



Cerulean Winds Aspen Project Limited

Aspen Offshore Wind Farm

Environmental Impact Assessment Report and Habitats Regulations
Appraisal Addendum

Appendix 2: Offshore Ornithology Environmental Impact Assessment
Report (EIAR) and Report to Inform Appropriate Assessment (RIAA)
Updates





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Defined Terms

Term	Definition
Addendum	The document which supplements the submitted Offshore Environmental Impact Assessment Report and Report to Inform Appropriate Assessment by providing additional environmental information and clarifications in response to the MD-LOT Request for Additional Information.
Applicant	Cerulean Winds Aspen Project Limited.
Applicant Approach	A scenario developed and applied by the Applicant for several species, in which available evidence was critically evaluated to inform a more proportionate and evidence-led assessment of potential impacts. This approach aims to maintain an appropriate level of precaution while avoiding excessive conservatism.
Apportioning	The process by which the predicted impacts of the Proposed Development are attributed to relevant colonies and Special Protection Areas. This is based on species-specific foraging areas, the colony's size, available foraging area and its distance to the array centre around the coast.
Cumulative Effects	The cumulative effect of the Proposed Development alongside the effects from a number of different projects, on the same single receptor/resource. This terminology is used for assessments contributing to the Environmental Impact Assessment.
Guidance Approach	A scenario in which assessment parameters and methodologies were applied in line with advice issued by NatureScot. This approach reflects the use of precautionary values and assumptions as recommended in published guidance or formal consultation responses.
In-combination Impacts	The combined impact of the Proposed Development in combination with the impacts from a number of different projects, on the same single receptor/resource. This terminology is used for assessments contributing to the Habitat Regulations Appraisal.
Population Viability Analysis (PVA)	PVA is used to estimate the population-level effects of predicted impacts, either alone or in-combination with impacts from other developments. Outputs are presented as the difference in population size and growth between an unimpacted 'baseline' and various impacted scenarios.
Project	Aspen Offshore Wind Farm - comprises the wind farm and all associated offshore and onshore components.



Abbreviations

Abbreviation	Definition
AEoSI	Adverse Effect on Site Integrity
BB	Berwick Bank
BTO	British Trust for Ornithology
CGR	Counterfactual of Growth Rate
CPS	Counterfactual of Population Size
DAS	Digital Aerial Survey
ECPPC	Excluding consented projects committed to compensation
EIA	Environmental Impact Assessment
HRA	Habitat Regulations Appraisal
IAC	Inter-array Cable
IND	Individual
MD-LOT	Marine Directorate – Licensing Operations Team
MHWS	Mean High Water Springs
MM	Mean Maximum
OSP	Offshore Substation Platform
OTC	Offshore Transmission Cable
OWF	Offshore Wind Farm
PVA	Population Viability Analysis
SD	Standard Deviation
SMP	Seabird Monitoring Programme
SPA	Special Protection Area
WTG	Wind Turbine Generator



1 Introduction

1.1 Project Background

- 1.1.1 Cerulean Winds Aspen Project Limited (hereafter referred to as the ‘Applicant’) is proposing to develop the Aspen Offshore Wind Farm (OWF) (hereafter ‘the Project’) located approximately 84 kilometres (km) east of Peterhead, Aberdeenshire. The Project includes both onshore and offshore components, with the offshore infrastructure associated with the Project located seaward of Mean High Water Springs (MHWS), hereafter referred to as the ‘Proposed Development’. The Proposed Development consists of the Aspen Array Area, covering an area of approximately 333 kilometres squared (km²), and the Offshore Transmission Cable Corridor (OTC Corridor) to Landfall.
- 1.1.2 The Proposed Development is located within the Aspen Lease Area which lies entirely within Scottish Territorial Waters. The offshore infrastructure of the Proposed Development includes Wind Turbine Generators (WTGs) and associated Floating Foundations, Offshore Substation Platform(s) (OSP(s)) and associated foundations, the Inter-link Cables, Inter-array Cables (IACs), Offshore Transmission Cables (OTCs) and Landfall.

1.2 Purpose of This Document

- 1.2.1 This document details the ornithological updates submitted in response to the Marine Directorate - Licensing Operations Team (MD-LOT) Request for Additional Information, based on the NatureScot representation to the consent application. The updated analyses presented herein update and, where relevant, supersede the relevant offshore ornithology assessment outputs reported in **Volume 2, Chapter 12: Offshore Ornithology** of the Offshore EIAR and within the Report to Inform Appropriate Assessment (RIAA), where applicable.
- 1.2.2 The purpose of this Appendix is to provide decision-makers with the updated assessment outputs requested by MD-LOT to inform the Environmental Impact Assessment (EIA) and Habitats Regulations Appraisal (HRA) processes. This includes revised regional population estimates for guillemot, updated apportionment of impacts to Special Protection Area (SPA) populations, and project-alone and in-combination Population Viability Analysis (PVA) modelling for relevant species and SPAs.
- 1.2.3 Where updates to the assessment have been undertaken in response to the Additional Information request, the conclusions of the Offshore EIAR and RIAA should be read with reference to the updated outputs presented in this Appendix and **Appendix 3: Population Viability Analysis (PVA) Technical Report** of this Addendum.
- 1.2.4 The updated PVA outputs presented herein have been used to inform the conclusions on Adverse Effect on Site Integrity (AEOI) within the RIAA, as updated through this Addendum. These updates do not alter the assessment methodology applied within the Offshore EIAR and RIAA unless expressly stated, but provide the additional analyses requested by MD-LOT to support completion of the Appropriate Assessment.



