Burnell *et al*., 2023). The main driver of this decline likely relates to climate change impacts leading to increased frequency and severity of winter storm events (Burnell *et al.,* 2023). These adverse weather conditions are linked to reductions in prey availability impacting adult survival (Burnell *et al.,* 2023).
- When comparing Seabird Count to the latest count, the colony has undergone growth of 2.72% per annum.
- Recent population growth may reflect remedial actions such as the sandeel (Prohibition of Fishing) (Scotland) Order 2024 and indirect effects of HPAI reducing predation pressure by impacting species such as great skua (Burnell *et al*., 2023).
- The puffin feature of North Caithness Cliffs SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- No detailed consideration of the potential effect of HPAI on puffins is provided within Tremlett *et al.* (2024) due to low mortality from HPAI recorded.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.5.1.5 The predicted in-combination impact is most realistically considered against the developer approach, which results in a 0.19% reduction in annual population growth rate. This impact is sufficiently small that it would be indistinguishable from natural fluctuations in the population and therefore no potential for AEoSI can confidently be concluded.

2.5.1.6 It is acknowledged that the upper guidance approach equates to a 0.95% reduction in annual growth rate, which would pose a risk to the long-term recovery of the feature. However, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.01% per annum (**Table 2.103**). Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.5.1.7 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage can confidently be ruled out for the Project in-combination**.

2.5.2 Forth Islands SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.5.2.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.104** and **Table 2.105**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.106** following the developer's approach and **Table 2.107** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.104 In-combination predicted abundance apportioned to the Forth Islands SPA puffin feature

Project	Breeding	Total non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	7,843.3	-	7,843.3
Green Volt	19.3	10.9	30.3
Pentland Floating Offshore Wind Farm	-	-	-
Berwick Bank	1,006.7	-	1,006.7
Salamander	127.1	-	127.1
West of Orkney	-	572.8	572.8
Culzean	-	-	-
Ossian	383.3	-	383.3
Cenos	56.6	17.9	74.5
Dogger Bank South (East and West)	-	101.0	101.0
Five Estuaries	-	-	-
North Falls	-	-	-
Outer Dowsing	-	222.1	222.1
Caledonia (Offshore Wind Farm)	-	358.4	358.4
Muir Mhor	N/A*	-	N/A*
Buchan	110.7	-	110.7
Dogger Bank D	-	6.4	6.4
The Project	225.5	13.4	238.9
Total	9,772.5	1,303.0	11,075.5

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the puffin feature of Forth Islands SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling, therefore predicted abundance could not be back calculated.

Table 2.105 In-combination predicted distributional response consequent mortality apportioned to Forth Islands SPA Puffin feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1% mort (guidance approach)	60% disp.; 3% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank (NEEOG)	39.2	141.2	235.3	-	-	-	39.2	141.2	235.3
Green Volt	0.1	0.3	0.6	0.1	0.1	0.2	0.2	0.4	0.8
Pentland Floating Offshore Wind Farm	-	-	-	-	-	-	-	-	-
Berwick Bank	5.0	18.2	30.2	-	-	-	5.0	18.2	30.2
Salamander	0.6	2.3	3.8	-	-	-	0.6	2.3	3.8
West of Orkney	-	-	-	2.9	3.4	10.3	2.9	3.4	10.3
Culzean	-	-	-	-	-	-	-	-	-
Ossian	1.9	6.9	11.5	-	-	-	1.9	6.9	11.5
Cenos	0.3	1.0	1.7	0.1	0.1	0.3	0.4	1.1	2.0

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1% mort (guidance approach)	60% disp.; 3% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)
Dogger Bank South (East and West)	-	-	-	0.5	0.6	1.8	0.5	0.6	1.8
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	1.1	1.3	4.0	1.1	1.3	4.0
Caledonia (Offshore Wind Farm)	-	-	-	1.8	2.2	6.5	1.8	2.2	6.5
Muir Mhor	10.2*	10.2*	10.2*	-	-	-	10.2	10.2	10.2
Buchan	0.6	2.0	3.3	-	-	-	0.6	2.0	3.3
Dogger Bank D	-	-	-	<0.1	<0.1	0.1	<0.1	<0.1	0.1
The Project	1.1	4.1	6.8	0.1	0.1	0.2	1.19	4.1	7.0
Total	59.1	186.2	303.4	6.5	7.8	23.5	65.6	194.0	326.8

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the puffin feature of Forth Islands SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions for the project were based on SeabORD modelling.

Table 2.106 Forth Islands SPA puffin feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.105

Scenario	Population count	Population size (breeding adults)	Predicted impact using 50% displacement and 0% to 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	85,846	0.0 to 59.1	0.0 to 6.5	0.0 to 65.6	0.000 to 0.069	0.000 to 0.008	0.000 to 0.076
	Latest Count (2024).	117,960				0.000 to 0.050	0.000 to 0.006	0.000 to 0.056
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	85,846	0.0 to 53.3	0.0 to 3.6	0.0 to 56.9	0.000 to 0.062	0.000 to 0.004	0.000 to 0.066
	Latest Count (2024).	117,960				0.000 to 0.045	0.000 to 0.003	0.000 to 0.048

Table 2.107 Forth Islands SPA puffin feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on guidance approach impact predictions within Table 2.105

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	85,846	186.2 to 303.4	7.8 to 23.5	194.0 to 326.8	0.217 to 0.353	0.009 to 0.027	0.226 to 0.381
	Latest Count (2024).	117,960				0.158 to 0.257	0.007 to 0.020	0.164 to 0.277
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	85,846	165.4 to 268.8	4.3 to 12.9	169.7 to 281.7	0.193 to 0.313	0.005 to 0.015	0.198 to 0.328
	Latest Count (2024).	117,960				0.140 to 0.228	0.004 to 0.011	0.144 to 0.239

2.5.2.2 As summarised in **Table 2.106** and **Table 2.107**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Forth Islands SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.5.2.3 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 117,960 breeding adults. Outputs are presented in **Table 2.108** below, including the predicted median CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.108 PVA results for annual in-combination distributional response predicted impacts apportioned to the puffin feature of Forth Islands SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
50% displacement; 1% mortality for all projects	65.6	0.999	0.07	0.977	2.31
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects	194.0	0.998	0.19	0.933	6.75
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects	326.8	0.997	0.33	0.889	11.13
50% displacement; 1% mortality for all projects excluding the Project	64.4	0.999	0.06	0.977	2.29
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects excluding the Project	189.9	0.998	0.19	0.934	6.61
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects excluding the Project	319.8	0.997	0.32	0.891	10.91
50% displacement; 1% mortality for a excluding consented projects with a commitment to compensation	56.9	0.999	0.06	0.980	2.03
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) excluding consented projects with a commitment to compensation	169.7	0.998	0.17	0.941	5.93

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) excluding consented projects with a commitment to compensation	281.7	0.997	0.28	0.903	9.68
50% displacement; 1% mortality excluding consented projects with a commitment to compensation excluding the Project	55.7	0.999	0.06	0.980	2.00
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) excluding consented projects with a commitment to compensation excluding the Project	165.5	0.998	0.17	0.942	5.78
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) excluding consented projects with a commitment to compensation excluding the Project	274.7	0.997	0.28	0.905	9.47

2.5.2.4 The known recent and historic growth trends of the puffin feature of Forth Islands SPA are presented within Section 6.2.9 of the **RIAA**, based on census data within the SMP database (2025) for the Isle of May count sector. When interpreting the PVA outputs presented within **Table 2.108**, it is important to consider the following points:

- Since citation in 1990, the Forth Island SPA puffin colonies have undergone significant growth, with the Isle of May colony reaching a peak count of 138,600 breeding adults in 2003.
- Between 2003-2009 a decline in population is recorded. The main driver of this decline likely relates to climate change impacts leading to increased frequency and severity of winter storm events (Burnell *et al.,* 2023). These adverse weather conditions are linked to reductions in prey availability impacting adult survival (Burnell *et al.,* 2023).
- In recent years the colony has undergone significant growth, with the colony increasing by 4.15% per annum between 2017 and 2024.
- No detailed consideration of the potential effect of HPAI on puffins is provided within Tremlett *et al.* (2024) due to low mortality from HPAI.
- The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for puffin.
- The puffin feature of Forth Islands SPA is currently classified as being in favourable condition.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.5.2.5 When considering the significant positive growth trend in the last 10 years, the reduction in growth rates presented within **Table 2.108** would not significantly impede the long-term recovery of the feature. Further, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.01% per annum (**Table 2.108**). Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.5.2.6 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, puffin will be maintained as a feature in the long term.

2.5.3 Fair Isle SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.5.3.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.109** and **Table 2.110**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.111** following the developer's approach and

2.5.3.2 **Table 2.112** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.109 In-combination predicted abundance apportioned to the Fair Isle SPA puffin feature

Project	Breeding	Total non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	-	-
Green Volt	5.4	0.6	6.0
Pentland Floating Offshore Wind Farm	13.0	-	13.0
Berwick Bank	-	-	-
Salamander	8.6	-	8.6
West of Orkney	-	29.4	29.4
Culzean	-	-	-
Ossian	-	-	-
Cenos	-	0.9	0.9
Dogger Bank South (East and West)	-	5.2	5.2
Five Estuaries	-	-	-
North Falls	-	-	-
Outer Dowsing	-	38.2	38.2
Caledonia (Offshore Wind Farm)	34.8	18.5	53.3
Muir Mhor	22.5	-	22.5
Buchan	45.8	-	45.8
Dogger Bank D	-	-	-
The Project	36.7	0.7	37.4
Total	166.9	93.5	260.3

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.110 In-combination predicted distributional response consequent mortality apportioned to Forth Islands SPA Puffin feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1% mort (guidance approach)	60% disp.; 3% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank (NEEOG)	-	-	-	-	-	-	-	-	-
Green Volt	0.0	0.1	0.2	<0.1	-	<0.1	<0.1	0.1	0.2
Pentland Floating Offshore Wind Farm	0.1	0.2	0.4	-	-	-	0.1	0.2	0.4
Berwick Bank	-	-	-	-	-	-	-	-	-
Salamander	<0.1	0.2	0.3	-	-	-	0.0	0.2	0.3
West of Orkney	-	-	-	0.1	0.2	0.5	0.1	0.2	0.5
Culzean	-	-	-	-	-	-	-	-	-
Ossian	-	-	-	-	-	-	-	-	-
Cenos	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1% mort (guidance approach)	60% disp.; 3% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)
Dogger Bank South (East + West)	-	-	-	<0.1	<0.1	0.1	<0.1	<0.1	0.1
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	0.2	0.2	0.7	0.2	0.2	0.7
Caledonia (Offshore Wind Farm)	0.2	0.6	1.0	0.1	0.1	0.3	0.3	0.7	1.4
Muir Mhor	0.1	0.4	0.7	-	-	-	0.1	0.4	0.7
Buchan	0.2	0.8	1.4	-	-	-	0.2	0.8	1.4
Dogger Bank D	-	-	-	-	-	-	-	-	-
The Project	0.2	0.7	1.1	<0.1	<0.1	<0.1	0.2	0.7	1.1
Total	0.8	3.0	5.0	0.5	0.6	1.7	1.3	3.6	6.7

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.111 Fair Isle SPA puffin feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.110

Scenario	Population count	Population size (breeding adults)	Predicted impact using 50% displacement and 0% to 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	13,332	0.0 to 0.8	0.0 to 0.5	0.0 to 1.3	0.000 to 0.006	0.000 to 0.004	0.000 to 0.010

Table 2.112 Fair Isle SPA puffin feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on guidance approach impact predictions within Table 2.110

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	13,332	3.0 to 5.0	0.6 to 1.7	3.6 to 6.7	0.023 to 0.038	0.004 to 0.013	0.027 to 0.050

2.5.3.3 As summarised in **Table 2.111** and **Table 2.112**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Fair Isle SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.5.3.4 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 13,332 breeding adults. Outputs are presented in **Table 2.113** below, including the predicted median CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.113 PVA results for annual in-combination distributional response predicted impacts apportioned to the puffin feature Fair Isle SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
50% displacement; 1% mortality for all projects	1.3	1.000	0.01	0.995	0.51
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects	3.6	1.000	0.03	0.989	1.10
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects	6.7	0.999	0.06	0.979	2.15
50% displacement; 1% mortality for all projects excluding the Project	1.1	1.000	0.01	0.996	0.42
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects excluding the Project	2.9	1.000	0.03	0.991	0.95
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects excluding the Project	5.6	1.000	0.05	0.982	1.79

2.5.3.5 When interpreting the PVA outputs presented within **Table 2.113**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015 to 2021 the puffin feature has declined by 5.3% per annum (Burnell *et al*., 2023). The main driver of this decline likely relates to climate change impacts leading to increased frequency and severity of winter storm events (Burnell *et al*., 2023). These adverse weather conditions are linked to reductions in prey availability impacting adult survival (Burnell *et al.,* 2023).
- The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for puffin.
- The puffin feature of Fair Isle SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- No detailed consideration of the potential effect of HPAI on puffins is provided within Tremlett *et al*. (2024) due to low mortality from HPAI recorded.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.5.3.6 Regardless of the unfavourable condition status, the reduction in growth rates presented within **Table 2.113** are sufficiently small that it would be indistinguishable from natural fluctuations in the population. Therefore, the reductions in growth rates predicted would not hinder the recovery of the feature.

2.5.3.7 Further, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.01% per annum (**Table 2.113**). Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.5.3.8 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage can confidently be ruled out for the Project in-combination**.

