CALEDONIA
Offshore Wind Farm

Code: UKCAL-CWF-CON-EIA-RPT-00008-1029

Volume 8 Additional Information

Appendix 29: Addendum to the Caledonia North and Caledonia South Compensation Plans

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Code	UKCAL-CWF-CON-EIA-RPT-00008-1029
Revision	Issued
Date	30 September 2025

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Acronyms and Abbreviations

AEoI	Adverse Effect on Integrity
AOB	Apparently Occupied Burrow
AON	Apparently Occupied Nest
BMP	Bycatch Monitoring Programme
CCTV	Closed-Circuit Television
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ICES	International Council for the Exploration of the Sea
IMP	Implementation and Monitoring Plan
LED	Light Emitting Diode
MRF	Marine Recovery Fund
NEEOG	North-East and East Ornithology Group
NGO	Non-Governmental Organisation
NTS	National Trust for Scotland
OWF	Offshore Wind Farm
PVA	Population Viability Analysis
RIAA	Report to Inform Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
SMEEF	Scottish Marine Environmental Enhancement Fund
SPA	Special Protection Area

1 Introduction

1.1 Project Background

1.1.1.1 This appendix provides an addendum to the Compensation Plan and Site Selection for the Caledonia Offshore Wind Farm (OWF), located in the Moray Firth, Scotland (Application Document 15, Appendix 15-3: Caledonia North Compensation Plan and Site Selection and Application Document 16, Appendix 16-3: Caledonia South Compensation Plan and Site Selection).

1.1.1.2 The Proposed Development (Offshore) will be developed in two phases (see Volume 1, Chapter 5: Proposed Development Phasing of the Environmental Impact Assessment Report (EIAR)). The Array Areas of the two phases are referred to as the Caledonia North Site and the Caledonia South Site, with the combined Array Areas referred to as the Caledonia OWF. The two consent applications for each of the phases are referred to as Caledonia North and Caledonia South. This appendix supports the Caledonia North and Caledonia South Derogation Cases (Application Document 15: Caledonia North Habitats Regulations Appraisal Derogation Case and Application Document 16: Caledonia South Habitats Regulations Appraisal Derogation Case).

1.1.1.3 It is assumed that construction of the two application areas could be progressed in either order (e.g., Caledonia North constructed in the first phase, then Caledonia South in the second phase, or vice-versa) or at the same time. This has been assessed within a single Report to Inform Appropriate Assessment (RIAA) covering Caledonia North and Caledonia South in isolation, as well as the Proposed Development (Offshore) (i.e., Caledonia North and Caledonia South combined) (Application Document 13: Caledonia North Report to Inform Appropriate Assessment and Application Document 14: Caledonia South Report to Inform Appropriate Assessment). Updated assessments were subsequently provided in Volume 8, Appendices 4, 5 and 6 (Ornithology Additional Information Reports for Caledonia OWF, Caledonia North and Caledonia South, respectively)

1.2 Compensation Development to Date

1.2.1.1 This addendum should be considered alongside a wider suite of documents submitted at the point of consent application, which support the derogation cases for Caledonia North and Caledonia South. Together, these documents provide the evidence, and an outline implementation plan for the delivery of compensation:

- Application Document 15: Caledonia North Derogation Case and Application Document 16: Caledonia South Derogation Case. These documents set out the evidence required by the Scottish Ministers to conclude that Caledonia North and Caledonia South pass the tests set

out within the Habitats Regulations Appraisal derogation provisions and can therefore be granted consent.