- 1.2.5 The document also presents the impact values used to inform in-combination PVA where this was requested. The in-combination totals have been calculated using the most up-to-date publicly available data from relevant projects at the time of writing this Addendum. This includes the data recently made available by the Caledonia, Muir Mhor, Ossian, Marram and Buchan OWFs¹.
- 1.2.6 The outputs presented herein follow the structure of the Additional Information request and should be read in that context. All analyses specifically requested by MD-LOT have been undertaken, and fully addressed, and are presented in this Appendix to the Addendum. Where the Offshore EIAR and RIAA applied assessment or apportionment approaches that differed from those subsequently requested by NatureScot, those original approaches were considered by the Applicant to be appropriately precautionary and supported by the available evidence at the time of submission. The updated analyses provided in response to the Additional Information request are presented without prejudice to that position and are intended to support completion of the EIA and HRA processes.

¹ In-combination impact values have been derived from the most recent publicly available consent applications or Additional Information submissions made to MD-LOT (or other authorities) by the following OWF projects:

- Caledonia Offshore Wind Farm - Additional Information (including updated PVA modelling), submitted January 2026 (<https://marine.gov.scot/?q=node/27218>);
- Muir Mhòr Offshore Wind Farm - Additional Information (including updated PVA modelling), submitted January 2026 (<https://marine.gov.scot/?q=node/27220>);
- Ossian Offshore Wind Farm - Additional Information (including updated PVA modelling), submitted January 2026 (<https://marine.gov.scot/?q=node/27212>);
- Marram Offshore Wind Farm - Consent Application, submitted January 2026 (<https://marine.gov.scot/?q=node/23529>);
- Buchan Offshore Wind Farm - Consent Application, submitted August 2025 (<https://marine.gov.scot/?q=node/26665>); and
- Dogger Bank D Offshore Wind Farm - Preliminary Environmental Information Report, submitted June 2025 (<https://community.engage.stantec.com/doggerbank-staging/peir.html#/>).

Where multiple submissions were available, the most recent submission available at the time of preparation of this Addendum has been used.



2 Updates to the EIAR and RIAA

2.1 Overview

- 2.1.1 The following sections present the results of re-analyses requested by MD-LOT, based on NatureScot’s representation, as part of this Addendum. In each case, the detail of the request is presented in order to provide context to the Additional Information provided herein.
- 2.1.2 In the majority of cases, the update specifies or necessitates an updated PVA. These are run for Special Protection Area (SPA) populations where an impact threshold of greater than 0.2 birds per year is met, reflecting established practice in recent offshore wind submissions and is used to ensure that very small, predicted impacts are not screened out prematurely. The key output of the PVA is the percentage of the counterfactual growth rate (CGR). The CGR expresses the modelled growth of the colony in the absence of the impact pathway arising from the Proposed Development (i.e., predicted mortality from collision risk and/or displacement effects in this instance). The PVA calculates a proportion of the CGR under the impacted scenario, thus presenting the difference in colony growth between the impacted and unimpacted scenarios. Consistent with NatureScot guidance, a proportional CGR of 0.995 or higher is generally considered unlikely to indicate Adverse Effect on Site Integrity (AEoSI). However, ultimately, conclusions regarding AEoSI will also consider population trends and other demographic factors as well the proportion of CGR.
- 2.1.3 PVA also calculates counterfactual population size (CPS) and these outputs are presented in the PVA output tables herein.

2.2 PVA Inputs

EIAR

- 2.2.1 The productivity rate and regional population inputted into the PVA model is presented in Table 2.1. The demographic rates for guillemot were obtained from Horswill and Robinson (2015). Details of the demographic rates used for the PVA model are presented in Table 2.1 of **Appendix 3: Population Viability Analysis (PVA) Technical Report** of this Addendum. Regional populations were calculated based on all the population of colonies with mean-maximum (MM) foraging range plus one standard deviation (SD) based on Woodward *et al.* (2019). Further details on the methodology to calculate the regional population is detailed below and within **Volume 3, Appendix 12.1: Offshore and Intertidal Ornithology Technical Baseline Report** of the Offshore EIAR.

Table 2.1 Summary of Input Parameters for the EIAR PVA

Species	SMP Count of Colony Breeding Adults (year)	Productivity Rate (SD)
Guillemot	274,189 (2023)	0.672 (0.147)



RIAA

- 2.2.2 Similar to the EIAR methodology, demographic rates were obtained from Horswill and Robinson (2015). The productivity rate and colony counts for each species and SPA are presented in Table 2.2 (parameters included to the updated RIAA PVA are presented in Table 2.2 of **Appendix 3: Population Viability Analysis (PVA) Technical Report** of this Addendum). The most recent population counts for each SPA were obtained from the Seabird Monitoring Programme (SMP) database (British Trust of Ornithology (BTO), 2025).
- 2.2.3 Within the RIAA, colony counts used for apportioning may differ from the colony counts used in the PVA presented herein. This is due to the guidance recommendation that for apportioning, colony counts most relevant to the dates of the DAS data should be used (in order that impacts are apportioned to the most appropriate population). For PVA, the guidance recommends the use of the most recent colony count.

Table 2.2 Summary of Input Parameters for the HRA PVA

Species	Colony	SMP Count of Colony Breeding Adults (year)	Productivity Rate (SD)
Kittiwake	Buchan Ness to Collieston Coast SPA	31,046 (2025)	0.690 (0.296)
	Troup, Pennan and Lion's Head SPA	19,706 (2023)	0.690 (0.296)
	East Caithness Cliffs SPA	36,562 (2024)	0.690 (0.296)
	North Caithness Cliffs SPA	13,918 (2024)	0.690 (0.296)
	Forth Islands SPA	16,070 (2025)	0.690 (0.296)
Great black-backed gull	Copinsay SPA	34 (2025)	1.139 (0.533)
	Hoy SPA	12 (2024)	1.139 (0.533)
	Calf of Eday	28 (2025)	1.139 (0.533)
Guillemot	Buchan Ness to Collieston Coast SPA	24,795 (2025)	0.672 (0.147)
	Troup, Pennan and Lion's Head SPA	30,663 (2023)	0.672 (0.147)
	Fowlsheugh SPA	81,054 (2023)	0.672 (0.147)
Razorbill	Troup, Pennan and Lion's Head SPA	4,812 (2023)	0.570 (0.247)
Puffin	Forth Islands SPA	117,960 (2024)	0.642 (0.135)
Gannet	Fair Isle SPA	6,860 (2025)	0.715 (0.076)
	North Rona and Sula Sgeir PSA	18,990 (2023)	0.715 (0.076)
	St Kilda SPA	118,410 (2023)	0.715 (0.076)
	Sule Skerry and Sule Stack SPA	15,648 (2024)	0.715 (0.076)



2.3 EIA - Regional Population and Cumulative Assessment for Guillemot

Additional Information Requested

- 2.3.1 NatureScot advised that the PVAs for guillemot cumulative impacts should be re-run using the extended MM foraging range approach (153.7 km). This is to ensure consistency with current methodologies being applied to far-offshore offshore wind projects and to support more comparable cumulative assessments across the wider sector.