2.5.4 Sule Skerry and Sule Stack SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.5.4.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.114** and **Table 2.115**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.116** following the developer's approach and **Table 2.117** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.114 In-combination predicted abundance apportioned to the Sule Skerry and Sule Stack SPA puffin feature

Project	Breeding	Total non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	-	-
Green Volt	47.7	<0.1	47.7
Pentland Floating Offshore Wind Farm	1,838.9	-	1,838.9
Berwick Bank	-	-	-
Salamander	51.8	-	51.8
West of Orkney	N/A	N/A	N/A
Culzean	-	-	-
Ossian	N/A	N/A	N/A
Cenos	-	-	-
Dogger Bank South (East and West)	-	-	-
Five Estuaries	-	-	-
North Falls	-	-	-
Outer Dowsing	-	N/A	-
Caledonia (Offshore Wind Farm)	612.4	0.7	613.1
Muir Mhor	-	-	-
Buchan	145.5	-	145.5
Dogger Bank D	-	-	-
The Project	130.63	0.03	130.66
Total	2,826.9	0.7	2,827.6

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.115 In-combination predicted distributional response consequent mortality apportioned to Sule Skerry and Sule Stack SPA Puffin feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1% mort (guidance approach)	60% disp.; 3% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank (NEEOG)	-	0.0	0.0	-	-	-	-	0.0	0.0
Green Volt	0.2	0.9	1.4	<0.1	<0.1	<0.1	0.2	0.9	1.4
Pentland Floating Offshore Wind Farm	9.2	33.1	55.2	-	-	-	9.2	33.1	55.2
Berwick Bank	0.0	0.0	0.0	-	-	-	-	0.0	0.0
Salamander	0.3	0.9	1.6	-	-	-	0.3	0.9	1.6
West of Orkney	-	48.5	80.9	-	-	-	-	48.5	80.9
Culzean	-			-	-	-	-		
Ossian	-	0.0	0.0	-	-	-	-	0.0	0.0
Cenos	-	0.0	0.0	-	-	-	-	0.0	0.0

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1% mort (guidance approach)	60% disp.; 3% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)
Dogger Bank South (East + West)	-	0.0	0.0	-	-	-	-	0.0	0.0
Five Estuaries	-	0.0	0.0	-	-	-	-	0.0	0.0
North Falls	-	0.0	0.0	-	-	-	-	0.0	0.0
Outer Dowsing	-	0.0	0.0	-	-	-	-	0.0	0.0
Caledonia (Offshore Wind Farm)	3.1	11.0	18.4	<0.1	<0.1	<0.1	3.1	11.0	18.4
Muir Mhor	-	0	0	-	-	-	-	0	0
Buchan	0.7	2.6	4.4	-	-	-	0.7	2.6	4.4
Dogger Bank D	-	0	0	-	-	-	-	0	0
The Project	0.7	2.4	3.9	<0.1	<0.1	<0.1	0.7	2.4	3.9
Total	14.1	99.4	165.7	<0.1	<0.1	<0.1	14.1	99.4	165.7

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.116 Sule Skerry and Sule Stack SPA puffin feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.115

Scenario	Population count	Population size (breeding adults)	Predicted impact using 50% displacement and 0% to 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	95,484	0.0 to 14.1	0.0 to <0.01	0.0 to 14.1	0.000 to 0.015	0.000 to <0.001	0.000 to 0.015

Table 2.117 Sule Skerry and Sule Stack SPA puffin feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on guidance approach impact predictions within Table 2.115

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	95,484	99.4 to 165.7	<0.01	99.4 to 165.7	0.104 to 0.174	<0.001	0.104 to 0.174

2.5.4.2 As summarised in **Table 2.116** and **Table 2.117**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Fair Isle SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.5.4.3 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 95,484 breeding adults. Outputs are presented in **Table 2.118** below, including the predicted median CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.118 PVA results for annual in-combination distributional response predicted impacts apportioned to the puffin feature Sule Skerry and Sule Stack SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
50% displacement; 1% mortality for all projects	14.1	1.000	0.02	0.994	0.64
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects	99.4	0.999	0.12	0.956	4.35
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects	165.7	0.998	0.20	0.929	7.13
50% displacement; 1% mortality for all projects excluding the Project	13.5	1.000	0.02	0.994	0.57
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects excluding the Project	97.1	0.999	0.12	0.958	4.22
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects excluding the Project	161.8	0.998	0.20	0.930	6.97

2.5.4.4 When interpreting the PVA outputs presented within **Table 2.118**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015 to 2021 the puffin feature has declined by 1.1% per annum (Burnell *et al*., 2023). The main driver of this decline likely relates to climate change impacts leading to increased frequency and severity of winter storm events (Burnell *et al.,* 2023). These adverse weather conditions are linked to reductions in prey availability impacting adult survival (Burnell *et al.,* 2023).
- The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for puffin.
- The puffin feature of Sule Skerry and Sule Stack SPA is currently classified as being in favourable condition.
- No detailed consideration of the potential effect of HPAI on puffins is provided within Tremlett *et al.* (2024) due to low mortality from HPAI recorded.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.5.4.5 The reductions in growth rates presented within **Table 2.118** are sufficiently small that it would be indistinguishable from natural fluctuations in the population. Further, it is important to consider that the Project does not contribute to the reduction in growth rate (**Table 2.118)**. Such a level of predicted change can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.5.4.6 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, puffin will be maintained as a feature in the long term.

2.5.5 Foula SPA

Operation and maintenance stage distributional response effects on the qualifying feature in-combination

2.5.5.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.119** and **Table 2.120**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.121** following the developer's approach and

2.5.5.2 **Table 2.122** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.119 In-combination predicted abundance apportioned to the Foula SPA puffin feature

Project	Breeding	Total non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	-	-
Green Volt	2.6	1.2	3.7
Pentland Floating Offshore Wind Farm	6.5	-	6.5
Berwick Bank	-	-	-
Salamander	-	-	-
West of Orkney	-	62.2	62.2
Culzean	-	-	-
Ossian	-	-	-
Cenos	-	1.9	1.9
Dogger Bank South (East and West)	-	10.8	10.8
Five Estuaries	-	-	-
North Falls	-	-	-
Outer Dowsing	-	80.3	80.3
Caledonia (Offshore Wind Farm)	16.7	38.9	55.6
Muir Mhor	-	-	-
Buchan	11.0	-	11.0
Dogger Bank D	-	-	-
The Project	10.8	1.5	12.3
Total	47.6	196.7	244.3

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.120 In-combination predicted distributional response consequent mortality apportioned to Foula SPA Puffin feature

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1% mort (guidance approach)	60% disp.; 3% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank (NEEOG)	-	-	-	-	-	-	-	-	-
Green Volt	<0.1	-	0.1	<0.1	-	-	<0.1	0.1	0.1
Pentland Floating Offshore Wind Farm	<0.1	0.1	0.2	-	-	-	<0.1	0.1	0.2
Berwick Bank	-	-	-	-	-	-	-	-	-
Salamander	-	-	-	-	-	-	-	-	-
West of Orkney	-	-	-	0.3	0.4	1.1	0.3	0.4	1.1
Culzean	-	-	-	-	-	-	-	-	-
Ossian	-	-	-	-	-	-	-	-	-
Cenos	-	-	-	<0.1	-	-	<0.1	-	-

Project	Breeding			Non-breeding			Annual		
	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 1% mort (guidance approach)	60% disp.; 3% mort (guidance approach)	50% disp.; 1% mort (developer approach)	60% disp.; 3% mort (guidance approach)	60% disp.; 5% mort (guidance approach)
Dogger Bank South (East + West)	-	-	-	0.1	0.1	0.2	0.1	0.1	0.2
Five Estuaries	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	0.4	0.5	1.4	0.4	0.5	1.4
Caledonia (Offshore Wind Farm)	0.1	0.3	0.5	0.2	0.2	0.7	0.3	0.5	1.2
Muir Mhor	-	-	-	-	-	-	-	-	-
Buchan	0.1	0.2	0.3	-	-	-	0.1	0.2	0.3
Dogger Bank D	-	-	-	-	-	-	-	-	-
The Project	0.1	0.2	0.3	<0.1	<0.1	<0.1	0.1	0.2	0.4
Total	0.2	0.8	1.5	1.0	1.2	3.5	1.2	2.1	4.9

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.121 Foula SPA puffin feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on developer approach impact predictions within Table 2.120

Scenario	Population count	Population size (breeding adults)	Predicted impact using 50% displacement and 0% to 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	8,468	0.0 to 0.2	0.0 to 1.0	0.0 to 1.2	0.000 to 0.003	0.000 to 0.012	0.000 to 0.014

Table 2.122 Foula SPA puffin feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on guidance approach impact predictions within Table 2.120

Scenario	Population count	Population size (breeding adults)	Predicted Impact using 60% displacement and 1% to 3% mortality in the non-breeding season, and 3% to 5% in the breeding season (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	8,468	0.8 to 1.5	1.2 to 3.5	2.1 to 4.9	0.010 to 0.017	0.014 to 0.041	0.025 to 0.058

2.5.5.3 As summarised in **Table 2.121** and **Table 2.122**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Fair Isle SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.5.5.4 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the Burnell *et al*. (2023) count of 8,468 breeding adults. Outputs are presented in **Table 2.123** below, including the predicted median CGR and median CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.123 PVA results for annual in-combination distributional response predicted impacts apportioned to the puffin feature Foula SPA

Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35 years)			
		Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35 years (%)
50% displacement; 1% mortality for all projects	1.2	1.000	0.02	0.993	0.65
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects	2.1	1.000	0.03	0.988	1.20
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects	4.9	0.999	0.07	0.976	2.43
50% displacement; 1% mortality for all projects excluding the Project	1.2	1.000	0.02	0.994	0.63
60% displacement; 3% mortality (breeding), 1% mortality (non-breeding) for all projects excluding the Project	1.9	1.000	0.03	0.991	0.85
60% displacement; 5% mortality (breeding), 3% mortality (non-breeding) for all projects excluding the Project	4.6	0.999	0.06	0.976	2.42

2.5.5.5 When interpreting the PVA outputs presented within **Table 2.123**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015 to 2021 the puffin feature has undergone significant decline (Burnell *et al*., 2023). The main driver of this decline likely relates to climate change impacts leading to increased frequency and severity of winter storm events (Burnell *et al*., 2023). These adverse weather conditions are linked to reductions in prey availability impacting adult survival (Burnell *et al*., 2023).
- The sandeel (Prohibition of Fishing) (Scotland) Order 2024 should reduce the risk of another significant reduction in key prey abundance for puffin.
- The puffin feature of Foula SPA is currently classified as being in unfavourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population has the ability to recover.
- No detailed consideration of the potential effect of HPAI on puffins is provided within Tremlett *et al.* (2024) due to low mortality from HPAI recorded.
- The potential effect predicted for the guidance approach is highly likely to be an overestimate. There is strong evidence to support the use of the developer's approach to auk displacement rate of 50% and a 1% mortality rate at most (see Section 6.2.4 of the **RIAA**), whereas the use of a mortality rate of up to 5% per annum is not supported by current available evidence (see Section 6.2.4 of the **RIAA**).

2.5.5.6 Despite the features unfavourable condition, the reduction in growth rates presented within **Table 2.123** are sufficiently small that any impact scenario would be indistinguishable from natural fluctuations in the population. Therefore, the reductions in growth rates predicted would not hinder the recovery of the feature.

2.5.5.7 Further, it is important to consider that the Project's contribution to any predicted reduction in growth rate is less than 0.01% per annum (**Table 2.123**). Such a level of predicted change would almost certainly be indistinguishable from natural fluctuations in the population growth trend and can confidently be concluded as not providing a tangible contribution to any in-combination effect.

2.5.5.8 Therefore, **the potential for an AEoSI in relation to distributional response impacts during the O&M stage can confidently be ruled out for the Project in-combination**.

2.6 Gannet

2.6.1 Forth Islands SPA

Operation and maintenance phase distributional response effects on the qualifying feature in-combination

2.6.1.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.124** and **Table 2.125**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.126** following the developer's approach and **Table 2.127** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.124 In-combination predicted abundance apportioned to the Forth Islands SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	10,433.3	966.7	4,557.1	5,523.8	15,957.1
Green Volt	40.8	21.9	3.9	25.8	66.6
Pentland Floating Offshore Wind Farm	15.7	-	-	-	15.7
Berwick Bank	4,096.5	88.2	267.0	355.2	4,451.8
Salamander	12.3	N/A	N/A	115.5	127.8
West of Orkney	-	43.8	332.9	376.7	376.7
Culzean	-	-	-	-	-
Ossian	979.2	13.1	188.3	201.5	1,180.7
Cenos	152.5	N/A	N/A	89.2	241.7
Dogger Bank South (East and West)	-	50.5	382.4	432.9	432.9
Five Estuaries	-	-	-	-	-
North Falls	-	90.7	69.8	160.5	160.5
Outer Dowsing	-	21.6	120.5	142.1	142.1
Caledonia (Offshore Wind Farm)	183.3	N/A	N/A	76.6	259.9
Muir Mhor	371.3	23.2	144.0	167.3	538.6
Buchan	70.2	15.0	40.9	55.9	126.1
Dogger Bank D	-	26.6	197.7	224.3	224.3

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
The Project	221.2	N/A	N/A	73.9	295.1
Total	16,576.4	1,361.3	6,304.5	8,021.1	24,597.5

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the gannet feature of Forth Islands SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.125 In-combination predicted distributional response consequent mortality apportioned to the Forth Islands SPA gannet feature

Project	Breeding				Non-breeding				Annual			
	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank	62.6	83.5	73.1	219.1	33.1	44.2	38.6	116.0	95.7	127.7	111.6	335.1
Green Volt	0.2	0.3	0.3	0.9	0.2	0.2	0.2	0.5	0.4	0.5	0.5	1.4
Pentland Floating Offshore Wind Farm	0.1	0.1	0.1	0.3	-	-	-	-	0.1	0.1	0.1	0.3
Berwick Bank	24.6	32.8	29.4	86.5	2.1	2.8	2.7	7.7	26.7	35.6	32.1	94.2
Salamander	0.1	0.1	0.1	0.3	0.7	0.9	0.8	2.4	0.8	1.0	0.9	2.7
West of Orkney	-	-	-	-	2.3	3.0	2.6	7.9	2.3	3.0	2.6	7.9
Culzean	-	-	-	-	-	-	-	-	-	-	-	-
Ossian	5.9	7.8	6.9	20.6	1.2	1.6	1.4	4.3	7.1	9.4	8.3	24.8
Cenos	0.9	1.2	1.1	3.2	0.5	0.7	0.6	1.9	1.5	1.9	1.7	5.1
Dogger Bank South (East and West)	-	-	-	-	2.6	3.5	3.0	9.1	2.6	3.5	3.0	9.1
Five Estuaries	-	-	-	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	1.0	1.3	1.1	3.4	1.0	1.3	1.1	3.4
Outer Dowsing	-	-	-	-	0.9	1.1	1.0	3.0	0.9	1.1	1.0	3.0
Caledonia (Offshore Wind Farm)	1.1	1.5	1.3	3.8	0.5	0.6	0.5	1.6	1.6	2.1	1.8	5.5
Muir Mhor	2.2	3.0	2.6	7.8	1.0	1.3	1.2	3.5	3.2	4.3	3.8	11.3
Buchan	0.4	0.6	0.5	1.5	0.3	0.4	0.4	1.2	0.8	1.0	0.9	2.6
Dogger Bank D	-	-	-	0.6	1.3	1.8	1.6	8.9	1.3	1.8	1.6	9.4

Project	Breeding				Non-breeding				Annual			
	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)
The Project	1.3	1.8	1.5	4.6	0.4	0.6	0.5	1.6	1.8	2.4	2.1	6.2
Total	99.5	132.	116.9	349.2	48.1	64.2	56.3	172.9	147.6	196.8	173.0	522.0

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the gannet feature of Forth Islands SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.126 Forth Islands SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the developer approach impact predictions within Table 2.125

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60% to 80% displacement and 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	150,518	99.5 to 132.6	48.1 to 64.2	147.6 to 196.8	0.066 to 0.088	0.032 to 0.043	0.098 to 0.131
	Latest Count (2025).	92,090				0.108 to 0.144	0.052 to 0.070	0.160 to 0.214
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023).	150,518	74.6 to 99.4	42.9 to 57.2	117.4 to 156.6	0.050 to 0.066	0.028 to 0.038	0.078 to 0.104
	Latest Count (2025).	92,090				0.081 to 0.108	0.047 to 0.062	0.128 to 0.170

Table 2.127 Forth Islands SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the guidance approach impact predictions within Table 2.125

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell et al. (2023)	150,518	116.9 to 349.2	56.3 to 172.9	173.0 to 522.0	0.078 to 0.232	0.037 to 0.115	0.115 to 0.347
	Latest Count (2025)	92,090				0.127 to 0.379	0.061 to 0.188	0.188 to 0.567
All projects excluding consented projects with a commitment to compensation	Burnell et al. (2023)	150,518	87.1 to 261.6	50.0 to 154.3	137.0 to 415.8	0.058 to 0.174	0.033 to 0.103	0.091 to 0.276
	Latest Count (2025)	92,090				0.095 to 0.284	0.054 to 0.168	0.149 to 0.451

2.6.1.2 As summarised in **Table 2.126** and **Table 2.127**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Forth Islands SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase potential collision risk impacts on the qualifying feature in combination

2.6.1.3 The predicted consequent mortality in relation to collision risk in-combination apportioned to the gannet feature of Forth Islands SPA is provided in **Table 2.128**. The predicted change in survival rate for scenarios considered are presented in **Table 2.129**.