- Application Document 15, Appendix 15-2: Caledonia North Compensation Longlist and Shortlist and Application Document 16, Appendix 16-2: Caledonia South Compensation Longlist and Shortlist. These documents set out and discuss the following:
  - For each at-risk species, an ecological description and information on pressures facing the species, the nature, extent and potential impacts of adverse effects; and
  - A long list and short list of compensation measures, with methodology provided and feasibility and sufficiency of compensation options discussed.
- Application Document 15, Appendix 15-3: Caledonia North Compensation Plan and Site Selection and Application Document 16, Appendix 16-3: Caledonia South Compensation Plan and Site Selection. These documents set out the following:
  - The predicted impacts (as set out in Application Document 13: Caledonia North Report to Inform Appropriate Assessment and Application Document 14: Caledonia South Report to Inform Appropriate Assessment); and
  - An overview of the shortlisted compensation measures, including ecological effectiveness, wider ecological considerations, timing of delivery, monitoring requirements, adaptive management requirements and feasibility.
- Application Document 15, Appendix 15-4: Caledonia North Outline Implementation and Monitoring Plan and Application Document 16, Appendix 16-4: Caledonia South Outline Implementation and Monitoring Plan. These documents set out the following
  - An outline for the Implementation and Monitoring Plan (IMP) for the shortlisted compensation measures including the consultation process and potential stakeholders.
  - The contents of the IMP for each shortlisted measures regarding the scale and location; design of measure; management/maintenance (where applicable); delivery mechanisms; implementation timeline; monitoring; adaptive management; and reporting.

1.2.1.2 A Refined Outline IMP (Volume 8, Appendix 30) has been produced alongside this appendix, providing further detail on the implementation and monitoring of the measures as developed since the consent applications were submitted in November 2024. The Refined Outline IMP also provides proposed indicative roadmaps for measure refinement, monitoring and implementation.

1.3 Document Purpose and Structure

1.3.1.1 In post-application consultation (04 June 2025) NatureScot requested that any updates to the compensation materials are provided as standalone documents clearly capturing additional information and key updates, rather than providing revised versions of the compensation documents submitted at the consent application (i.e., November 2024). This appendix serves as this standalone document providing key information and updates on the proposed compensation measures. Where additional information relates to the implementation and monitoring of the measure, this is provided in the Refined Outline IMP (Appendix 30), which should be read alongside this document.

1.3.1.2 For additional clarity, in instances where information in a section of this appendix addresses, or relates to, specific questions or advice raised by a consultee in their representations, this is described in the style displayed in the example below:

Example

In its representations, NatureScot advised [*description of advice provided…]*

1.3.1.3 Section 2 provides a summary of the additional information requested by NatureScot and The Royal Society for the Protection of Birds (RSPB) Scotland in respective representations, with the remainder of the appendix providing additional information on the proposed compensation measures, covering the following topics:

- The methodology and calculations setting out the compensation quanta, including a summary of the predicted impacts under the Guidance and Applicant Approaches (Section 3);
- A discussion on strategic compensation (Section 4);
- A statement on compensation for razorbill *Alca torda* (Section 5); and
- Additional information on the proposed compensation measures (Section 6), covering:
  - Non-lethal avian predator control (Section 6.2);
  - Reduction of disturbance (Section 6.3);
  - Mammalian predator management (Section 6.4);
  - Bycatch mitigation (Section 6.5);
  - Breeding site restoration or maintenance (Section 6.6); and
  - Conservation management funding (Section 6.7).

2 NatureScot and RSPB Advice

2.1 NatureScot Advice

2.1.1.1 Table 2-1 provides a summary of the key advice received within the NatureScot representations (dated 27 March 2025), focusing in particular on any additional information requested with regards to the compensatory measures put forward by the Applicant. The table provides a reference to the report section(s) in which each topic is covered.

Table 2-1: Summary of additional information requested in NatureScot's representations.