Relevant Regional Population

- 2.3.2 The colonies and counts that comprise the relevant regional population using the extended foraging range approach (i.e., with a foraging range of 153.7 km for guillemot in the breeding season) are presented in Table 2.3.
- 2.3.3 The sum of the colony counts was multiplied by the proportion of immature birds (Furness, 2015) to obtain the number of immature birds, this was then summed with the colony counts to produce a regional breeding season guillemot population of 274,189. This total was also used as the reference population for the non-breeding season and for the annual population.

Cumulative Impacts

- 2.3.0 NatureScot requested that PVA for guillemot were to be re-run using the extended foraging range (153.7 km) (Woodward *et al.*, 2019). In order to re-run cumulative PVA, additional plans and projects within a distance 153.7 km (guillemot extended foraging range) (Woodward *et al.*, 2019) were scoped in for the breeding season.

Outputs of Updated PVA

- 2.3.1 The results of the Applicant Approach and NatureScot (Guidance) Approach to the PVA are presented in Table 2.4 and Table 2.5 for the breeding and non-breeding seasons respectively, the results of the annual PVA are presented in Table 2.6. Further details regarding the PVA run, with inputs based upon the Applicant Approach and the NatureScot (Guidance) Approach to the assessment, are presented in **Appendix 3: Population Viability Analysis (PVA) Technical Report** of this Addendum.



Table 2.3 Relevant Guillemot Colony Counts from SMP

Site	Master Site	Colony Count (IND)
Aberdour Bay	Troup, Pennan and Lion's Heads SPA	2,187
Black Slough to Burn of Daff	Burn of Daff	12
Buchan Ness to Collieston	Buchan Ness to Collieston Coast SPA	24,795
Burn of Daff to Newtonhill	Burn of Daff	335
Cove Bay	Girdle Ness to Hare Ness	168
Cove to Hare Ness	Girdle Ness to Hare Ness	54
Crovie to Collie Head	Troup, Pennan and Lion's Heads SPA	1,137
Fowlsheugh RSPB	Fowlsheugh SPA	81,054
Hare Ness to Seal's Cove	Findon Ness - Hare Ness	628
More Head-Crovie Pier (+Craigandargity skerry)	Troup, Pennan and Lion's Heads SPA	175
Muchalls	Newton Hill	3
Newtonhill - May Craig	Newtonhill - Hall Bay	311
Pennan Head	Troup, Pennan and Lion's Heads SPA	1,449
Sands of Forvie	Ythan Estuary, Sands of Forvie and Meikle Loch SPA	23
Seal's Cove to Findon Ness	Findon Ness - Hare Ness	549
Swallow Cove - Crawton	Fowlsheugh SPA	1,460
Thornyhive Bay	Fowlsheugh SPA	5,302
Tremuda/Old Hall Bay	Fowlsheugh SPA	1,650
Troup & Lion's Head RSPB (Coast & Reserve)	Troup, Pennan and Lion's Heads SPA	30,663



Table 2.4 Guillemot Breeding Season PVA Results (with a reference population of 274,189 birds)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Applicant	2.32	1.000	1.000	0.001	0.040
Guidance Low	8.35	1.000	0.999	0.004	0.117
Guidance High	13.92	1.000	0.998	0.006	0.214
Cumulative					
Applicant	1,251.01	0.995	0.831	0.514	16.913
Guidance Low	4,503.65	0.982	0.511	1.848	48.897
Guidance High	7,506.08	0.969	0.324	3.080	67.577

Table 2.5 Guillemot Non-breeding Season PVA Results (with a reference population of 274,189 birds)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Applicant	25.20	1.000	0.996	0.010	0.371
Guidance Low	30.24	1.000	0.996	0.013	0.447
Guidance High	90.71	1.000	0.987	0.037	1.327
Cumulative					
Applicant	1,109.74	0.995	0.849	0.455	15.147
Guidance Low	1,331.69	0.995	0.821	0.546	17.893
Guidance High	3,995.08	0.984	0.552	1.640	44.844



Table 2.6 Guillemot Annual Total PVA Results (with a reference population of 274,189 birds)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Applicant	27.52	1.000	0.996	0.011	0.402
Guidance Low	38.59	1.000	0.994	0.016	0.563
Guidance High	104.63	1.000	0.985	0.043	1.534
Cumulative					
Applicant	2,360.76	0.990	0.704	0.969	29.553
Guidance Low	5,835.34	0.976	0.418	2.394	58.201
Guidance High	11,501.16	0.953	0.175	4.719	82.453



2.4 RIAA - Project-alone Assessment for Guillemot

Additional Information Requested

- 2.4.1 NatureScot required the use of the Fair Isle extended foraging range approach to inform both apportionment and the PVAs for guillemot. NatureScot also requested updated project-alone PVAs for Buchan Ness to Collieston Coast SPA, Fowlsheugh SPA, and Troup, Pennan and Lion's Head SPA to ensure consistency with the preferred assessment methodology.