Table 2.128 In-combination predicted collision mortality apportioned to the Forth Islands SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	361.2	53.7	118.8	172.5	533.7
Green Volt **	4.9	0.3	<0.1	0.4	5.3
Pentland Floating Offshore Wind Farm * & **	0.1	-	-	-	-
Berwick Bank * & **	102.8	0.2	0.7	0.9	103.6
Salamander **	0.2	0.1	0.1	0.2	0.3
West of Orkney EIA Addendum **	-	0.2	0.6	0.8	0.8
Culzean	-	-	-	-	-
Ossian **	19.9	-	0.3	0.3	20.2
Cenos	12.1	N/A	N/A	0.7	12.8
Dogger Bank South	-	0.1	0.9	1.0	1.0

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
(East and West)					
Five Estuaries	-	-	-	-	-
North Falls	-	0.2	0.2	0.5	0.5
Outer Dowsing	-	<0.1	0.1	0.1	0.1
Caledonia (Offshore Wind Farm)	2.5	N/A	N/A	0.2	2.7
Muir Mhor	2.9	0.1	0.6	0.7	3.7
Buchan **	0.7	<0.1	<0.1	0.1	0.8
Dogger Bank D	-	0.2	0.8	1.0	1.0
The Project	13.7	0.3	0.6	0.8	14.5
Total	521.1	55.5	123.6	180.0	701.0

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the gannet feature of Forth Islands SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023). ** 70% macro-avoidance has been applied in the non-breeding season for Scottish Projects and across all seasons for English projects (where not already applied) in line with guidance from NatureScot and Natural England.

Table 2.129 Forth Islands SPA gannet feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.128

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	150,518	521.1	180.0	701.0	0.346%	0.120%	0.466%
	Latest Count (2025)	92,090				0.566%	0.195%	0.761%
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	150,518	413.2	177.8	591.0	0.275%	0.118%	0.393%
	Latest Count (2025)	92,090				0.449%	0.193%	0.642%

2.6.1.4 As summarised in **Table 2.129**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Forth Islands SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase combined distributional response and collision risk impacts on the qualifying features in-combination

2.6.1.5 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.128**) and distributional responses (**Table 2.125**) in-combination is presented within **Table 2.126** following the developer's approach and **Table 2.127** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023). Predicted consequent change in survival rate for the gannet feature of Forth Islands SPA for each scenario considered is also presented in **Table 2.130** and **Table 2.131** for the developer's and guidance approaches respectively.

2.6.1.6 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.130 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Forth Island SPA gannet feature following the developer's approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60% to- 80% displacement and 1% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	150,518	620.5 to 653.7	228.1 to 244.1	848.6 to 897.8	0.412 to 0.434	0.152 to 0.162	0.564 to 0.596
	Latest Count (2025)	92,090				0.674 to 0.710	0.248 to 0.265	0.922 to 0.975
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	150,518	487.8 to 512.6	220.7 to 235.0	708.5 to 747.6	0.324 to 0.341	0.147 to 0.156	0.471 to 0.497
	Latest Count (2025)	92,090				0.530 to 0.557	0.240 to 0.255	0.769 to 0.812

Table 2.131 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Forth Island SPA gannet feature following the guidance approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	150,518	637.9 to 870.2	236.3 to 352.9	874.1 to 1,223.0	0.424 to 0.578	0.157 to 0.234	0.581 to 0.813
	Latest Count (2025)	92,090				0.693 to 0.945	0.257 to 0.383	0.949 to 1.328
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	150,518	500.3 to 674.8	227.8 to 332.1	728.0 to 1,006.8	0.332 to 0.448	0.151 to 0.221	0.484 to 0.669
	Latest Count (2025)	92,090				0.543 to 0.733	0.247 to 0.361	0.791 to 1.093

2.6.1.7 As summarised in **Table 2.130** and **Table 2.131**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Forth Islands SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.6.1.8 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 92,090 breeding adults. Outputs are presented in **Table 2.132** below, including the predicted median reduction in annual growth rate CGR and median reduction in final population size CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.132 PVA results for annual in-combination predicted impacts apportioned to the gannet feature of Forth Islands SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
Distributional responses	60% displacement; 1% mortality for all projects	147.6	0.998	0.19	0.934	6.63
	80% displacement; 1% mortality for all projects	196.8	0.997	0.25	0.913	8.73
	70% displacement; 1% mortality for all projects	173.0	0.998	0.22	0.923	7.70
	70% displacement; 3% mortality for all projects	522.0	0.993	0.67	0.785	21.53
	60% displacement; 1% mortality for all projects excluding the Project	145.8	0.998	0.19	0.935	6.52
	80% displacement; 1% mortality for all projects excluding the Project	194.4	0.998	0.25	0.914	8.61
	70% displacement; 1% mortality for all projects excluding the Project	171.0	0.998	0.22	0.924	7.60
	70% displacement; 3% mortality for all projects excluding the Project	515.8	0.993	0.66	0.787	21.29
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	117.4	0.998	0.15	0.947	5.29

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	156.6	0.998	0.20	0.930	7.01
	70% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	137.0	0.998	0.18	0.939	6.14
	70% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation	415.8	0.995	0.53	0.825	17.54
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	115.7	0.999	0.15	0.948	5.23
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	154.2	0.998	0.20	0.931	6.92
	70% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	134.9	1.000	0.05	0.983	1.70
	70% displacement; 3% mortality for all projects excluding consented	409.6	0.999	0.06	0.977	2.25

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
	projects with a commitment to compensation and the Project					
Collision risk	All projects	701.0	0.991	0.90	0.722	27.79
	All projects excluding the Project	686.5	0.991	0.88	0.727	27.31
	All projects excluding consented projects with a commitment to compensation	591.0	0.992	0.76	0.760	23.99
	All projects excluding consented projects with a commitment to compensation and the Project	576.5	0.993	0.74	0.765	23.47
Combined effects	60% displacement; 1% mortality for all projects	848.6	0.989	1.09	0.674	32.60
	80% displacement; 1% mortality for all projects	897.8	0.988	1.15	0.659	34.12
	70% displacement; 1% mortality for all projects	874.1	0.989	1.12	0.666	33.41
	70% displacement; 3% mortality for all projects	1,223.0	0.984	1.57	0.565	43.46
	60% displacement; 1% mortality for all projects excluding the Project	832.3	0.989	1.07	0.679	32.10
	80% displacement; 1% mortality for all projects excluding the Project	880.9	0.989	1.13	0.664	33.61

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
	70% displacement; 1% mortality for all projects excluding the Project	857.5	0.989	1.10	0.671	32.89
	70% displacement; 3% mortality for all projects excluding the Project	1,202.3	0.985	1.54	0.571	42.90
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	708.5	0.991	0.91	0.720	28.04
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	747.6	0.990	0.96	0.706	29.36
	70% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	728.0	0.991	0.94	0.713	28.70
	70% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation	1,006.8	0.987	1.29	0.626	37.42
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	692.2	0.991	0.89	0.725	27.49

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	730.7	0.991	0.94	0.712	28.79
	70% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	711.4	0.991	0.91	0.719	28.12
	70% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project	986.1	0.987	1.27	0.632	36.80

2.6.1.9 The known recent and historic growth trends of the gannet feature of Forth Islands SPA are presented within Section 6.2.9 of the **RIAA**. When interpreting the PVA outputs presented within **Table 2.132**, it is important to consider the following points:

- The Forth Islands SPA have experienced long term population growth for over 100 years (Jeglinski *et al.* 2022). From 1985 to 2014 the colony has maintained a consistent growth rate of over 4% per annum.
- Between 2014 and 2021, the growth rate reduced to just over 1% per annum. Although the 2021 colony count is an extrapolation only, the reduction of growth rate predicted is likely to be consistent with the actual trend, as the colony (pre-HPAI) was considered close to carrying capacity in the early 2020s (Harris et al. 2023).
- In 2022, the Forth Islands SPA gannet population was significantly impacted by HPAI, with a significant reduction in colony size in 2022 (Lane *et al.* 2024). Counts in 2023 recorded 103,688 birds, an increase of 144% compared to the 2022 count and above the citation count, although still lower than the previous 2014 census (31% decline). A further census undertaken in 2024 (Burton *et al.* 2024) recorded 92,090 birds, although it is unclear whether this count reflects a further decline between 2023-2024, variation in survey methodologies or redistribution of the population (Burton *et al.* 2024).
- When considering the historic consistent growth of all gannet populations over the last 50 years (Burnell *et al.* 2023), the impact of HPAI is not expected to affect the long-term integrity of the national site network significantly.
- The gannet feature of Forth Islands SPA is currently classified as being in favourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population is maintained.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), no evidence to support a mortality rate of 3% for distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.6.1.10 Although the reductions in growth rate presented within **Table 2.132** are not insignificant, when considering the long-term growth rates prior to reaching carrying capacity of over 4% per annum, the colony is expected to remain in significant stable growth.

2.6.1.11 Despite the colony having been impacted by HPAI, the gannet feature of the Forth Islands SPA is estimated to recover significantly when considering historic trends of both the UK site network and the Forth Islands SPA, if not fully before the Project's impact begins to provide a contribution to any in-combination effect when operational in 2037.

2.6.1.12 Therefore, **the potential for an AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, gannet will be maintained as a feature in the long term.

2.6.2 Fair Isle SPA

Operation and maintenance phase distributional response effects on the qualifying feature in-combination

2.6.2.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.133** and **Table 2.134**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.135** following the developer's approach and **Table 2.137** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.133 In-combination predicted abundance apportioned to the Fair Isle SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	-	161.9	255.8	255.8
Green Volt	2.2	1.2	0.2	1.5	3.7
Pentland Floating Offshore Wind Farm	1.3	-	-	-	-
Berwick Bank	8.4	1.3	9.0	10.3	18.8
Salamander	0.6	N/A	N/A	8.1	8.7
West of Orkney	-	2.9	19.0	21.9	21.9
Culzean	-	-	-	-	-
Ossian	12.3	0.9	10.9	11.8	24.1
Cenos	5.2	N/A	N/A	4.7	9.9
Dogger Bank South (East and West)	-	3.5	22.0	25.5	25.5
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	1.5	6.8	8.4	8.4
Caledonia (Offshore Wind Farm)	16.6	N/A	N/A	4.3	20.9

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Muir Mhor	13.0	1.6	8.3	9.9	22.9
Buchan	17.8	1.0	2.3	3.4	21.2
Dogger Bank D	-	-	-	-	-
The Project	20.4	N/A	N/A	4.2	24.6
Total	97.8	108.0	240.5	369.7	466.2

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the gannet feature of Fair Isle SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.134 In-combination predicted distributional response consequent mortality apportioned to the Fair Isle SPA gannet feature

Project	Breeding				Non-breeding				Annual			
	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank	-	-	-	-	1.5	2.0	1.8	5.4	1.5	2.0	1.7	5.3
Green Volt	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Pentland Floating Offshore Wind Farm	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1
Berwick Bank	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.4
Salamander	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2
West of Orkney	-	-	-	-	0.1	0.2	0.2	0.5	0.1	0.2	0.2	0.5
Culzean	-	-	-	-	-	-	-	-	-	-	-	-
Ossian	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.5
Cenos	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.2
Dogger Bank South (East and West)	-	-	-	-	0.2	0.2	0.2	0.5	0.2	0.2	0.2	0.5
Five Estuaries	-	-	-	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	-	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2
Caledonia (Offshore Wind Farm)	0.1	0.1	0.1	0.3	<0.1	<0.1	<0.1	0.1	0.1	0.2	0.1	0.4
Muir Mhor	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.5
Buchan	0.1	0.1	0.1	0.4	<0.1	<0.1	<0.1	0.1	0.1	0.2	0.1	0.4
Dogger Bank D	-	-	-	-	-	-	-	-	-	-	-	-
The Project	0.1	0.2	0.1	0.4	<0.1	<0.1	<0.1	0.1	0.1	0.2	0.2	0.5

Project	Breeding				Non-breeding				Annual			
	60% disp.; 1% mort (developer approach)	**80% disp.; 1% mort (developer approach)**	**70% disp.; 1% mort (guidance approach)**	**70% disp.; 3% mort (guidance approach)**	**60% disp.; 1% mort (developer approach)**	**80% disp.; 1% mort (developer approach)**	**70% disp.; 1% mort (guidance approach)**	**70% disp.; 3% mort (guidance approach)**	**60% disp.; 1% mort (developer approach)**	**80% disp.; 1% mort (developer approach)**	**70% disp.; 1% mort (guidance approach)**	**70% disp.; 3% mort (guidance approach)**
Total	0.6	0.8	0.8	2.1	2.2	3.0	2.6	7.7	2.8	3.7	3.3	9.7

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the gannet feature of Forth Islands SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.135 Fair Isle SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the developer approach impact predictions within Table 2.134

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60 - 80% displacement and 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	9,942	0.6 to 0.8	2.2 to 3.0	2.8 to 3.7	0.006 to 0.008	0.022 to 0.030	0.028 to 0.038
	Latest Count (2025)	11,184				0.005 to 0.007	0.020 to 0.026	0.025 to 0.033
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	9,942	0.5 to 0.7	2.2 to 2.9	2.7 to 3.6	0.005 to 0.007	0.022 to 0.029	0.027 to 0.036
	Latest Count (2025)	11,184				0.005 to 0.006	0.019 to 0.026	0.024 to 0.032

Table 2.136 Fair Isle SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the guidance approach impact predictions within Table 2.134

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	9,942	0.8 to 2.1	2.6 to 7.7	3.3 to 9.7	0.008 to 0.021	0.027 to 0.078	0.033 to 0.098
	Latest Count (2025)	11,184				0.007 to 0.019	0.024 to 0.069	0.029 to 0.087
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	9,942	0.7 to 1.9	2.5 to 7.5	3.1 to 9.3	0.007 to 0.019	0.026 to 0.076	0.031 to 0.094
	Latest Count (2025)	11,184				0.006 to 0.017	0.023 to 0.067	0.028 to 0.084

2.6.2.2 As summarised in **Table 2.135** and **Table 2.136** the level of impact predicted annually or seasonally from all projects in-combination, attributed to Fair Isle SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase potential collision risk impacts on the qualifying feature in combination

2.6.2.3 The predicted consequent mortality in relation to collision risk in-combination apportioned to the gannet feature of Fair Isle SPA is provided in **Table 2.137**. The predicted change in survival rate for scenarios considered are presented in **Table 2.138**.