Additional Information Requested by NatureScot	Location of Further Information Provided by the Applicant
General Comments	
NatureScot's assessment of the RIAA has provisionally concluded AEoI for razorbill, and provisionally advises that compensation will be required for that species.	Section 5
Further consideration of indirect impacts is required, for example on other species or habitats.	Sections 6.3.3, 6.4.2.19, 6.5.3, 6.6.2 and 6.7.2
Additional evidence is required to support the claim that the measures would compensate for the current predicted losses.	Section 6.3.1, 6.3.5, 6.5.1, 6.6.1 and 6.7.1
Further detail is required on how the success of the measures will be monitored.	Refined Outline IMP (Volume 8, Appendix 30)
NatureScot advised they appreciate the creation of a steering group, however during the planning stage are only able to provide high-level advice.	Refined Outline IMP (Volume 8, Appendix 30; Section 2)
Site-specific or other baseline survey/data collection should be built in to inform discussions/reports and help identify effectiveness of measures.	Refined Outline IMP (Volume 8, Appendix 30)
Key stages at which points of agreement can be made should be identified	Refined Outline IMP (Volume 8, Appendix 30)
Disturbance Reduction	
In their Representations, NatureScot advised they require more detail on which colonies and species would benefit, quantification of existing pressures, how the measure integrates with existing management measures and any landowner agreements.	Section 6.3.4

Additional Information Requested by NatureScot	Location of Further Information Provided by the Applicant
NatureScot advised further detail is required regarding the planned frequency and duration of the measure.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.1.2)
In their Representations, NatureScot advised key stages are identified at which points of agreement can be made.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.1.5)
In their Representations, NatureScot advised they require further detail on how the success of the measure will be monitored. NatureScot advised baseline data collection is built into the monitoring plans to inform reports and measure effectiveness.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.1.6)
Predator Management	
NatureScot advised they require more detail on which colonies and species would benefit, which predators would be targeted (and evidence of their impacts), how the measure integrates with existing management measures and any landowner agreements.	Section 6.4.3
NatureScot advised they require further detail on how the success of the measure will be monitored. NatureScot advised baseline data collection is built into the monitoring plans to inform reports and measure effectiveness.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.1.6)
NatureScot advised further detail is required regarding the planned frequency and duration of the measure.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.2.2)
NatureScot advised key stages are identified at which points of agreement can be made.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.2.5)
NatureScot advised they require further detail on how the success of the measure will be monitored. NatureScot advised baseline data collection is built into the monitoring plans to inform reports and measure effectiveness.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.2.6)
NatureScot advised they agree that avian predator management has potential to compensate for impacts from offshore wind, but do not support it as a measure at this stage.	Section 6.2 and Refined Outline IMP (Volume 8, Appendix 30; Section 1)
Bycatch Mitigation	
NatureScot advised they require more detail on which elements the Applicant has the ability to deliver.	Section 6.5.4

Additional Information Requested by NatureScot	Location of Further Information Provided by the Applicant
NatureScot advised they require more detail on the methodology and results of the pilot study in order to assess the effectiveness of a scaled-up measure.	Section 6.5.4
NatureScot advised they require more detail on which colonies would benefit and how this is established.	Section 6.5.4
NatureScot advised they require quantification of the existing pressures, existing management measures, and information on how this measure integrates with existing management measures.	Section 6.5.4
NatureScot advised key stages are identified at which points of agreement can be made.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.3.6)
NatureScot advised they require further detail on how the success of the measure will be monitored. NatureScot advised baseline data collection is built into the monitoring plans to inform reports and measure effectiveness.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.3.7)
Breeding Site Restoration	
NatureScot advised they require quantification of existing pressures and more detail on which colonies would benefit, existing management measures and any landowner agreements.	Section 6.6.1
NatureScot advised further detail is required regarding the planned frequency and duration of the measure.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.4.2)
NatureScot advised key stages are identified at which points of agreement can be made.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.4.5)
NatureScot advised they require further detail on how the success of the measure will be monitored. NatureScot advised baseline data collection is built into the monitoring plans to inform reports and measure effectiveness.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.4.6)

Additional Information Requested by NatureScot	Location of Further Information Provided by the Applicant
Conservation Management Funding	
NatureScot advised they require quantification of existing pressures and more detail on which colonies would benefit, existing management measures and any landowner agreements and/or details on the funding body.	Section 6.7.1
NatureScot advised further detail is required regarding the planned frequency and duration of the measure.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.5.2)

2.2 RSPB Advice

2.2.1.1 Table 2-2 provides a summary of the key advice received within the RSPB Scotland representations (letter dated 28 March 2025), focusing in particular on any additional information requested with regards to the compensatory measures put forward by the Applicant. The table provides a reference to the report section(s) in which each topic is covered.