Outputs of Updated Apportioning

- 2.4.2 Further details regarding the Applicant Approach to Apportioning are presented in **Volume 3, Appendix 12.7: Offshore Ornithology Apportionment Report** of the Offshore EIAR. Results from the NatureScot (Guidance) Approach to apportioning are presented in Table 2.7 and Table 2.8 for colonies and SPAs respectively (Applicant Approach also included for SPAs in Table 2.8). Where possible, colony counts in 2023 and 2024 were selected for apportioning over the most recent count due to their relevance in date to the digital aerial survey (DAS) period. In cases where counts are available for both DAS years the mean was taken. Therefore, it is noted that colony counts used for apportioning may differ from those used in PVA.
- 2.4.3 The Ythan Estuary, Sands of Forvie and Meikle Loch SPA is not designated for guillemot and, as such, does not have a citation count for the species.
- 2.4.4 The proportional weight of the three SPAs to which impacts have been apportioned are as follows:
- Troup, Pennan and Lion's Heads SPA – 0.255
 - Buchan Ness to Collieston Coast SPA – 0.252
 - Fowlsheugh SPA – 0.481

Outputs of Updated PVA

- 2.4.5 The results of the NatureScot (Guidance) Approach to the PVA are presented in Table 2.20 for project-alone impacts to guillemot at the Buchan Ness to Collieston Coast SPA, in Table 2.21 for project-alone impacts to guillemot at the Troup, Pennan and Lion's Heads SPA and in Table 2.22 for project-alone impacts to guillemot at the Fowlsheugh SPA.



Table 2.7 Breeding Season Apportioned Weight of Colonies

Site	Master Site	Count (Individuals)	At Sea Foraging Area (%)	Distance to Site Array Centre and Coast (km)	Proportional Weight of Colonies
Aberdour Bay	Troup, Pennan and Lion's Heads SPA	2,187	61.59	121	0.016
Black Slough to Burn of Daff	Burn of Daff	12	58.86	139.1	0
Buchan Ness to Collieston	Buchan Ness to Collieston Coast SPA	30,420	71.09	106.8	0.252
Burn of Daff to Newtonhill	Burn of Daff	335	58.08	140.9	0.002
Cove Bay	Girdle Ness to Hare Ness	168	61.18	133.2	0.001
Cove to Hare Ness	Girdle Ness to Hare Ness	54	60.72	134.2	0
Crovie to Collie Head	Troup, Pennan and Lion's Heads SPA	1,137	58.79	127.4	0.008
Fowlsheugh RSPB	Fowlsheugh SPA	81,054	54.45	151.7	0.435
Hare Ness to Seal's Cove	Findon Ness - Hare Ness	628	60.29	135.4	0.004
More Head-Crovie Pier (+Craigandargity skerry)	Troup, Pennan and Lion's Heads SPA	175	57.72	128.8	0.001
Muchalls	Newton Hill	3	57.04	143.4	0
Newtonhill - May Craig	Newtonhill - Hall Bay	311	57.68	141.9	0.002
Pennan Head	Troup, Pennan and Lion's Heads SPA	1,449	60.97	122.6	0.011
Sands of Forvie	Ythan Estuary, Sands of Forvie and Meikle Loch SPA	23	67.92	113.6	0
Seal's Cove to Findon Ness	Findon Ness - Hare Ness	549	59.94	136.4	0.003
Swallow Cove - Crawton	Fowlsheugh SPA	1,460	54.05	152.9	0.008
Thornyhive Bay	Fowlsheugh SPA	5,302	54.65	150.8	0.029
Tremuda/Old Hall Bay	Fowlsheugh SPA	1,650	54.75	150.4	0.009
Troup & Lion's Head RSPB (Coast & Reserve)	Troup, Pennan and Lion's Heads SPA	30,663	59.88	125.2	0.219



Table 2.8. Impacts Apportioned to Relevant Sites

SPA	Apportioned Adults	Population Count	Estimated Mortalities		% Decrease in Adult Survival Rate (citation count)		% Decrease in Adult Survival Rate (recent count)	
			Applicant Approach	Guidance Low – Guidance High	Applicant Approach	Guidance Low – Guidance High	Applicant Approach	Guidance Low – Guidance High
Fowlsheugh SPA	127	81,054	0.63	2.28 - 3.81	0.001	0.004 - 0.007	0.001	0.003 - 0.005
Troup, Pennan and Lion's Heads SPA	68	30,663	0.34	1.22 - 2.03	0.001	0.003 - 0.005	0.001	0.004 - 0.007
Buchan Ness to Collieston Coast SPA	67	30,420	0.33	1.20 - 2.00	0.002	0.007 - 0.012	0.001	0.005 - 0.008



2.5 RIAA - Great black-backed gull

Additional Information Requested

- 2.5.1 NatureScot has requested that PVAs be undertaken for project-alone impacts on great black-backed gull at Calf of Eday SPA and Hoy SPA, as well as PVAs for the in-combination impacts on these same SPAs.

Outputs of Updated PVA

- 2.5.2 The results of the PVA using the NatureScot (Guidance) Approach to the assessment are presented in Table 2.9. In-combination outputs are presented in Table 2.17, Table 2.18 and Table 2.19 for Hoy, Copinsay and Calf of Eday SPAs, respectively.



Table 2.9 Great Black-backed Gull Project-alone PVA Results for Hoy, Copinsay and Calf of Eday SPAs

SPA	Population (Individuals)	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone						
Hoy	12	0.00	0.999792	0.993821	0.021	0.618
Copinsay	34	0.00	0.999715	0.998402	0.028	0.160
Calf of Eday	28	0.00	0.999971	0.998927	0.003	0.107