Table 2.137 In-combination predicted collision mortality apportioned to the Fair Isle SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	3.6	4.7	8.3	8.3
Green Volt **	0.3	<0.1	<0.1	<0.1	0.3
Pentland Floating Offshore Wind Farm * & **	<0.1	-	-	-	<0.1
Berwick Bank * & **	0.2	-	<0.1	<0.1	0.2
Salamander **	<0.1	<0.1	<0.1	<0.1	<0.1
West of Orkney EIA Addendum **	-	<0.1	<0.1	<0.1	<0.1
Culzean	-	-	-	-	-
Ossian **	0.3	-	<0.1	<0.1	0.3
Cenos	0.4	N/A	N/A	0.1	0.5
Dogger Bank South	-	-	0.1	0.1	0.1

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
(East and West)					
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	<0.1	<0.1	<0.1	<0.1
Caledonia (Offshore Wind Farm)	0.2	N/A	N/A	<0.1	0.2
Muir Mhor	0.1	<0.1	<0.1	<0.1	0.1
Buchan **	0.2	<0.1	<0.1	<0.1	0.2
Dogger Bank D	-	-	-	-	-
The Project	1.3	<0.1	<0.1	0.1	1.3
Total	3.0	3.7	5.0	8.7	11.7

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the gannet feature of Fair Isle SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023). ** 70% macro-avoidance has been applied in the non-breeding season for Scottish Projects and across all seasons for English projects (where not already applied) in line with guidance from NatureScot and Natural England.

Table 2.138 Fair Isle SPA gannet feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.137

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	9,942	3.0	8.7	11.7	0.030%	0.087%	0.118%
	Latest Count (2025)	11,184				0.027%	0.078%	0.105%
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	9,942	2.8	8.7	11.5	0.028%	0.087%	0.116%
	Latest Count (2025)	11,184				0.025%	0.078%	0.103%

2.6.2.4 As summarised in **Table 2.138**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Fair Isle SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase combined distributional response and collision risk impacts on the qualifying features in-combination

2.6.2.5 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.138**) and distributional responses (**Table 2.134**) in-combination is presented within **Table 2.135** following the developer's approach and **Table 2.136** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023). Predicted consequent change in survival rate for the gannet feature of Fair Isle SPA for each scenario considered is also presented in **Table 2.139** and **Table 2.140** for the developer's and guidance approaches respectively.

2.6.2.6 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.139 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Fair Isle SPA gannet feature following the developer's approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60% to 80% displacement and 1% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	9,942	3.6 to 3.8	10.9 to 11.7	14.5 to 15.5	0.036 to 0.038	0.110 to 0.117	0.146 to 0.156
	Latest Count (2025)	11,184				0.032 to 0.034	0.098 to 0.104	0.130 to 0.138
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	9,942	3.4 to 3.5	10.8 to 11.5	14.2 to 15.1	0.034 to 0.036	0.109 to 0.116	0.143 to 0.152
	Latest Count (2025)	11,184				0.030 to 0.032	0.097 to 0.103	0.127 to 0.135

Table 2.140 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Fair Isle SPA gannet feature following the guidance approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	9,942	3.8 to 5.1	11.3 to 16.4	15.0 to 21.5	0.038 to 0.052	0.114 to 0.165	0.151 to 0.216
	Latest Count (2025)	11,184				0.034 to 0.046	0.101 to 0.147	0.134 to 0.192
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	9,942	3.5 to 4.7	11.2 to 16.2	14.6 to 20.8	0.035 to 0.048	0.113 to 0.163	0.147 to 0.210
	Latest Count (2025)	11,184				0.031 to 0.042	0.100 to 0.145	0.130 to 0.186

2.6.2.7 As summarised in **Table 2.139** and **Table 2.140**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Fair Isle SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.6.2.8 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 11,184 breeding adults. Outputs are presented in **Table 2.141** below, including the predicted median reduction in annual growth rate CGR and median reduction in final population size CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.141 PVA results for annual in-combination predicted impacts apportioned to the gannet feature of Fair Isle SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
Distributional responses	60% displacement; 1% mortality for all projects	2.8	1.000	0.03	0.989	1.09
	80% displacement; 1% mortality for all projects	3.7	1.000	0.04	0.986	1.45
	70% displacement; 1% mortality for all projects	3.3	1.000	0.03	0.988	1.19
	70% displacement; 3% mortality for all projects	9.7	0.999	0.10	0.964	3.64
	60% displacement; 1% mortality for all projects excluding the Project	2.7	1.000	0.03	0.989	1.06
	80% displacement; 1% mortality for all projects excluding the Project	3.5	1.000	0.04	0.986	1.39
	70% displacement; 1% mortality for all projects excluding the Project	3.1	1.000	0.03	0.988	1.24
	70% displacement; 3% mortality for all projects excluding the Project	9.2	0.999	0.10	0.966	3.39
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	2.7	1.000	0.03	0.990	0.99

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	3.6	1.000	0.04	0.986	1.37
	70% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	3.1	1.000	0.03	0.988	1.17
	70% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation	9.3	0.999	0.10	0.965	3.53
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	2.5	1.000	0.03	0.991	0.94
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	3.4	1.000	0.04	0.987	1.32
	70% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	2.9	1.000	0.03	0.988	1.16
	70% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project	8.8	0.999	0.09	0.966	3.36

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
Collision risk	All projects	11.7	0.999	0.12	0.956	4.36
	All projects excluding the Project	10.4	0.999	0.11	0.962	3.84
	All projects excluding consented projects with a commitment to compensation	11.5	0.999	0.12	0.958	4.24
	All projects excluding consented projects with a commitment to compensation and the Project	10.2	0.999	0.11	0.962	3.76
Combined effects	60% displacement; 1% mortality for all projects	14.5	0.998	0.15	0.946	5.39
	80% displacement; 1% mortality for all projects	15.5	0.998	0.16	0.943	5.73
	70% displacement; 1% mortality for all projects	15.0	0.998	0.16	0.945	5.51
	70% displacement; 3% mortality for all projects	21.5	0.998	0.23	0.922	7.83
	60% displacement; 1% mortality for all projects excluding the Project	13.1	0.999	0.14	0.951	4.86
	80% displacement; 1% mortality for all projects excluding the Project	13.9	0.999	0.15	0.949	5.15
	70% displacement; 1% mortality for all projects excluding the Project	13.5	0.999	0.14	0.950	5.00

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
	70% displacement; 3% mortality for all projects excluding the Project	19.6	0.998	0.21	0.928	7.17
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	14.2	0.999	0.15	0.947	5.25
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	15.1	0.998	0.16	0.944	5.62
	70% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	14.6	0.998	0.15	0.946	5.43
	70% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation	20.8	0.998	0.22	0.923	7.65
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	12.7	0.999	0.13	0.953	4.74
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	13.6	0.999	0.14	0.949	5.06
	70% displacement; 1% mortality for all projects excluding consented projects	13.1	0.999	0.14	0.952	4.85

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
	with a commitment to compensation and the Project					
	70% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project	19.0	0.998	0.20	0.930	6.97

2.6.2.9 When interpreting the PVA outputs presented within **Table 2.141**, it is important to consider the following points:

- Since citation in 1999, the colony has undergone a steady population increase, with only minor reductions in population size noted in 2016 and 2023 compared to previous counts (SMP, 2025).
- Between the seabird 2000 count and the Seabird Count 2015 - 2021 the gannet feature has increased by 4.8% per annum (Burnell *et al.* 2023).
- The colony experienced a reduction in population size in 2023, likely linked to HPAI based on the year of decline and significant number of positive cases reported for UK gannets. However, only minor reduction was cited for Fair Isle SPA of 3% between 2021 and 2023 (Tremlett *et al.* 2024). The colony count in 2024 suggests that the colony is quickly recovering from the effects of HPAI based on the population increase recorded between 2023 to 2024.
- When considering the historic consistent growth of all gannet populations over the last 50 years (Burnell *et al.* 2023), the impact of HPAI is not expected to significantly affect the long-term integrity of the national site network.
- The gannet feature of Fair Isle SPA is currently classified as being in favourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population is maintained.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), no evidence to support a mortality rate of 3% for distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.6.2.10 The reductions in growth rate presented within **Table 2.141** are sufficiently small that any impact scenario would be indistinguishable from natural fluctuations in the population, when considering the overall long term growth rates of the colony. Therefore, the Fair Isle SPA is expected to remain in significant stable growth.

2.6.2.11 As the colony experienced only minor impacts from HPAI, the gannet feature of the Fair Isle SPA is estimated to recover fully when considering historic trends of both the UK site network and Fair Isle SPA, before the Project's impact begins to provide a contribution to any in-combination effect when operational in 2037.

2.6.2.12 Therefore, **the potential for an AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, gannet will be maintained as a feature in the long term.

2.6.3 Sule Skerry and Sule Stack SPA

Operation and maintenance phase distributional response effects on the qualifying feature in-combination

2.6.3.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.142** and **Table 2.143**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.144** following the developer's approach and **Table 2.145** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.142 In-combination predicted abundance apportioned to the Sule Skerry and Sule Stack SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	1.6	-	62.2	62.2	63.8
Green Volt	2.2	0.2	0.0	0.2	2.4
Pentland Floating Offshore Wind Farm	75.7	-	-	-	75.7
Berwick Bank	12.7	-	4.5	4.5	17.2
Salamander	0.8	N/A	N/A	-	0.8
West of Orkney	421.4	-	2.9	2.9	424.3
Culzean	-	-	-	-	-
Ossian	16.0	-	1.6	1.6	17.5
Cenos	-	N/A	N/A	0.4	0.4
Dogger Bank South (East and West)	-	-	-	-	-
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	-	-	-	-
Caledonia (Offshore Wind Farm)	34.5	N/A	N/A	0.7	35.1
Muir Mhor	17.1	-	1.2	1.2	18.3

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Buchan	13.1	-	0.3	0.3	13.4
Dogger Bank D	-	-	-	-	-
The Project	15.8	N/A	N/A	0.6	16.4
Total	610.8	0.2	72.6	74.5	685.3

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.143 In-combination predicted distributional response consequent mortality apportioned to the Sule Skerry and Sule Stack SPA gannet feature

Project	Breeding				Non-breeding				Annual			
	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank	<0.1	<0.1	<0.1	<0.1	0.4	0.5	0.5	1.3	0.4	0.5	0.5	1.3
Green Volt	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Pentland Floating Offshore Wind Farm	0.5	0.6	0.5	1.6	-	-	-	-	0.5	0.6	0.5	1.6
Berwick Bank	0.1	0.1	0.1	0.3	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	0.4
Salamander	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1
West of Orkney	2.5	3.4	2.9	8.9	<0.1	<0.1	<0.1	0.1	2.5	3.4	2.9	8.9
Culzean	-	-	-	-	-	-	-	-	-	-	-	-
Ossian	0.1	0.1	0.1	0.3	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.4
Cenos	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dogger Bank South (East and West)	-	-	-	-	-	-	-	-	-	-	-	-
Five Estuaries	-	-	-	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	-	-	-	-	-	-	-	-	-
Caledonia (Offshore Wind Farm)	0.2	0.3	0.2	0.7	<0.1	<0.1	<0.1	<0.1	0.2	0.3	0.2	0.7
Muir Mhor	0.1	0.1	0.1	0.4	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.4
Buchan	0.1	0.1	0.1	0.3	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3
Dogger Bank D	-	-	-	-	-	-	-	-	-	-	-	-
The Project	0.1	0.1	0.1	0.3	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3
Total	3.7	4.9	4.2	12.8	0.4	0.6	0.6	1.6	4.1	5.5	4.8	14.4

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.144 Sule Skerry and Sule Stack SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the developer approach impact predictions within Table 2.143

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60% to 80% displacement and 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	18,130	3.7 to 4.9	0.4 to 0.6	4.1 to 5.5	0.020 to 0.027	0.002 to 0.003	0.023 to 0.030
	Latest Count (2013-2024)	15,648				0.023 to 0.031	0.003 to 0.004	0.026 to 0.035

Table 2.145 Sule Skerry and Sule Stack SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the guidance approach impact predictions within Table 2.143

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	18,130	4.2 to 12.8	0.6 to 1.6	4.8 to 14.4	0.023 to 0.071	0.003 to 0.009	0.026 to 0.079
	Latest Count (2013-2024)	15,648				0.027 to 0.082	0.004 to 0.010	0.031 to 0.092

2.6.3.2 As summarised in **Table 2.144** and **Table 2.145**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Sule Skerry and Sule Stack SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase potential collision risk impacts on the qualifying feature in combination

2.6.3.3 The predicted consequent mortality in relation to collision risk in-combination apportioned to the gannet feature of Sule Skerry and Sule Stack SPA is provided in **Table 2.146**. The predicted change in survival rate for scenarios considered are presented in **Table 2.147**.

Table 2.146 In-combination predicted collision mortality apportioned to the Sule Skerry and Sule Stack SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	-	1.7	1.7	1.6
Green Volt **	0.3	<0.1	<0.1	<0.1	0.3
Pentland Floating Offshore Wind Farm * & **	1.1	-	-	-	1.1
Berwick Bank * & **	0.5	-	0.1	0.1	0.6
Salamander **	<0.1	-	-	-	0.0
West of Orkney EIA Addendum **	17.5	-	0.0	0.0	17.5
Culzean	-	-	-	-	-
Ossian **	0.0	-	-	-	0.0
Cenos	0.3	N/A	N/A	-	0.3
Dogger Bank South	-	-	-	-	-

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
(East and West)					
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	-	-	-	-
Caledonia (Offshore Wind Farm)	0.5	N/A	N/A	<0.1	0.5
Muir Mhor	0.1	-	<0.1	<0.1	0.1
Buchan **	0.1	-	<0.1	<0.1	0.1
Dogger Bank D	-	-	-	-	-
The Project	1.0	-	-	-	1.0
Total	21.3	0.0	1.8	1.8	23.1

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023). ** 70% macro-avoidance has been applied in the non-breeding season for Scottish Projects and across all seasons for English projects (where not already applied) in line with guidance from NatureScot and Natural England.