Table 2-2: Summary of additional information requested in RSPB's representations.

Additional Information Requested by RSPB	Location of Further Information Provided by the Applicant
General Comments	
RSPB welcome the proposed establishment of a steering group to oversee implementation of compensation measures. RSPB notes that whilst they welcome involvement, RSPB is unlikely to have the capacity to engage as they might ideally like.	Refined Outline IMP (Volume 8, Appendix 30; Section 2)
RSPB advised the proposals are all theoretical and desk based at this time [of consent application], with little actual reference to site specific areas where compensation could be provided, or detailed information on how any measures could be successfully implemented at those potential sites. There is limited evidence of engagement with sites where compensation may be carried out.	Throughout this appendix and the Refined Outline IMP (Volume 8, Appendix 30), additional information is provided on refinement of the measures, including engagement with sites and partners.

Additional Information Requested by RSPB	Location of Further Information Provided by the Applicant
Disturbance Reduction	
In their Representations, RSPB advised that whilst the proposed disturbance reduction activities can have a practical effect, little detail is included [in the consent application] regarding how this would actually work.	Section 6.3.4 and Refined Outline IMP (Volume 8, Appendix 30; Section 3.1)
In their Representations, RSPB advised that whilst the proposed disturbance reduction activities can have a practical effect, little detail is included [in the consent application] regarding how it would increase productivity.	Section 6.3
Predator Management	
In their Representations, RSPB noted that the Applicant suggested that the development of an existing [mammalian] predator control programme is more beneficial than individual project-based proposals, but that no detailed proposals were put forward.	Section 6.4.3 and Refined Outline IMP (Volume 8, Appendix 30; Section 3.2)
In their Representations, RSPB noted difficulties of carrying out non-lethal avian predator control and flagged potential impacts upon species associated with other designated SPAs.	Section 6.2 and Refined Outline IMP (Volume 8, Appendix 30; Section 1.1)
Breeding Site Restoration	
In their Representations, RSPB considered habitat restoration and vegetation removal to restore puffin breeding sites a technically feasible measure.	Refined Outline IMP (Volume 8, Appendix 30; Section 3.4)

3 Compensation Quantum

3.1 Background

3.1.1.1 Compensation quanta set out the amount of ecological gain (e.g., additional nesting sites, additional breeding adults) that needs to be delivered in order to sufficiently compensate for the predicted impacts (measured as additional adult mortalities). The methodology for calculating the required compensation quantum is dependent on whether the measure aims to increase the adult breeding population size directly through a reduction of adult mortalities, or indirectly through enhanced breeding (i.e., an increase in the numbers of fledglings, of which a proportion will survive to adulthood to increase the adult breeding population, for example achieved through the provision of additional nesting space or an increase in breeding productivity).

3.1.1.2 The sections below set out the predicted impacts from the Proposed Development (Offshore) and the methodology and calculations of the compensation quanta for the impacted species.

3.2 Predicted Impacts

3.2.1.1 Predicted impacts for Caledonia North and Caledonia South, as well as the Proposed Development (Offshore), are summarised in Table 3-1, with both the Applicant Approach and Statutory Nature Conservation Bodies (SNCB) Guidance Approach to the assessment shown. As discussed in consultation (07 August 2025), all in-combination assessment outcomes are based on all projects excluding projects that have made a commitment to compensation (plus the Caledonia North OWF, Caledonia South OWF or Proposed Development (Offshore)) (for further information, see the Ornithology Additional Information Reports for Caledonia OWF, North and South (Volume 8, Appendices 4, 5 and 6)). Derogation cases are without prejudice for those species for which the Applicant Approach concluded No Adverse Effect on Integrity (AEoI), namely guillemot *Uria aalge*, razorbill and puffin *Fratercula arctica*.