2.6 RIAA - In-combination AEoSI Assessments

In-combination Impact Values

- 2.6.1 Following guidance from MD-LOT, the Applicant has based its in-combination impact values on the most recent figures submitted to MD-LOT in January 2026 by the Muir Mhòr, Ossian and Caledonia OWF projects (presented within the ‘all other impacts’ column in Table 2.10). To ensure the in-combination assessments reflect the most up-to-date predicted impacts, values released by the Marram, Buchan and Dogger Bank D OWF projects were also added to these totals alongside the Applicant’s own predicted impacts derived from the NatureScot (Guidance) approach to assessment.
- 2.6.2 The in-combination impacts are presented in Table 2.10 with scenarios for:
- **All projects** – This scenario includes the total combined impact of all planned and consented projects with publicly available impact values. It incorporates the Proposed Development as well as all other projects that are already consented and have committed to delivering seabird compensation measures.
 - **All projects excluding consented projects committed to compensation (ECPCC)** – This scenario removes any projects that were consented on the basis that their seabird impacts would be fully compensated for the particular species of the relevant SPA. This approach aligns with the additional information requests issued for the Caledonia, Ossian, and Muir Mhor OWFs. While not specifically requested by MD-LOT for the Proposed Development, this scenario has been included to provide a transparent and precautionary comparison across cumulative assumptions.
 - **All projects without Berwick Bank (BB)** – This scenario was specifically requested by NatureScot. It shows the total in-combination impacts with Berwick Bank OWF removed.
- 2.6.3 Across all species and SPAs, the ECPCC scenario can show either higher or lower impacts than the ‘All projects without Berwick Bank’ scenario because each scenario removes different projects, and those projects contribute different levels of impact depending on the species and site. As a result, the relative reduction in impact is not consistent between the two scenarios.
- 2.6.4 Impact values and percent changes in adult survival are presented to reflect the low and high impact scenarios proposed by NatureScot (Guidance Low – Guidance High).



Table 2.10 Annual In-combination Impacts to SPAs From Displacement and Collision Mortality

Species	SPA	Breeding Population (adults)	All Projects							All Projects Excluding Those Committed to Compensation (ECPC)		
			Aspen Impact	Marram Impact	Buchan Impact	Dogger Bank D Impact	All Other Impacts	Total Impact	% Reduction in Adult Survival	All Other Impacts	Total Impact	% Reduction in Adult Survival
Guillemot	Buchan Ness to Collieston Coast	24,795	5.54 - 15.03	78.96 - 141.15	5.72 - 17.16	-	243.53 - 518.73	333.74 - 692.07	0.013460 - 0.027912	243.53 - 518.73	333.74 - 692.07	0.013460 - 0.027912
Guillemot	Fowlsheugh	81,054	10.56 - 28.62	-	-	-	575.09 - 1000.36	585.65 - 1028.98	0.007225 - 0.012695	575.09 - 1000.36	585.65 - 1028.98	0.007225 - 0.012695
Guillemot	Troup, Pennan and Lion's Heads	30,663	5.62 - 15.24	67.85 - 121.31	8.46 - 25.37	-	155.87 - 334.10	237.80 - 496.02	0.007755 - 0.016176	129.54 - 273.48	211.47 - 435.40	0.006897 - 0.014199
Razorbill	Troup, Pennan and Lion's Heads	4,812	0.38 - 0.64	1.38 - 2.35	0.91 - 0.92	-	12.79 - 27.83	15.45 - 31.74	0.003212 - 0.006597	10.46 - 23.07	13.13 - 26.98	0.002728 - 0.005608
Puffin	Forth Islands	117,960	2.05 - 3.66	4.14 - 7.01	1.99 - 3.32	0.04 - 0.12	238.85 - 478.68	247.07 - 492.78	0.002095 - 0.004178	197.81 - 385.61	206.03 - 399.71	0.001747 - 0.003389
Great Black-backed Gull	Calf of Eday	28	0.00	0.01	-	-	0.08	0.10	0.003413	0.08	0.10	0.003413
Great Black-	Copinsay	34	0.00	0.04	-	-	0.14	0.18	0.005311	0.14	0.18	0.005311



Species	SPA	Breeding Population (adults)	All Projects							All Projects Excluding Those Committed to Compensation (ECPCC)		
			Aspen Impact	Marram Impact	Buchan Impact	Dogger Bank D Impact	All Other Impacts	Total Impact	% Reduction in Adult Survival	All Other Impacts	Total Impact	% Reduction in Adult Survival
backed Gull												
Great Black-backed Gull	Hoy	12	0.00	0.00	-	-	0.12	0.12	0.010286	0.12	0.12	0.010286
Kittiwake	Buchan Ness to Collieston Coast	31,406	1.18 - 1.31	3.34 - 3.99	1.28 - 1.29	0.00 - 0.00	89.10 - 126.97	94.90 - 133.56	0.003022 - 0.004253	27.18 - 35.37	32.98 - 41.96	0.001050 - 0.001336
Kittiwake	East Caithness Cliffs	36,562	0.72 - 0.82	4.81 - 5.65	2.75 - 2.92	1.06 - 1.06	274.31 - 416.93	283.65 - 427.39	0.007758 - 0.011689	115.51 - 187.85	124.85 - 198.31	0.003415 - 0.005424
Kittiwake	Forth Islands	16,070	0.21 - 0.24	0.48 - 0.57	0.42 - 0.43	0.00 - 0.00	59.22 - 83.65	60.33 - 84.89	0.003754 - 0.005282	21.66 - 34.38	22.77 - 35.62	0.001417 - 0.002216
Kittiwake	Fowlsheugh	30,966	1.03 - 1.14	2.25 - 2.68	2.37 - 2.41	4.56 - 4.56	186.08 - 252.53	196.29 - 263.32	0.006339 - 0.008504	66.92 - 96.98	77.13 - 107.77	0.002491 - 0.003480
Kittiwake	North Caithness Cliffs	13,918	0.44 - 0.50	0.80 - 0.93	3.42 - 3.47	0.00 - 0.00	54.27 - 75.83	58.94 - 80.72	0.004235 - 0.005800	12.49 - 15.73	17.16 - 20.63	0.001233 - 0.001482
Kittiwake	Troup, Pennan and Lion's Heads	19,706	0.37 - 0.41	3.30 - 3.93	2.55 - 2.62	0.00 - 0.00	84.80 - 125.35	91.01 - 132.31	0.004618 - 0.006714	22.56 - 34.98	28.78 - 41.93	0.001460 - 0.002128