Table 2.147 Sule Skerry and Sule Stack SPA gannet feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.146

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	18,130	20.9	1.7	22.6	0.115%	0.010%	0.125%
	Latest Count (2013-2024)	15,648				0.133%	0.011%	0.144%

2.6.3.4 As summarised in **Table 2.147**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Sule Skerry and Sule Stack SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase combined distributional response and collision risk impacts on the qualifying features in-combination

2.6.3.5 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.146**) and distributional responses (**Table 2.143**) in-combination is presented within **Table 2.148** following the developer's approach and **Table 2.149** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023). Predicted consequent change in survival rate for the gannet feature of Sule Skerry and Sule Stack SPA for each scenario considered is also presented in **Table 2.148** and **Table 2.149** for the developer's and guidance approaches respectively.

2.6.3.6 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.148 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Sule Skerry and Sule Stack SPA gannet feature following the developer's approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60% to 80% displacement and 1% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell et al. (2023)	18,130	20.9 to 20.9	1.7 to 1.7	26.7 to 28.1	0.115 to 0.115	0.010 to 0.010	0.147 to 0.155
	Latest Count (2024)	15,648				0.133 to 0.133	0.011 to 0.011	0.171 to 0.179

Table 2.149 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Sule Skerry and Sule Stack SPA gannet feature following the guidance approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	18,130	25.1 to 33.7	2.3 to 3.3	27.4 to 37.0	0.139 to 0.186	0.013 to 0.018	0.151 to 0.204
	Latest Count (2024)	15,648				0.160 to 0.215	0.015 to 0.021	0.175 to 0.236

2.6.3.7 As summarised in **Table 2.148** and **Table 2.149**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Sule Skerry and Sule Stack SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.6.3.8 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 15,648 breeding adults. Outputs are presented in **Table 2.150** below, including the predicted median reduction in annual growth rate CGR and median reduction in final population size CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.150 PVA results for annual in-combination predicted impacts apportioned to the gannet feature of Sule Skerry and Sule Stack SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
Distributional responses	60% displacement; 1% mortality for all projects	4.1	1.000	0.03	0.989	1.11
	80% displacement; 1% mortality for all projects	5.5	1.000	0.04	0.986	1.44
	70% displacement; 1% mortality for all projects	4.8	1.000	0.03	0.987	1.25
	70% displacement; 3% mortality for all projects	14.4	0.999	0.11	0.962	3.82
	60% displacement; 1% mortality for all projects excluding the Project	4.0	1.000	0.03	0.990	1.02
	80% displacement; 1% mortality for all projects excluding the Project	5.4	1.000	0.04	0.986	1.45
	70% displacement; 1% mortality for all projects excluding the Project	4.7	1.000	0.04	0.987	1.25
	70% displacement; 3% mortality for all projects excluding the Project	14.0	0.999	0.10	0.963	3.70
Collision risk	All projects	22.6	0.998	0.17	0.940	6.02
	All projects excluding the Project	21.6	0.998	0.16	0.943	5.72

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
Combined effects	60% displacement; 1% mortality for all projects	26.7	0.998	0.20	0.930	6.99
	80% displacement; 1% mortality for all projects	28.1	0.998	0.21	0.927	7.33
	70% displacement; 1% mortality for all projects	27.4	0.998	0.21	0.927	7.26
	70% displacement; 3% mortality for all projects	37.0	0.997	0.28	0.904	9.60
	60% displacement; 1% mortality for all projects excluding the Project	25.6	0.998	0.19	0.933	6.74
	80% displacement; 1% mortality for all projects excluding the Project	27.0	0.998	0.20	0.929	7.09
	70% displacement; 1% mortality for all projects excluding the Project	26.3	0.998	0.20	0.931	6.90
	70% displacement; 3% mortality for all projects excluding the Project	35.7	0.997	0.27	0.907	9.29

2.6.3.9 When interpreting the PVA outputs presented within **Table 2.150**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015 to 2021 the gannet feature has increased by 3.2% per annum (Burnell *et al.* 2023).
- The colony experienced a reduction in population size between available counts in 2018 and 2024, potentially linked to HPAI based on the year of decline and significant number of positive cases reported for UK gannets. However, the full extent of HPAI impact on the gannet feature of Sule Skerry and Sule Stack SPA is unknown and is not considered in Tremlett *et al.* (2024).
- When considering the historic consistent growth of all gannet populations over the last 50 years (Burnell *et al.* 2023), the impact of HPAI is not expected to significantly affect the long-term integrity of the national site network.
- The gannet feature of Sule Skerry and Sule Stack SPA is currently classified as being in favourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population is maintained.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), no evidence to support a mortality rate of 3% for distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.6.3.10 The reductions in growth rate presented within **Table 2.150** are sufficiently small that any impact scenario would be indistinguishable from natural fluctuations in the population, when considering the overall long term growth rates of the colony. Therefore, the Sule Skerry and Sule Stack SPA is expected to remain in significant stable growth.

2.6.3.11 Although the impact of HPAI on the colony is unknown, the gannet feature is estimated to recover fully when considering historic trends of both the UK site network and Sule Skerry and Sule Stack SPA, before the Project's impact begins to provide a contribution to any in-combination effect when operational in 2037.

2.6.3.12 Therefore, the potential for an **AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, gannet will be maintained as a feature in the long term.

2.6.4 Noss SPA

Operation and maintenance phase distributional response effects on the qualifying feature in-combination

2.6.4.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.151** and **Table 2.152**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.153** following the developer's approach and **Table 2.154** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.151 In-combination predicted abundance apportioned to the Noss SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	309.5	576.2	885.7	885.7
Green Volt	3.8	3.1	0.5	3.6	7.4
Pentland Floating Offshore Wind Farm	1.7	-	-	-	-
Berwick Bank	16.9	7.0	42.0	49.0	65.9
Salamander	0.9	N/A	N/A	20.3	21.2
West of Orkney	-	7.6	46.7	54.3	54.3
Culzean	-	-	-	-	-
Ossian	24.6	2.3	26.4	28.7	53.2
Cenos	10.0	N/A	N/A	11.9	21.9
Dogger Bank South (East and West)	-	8.9	53.5	62.4	62.4
Five Estuaries	-	-	-	-	-
North Falls	-	16.0	9.8	25.8	25.8
Outer Dowsing	-	3.8	17.0	20.8	20.8
Caledonia (Offshore Wind Farm)	18.8	N/A	N/A	10.8	29.5
Muir Mhor	20.6	4.1	20.1	24.2	44.9
Buchan	19.7	2.6	5.8	8.4	28.1
Dogger Bank D	-	4.7	27.8	32.5	32.5

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
The Project	31.1	N/A	N/A	10.4	41.5
Total	148.0	369.6	825.8	1,248.8	1,395.1

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.152 In-combination predicted distributional response consequent mortality apportioned to the Noss SPA gannet feature

Project	Breeding				Non-breeding				Annual			
	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)
UK North Sea Projects up to the point of Berwick Bank	-	-	-	-	5.3	7.1	6.1	18.6	5.3	7.1	6.2	18.5
Green Volt	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	0.1	0.2
Pentland Floating Offshore Wind Farm	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1
Berwick Bank	0.1	0.1	0.1	0.4	0.3	0.4	0.4	1.1	0.4	0.5	0.5	1.5
Salamander	<0.1	<0.1	<0.1	<0.1	0.1	0.2	0.1	0.4	0.1	0.2	0.1	0.4
West of Orkney	-	-	-	-	0.3	0.4	0.4	1.2	0.3	0.4	0.4	1.2
Culzean	-	-	-	-	-	-	-	-	-	-	-	-
Ossian	0.1	0.2	0.2	0.5	0.2	0.2	0.2	0.6	0.3	0.4	0.4	1.1
Cenos	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.5
Dogger Bank South (East and West)	-	-	-	-	0.4	0.5	0.4	1.3	0.4	0.5	0.4	1.3
Five Estuaries	-	-	-	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	0.2	0.2	0.2	0.5	0.2	0.2	0.2	0.5
Outer Dowsing	-	-	-	-	0.1	0.2	0.1	0.4	0.1	0.2	0.1	0.4
Caledonia (Offshore Wind Farm)	0.1	0.2	0.1	0.4	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.6
Muir Mhor	0.1	0.2	0.1	0.4	0.1	0.2	0.2	0.5	0.3	0.4	0.3	0.9
Buchan	0.1	0.2	0.1	0.4	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.6
Dogger Bank D	-	-	-	0.1	0.2	0.3	0.2	1.3	0.2	0.3	0.2	1.4
The Project	0.2	0.2	0.2	0.7	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.9
Total	0.9	1.2	1.1	3.2	7.5	10.0	8.7	26.9	8.4	11.2	9.9	30.0

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.153 Noss SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the developer approach impact predictions within Table 2.152

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60% to 80% displacement and 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell et al. (2023)	27,530	0.9 to 1.2	7.5 to 10.0	8.4 to 11.2	0.003 to 0.004	0.027 to 0.036	0.030 to 0.041
	Latest Count (2023)	24,670				0.004 to 0.005	0.030 to 0.040	0.034 to 0.045

Table 2.154 Noss SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the guidance approach impact predictions within Table 2.152

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell et al. (2023)	27,530	1.1 to 3.2	8.7 to 26.9	9.9 to 30.0	0.004 to 0.012	0.032 to 0.098	0.036 to 0.109
	Latest Count (2023)	24,670				0.004 to 0.013	0.035 to 0.109	0.040 to 0.122

2.6.4.2 As summarised in **Table 2.153** and **Table 2.154**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Noss SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase potential collision risk impacts on the qualifying feature in combination

2.6.4.3 The predicted consequent mortality in relation to collision risk in-combination apportioned to the gannet feature of Noss SPA is provided in **Table 2.155**. The predicted change in survival rate for scenarios considered are presented in **Table 2.156**.

Table 2.155 In-combination predicted collision mortality apportioned to the Noss SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Green Volt **	0.5	<0.1	<0.1	0.1	0.5
Pentland Floating Offshore Wind Farm * & **	0.1	-	-	-	0.1
Berwick Bank * & **	0.4	<0.1	0.1	0.1	0.5
Salamander **	0.0	<0.1	<0.1	<0.1	<0.1
West of Orkney EIA Addendum **	-	<0.1	0.1	0.1	0.1
Culzean	-	-	-	-	-
Ossian **	0.5	-	<0.1	<0.1	0.5
Cenos	0.8	N/A	N/A	0.1	0.9
Dogger Bank South (East and West)	-	-	0.1	0.1	0.1
Five Estuaries	-	-	-	-	-
North Falls	-	<0.1	<0.1	0.1	0.1

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
Outer Dowsing	-	<0.1	<0.1	<0.1	<0.1
Caledonia (Offshore Wind Farm)	0.3	N/A	N/A	<0.1	0.3
Muir Mhor	0.2	<0.1	0.1	0.1	0.3
Buchan **	0.2	<0.1	<0.1	<0.1	0.2
Dogger Bank D	-	<0.1	0.1	0.2	0.2
The Project	1.9	<0.1	0.1	0.1	2.1
Total	4.8	12.0	16.5	28.6	33.4

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023). ** 70% macro-avoidance has been applied in the non-breeding season for Scottish Projects and across all seasons for English projects (where not already applied) in line with guidance from NatureScot and Natural England.

Table 2.156 Noss SPA gannet feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.155

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	27,530	4.8	28.6	33.4	0.017%	0.104%	0.121%
	Latest Count (2023)	24,670				0.020%	0.116%	0.135%
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	27,530	4.8	28.6	33.4	0.017%	0.104%	0.121%
	Latest Count (2023)	24,670				0.020%	0.116%	0.135%

2.6.4.4 As summarised in **Table 2.156**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Noss SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase combined distributional response and collision risk impacts on the qualifying features in-combination

2.6.4.5 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.155**) and distributional responses (**Table 2.152**) in-combination is presented within **Table 2.157** following the developer's approach and **Table 2.158** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023). Predicted consequent change in survival rate for the gannet feature of Noss SPA for each scenario considered is also presented in **Table 2.157** and **Table 2.158** for the developer's and guidance approaches respectively.

2.6.4.6 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.157 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Noss SPA gannet feature following the developer's approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60% to 80% displacement and 1% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	27,530	4.8 to 4.8	28.6 to 28.6	41.8 to 44.5	0.017 to 0.017	0.104 to 0.104	0.152 to 0.162
	Latest Count (2023)	24,670				0.020 to 0.020	0.116 to 0.116	0.169 to 0.181
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	27,530	4.8 to 4.8	28.6 to 28.6	41.8 to 44.5	0.017 to 0.017	0.104 to 0.104	0.152 to 0.162
	Latest Count (2023)	24,670				0.020 to 0.020	0.116 to 0.116	0.169 to 0.181

Table 2.158 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Noss SPA gannet feature following the guidance approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	27,530	5.9 to 8.1	37.3 to 55.5	43.2 to 63.4	0.021 to 0.029	0.135 to 0.202	0.157 to 0.230
	Latest Count (2023)	24,670				0.024 to 0.033	0.151 to 0.225	0.175 to 0.257
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	27,530	5.9 to 8.1	37.3 to 55.5	43.2 to 63.4	0.021 to 0.029	0.135 to 0.202	0.157 to 0.230
	Latest Count (2023)	24,670				0.024 to 0.033	0.151 to 0.225	0.175 to 0.257

2.6.4.7 As summarised in **Table 2.157** and **Table 2.158**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Noss SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.6.4.8 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 24,670 breeding adults. Outputs are presented in **Table 2.159** below, including the predicted median reduction in annual growth rate CGR and median reduction in final population size CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.159 PVA results for annual in-combination predicted impacts apportioned to the gannet feature of Noss SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
Distributional responses	60% displacement; 1% mortality for all projects	8.4	1.000	0.04	0.986	1.42
	80% displacement; 1% mortality for all projects	11.2	0.999	0.05	0.981	1.89
	70% displacement; 1% mortality for all projects	9.9	1.000	0.05	0.983	1.69
	70% displacement; 3% mortality for all projects	30.0	0.999	0.14	0.949	5.05
	60% displacement; 1% mortality for all projects excluding the Project	8.1	1.000	0.04	0.986	1.37
	80% displacement; 1% mortality for all projects excluding the Project	10.8	0.999	0.05	0.982	1.84
	70% displacement; 1% mortality for all projects excluding the Project	9.6	1.000	0.05	0.983	1.68
	70% displacement; 3% mortality for all projects excluding the Project	29.2	0.999	0.14	0.950	4.96
Collision risk	All projects	33.4	0.998	0.16	0.944	5.60
	All projects excluding the Project	31.3	0.998	0.15	0.947	5.30

Effect pathway	**Scenario modelled**	**Annual increase in mortality (breeding adults)**	**Density independent counterfactual metric (35yrs)**			
			Median CGR	**Reduction in annual growth rate (%)**	**Median CPS**	**Reduction in final population size after 35yrs (%)**
Combined effects	60% displacement; 1% mortality for all projects	41.8	0.998	0.20	0.931	6.93
	80% displacement; 1% mortality for all projects	44.5	0.998	0.21	0.926	7.42
	70% displacement; 1% mortality for all projects	43.2	0.998	0.21	0.928	7.19
	70% displacement; 3% mortality for all projects	63.4	0.997	0.31	0.896	10.44
	60% displacement; 1% mortality for all projects excluding the Project	39.5	0.998	0.19	0.934	6.59
	80% displacement; 1% mortality for all projects excluding the Project	42.2	0.998	0.20	0.930	7.01
	70% displacement; 1% mortality for all projects excluding the Project	40.9	0.998	0.20	0.932	6.85
	70% displacement; 3% mortality for all projects excluding the Project	60.5	0.997	0.29	0.900	9.96

2.6.4.9 When interpreting the PVA outputs presented within **Table 2.159**, it is important to consider the following points:

- The overall trend of the colony has been primarily steady growth with only a minor reduction in population size noted between 2019 to 2022 (SMP, 2025), which may suggest the colony beginning to reach carrying capacity. Between the seabird 2000 count and the Seabird Count 2015 to 2021 the gannet feature has increased by 2.2% per annum (Burnell *et al.* 2023).
- Reduction in population size between 2019 to 2022 is likely to be linked to HPAI based on the year of decline and significant number of positive cases reported for UK gannets (Tremlett et al. 2024). Although recent counts are unavailable, the colony appears to be recovering from the effects of HPAI based on the population increase recorded between 2022 to 2023.
- When considering the historic consistent growth of all gannet populations over the last 50 years (Burnell et al. 2023), the impact of HPAI is not expected to significantly affect the long-term integrity of the national site network.
- The gannet feature of Noss SPA is currently classified as being in favourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population is maintained.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), no evidence to support a mortality rate of 3% for distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.6.4.10 The reductions in growth rate presented within **Table 2.159** are sufficiently small that any impact scenario would be indistinguishable from natural fluctuations in the population, when considering the overall long term growth rates of the colony. Therefore, the Noss SPA is expected to remain in significant stable growth.