3.2.1.2 The nature and extent of potential impacts has been informed through the ornithological assessments and the realistic worst-case design scenario (see Volume 8, Appendices 4, 5 and 6). The compensation measures proposed here are designed to provide compensation for the worst-case design scenarios of Caledonia North, Caledonia South, and the Proposed Development (Offshore), but it should be noted that the predicted impacts for the worst-case design scenario for the Proposed Development (Offshore) are lower than the combined predicted impacts of Caledonia North and South, and impacts of the wind farm as-built will thus not exceed those calculated for the Proposed Development (Offshore).

Furthermore, the impact assessments will be subject to refinement following the consent decision and finalisation of the wind farm design. The proposed measures presented below, and the scale of compensation required, are thus subject to change and will be consulted upon and finalised within the IMP post-consent.

Table 3-1: Project alone predicted annual additional mortality, for those sites and species for which Adverse Effects on Site Integrity could not be ruled out in-combination with other projects for the Proposed Development (Offshore), presenting the lower and upper limits of the Guidance Approach.

Species	Site	Scale of Potential Effect (Predicted Additional Annual Adult Mortality) – Guidance Approach			Scale of Potential Effect (Predicted Additional Annual Adult Mortality) – Applicant Approach		
		Proposed Development (Offshore)	Caledonia North	Caledonia South	Proposed Development (Offshore)	Caledonia North	Caledonia South
Kittiwake	East Caithness Cliffs SPA	15.00 – 17.98	6.18-7.40	9.54 – 11.42	N/A*	N/A*	N/A*
	North Caithness Cliffs SPA	2.05 – 2.46	No AEoI**	No AEoI**	N/A*	N/A*	N/A*
	Troup, Pennan & Lion's Head SPA	6.55 – 7.85	1.87-2.24	6.69 – 8.00	N/A*	N/A*	N/A*
	Buchan Ness to Collieston Coast SPA	2.33 – 2.80	0.77 – 0.92	2.07 – 2.49	N.A*	N.A*	N.A*
	Total	25.93 – 31.09	8.82 – 17.96	18.30 – 21.91	N/A*	N/A*	N/A*
Guillemot	East Caithness Cliffs SPA	117.79 – 209.20	52.29 – 89.90	78.75 – 142.37	No AEoI**	No AEoI**	No AEoI**
	Troup, Pennan & Lion's Head SPA	18.59 – 34.05	5.55 – 9.91	19.34 – 34.88	No AEoI**	No AEoI**	No AEoI**
	Total	136.38 – 243.25	57.84 – 99.81	98.09 – 177.25	No AEoI**	No AEoI**	No AEoI**
Razorbill	East Caithness Cliffs SPA	12.66 – 21.75	6.65 – 11.56	7.19 – 12.25	No AEoI**	No AEoI**	No AEoI**

Species	Site	Scale of Potential Effect (Predicted Additional Annual Adult Mortality) – Guidance Approach			Scale of Potential Effect (Predicted Additional Annual Adult Mortality) – Applicant Approach		
		Proposed Development (Offshore)	Caledonia North	Caledonia South	Proposed Development (Offshore)	Caledonia North	Caledonia South
Puffin	North Caithness Cliffs SPA	0.86 – 1.45	0.63 – 1.06	0.44 – 0.75	No AEoI**	No AEoI**	No AEoI**
Gannet (Guidance Approach to macro-avoidance)***	Forth Islands SPA	4.33 – 7.86	1.62 – 2.94	3.29 – 5.77	4.33	1.62	3.29
Gannet (Applicant Approach to macro-avoidance)****	Forth Islands SPA	2.66 – 6.19	1.03 – 2.35	1.92 – 4.40	2.66	1.03	1.92

Note, all in-combination assessment outcomes are based on all projects excluding projects that have made a commitment to compensation (plus the Caledonia North OWF, Caledonia South OWF or Proposed Development (Offshore)).

Applicant Approach impacts shown where applicable. Full details available in the Ornithology Additional Information Reports for Caledonia OWF, North and South (Volume 8, Appendices 4, 5 and 6).