Species	SPA	Breeding Population (adults)	All Projects							All Projects Excluding Those Committed to Compensation (ECPCC)		
			Aspen Impact	Marram Impact	Buchan Impact	Dogger Bank D Impact	All Other Impacts	Total Impact	% Reduction in Adult Survival	All Other Impacts	Total Impact	% Reduction in Adult Survival
Gannet	Fair Isle	6,860	0.40 - 0.60	1.49 - 1.84	0.34 - 0.64	0.00 - 0.00	6.77 - 13.87	9.00 - 16.94	0.001312 - 0.002470	6.63 - 13.51	8.86 - 16.58	0.001292 - 0.002417
Gannet	North Rona and Sula Sgeir	18,990	0.18 - 0.24	0.82 - 1.00	0.12 - 0.21	0.00 - 0.00	3.19 - 6.65	4.30 - 8.10	0.000226 - 0.000427	3.19 - 6.65	4.30 - 8.10	0.000226 - 0.000427
Gannet	St Kilda	118,410	0.65 - 0.89	-	-	-	2.60 - 4.72	3.24 - 5.61	0.000027 - 0.000047	2.60 - 4.72	3.24 - 5.61	0.000027 - 0.000047
Gannet	Sule Skerry and Sule Stack	15,648	0.25 - 0.33	1.09 - 1.32	0.23 - 0.42	0.00 - 0.00	25.01 - 34.58	26.59 - 36.66	0.001699 - 0.002343	25.01 - 34.58	26.59 - 36.66	0.001699 - 0.002343



Additional Information Requested

2.6.5 NatureScot noted that it currently does not have sufficient information to fully assess the potential for AEoSI arising from in-combination impacts across several species and SPAs. To address this, NatureScot required in-combination PVAs for the following:

- Puffin - Forth Islands SPA;
- Guillemot - Fowlsheugh SPA; Troup, Pennan and Lion's Head SPA;
- Great black-backed gull - Calf of Eday SPA; Copinsay SPA; Hoy SPA;
- Gannet - Fair Isle SPA; North Rona and Sula Sgeir SPA; St Kilda SPA; Sule Skerry and Sule Stack SPA;
- Kittiwake - East Caithness Cliffs SPA; Forth Islands SPA; North Caithness Cliffs SPA; Troup, Pennan and Lion's Head SPA;
- Razorbill - Troup, Pennan and Lion's Head SPA; and
- Any species/site combinations where the Applicant predicts impacts between 0.2 and 1.0 birds per annum.

2.6.6 In response to this request, the Applicant has presented in-combination PVAs (including a 'without Berwick Bank' scenario) for the annual in-combination totals for the species and SPA's listed above.

2.6.7 In response to MD-LOT's request, based on NatureScot's representation to the consent application, cumulative and in-combination assessments have been undertaken incorporating a specific 'without Berwick Bank' scenario. This scenario has been provided throughout alongside two other cumulative and in-combination scenarios, including the 'all projects' and 'ECPC' scenarios, to enable stakeholders to understand the contribution of the Proposed Development's impacts with different cumulative contexts.



Buchan Ness to Collieston Coast SPA

Table 2.11 Kittiwake PVA Results Buchan Ness to Collieston Coast SPA (reference population = 31,046)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	1.18	0.999953	0.998502	0.005	0.150
Guidance High Approach	1.31	0.999951	0.997984	0.005	0.202
In-combination					
Guidance Low Approach - All Projects	94.90	0.996415	0.878636	0.358	12.136
Guidance High Approach - All Projects	133.56	0.994966	0.833962	0.503	16.604
Guidance Low Approach - ECPCC	32.98	0.998758	0.956208	0.124	4.379
Guidance High Approach - ECPCC	41.96	0.998431	0.944863	0.157	5.514
Guidance Low Approach - Without BB	82.29	0.996872	0.893422	0.313	10.658
Guidance High Approach - Without BB	116.46	0.995612	0.853784	0.439	14.622



Troup, Pennan and Lion's Heads SPA

Table 2.12 Kittiwake PVA Results Troup, Pennan and Lion's Heads SPA (reference population = 19,706)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	0.37	0.999995	1.000330	0.001	-0.033
Guidance High Approach	0.41	0.999977	0.999424	0.002	0.058
In-combination					
Guidance Low Approach - All Projects	91.01	0.994555	0.821593	0.545	17.841
Guidance High Approach - All Projects	132.31	0.992088	0.751301	0.791	24.870
Guidance Low Approach - ECPCC	28.78	0.998286	0.940305	0.171	5.970
Guidance High Approach - ECPCC	41.93	0.997493	0.914179	0.251	8.582
Guidance Low Approach - Without BB	80.21	0.995194	0.840906	0.481	15.909
Guidance High Approach - Without BB	117.22	0.992984	0.776171	0.702	22.383



Table 2.13 Kittiwake PVA Results for East Caithness Cliffs SPA (reference population = 36,562)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	0.72	0.999975	0.999171	0.003	0.083
Guidance High Approach	0.82	0.999959	0.998622	0.004	0.138
In-combination					
Guidance Low Approach - All Projects	283.65	0.990848	0.717942	0.915	28.206
Guidance High Approach - All Projects	427.39	0.986193	0.606425	1.381	39.358
Guidance Low Approach - ECPCC	124.85	0.995955	0.864227	0.404	13.577
Guidance High Approach - ECPCC	198.31	0.993583	0.793027	0.642	20.697
Guidance Low Approach - Without BB	259.95	0.991603	0.737934	0.840	26.207
Guidance High Approach - Without BB	393.29	0.987300	0.631173	1.270	36.883