2.6.4.11 As the colony experienced only minor impacts from HPAI, the gannet feature of the Noss SPA is estimated to recover fully when considering historic trends of both the UK site network and Noss SPA, before the Project's impact begins to provide a contribution to any in-combination effect when operational in 2037.

2.6.4.12 Therefore, the potential for an **AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, gannet will be maintained as a feature in the long term.

2.6.5 North Rona and Sula Sgeir SPA

Operation and maintenance phase distributional response effects on the qualifying feature in-combination

2.6.5.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.160** and **Table 2.161**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.162** following the developer's approach and **Table 2.163** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.160 In-combination predicted abundance apportioned to the North Rona and Sula Sgeir SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	1.1	-	110.0	110.0	111.1
Green Volt	1.5	0.4	0.1	0.4	2.0
Pentland Floating Offshore Wind Farm	14.3	-	-	-	14.3
Berwick Bank	8.4	-	9.0	9.0	17.4
Salamander	0.6	N/A	N/A	-	0.6
West of Orkney	-	-	-	-	-
Culzean	-	-	-	-	-
Ossian	13.5	-	3.1	3.1	16.6
Cenos	-	N/A	N/A	0.4	0.4
Dogger Bank South (East and West)	-	-	-	-	-
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	-	-	-	-
Caledonia (Offshore Wind Farm)	20.4	N/A	N/A	1.3	21.7
Muir Mhor	10.8	-	2.4	2.4	13.2
Buchan	6.3	-	0.7	0.7	7.0
Dogger Bank D	-	-	-	-	-

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
The Project	11.6	N/A	N/A	1.2	12.8
Total	88.5	0.4	125.3	128.5	217.0

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.161 In-combination predicted distributional response consequent mortality apportioned to the North Rona and Sula Sgeir SPA gannet feature

Project	Breeding				Non-breeding				Annual			
	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)
UK North Sea projects including Berwick Bank	-	-	0.1	0.2	-	-	0.8	2.5	-	-	0.9	2.7
UK North Sea Projects up to the point of Berwick Bank	<0.1	<0.1	<0.1	<0.1	0.7	0.9	0.7	2.3	0.7	0.9	0.7	2.3
Green Volt	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pentland Floating Offshore Wind Farm	0.1	0.1	0.1	0.3	-	-	-	-	0.1	0.1	0.1	0.3
Berwick Bank	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.4
Salamander	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1
West of Orkney	-	-	-	-	-	-	-	-	-	-	-	-
Culzean	-	-	-	-	-	-	-	-	-	-	-	-
Ossian	0.1	0.1	0.1	0.3	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	0.3
Cenos	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dogger Bank South (East and West)	-	-	-	-	-	-	-	-	-	-	-	-
Five Estuaries	-	-	-	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	-	-	-	-	-	-	-	-
Outer Dowsing	-	-	-	-	-	-	-	-	-	-	-	-
Caledonia (Offshore Wind Farm)	0.1	0.2	0.1	0.4	<0.1	<0.1	<0.1	<0.1	0.1	0.2	0.2	0.5
Muir Mhor	0.1	0.1	0.1	0.2	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	0.3

Project	Breeding				Non-breeding				Annual			
	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)
Buchan	<0.1	0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Dogger Bank D	-	-	-	-	-	-	-	-	-	-	-	-
The Project	0.1	0.1	0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3
Total	0.5	0.7	0.7	1.9	0.8	1.0	0.9	2.7	1.3	1.7	1.5	4.6

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.162 North Rona and Sula Sgeir SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the developer approach impact predictions within Table 2.125

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60% to 80% displacement and 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	24,542	0.5 to 0.7	0.8 to 1.0	1.3 to 1.7	0.002 to 0.003	0.003 to 0.004	0.005 to 0.007
	Latest Count (2023).	18,990				0.003 to 0.004	0.004 to 0.005	0.007 to 0.009

Table 2.163 North Rona and Sula Sgeir SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the guidance approach impact predictions within Table 2.125

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	24,542	0.7 to 1.9	0.9 to 2.7	1.5 to 4.6	0.003 to 0.008	0.004 to 0.011	0.006 to 0.019
	Latest Count (2023).	18,990				0.003 to 0.010	0.005 to 0.014	0.008 to 0.024

2.6.5.2 As summarised in **Table 2.162** and **Table 2.163**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to North Rona and Sula Sgeir SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase potential collision risk impacts on the qualifying feature in combination

2.6.5.3 The predicted consequent mortality in relation to collision risk in-combination apportioned to the gannet feature of North Rona and Sula Sgeir SPA is provided in **Table 2.164**. The predicted change in survival rate for scenarios considered are presented in **Table 2.165**.

Table 2.164 In-combination predicted collision mortality apportioned to the North Rona and Sula Sgeir SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	-	3.0	3.0	3.0
Green Volt **	0.2	<0.1	<0.1	<0.1	0.2
Pentland Floating Offshore Wind Farm * & **	0.1	-	-	-	0.1
Berwick Bank * & **	0.2	-	<0.1	<0.1	0.2
Salamander **	<0.1	-	<0.1	<0.1	<0.1
West of Orkney EIA Addendum **	-	-	-	-	-
Culzean	-	-	-	-	-
Ossian **	0.3	-	-	-	0.3
Cenos	-	N/A	N/A	<0.1	<0.1
Dogger Bank South	-	-	-	-	-

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
(East and West)					
Five Estuaries	-	-	-	-	-
North Falls	-	-	-	-	-
Outer Dowsing	-	-	-	-	-
Caledonia (Offshore Wind Farm)	0.3	N/A	N/A	<0.1	0.3
Muir Mhor	0.1	-	<0.1	<0.1	0.1
Buchan **	0.1	-	<0.1	<0.1	0.1
Dogger Bank D	-	-	-	-	-
The Project	0.7	-	<0.1	<0.1	0.7
Total	2.0	<0.1	3.0	3.1	5.1

Table note: Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023). ** 70% macro-avoidance has been applied in the non-breeding season for Scottish Projects and across all seasons for English projects (where not already applied) in line with guidance from NatureScot and Natural England.

Table 2.165 North Rona and Sula Sgeir SPA gannet feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.146

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	24,542	2.0	3.1	5.1	0.008%	0.012%	0.021%
	Latest Count (2023).	18,990				0.011%	0.016%	0.027%

2.6.5.4 As summarised in **Table 2.165**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to North Rona and Sula Sgeir SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase combined distributional response and collision risk impacts on the qualifying features in-combination

2.6.5.5 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.164**) and distributional responses (**Table 2.161**) in-combination is presented within **Table 2.166** following the developer's approach and **Table 2.167** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023). Predicted consequent change in survival rate for the gannet feature of North Rona and Sula Sgeir SPA for each scenario considered is also presented in **Table 2.166** and **Table 2.167** for the developer's and guidance approaches respectively.

2.6.5.6 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.166 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the North Rona and Sula Sgeir SPA gannet feature following the developer's approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60% to 80% displacement and 1% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023).	24,542	2.0 to 2.0	3.1 to 3.1	6.4 to 6.8	0.008 to 0.008	0.012 to 0.012	0.026 to 0.028
	Latest Count (2023).	18,990				0.011 to 0.011	0.016 to 0.016	0.034 to 0.036

Table 2.167 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the North Rona and Sula Sgeir SPA gannet feature following the guidance approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	24,542	2.6 to 3.9	3.9 to 5.8	6.6 to 9.6	0.011 to 0.016	0.016 to 0.023	0.027 to 0.039
	Latest Count (2023)	18,990				0.014 to 0.020	0.021 to 0.030	0.035 to 0.051

2.6.5.7 As summarised in **Table 2.166** and **Table 2.167**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to North Rona and Sula Sgeir SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.6.5.8 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 18,990 breeding adults. Outputs are presented in Table 2.168below, including the predicted median reduction in annual growth rate CGR and median reduction in final population size CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.168 PVA results for annual in-combination predicted impacts apportioned to the gannet feature of North Rona and Sula Sgeir SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
Distributional responses	60% displacement; 1% mortality for all projects	1.3	1.000	0.01	0.997	0.30
	80% displacement; 1% mortality for all projects	1.7	1.000	0.01	0.997	0.34
	70% displacement; 1% mortality for all projects	1.5	1.000	0.01	0.997	0.29
	70% displacement; 3% mortality for all projects	4.6	1.000	0.03	0.990	1.01
	60% displacement; 1% mortality for all projects excluding the Project	1.2	1.000	0.01	0.997	0.25
	80% displacement; 1% mortality for all projects excluding the Project	1.6	1.000	0.01	0.996	0.36
	70% displacement; 1% mortality for all projects excluding the Project	1.4	1.000	0.01	0.997	0.30
	70% displacement; 3% mortality for all projects excluding the Project	4.3	1.000	0.03	0.991	0.94
Collision risk	All projects	5.1	1.000	0.03	0.989	1.11
	All projects excluding the Project	4.3	1.000	0.03	0.990	1.02

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
Combined effects	60% displacement; 1% mortality for all projects	6.4	1.000	0.04	0.986	1.36
	80% displacement; 1% mortality for all projects	6.8	1.000	0.04	0.985	1.52
	70% displacement; 1% mortality for all projects	6.6	1.000	0.04	0.985	1.45
	70% displacement; 3% mortality for all projects	9.6	0.999	0.06	0.978	2.21
	60% displacement; 1% mortality for all projects excluding the Project	5.6	1.000	0.04	0.988	1.23
	80% displacement; 1% mortality for all projects excluding the Project	6.0	1.000	0.04	0.987	1.32
	70% displacement; 1% mortality for all projects excluding the Project	5.8	1.000	0.04	0.987	1.27
	70% displacement; 3% mortality for all projects excluding the Project	8.8	0.999	0.05	0.980	1.97

2.6.5.9 When interpreting the PVA outputs presented within **Table 2.168**, it is important to consider the following points:

- Between the seabird 2000 count and the Seabird Count 2015 to 2021 the gannet feature has increased by 1.3% per annum (Burnell *et al.* 2023).
- Reduction in population size of 23% between 2021 to 2023 is likely to be linked to HPAI based on the year of decline and significant number of positive cases reported for UK gannets (Tremlett *et al.* 2024). However, as recent counts are unavailable it is unclear if the colony is recovering from the effects of HPAI.
- When considering the historic consistent growth of all gannet populations over the last 50 years (Burnell et al. 2023), the impact of HPAI is not expected to significantly affect the long-term integrity of the national site network.
- The gannet feature of North Rona and Sula Sgeir SPA is currently classified as being in favourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population is maintained.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), no evidence to support a mortality rate of 3% for distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.6.5.10 The reductions in growth rate presented within **Table 2.168** are sufficiently small that any impact scenario would be indistinguishable from natural fluctuations in the population, when considering the overall long term growth rates of the colony. Therefore, the North Rona and Sula Sgeir SPA is expected to remain in significant stable growth.

2.6.5.11 Despite the colony having been impacted by HPAI, the gannet feature of the North Rona and Sula Sgeir SPA is estimated to recover significantly when considering historic trends of both the UK site network and the North Rona and Sula Sgeir SPA, if not fully before the Project's impact begins to provide a contribution to any in-combination effect when operational in 2037.

2.6.5.12 Therefore, the potential for an **AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, gannet will be maintained as a feature in the long term.

2.6.6 Hermaness, Saxa Vord and Valla Field SPA

Operation and maintenance phase distributional response effects on the qualifying feature in-combination

2.6.6.1 The predicted apportioned mean seasonal peak abundances for each project's OAA plus a 2km buffer (where available) and respective impact predictions for the different seasonal in-combination scenarios considered are presented in **Table 2.169** and **Table 2.170**, respectively. The predicted change in survival rate for scenarios considered are presented in **Table 2.171** following the developer's approach and **Table 2.172** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023).