* No Applicant Approach submitted for kittiwake.

** No effect predicted as AEoI ruled out in-combination with other projects. Full details available in Volume 8, Appendices 4, 5 and 6.

*** As agreed in consultation a macro-avoidance rate of 70% has been applied to gannet densities during the non-breeding season. During the breeding season, the monthly in-flight densities have not been adjusted for macro-avoidance. This approach has been presented as the Guidance Approach.

**** The Applicant Approach has also been presented, with the 70% macro-avoidance rate applied to the predicted mortalities in all months

3.3 Calculation Methodology

3.3.1 Overview

3.3.1.1 An overview of the compensation quantum calculation methodology required for each proposed compensation measure is detailed in Table 3-2, with further information provided in the relevant sub-sections below. The methodology provided aligns with the compensation calculations outlined within the applications of other, now consented, Scottish OWFs, including Green Volt and West of Orkney.

Table 3-2: Methods of compensation delivery for each proposed compensation measure.

Compensation Measure	Compensation Delivery	Reference for Relevant Calculations
Reduction in disturbance	▪ Increase in available nesting space ▪ Increase in productivity	Section 3.3.2
Mammalian predator management	▪ Increase in available nesting space ▪ Increase in productivity	Section 3.3.2
Bycatch mitigation	▪ Reduction of mortalities	Section 3.3.3
Restoration or maintenance of breeding sites	▪ Increase in available nesting space ▪ Increase in productivity	Section 3.3.2

3.3.2 Enhanced Breeding

3.3.2.1 An increase in the number of fledglings can be achieved through an increase in productivity, an increase in availability of predator free nesting space, or a combination of both. Further details are discussed in the sub-sections below.

3.3.2.2 The following compensation options aim to deliver compensation through enhanced breeding:

- Reduction in disturbance;
- Mammalian predator management; and
- Restoration or maintenance of breeding sites.

3.3.2.3 Table 3-1 presents the predicted impacts on breeding adults that need to be compensated for. As the measures described focus on growing the population through increasing the numbers of nests and/or fledglings, a proportion of which then mature to adulthood, additional calculations are needed to determine the quanta required for that measure in order to recruit the equivalent number of the impacted adults into the breeding

population. On this basis, for each target species, the number of fledglings required to survive to adulthood to produce the required compensation quantum has been identified via the following:

- The number of adult birds required to be compensated, as identified in Table 3-1; and
- The number of chicks required to fledge to ensure that the required number of birds survive to adulthood (breeding age) (based on age of recruitment and survival rate), as calculated in **Equation 1** and **Equation 2**.

3.3.2.4 **Equation 1** presents the calculations undertaken to identify the proportion of fledglings that are predicted to survive until breeding age. This has been undertaken through multiplying the average annual survival rate per age class from year one until the defined breeding age. Both survival rate and breeding age were based on Horswill and Robinson (2015[1]) and are provided in Table 3-3.

Equation 1

Calculation for survival to breeding age. Example based on kittiwake with an average breeding age of four years. "S" represents the survival rate, as extracted from Horswill and Robinson (2015[1]).

$$Survival\ to\ Breeding\ Age = S_{0-1\ year}\ x\ S_{1-2\ year}\ x\ S_{2-3\ year}\ x\ S_{3-4\ year}$$

$$Survival\ to\ Breeding\ Age = 0.79\ x\ 0.854\ x\ 0.854\ x\ 0.854$$

$$Survival\ to\ Breeding\ Age = 0.492$$

Table 3-3: Demographic parameters and number of breeding pairs required for one chick to survive to adulthood.

Species	Average Breeding Age (Years)*	Survival to Breeding Age**	Productivity*	Number of Breeding Pairs Required for One Chick to Survive to Adulthood***
Kittiwake	4	0.492	0.690	2.95
Guillemot	6	0.337	0.672	4.42
Razorbill	5	0.452	0.570	3.88
Puffin	5	0.434	0.617	3.73
Gannet	5	0.258	0.700	5.55

* Extracted from Horswill and Robinson (2015[1]).
** Calculated through data from Horswill and Robison (2015[1]) using **Equation 1**.
*** Calculated as: 1 / survival to breeding age / productivity.