Table 2.14 Kittiwake PVA Results for Fowlsheugh SPA (reference population = 30,966)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	1.03	0.999949	0.998248	0.005	0.175
Guidance High Approach	1.14	0.999943	0.998136	0.006	0.186
In-combination					
Guidance Low Approach - All Projects	196.29	0.992500	0.762421	0.750	23.758
Guidance High Approach - All Projects	263.32	0.989945	0.694743	1.006	30.526
Guidance Low Approach - ECPCC	77.13	0.997062	0.899464	0.294	10.054
Guidance High Approach - ECPCC	107.77	0.995885	0.861927	0.411	13.807
Guidance Low Approach - Without BB	114.06	0.995634	0.854312	0.437	14.569
Guidance High Approach - Without BB	159.72	0.993899	0.802294	0.610	19.771



Table 2.15 Kittiwake PVA Results for North Caithness Cliffs SPA (reference population = 13,918)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	0.44	0.999965	0.999066	0.004	0.093
Guidance High Approach	0.50	0.999948	0.998588	0.005	0.141
In-combination					
Guidance Low Approach - All Projects	58.94	0.994970	0.834245	0.503	16.576
Guidance High Approach - All Projects	80.72	0.993108	0.779676	0.689	22.032
Guidance Low Approach - ECPCC	17.16	0.998535	0.949065	0.147	5.094
Guidance High Approach - ECPCC	20.63	0.998255	0.938823	0.175	6.118
Guidance Low Approach - Without BB	53.10	0.995499	0.849927	0.450	15.007
Guidance High Approach - Without BB	72.28	0.993860	0.801557	0.614	19.844



Table 2.16 Kittiwake PVA Results for Forth Islands SPA (reference population = 16,070)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	0.21	0.999995	0.999770	0.001	0.023
Guidance High Approach	0.24	0.999967	0.999404	0.003	0.060
In-combination					
Guidance Low Approach - All Projects	60.33	0.995547	0.851919	0.445	14.808
Guidance High Approach - All Projects	84.89	0.993731	0.797759	0.627	20.224
Guidance Low Approach - ECPCC	22.77	0.998344	0.942250	0.166	5.775
Guidance High Approach - ECPCC	35.62	0.997362	0.909707	0.264	9.029
Guidance Low Approach - Without BB	33.07	0.997554	0.915153	0.245	8.485
Guidance High Approach - Without BB	50.53	0.996272	0.874312	0.373	12.569



Great black-backed gull

Hoy SPA

Table 2.17 Great Black-backed Gull PVA Results for Hoy SPA (reference population = 12)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
In-combination					
All Projects	0.12	0.987672	0.644068	1.233	35.593
All Projects - ECPCC	0.12	0.987774	0.650350	1.223	34.965
All Projects - Without BB	0.12	0.987527	0.644970	1.247	35.503

Copinsay SPA

Table 2.18 Great Black-backed Gull PVA Results for Copinsay SPA (reference population = 34)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
In-combination					
All Projects	0.18	0.993703	0.796365	0.630	20.364
All Projects - ECPCC	0.18	0.993806	0.800000	0.619	20.000
All Projects - Without BB	0.18	0.993639	0.793284	0.636	20.672



Table 2.19. Great Black-backed Gull PVA Results for Calf of Eday SPA (reference population = 28)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
In-combination					
All Projects	0.10	0.996055	0.865428	0.394	13.457
All Projects - ECPC	0.10	0.996008	0.872767	0.399	12.723
All Projects - Without BB	0.10	0.995917	0.866810	0.408	13.319



Buchan Ness to Collieston Coast SPA

Table 2.20 Guillemot PVA Results for Buchan Ness to Collieston Coast SPA (reference population = 24,795)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	5.62	0.999741	0.990795	0.026	0.921
Guidance High Approach	15.24	0.999301	0.975281	0.070	2.472
In-combination					
Guidance Low Approach - All Projects	333.74	0.984933	0.578915	1.507	42.109
Guidance High Approach - All Projects	692.07	0.968751	0.318948	3.125	68.105
Guidance Low Approach - ECPC	333.74	0.984925	0.578934	1.507	42.107
Guidance High Approach - ECPC	692.07	0.968769	0.319197	3.123	68.080
Guidance Low Approach - Without BB	324.14	0.985365	0.588173	1.464	41.183
Guidance High Approach - Without BB	670.60	0.969757	0.330968	3.024	66.903



Troup, Pennan and Lion's Heads SPA

Table 2.21 Guillemot PVA Results for Troup, Pennan and Lion's Heads SPA (reference population = 30,663)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	5.62	0.999784	0.992137	0.022	0.786
Guidance High Approach	15.24	0.999445	0.980310	0.055	1.969
In-combination					
Guidance Low Approach - All Projects	237.80	0.991325	0.730769	0.867	26.923
Guidance High Approach - All Projects	496.02	0.981916	0.518459	1.808	48.154
Guidance Low Approach - ECPCC	211.47	0.992282	0.756769	0.772	24.323
Guidance High Approach - ECPCC	435.40	0.984123	0.562100	1.588	43.790
Guidance Low Approach - Without BB	232.60	0.991513	0.735917	0.849	26.408
Guidance High Approach - Without BB	424.20	0.984526	0.570319	1.547	42.968



Table 2.22 Guillemot PVA Results for Fowlsheugh SPA (reference population = 81,054)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	10.55	0.999859	0.994870	0.014	0.513
Guidance High Approach	28.62	0.999602	0.986030	0.040	1.397
In-combination					
Guidance Low Approach - All Projects	585.65	0.991912	0.746653	0.809	25.335
Guidance High Approach - All Projects	1,028.98	0.985798	0.597539	1.420	40.246
Guidance Low Approach - ECPCC	585.65	0.991922	0.746784	0.808	25.322
Guidance High Approach - ECPCC	1,028.98	0.985803	0.597634	1.420	40.237
Guidance Low Approach - Without BB	325.75	0.995510	0.850521	0.449	14.948
Guidance High Approach - Without BB	555.68	0.992337	0.758133	0.766	24.187