Table 2.169 In-combination predicted abundance apportioned to the Hermaness, Saxa Vord and Valla Field SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	671.4	1,252.4	1,923.8	1,923.8
Green Volt	3.8	7.7	1.4	9.1	12.9
PFOWF	1.9	-	-	-	-
Berwick Bank	21.1	12.6	75.0	87.6	108.7
Salamander	1.2	N/A	N/A	50.6	51.7
West of Orkney	-	19.0	116.7	135.7	135.7
Culzean	-	-	-	-	-
Ossian	33.2	5.8	65.9	71.6	104.8
Cenos	10.8	N/A	N/A	18.1	28.8
Dogger Bank South (East and West)	-	22.1	133.8	155.9	155.9
Five Estuaries	-	-	-	-	-
North Falls	-	39.8	24.5	64.3	64.3
Outer Dowsing	-	9.5	42.3	51.8	51.8
Caledonia (OWF)	15.0	N/A	N/A	26.9	41.9
Muir Mhor	29.9	10.2	50.4	60.6	90.5
Buchan	14.1	6.6	14.3	20.9	35.0
Dogger Bank D	-	11.7	69.4	81.1	81.1
The Project	34.0	N/A	N/A	26.0	60.0
Total	165.0	816.4	1,846.0	2,783.9	2,947.0

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the gannet feature of Hermaness, Saxa Vord and Valla Field SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.170 In-combination predicted distributional response consequent mortality apportioned to the Hermaness, Saxa Vord and Valla Field SPA gannet feature

Project	Breeding				Non-breeding				Annual			
	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)
UK North Sea projects including Berwick Bank	N/A	N/A	0.2	0.4	N/A	N/A	14.1	42.3	N/A	N/A	14.3	42.8
UK North Sea Projects up to the point of Berwick Bank	-	-	-	-	11.5	15.4	13.5	40.4	11.5	15.4	13.5	40.5
Green Volt	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.3
PFOWF	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1
Berwick Bank	0.1	0.2	0.2	0.4	0.5	0.7	0.6	1.9	0.7	0.9	0.8	2.3
Salamander	0.0	0.0	0.0	0.0	0.3	0.4	0.4	1.1	0.3	0.4	0.4	1.1
West of Orkney	-	-	-	-	0.8	1.1	1.0	2.9	0.8	1.1	1.0	2.9
Culzean	-	-	-	-	-	-	-	-	-	-	-	-
Ossian	0.2	0.3	0.2	0.7	0.4	0.6	0.5	1.5	0.6	0.8	0.7	2.2
Cenos	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.4	0.2	0.2	0.2	0.6
Dogger Bank South (East and West)	-	-	-	-	0.9	1.2	1.1	3.3	0.9	1.2	1.1	3.3
Five Estuaries	-	-	-	-	-	-	-	-	-	-	-	-
North Falls	-	-	-	-	0.4	0.5	0.5	1.4	0.4	0.5	0.5	1.4
Outer Dowsing	-	-	-	-	0.3	0.4	0.4	1.1	0.3	0.4	0.4	1.1
Caledonia (OWF)	0.1	0.1	0.1	0.3	0.2	0.2	0.2	0.6	0.3	0.3	0.3	0.9
Muir Mhor	0.2	0.2	0.2	0.6	0.4	0.5	0.4	1.3	0.5	0.7	0.6	1.9
Buchan	0.1	0.1	0.1	0.3	0.1	0.2	0.1	0.4	0.2	0.3	0.2	0.7
Dogger Bank D	-	-	-	0.2	0.5	0.6	0.6	3.2	0.5	0.6	0.6	3.4

Project	Breeding				Non-breeding				Annual			
	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)	60% disp.; 1% mort (developer approach)	80% disp.; 1% mort (developer approach)	70% disp.; 1% mort (guidance approach)	70% disp.; 3% mort (guidance approach)
The Project	0.2	0.3	0.2	0.7	0.2	0.2	0.2	0.5	0.4	0.5	0.4	1.3
Total	1.0	1.3	1.2	3.7	16.7	22.3	19.5	60.0	17.7	23.6	20.7	63.8

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the gannet feature of Hermaness, Saxa Vord and Valla Field SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed.

Table 2.171 Hermaness, Saxa Vord and Valla Field SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the developer approach impact predictions within Table 2.170

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60% to 80% displacement and 1% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	59,124	1.0 to 1.3	4.9 to 6.5	11.1 to 14.8	0.002 to 0.002	0.008 to 0.011	0.019 to 0.025
	Latest Count (2024)	39,606				0.002 to 0.003	0.012 to 0.016	0.028 to 0.037
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	59,124	0.9 to 1.2	15.4 to 20.5	16.2 to 21.6	0.001 to 0.002	0.026 to 0.035	0.027 to 0.037
	Latest Count (2024)	39,606				0.002 to 0.003	0.039 to 0.052	0.041 to 0.055

Table 2.172 Hermaness, Saxa Vord and Valla Field SPA gannet feature in-combination distributional response effect and predicted change in survival rate for scenarios considered based on the guidance approach impact predictions within Table 2.170

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al*. (2023)	59,124	1.2 to 3.7	19.5 to 60.0	20.7 to 63.8	0.002 to 0.006	0.033 to 0.101	0.035 to 0.108
	Latest Count (2024)	39,606				0.003 to 0.009	0.049 to 0.152	0.052 to 0.161
All projects excluding consented projects with a commitment to compensation	Burnell *et al*. (2023)	59,124	1.0 to 3.3	18.0 to 55.2	19.0 to 58.6	0.002 to 0.006	0.030 to 0.093	0.032 to 0.099
	Latest Count (2024)	39,606				0.003 to 0.008	0.045 to 0.139	0.048 to 0.148

2.6.6.2 As summarised in **Table 2.171** and **Table 2.172**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Hermaness, Saxa Vord and Valla Field SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase potential collision risk impacts on the qualifying feature in combination

2.6.6.3 The predicted consequent mortality in relation to collision risk in-combination apportioned to the gannet feature of Hermaness, Saxa Vord and Valla Field SPA is provided in **Table 2.173**. The predicted change in survival rate for scenarios considered are presented in **Table 2.174**.

Table 2.173 In-combination predicted collision mortality apportioned to the Hermaness, Saxa Vord and Valla Field SPA gannet feature

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
UK North Sea Projects up to the point of Berwick Bank	-	25.5	34.3	59.8	59.8
Green Volt	0.5	0.4	0.1	0.9	0.4
PFOWF*	0.1	-	-	-	0.1
Berwick Bank*	0.8	0.1	0.9	1.0	1.8
Salamander	0.0	0.1	0.1	0.2	0.2
West of Orkney EIA Addendum	-	0.2	0.7	0.9	0.9
Culzean	-	-	-	-	-
Ossian	0.7	-	0.3	0.3	1.0
Cenos**	0.9	N/A	N/A	1.1	0.2
Dogger Bank South (East and West)**	-	-	0.3	0.3	0.3
Five Estuaries**	-	-	-	-	-

Project	Breeding	Return migration	Post-breeding migration	Non-breeding	Annual
North Falls**	-	0.1	0.1	0.2	0.2
Outer Dowsing**	-	0.0	0.0	0.1	0.1
Caledonia (OWF)**	0.2	N/A	N/A	0.1	0.3
Muir Mhor	0.2	0.1	0.2	0.3	0.5
Buchan	0.2	0.0	0.0	0.1	0.2
Dogger Bank D**	-	0.1	0.3	0.4	0.4
The Project	2.1	0.1	0.2	0.3	2.4
Total	5.6	26.7	37.5	65.8	68.8

Table note: Projects presented in green are those with a commitment to compensating their predicted impact on the gannet feature of Hermaness, Saxa Vord and Valla Field SPA as part of their consent conditions. Dashes (-) denote where a projects impact contributions is either zero or the potential for a LSE was ruled and therefore not assessed. *Impact predictions presented within the development's RIAA were based on old avoidance rates (deterministic modelling using a 0.989 avoidance rate) and have therefore been adjusted to reflect updated NatureScot guidance (0.9923 for deterministic) using the method outlined within Royal HaskoningDHV (2023). ** For Scottish projects, 70% macro-avoidance has been applied in the non-breeding season (where not already applied), and across all seasons for English projects in line with Natural England guidance.

Table 2.174 Hermaness, Saxa Vord and Valla Field SPA gannet feature in-combination predicted collision mortality and predicted change in survival rate for scenarios considered based on impact predictions within Table 2.173

Scenario	Population count	Population size (breeding adults)	Prediction collision (breeding adults per annum)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	59,124	5.4	63.2	66.8	0.009	0.107	0.113
	Latest Count (2024)	39,606				0.014	0.159	0.169
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	59,124	4.8	62.7	65.8	0.008	0.106	0.111
	Latest Count (2024)	39,606				0.012	0.158	0.166

2.6.6.4 As summarised in **Table 2.174**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Hermaness, Saxa Vord and Valla Field SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA (see operation and maintenance stage combined distributional response and collision risk impacts on the qualifying features in-combination).

Operation and maintenance phase combined distributional response and collision risk impacts on the qualifying features in-combination

2.6.6.5 The apportioned predicted consequent mortality as a result of combined collision (**Table 2.173**) and distributional responses (**Table 2.170**) in-combination is presented within **Table 2.175** following the developer's approach and **Table 2.176** following the guidance approach. The developer's approach is derived from the critical appraisal of evidence presented within Section 6.2.4 of the **RIAA**, whilst the guidance approach is based on the recommendations within NatureScot's Guidance Note 8 (NatureScot, 2023). Predicted consequent change in survival rate for the gannet feature of Hermaness, Saxa Vord and Valla Field SPA for each scenario considered is also presented in **Table 2.175** and **Table 2.176** for the developer's and guidance approaches respectively.

2.6.6.6 As is standard practice predicted displacement and collision consequent mortality have been added together to inform the level of predicted combined impact in-combination. It's important to note that simply adding both impacts to together is highly likely to lead to an overestimate of impact, as a bird which is displaced can't consequently collide with a WTG and vice versa.

Table 2.175 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Forth Island SPA gannet feature following the developer's approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 60% to 80% displacement and 1% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	59,124	6.4 to 6.7	68.1 to 69.7	77.9 to 81.6	0.011 to 0.011	0.115 to 0.118	0.132 to 0.138
	Latest Count (2024)	39,606				0.016 to 0.017	0.172 to 0.176	0.197 to 0.206
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	59,124	5.7 to 6.0	78.0 to 83.2	82.0 to 87.4	0.010 to 0.010	0.132 to 0.141	0.139 to 0.148
	Latest Count (2024)	39,606				0.014 to 0.015	0.197 to 0.210	0.207 to 0.221

Table 2.176 In-combination predicted combined distributional response and collision risk consequent mortality apportioned to the Forth Island SPA gannet feature following the guidance approach

Scenario	Population count	Population size (breeding adults)	Predicted impact using 70% displacement and 1% to 3% mortality plus CRM (breeding adults)			Change in survival rate (%)		
			Breeding	Non-breeding	Annual	Breeding	Non-breeding	Annual
All projects	Burnell *et al.* (2023)	59,124	6.6 to 9.0	82.7 to 123.2	87.5 to 130.6	0.011 to 0.015	0.140 to 0.208	0.148 to 0.221
	Latest Count (2024)	39,606				0.017 to 0.023	0.209 to 0.311	0.221 to 0.330
All projects excluding consented projects with a commitment to compensation	Burnell *et al.* (2023)	59,124	5.8 to 8.1	80.7 to 117.9	84.7 to 124.4	0.010 to 0.014	0.136 to 0.199	0.143 to 0.210
	Latest Count (2024)	39,606				0.015 to 0.020	0.204 to 0.298	0.214 to 0.314

2.6.6.7 As summarised in **Table 2.175** and **Table 2.176**, the level of impact predicted annually or seasonally from all projects in-combination, attributed to Hermaness, Saxa Vord and Valla Field SPA, exceeds a 0.02% change in adult survival rate. In accordance with NatureScot Guidance Note 11 (NatureScot, 2023) the predicted impact has been further analysed via PVA.

2.6.6.8 PVA has been undertaken for the 35-year operational lifetime of the Project and modelled using the latest count of 39,606 breeding adults. Outputs are presented in **Table 2.177** below, including the predicted median reduction in annual growth rate CGR and median reduction in final population size CPS. PVA modelling was undertaken using density independent modelling, and therefore the CGR value is considered a more reliable metric than CPS values for interpreting impacts (Cook and Robinson, 2016). For full details on PVA methodology, see **Appendix D: HRA Population Viability Analysis Report**.

Table 2.177 PVA results for annual in-combination predicted impacts apportioned to the gannet feature of Hermaness, Saxa Vord and Valla Field SPA

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
Distributional responses	60% displacement; 1% mortality for all projects	11.1	1.000	0.03	0.988	1.18
	80% displacement; 1% mortality for all projects	14.8	1.000	0.04	0.984	1.57
	70% displacement; 1% mortality for all projects	20.7	0.999	0.06	0.978	2.21
	70% displacement; 3% mortality for all projects	63.8	0.998	0.19	0.934	6.59
	60% displacement; 1% mortality for all projects excluding the Project	10.7	1.000	0.03	0.989	1.13
	80% displacement; 1% mortality for all projects excluding the Project	14.3	1.000	0.04	0.985	1.50
	70% displacement; 1% mortality for all projects excluding the Project	20.3	0.999	0.06	0.978	2.17
	70% displacement; 3% mortality for all projects excluding the Project	62.5	0.998	0.19	0.935	6.49
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	16.2	1.000	0.05	0.983	1.72

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	21.6	0.999	0.06	0.977	2.29
	70% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	19.0	0.999	0.06	0.980	2.04
	70% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation	58.6	0.998	0.17	0.939	6.10
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	15.9	1.000	0.05	0.983	1.69
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	21.2	0.999	0.06	0.978	2.23
	70% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	18.5	0.999	0.05	0.980	1.96
	70% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project	57.3	0.998	0.17	0.940	5.97

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
Collision risk	All projects	66.8	0.998	0.20	0.931	6.91
	All projects excluding the Project	64.4	0.998	0.19	0.933	6.70
	All projects excluding consented projects with a commitment to compensation	65.8	0.998	0.20	0.932	6.81
	All projects excluding consented projects with a commitment to compensation and the Project	63.3	0.998	0.19	0.934	6.56
Combined effects	60% displacement; 1% mortality for all projects	77.9	0.998	0.23	0.920	8.05
	80% displacement; 1% mortality for all projects	81.6	0.998	0.24	0.916	8.44
	70% displacement; 1% mortality for all projects	87.5	0.997	0.26	0.910	8.96
	70% displacement; 3% mortality for all projects	130.6	0.996	0.39	0.869	13.12
	60% displacement; 1% mortality for all projects excluding the Project	75.1	0.998	0.22	0.922	7.76
	80% displacement; 1% mortality for all projects excluding the Project	78.7	0.998	0.23	0.919	8.11
	70% displacement; 1% mortality for all projects excluding the Project	84.7	0.997	0.25	0.913	8.70

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
	70% displacement; 3% mortality for all projects excluding the Project	126.9	0.996	0.38	0.872	12.77
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	82.0	0.998	0.25	0.915	8.48
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	87.4	0.997	0.26	0.910	9.01
	70% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation	84.7	0.997	0.25	0.913	8.70
	70% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation	124.4	0.996	0.37	0.875	12.51
	60% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	79.2	0.998	0.24	0.918	8.19
	80% displacement; 1% mortality for all projects excluding consented projects with a commitment to compensation and the Project	84.5	0.997	0.25	0.913	8.69
	70% displacement; 1% mortality for all projects excluding consented projects	81.9	0.998	0.24	0.916	8.42

Effect pathway	Scenario modelled	Annual increase in mortality (breeding adults)	Density independent counterfactual metric (35yrs)			
			Median CGR	Reduction in annual growth rate (%)	Median CPS	Reduction in final population size after 35yrs (%)
	with a commitment to compensation and the Project					
	70% displacement; 3% mortality for all projects excluding consented projects with a commitment to compensation and the Project	120.7	0.996	0.36	0.878	12.15

2.6.6.9 When interpreting the PVA outputs presented within **Table 2.177**, it is important to consider the following points:

- There was a significant increase in the size of the gannet colony at Hermaness, Saxa Vord and Valla Field SPA between 1985 and 2021, followed by a 37% decline between 2021 and 2023, likely due to HPAI (Tremlett *et al.* 2024).
- The most recent count in 2024 suggests significantly recovery following HPAI with an annual compound growth rate of 5.7% between 2023 and 2024 (SMP, 2025).
- When considering the historic consistent growth of all gannet populations over the last 50 years (Burnell et al. 2023), the impact of HPAI is not expected to affect the long-term integrity of the national site network significantly.
- The gannet feature of Hermaness, Saxa Vord and Valla Field SPA is currently classified as being in favourable condition, therefore suggesting that conservation objectives are targeted at ensuring the population is maintained.
- The potential effect predicted is highly likely to be a significant overestimate due to high degree of precaution within assessment of CRM (see Section 6.2.5 of the **RIAA**), no evidence to support a mortality rate of 3% for distributional response effects (see Section 6.2.4 of the **RIAA**) and simplistic additive manner of considering combined effects.