3.3.2.5 The survival to breeding age has then been used to calculate the increase in the number of chicks fledged annually required to fulfil the compensation requirements (**Equation 2**). This is undertaken through dividing the estimated number of adult birds requiring compensation (Table 3-1) by the survival rate to breeding age (**Equation 1**; Table 3-3). The estimated number of additional chicks required for delivering compensation for each species is provided in Table 3-4.

Equation 2
Calculation for required increase in number of chicks fledged. Example based on kittiwake.

$$Required\ Increase\ in\ Number\ of\ Chicks\ Fledged = \frac{Adult\ Birds\ Requiring\ Compensation}{Survival\ to\ Breeding\ Age}$$

$$Required\ Increase\ in\ Number\ of\ Chicks\ Fledged = \frac{31.09}{0.492}$$

$$Required\ Increase\ in\ Number\ of\ Chicks\ Fledged = 63.19$$

Table 3-4: Required annual increase in number of chicks fledged to fulfil the compensation requirements for both the Guidance and Applicant Approaches.

Species	Guidance Approach		Applicant Approach	
	Adult Birds Requiring Compensation	Required Increase in Number of Chicks Fledged	Adult Birds Requiring Compensation	Required Increase in Number of Chicks Fledged
Proposed Development (Offshore)				
Kittiwake	25.93 – 31.09	52.70 – 63.19	N/A***	N/A***
Guillemot	136.38 – 243.25	405.02 – 722.39	N/A***	N/A***
Razorbill	12.66 – 21.75	28.01 – 48.12	N/A***	N/A***
Puffin	0.86 – 1.45	1.98 – 3.34	N/A***	N/A***
Gannet*	4.33 – 7.86	16.81 – 30.51	4.33	16.81
Gannet**	2.66 – 6.19	10.33 – 24.03	2.66	10.33
Caledonia North				
Kittiwake	8.82 – 17.96	17.93 – 36.50	N/A***	N/A***
Guillemot	57.84 – 99.81	171.77 – 296.41	N/A***	N/A***
Razorbill	6.65 – 11.56	14.71 – 25.58	N/A***	N/A***

Species	Guidance Approach		Applicant Approach	
	Adult Birds Requiring Compensation	Required Increase in Number of Chicks Fledged	Adult Birds Requiring Compensation	Required Increase in Number of Chicks Fledged
Puffin	0.63 – 1.06	1.45 – 2.44	N/A***	N/A***
Gannet*	1.62 – 2.94	6.29 – 11.41	1.62	6.29
Gannet**	1.03 – 2.35	4.00 – 9.12	1.03	4.00
Caledonia South				
Kittiwake	18.30 – 21.91	37.19 – 44.53	N/A***	N/A***
Guillemot	98.09 – 177.25	291.30 – 526.39	N/A***	N/A***
Razorbill	7.19 – 12.25	15.91 – 27.10	N/A***	N/A***
Puffin	0.44 – 0.75	1.01 – 1.73	N/A***	N/A***
Gannet*	3.29 – 5.77	12.77 – 22.40	3.29	12.77
Gannet**	1.92 – 4.40	7.45 – 17.08	1.92	7.45

* As agreed in consultation a macro-avoidance rate of 70% has been applied to gannet densities during the non-breeding season. During the breeding season, the monthly in-flight densities have not been adjusted for macro-avoidance. This approach has been presented as the Guidance Approach.

** The Applicant Approach has also been presented, with the 70% macro-avoidance rate applied to the predicted mortalities in all months.