Troup, Pennan and Lion's Heads SPA

Table 2.23 Razorbill PVA Results for Troup, Pennan and Lion's Heads SPA (reference population = 4,812)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	0.38	0.999862	0.994783	0.014	0.522
Guidance High Approach	0.64	0.999857	0.994706	0.014	0.529
In-combination					
Guidance Low Approach - All Projects	15.45	0.996241	0.873293	0.376	12.671
Guidance High Approach - All Projects	31.74	0.992286	0.757302	0.771	24.270
Guidance Low Approach - ECPCC	13.13	0.996797	0.891496	0.320	10.850
Guidance High Approach - ECPCC	26.98	0.993416	0.787870	0.658	21.213
Guidance Low Approach - Without BB	11.70	0.997165	0.903023	0.284	9.698
Guidance High Approach - Without BB	23.77	0.994195	0.811010	0.580	18.899



Table 2.24 Puffin PVA Result for Forth Islands (reference population = 117,960)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	2.05	0.999975	0.999103	0.003	0.090
Guidance High Approach	3.66	0.999959	0.998509	0.004	0.149
In-combination					
Guidance Low Approach - All Projects	247.07	0.997512	0.914388	0.249	8.561
Guidance High Approach - All Projects	492.78	0.995074	0.837060	0.493	16.294
Guidance Low Approach - ECPCC	206.03	0.997935	0.928289	0.206	7.171
Guidance High Approach - ECPCC	399.71	0.996005	0.865788	0.399	13.421
Guidance Low Approach - Without BB	191.72	0.998083	0.933240	0.192	6.676
Guidance High Approach - Without BB	326.57	0.996732	0.888819	0.327	11.118



Fair Isle SPA

Table 2.25 Gannet PVA Results for Fair Isle SPA (reference population = 6,860)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	0.40	0.999940	0.997207	0.006	0.279
Guidance High Approach	0.60	0.999911	0.996711	0.009	0.329
In-combination					
Guidance Low Approach - All Projects	9.00	0.998458	0.945811	0.154	5.419
Guidance High Approach - All Projects	16.94	0.997095	0.900864	0.291	9.914
Guidance Low Approach - ECPC	8.86	0.998461	0.946203	0.154	5.380
Guidance High Approach - ECPC	16.58	0.997151	0.902152	0.285	9.785
Guidance Low Approach - Without BB	8.64	0.998511	0.947641	0.149	5.236
Guidance High Approach - Without BB	16.38	0.997195	0.903449	0.280	9.655



Sule Skerry and Sule Stack SPA

Table 2.26 Gannet PVA Results for Sule Skerry and Sule Stack SPA (reference population = 15,648)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	0.25	0.999973	0.999236	0.003	0.076
Guidance High Approach	0.33	0.999966	0.998411	0.003	0.159
In-combination					
Guidance Low Approach - All Projects	26.59	0.997978	0.929489	0.202	7.051
Guidance High Approach - All Projects	36.66	0.997239	0.905278	0.276	9.472
Guidance Low Approach - ECPC	26.59	0.997990	0.930270	0.201	6.973
Guidance High Approach - ECPC	36.66	0.997237	0.905604	0.276	9.440
Guidance Low Approach - Without BB	26.11	0.998044	0.931422	0.196	6.858
Guidance High Approach - Without BB	35.98	0.997285	0.907250	0.272	9.275



Table 2.27 Gannet PVA Results for North Rona and Sula Sgeir SPA (reference population = 18,990)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	0.18	0.999961	0.998700	0.004	0.130
Guidance High Approach	0.24	0.999987	0.999842	0.001	0.016
In-combination					
Guidance Low Approach - All Projects	4.30	0.999734	0.990597	0.027	0.940
Guidance High Approach - All Projects	8.10	0.999502	0.982377	0.050	1.762
Guidance Low Approach - ECPC	4.30	0.999721	0.990290	0.028	0.971
Guidance High Approach - ECPC	8.10	0.999488	0.981807	0.051	1.819
Guidance Low Approach - Without BB	4.18	0.999744	0.990288	0.026	0.971
Guidance High Approach - Without BB	7.78	0.999496	0.982504	0.050	1.750



Table 2.28 Gannet PVA Results for St Kilda SPA (reference population = 118,410)

Scenario	Estimated Mortalities	CGR	CPS	Difference in CGR (%)	Difference in CPS (%)
Project Alone					
Guidance Low Approach	0.65	0.999994	0.999561	0.001	0.044
Guidance High Approach	0.89	0.999987	0.999628	0.001	0.037
In-combination					
Guidance Low Approach - All Projects	3.24	0.999970	0.998779	0.003	0.122
Guidance High Approach - All Projects	5.61	0.999950	0.998189	0.005	0.181
Guidance Low Approach - ECPC	3.24	0.999970	0.998787	0.003	0.121
Guidance High Approach - ECPC	5.61	0.999946	0.998114	0.005	0.189
Guidance Low Approach - Without BB	3.24	0.999963	0.998580	0.004	0.142
Guidance High Approach - Without BB	5.61	0.999946	0.997928	0.005	0.207



3 Summary and Status of Update Assessment

- 3.1.1 This Appendix presents the additional analyses requested by MD-LOT, based on NatureScot's representation, including updated regional population estimates for guillemot, revised SPA apportionment approaches, and project-alone and in-combination PVA modelling for relevant species and SPAs.
- 3.1.2 The updated assessments supersede the relevant offshore ornithology outputs reported in **Volume 2, Chapter 12: Offshore Ornithology** of the Offshore EIAR and within the RIAA, where applicable. The updated PVA outputs have been used to inform the conclusions on AEoSI presented in the RIAA as updated through this Addendum.
- 3.1.3 Where re-analysis has been undertaken, the conclusions of the Offshore EIAR and RIAA should be read with reference to the updated outputs presented in this Appendix and in **Appendix 3: Population Viability Analysis (PVA) Technical Report** of this Addendum.
- 3.1.4 The additional information provided herein fully addresses the requests made by MD-LOT in relation to offshore ornithology. The updated assessments provide the information necessary to support completion of the EIA and Appropriate Assessment under the Habitats Regulations.



4 References

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