2.6.6.10 The reductions in growth rate presented within **Table 2.177** are sufficiently small that any impact scenario would be indistinguishable from natural fluctuations in the population, when considering the overall long-term growth rates of the colony. Therefore, the Hermaness, Saxa Vord and Valla Field SPA is expected to remain in significant stable growth.

2.6.6.11 Despite the colony having been impacted by HPAI, the gannet feature of the Hermaness, Saxa Vord and Valla Field SPA is estimated to recover significantly when considering historic trends of both the UK site network and the Hermaness, Saxa Vord and Valla Field SPA, if not fully before the Project's impact begins to provide a contribution to any in-combination effect when operational in 2037.

2.6.6.12 Therefore, the potential for an AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination. Subject to natural change, gannet will be maintained as a feature in the long term.

2.6.6.13 Therefore, **the potential for an AEoSI in relation to distributional response impacts, collision risk impacts and both effect pathways combined during the O&M stage can confidently be ruled out for the Project in-combination**. Subject to natural change, gannet will be maintained as a feature in the long term.

3. References

APEM, (2023). *Green Volt Offshore Wind Farm Offshore Environmental Impact Assessment: Technical Appendix 12.8 The Supplementary Ornithological Assessment Report*. APEM Scientific Report P000012307. Green Volt Offshore Windfarm Ltd., 18/09/2023c, v2.1, 286 pp. [online] Available at: https://marine.gov.scot/sites/default/files/flo-gre-rep-0020_supplementary_ornithological_assessment_v2_anonymised_redacted.pdf [Accessed: 2 October 2025].

Burnell, D., Perkins, A.J., Newton, S.F., Bolton, M, Tierney, T.D. and Dunn, T.D., (2023). *Seabirds Count, A census of breeding seabirds in Britain and Ireland (2015–2021).* Barcelona: Lynx Nature Books.

Cook, A.S.C.P. and Robinson, R.A., (2016). *Testing sensitivity of metrics of seabird population response to offshore wind farm effects*. JNCC report no. 533.

GoBe, (2024). *Caledonia Offshore Wind Farm Application Document 13 Part 4: Caledonia North Report to Inform Appropriate Assessment*. [online] Available at: https://www.caledoniaoffshorewind.com/wp-content/uploads/2024/12/Application-Document-13-North-Report-to-Inform-Appropriate-Assessment-Part-4.pdf [Accessed: 20 October 2025].

GoBe, (2025a). Five Estuaries Offshore Wind Farm Environmental Statement Volume 5, Report 4: Report to Inform Appropriate Assessment (Tracked). [online] Available at: https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN010115-001665-5.4%20Report%20to%20Inform%20Appropriate%20Assessment%20-%20Revision%20D%20(Clean)pdf.pdf [Accessed: 20 October 2025].

GoBe, (2025b). *Outer Dowsing Offshore Wind Farm Habitats Regulations Assessment: Report to Inform Appropriate Assessment*. [online] Available at: https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN010130-002223-7.1%20Report%20to%20Inform%20Appropriate%20Assessment.pdf [Accessed: 20 October 2025].

MacArthur Green, (2024). *West of Orkney Windfarm Offshore Ornithology Additional Information Addendum to the Report to Inform Appropriate Assessment: HRA Stage 2 - SPA Appropriate Assessment.* [online] Available at: https://www.westoforkney.com/application/files/6917/2795/5171/Addendum-to-the-Report-to-Inform-Appropriate-Assessment-HRA-Stage-2-SPA-Appropriate-Assessment.pdf [Accessed: 20 October 2025].

Natural Power Ltd., (2024). *Muir Mhòr Offshore Wind Farm Environmental Impact Assessment Report Volume 3, Appendix 11.5: Population Viability Analysis Report.* [online] Available at: https://muirmhor.co.uk/wp-content/uploads/2024/12/MMH-GBE-A004-ENV-0006-314-EIAR-Volume-3-Appendix-11.5-Offshore-Ornithology-Population-Viability-Analysis-Report.pdf [Accessed: 20 October 2025].

Natural Power Ltd., (2025). *Buchan Offshore Windfarm Part 3 – Assessment on Special Protection Areas and Ramsar Sites Report to Inform Appropriate Assessment.* [online] Available at: https://marine.gov.scot/sites/default/files/part_3_assessment_on_spas_and_ramsar_sites.pdf [Accessed: 20 October 2025].

NatureScot, (2023). *Guidance Note 11: Guidance to support Offshore Wind Applications: Marine Ornithology - Recommendations for Seabird Population Viability Analysis (PVA).* [online] Available at: https://www.nature.scot/doc/guidance-note-11-guidance-support-offshore-wind-applications-marine-ornithology-recommendations [Accessed: 20 October 2025].

NIRAS Group (UK) Ltd., (2024). *Salamander Offshore Wind Farm Offshore Report to Inform Appropriate Assessment.* [online] Available at: https://salamanderfloatingwind.com/wp-content/uploads/2024/offshore-wind-pdf/RP.A.1.1%20Report%20to%20Inform%20Appropriate%20Assessment%20%28RIAA%29.pdf [Accessed: 20 October 2025].

NIRAS Group (UK) Ltd. and RPS Energy, (2024). *Ossian Offshore Wind Farm Report to Inform Appropriate Assessment Part 3: Assessment of Special Protection Areas and Ramsar Sites*. [online] Available at: https://marine.gov.scot/sites/default/files/riaa_-_part_3_-_assessment_on_special_protection_areas_and_ramsar_sites.pdf [Accessed: 20 October 2025].

Royal HaskoningDHV, (2022). *Berwick Bank Wind Farm Report to Inform Appropriate Assessment*. [online] Available at: https://rpsnpi.blob.core.windows.net/berwick-pdfs/05.%20Report%20to%20Inform%20Appropriate%20Assessment/EOR0766_Berwick%20Bank%20Wind%20Farm%20-%20RIAA%20-%20Part%203%20-%20SPA%20Assessments.pdf/EOR0766_Berwick%20Bank%20Wind%20Farm%20-%20RIAA%20-%20Part%203%20-%20SPA%20Assessments.pdf [Accessed: 20 October 2025].

Royal Haskoning DHV (2024a). *In-combination and Cumulative Totals for Seabird Species of Key Importance to Northeast and East ScotWind Projects.* Document reference PC4885- 102-RHD-XX-XX-RP-X-0001 [Accessed: 20 October 2025].

Royal HaskoningDHV, (2024b). *North Falls Offshore Wind Farm Report to Inform Appropriate Assessment Part 4 Offshore Ornithology (Birds Directive Annex 1 and Migratory Species)*. [online] Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010119/EN010119-000345-7.1.4_RIAA%20Part%204%20Offshore%20Ornithology%20Birds%20Directive%20Annex%201%20and%20Migratory%20Species.pdf [Accessed: 20 October 2025].

Royal HaskoningDHV, (2025). *Dogger Bank D Report to Inform Appropriate Assessment.* [online] Available at: https://community.engage.stantec.com/doggerbank-staging/peir.html#/ [Accessed: 20 October 2025].

RWE Renewables, (2025). *Dogger Bank South Offshore Wind Farms Report to Inform Appropriate Assessment: Habitats Regulations Assessment, Volume 6, Part 4 of 4 – Marine Ornithological Features (Revision 5) (Clean).* [online] Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010125/EN010125-001778-6.1%20RIAA%20HRA%20Part%204%20of%204%20%E2%80%93%20Marine%20Ornithological%20Features%20(Revision%205)%20(Clean).pdf [Accessed: 20 October 2025].

Seabird Monitoring Programme, (2025). *JNCC UK Seabird Monitoring Programme.* [online] Available at: https://app.bto.org/seabirds/public/index.jsp [Accessed: 20 October 2025].

Tremlett, C.J., Morley, N., and Wilson, L.J., (2024) *UK seabird colony counts in 2023 following the 2021-22 outbreak of Highly Pathogenic Avian Influenza*. RSPB Research Report 76.

Xodus Group Ltd., (2022). *Pentland Floating Offshore Wind Farm Habitats Regulations Appraisal: Offshore Report to Inform Appropriate Assessment*. [online] Available at: https://marine.gov.scot/sites/default/files/habitat_regulation_assessment_report_redacted.pdf [Accessed: 20 October 2025].

Xodus Group Ltd., (2024a). *Cenos Offshore Windfarm Report to Inform Appropriate Assessment*. [online] Available at: https://cenosoffshorewind.com/wp-content/uploads/2025/02/CEN001-FLO-CON-ENV-RPT-0084-Cenos-Report-to-Inform-Appropriate-Assessment.pdf [Accessed: 20 October 2025].

Xodus Group Ltd., (2024b). *Culzean - Floating Offshore Wind Turbine Pilot Project HRA Report including HRA Screening and RIAA.* Available at: https://marine.gov.scot/sites/default/files/combined_hra_screening_and_riaa.pdf [Accessed: 20 October 2025].

4. Glossary and Abbreviations

4.1 Abbreviations

Acronym	Definition
AEoSI	Adverse Effect of Site Integrity
CGR	Counterfactual Growth Rate
CPS	Counterfactual Population Size
CRM	Collision Risk Modelling
DAS	Digital Aerial Survey
EIA	Environmental Impact Assessment
HDD	Horizontal directional drilling
HPAI	Highly Pathogenic Avian Influenza
LSE	Likely Significant Effect
NEEOG	Northeast and East Ornithology Group
O&M	Operation and Maintenance
OAA	Option Agreement Area
PVA	Population Viability Analysis
RSPB	Royal Society for the Protection of Birds
SD	Standard Deviation
SPA	Special Protection Area
SPR	ScottishPower Renewables
WTG	Wind Turbine Generator

4.2 Glossary of terms

Term	Definition
Adverse Effect on Site Integrity	A significant effect that is assessed as undermining a site's conservation objectives.
Appropriate Assessment	An assessment to determine the implications of a plan or project on relevant national site network sites in view of that site's conservation objectives. An Appropriate Assessment forms part of the Habitats Regulations Appraisal (HRA) and is required when a plan or project (either alone or in-combination with other plans or projects) is likely to have a

Term	Definition
	significant effect on a national site network. Where there are adverse impacts, it also includes an assessment of the potential mitigation for those impacts.
Collision	Contact between two or more bodies (e.g. vessels, animals).
Conservation Objective	An objective set for each qualifying feature of a site. One of the key purposes is to provide a benchmark against which plans and projects are assessed.
Digital Aerial Surveys	Digital surveys carried out by aeroplane.
Effect	An effect is the consequence of an impact when considered in combination with the receptor's sensitivity / value / importance, defined in terms of significance.
Environmental Impact Assessment	The process of evaluating the likely significant environmental effects of a proposed project or development over and above the existing circumstances (or 'baseline').
Environmental Impact Assessment Report	The outcome of the Environmental Impact Assessment (EIA) process is reported within a document called an EIA Report.
Export Cable Corridor	The broad linear area through seabed (seaward of Mean High Water Springs (MHWS)) and land (landward of MHWS) connecting the Project OAA offshore to the proposed substation onshore, and within which electrical export cables will be located.
Habitats Regulation Appraisal	The assessment of the impacts of implementing a plan or policy on a European Site, the purpose being to consider the impacts of a project against conservation objectives of the site and to ascertain whether it would adversely affect the integrity of the site.
Impact	The changes resulting from an action.
In-combination effects	Effects resulting from the combined impacts of the Project with other projects / plans on European Conservation Sites. These will be presented separately within HRA-related documentation.
Indirect effects and secondary effects	Those effects that are not caused immediately by the Project but arise as a consequence of it. An example would be where indirect employment is created as suppliers increase their activities and hire new workers to provide the additional goods and services required by the Project.
Likely Significant Effect (LSE)	An effect to a European site that has the potential to undermine the conservation objectives.
MarramWind Limited ('the Applicant')	MarramWind Offshore Wind Farm (hereafter referred to as 'the Project') is wholly owned by ScottishPower Renewables UK Limited (SPR). MarramWind Limited, a subsidiary of SPR, is the Applicant for the Project.
Mean (average)	The arithmetic average of a set of numbers, e.g. add up the numbers and divide by the number of numbers
Natural England	A Government advisory body responsible for protecting and enhancing England's natural environment.

Term	Definition
NatureScot	Formerly known as Scottish Natural Heritage, NatureScot is a public body and government advisor responsible for Scotland's natural heritage, in particular for its natural, genetic and scenic diversity.
Offshore	Pertaining to the seaward side of MLWS, and typically in reference to locations some distance from the coast.
Offshore Wind Farm	An offshore wind farm is a group of wind turbine generators in the same location (offshore) in the sea, which are used to produce electricity.
Option Agreement Area	Term for the wind farm site upon the seabed at a location specified in the Option Agreement between the Crown Estate Scotland and a developer. It is the agreement that allows the developer the rights to undertake such tests, survey and site investigations that do not entail the temporary or permanent installation of any works or structures on the seabed.
Project Option Agreement Area	Term for the wind farm site upon the seabed at a location specified in the Option Agreement between the Crown Estate Scotland and a developer. It is the agreement that allows the developer the rights to undertake such tests, survey and site investigations that do not entail the temporary or permanent installation of any works or structures on the seabed.
Qualifying Feature	Habitats, species or assemblages that are protected under the Habitats Regulations and are designated as SACS and SPAs.
Receptor	This term originates as defined in Regulation 5(2) of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and include population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and landscape that may be at risk from exposure to pollutants which could potentially arise as a result of the Project. It is equivalent to the term ‘factors’ defined in 4(3) of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, where factors may be subject to significant effects of the Project and include population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and the landscape.
Report to Inform Appropriate Assessment	A report submitted by an applicant for a project to provide information to enable Scottish Ministers to undertake a Habitats Regulations Appraisal (HRA).
ScottishPower Renewables UK Limited (SPR)	Part of the Iberdrola group and 100100% owner of MarramWind Limited..
The Project	MarramWind Offshore Wind Farm Project that is the subject of this RIAA, as described in Chapter 2.

MarramWind