*** No AEoI concluded using the Applicant Approach.

Increase in Productivity

3.3.2.6 The required increase in number of chicks fledged is used for the quantum that needs to be delivered through an increase in productivity. To calculate the potential increase in number of fledglings from an increase in productivity, site-specific information is required. This is due to the fact there is substantial variation in productivity rates between sites, and in order to obtain accurate estimates, the productivity rates observed at the implementation site for compensation should thus be used. Therefore, potential benefits to productivity cannot be accurately calculated until site selection has been completed. Ecologically realistic scenarios on site-specific benefits are provided in Section 6 to provide further insight into the potential benefits of the proposed measure.

Increase in Available Nesting Space

3.3.2.7 To identify the required increase in available nesting space, the required increase in the number of chicks fledged (**Equation 2**) is divided by the productivity rate (Table 3-3; Horswill and Robinson, 2015[1]) (see **Equation 3** for a worked example). The estimated additional nesting space required for delivering compensation for each species is provided in Section 3.4.

Equation 3
Calculation for the required increase in number of chicks fledges
Example based on kittiwake. Productivity rate extracted from Horswill and Robinson (2015[1]).

$$Additional\ Nesting\ Spaces\ Required = \frac{Required\ Increase\ in\ Number\ of\ Chicks\ Fledged}{Productivity\ Rate}$$

$$Additional\ Nesting\ Spaces\ Required = \frac{60.14}{0.69}$$

$$Additional\ Nesting\ Spaces\ Required = 87.16$$

3.3.3 Reduction in Mortality

3.3.3.1 The bycatch reduction compensation measure focuses on reducing mortality of both adults and immatures. It is noted that the requirement for compensation is to provide additional adult birds, therefore calculations have been undertaken to identify the proportion of individuals which would feed back into the breeding population. The calculation has been undertaken through:

- Proportion of adults in the population (Furness, 2015[2], Table 3-5); plus
- The proportion of immatures which would survive until breeding age (**Equation 1**; **Equation 4**; Table 3-5).

3.3.3.2 Due to a lack of data on the proportions of different immature age groups in the populations, all immatures are assumed to be within the first year after fledging. This approach applies a lower survival rate than when incorporating the fact that a proportion of the immatures are older. For instance, using the immature survival rates from Horswill and Robinson (2015[1]), it can be calculated that a juvenile (0-1 year) guillemot has a survival rate to breeding age of 0.34, whereas an older 2-3 year immature bird has a survival rate to breeding age of 0.76. The assumption that all immatures are within their first year after fledging therefore adds additional precaution into the calculations, and underestimates the total numbers that survive to adulthood. True benefits provided are thus higher than those presented using this precautionary approach.

3.3.3.3 **Equation 1** (Section 3.3) presents the calculations undertaken to identify the proportion of immatures that are predicted to survive until breeding age. The survival to breeding age rates for each species are provided in Table 3-5.

Table 3-5: Demographic parameters and proportion of adults plus immatures to survive to adulthood.

Species	Proportion of Adults:Immatures*	Average Breeding Age (Years)**	Survival of Immatures to Breeding Age***	Proportion of Adults plus Immatures Survived Until Adulthood****
Guillemot	0.57:0.43	6	0.337	0.715
Razorbill	0.57:0.43	5	0.452	0.764
Gannet	0.55:0.45	5	0.258	0.666

* Furness (2015[2]).
** Horswill and Robinson (2015[1]).
*** Calculated through data from Horswill and Robison (2015[1]) using **Equation 1**.
**** Calculated through data from Horswill and Robison (2015[1]) using **Equation 4**.

3.3.3.4 To calculate the total proportion of individuals which would feed back into the breeding population, the proportion of adults (Furness, 2015[2]) was summed with the proportion of immature which are predicted by published data to survive to breeding age (**Equation 4**; Table 3-5). The proportion of adults plus immatures predicted to survive until adulthood was then used to calculate the total number of individuals required to be prevented from being bycaught.

Equation 4
Calculation for proportion of individuals which feedback to the breeding population (adults plus immatures which survive to adulthood). "A_p" represents the proportion of adults from Furness (2015)[2], "I_p" represents the proportion of immatures from Furness (2015)[2], and "S_b" represents the survival of immatures to breeding age (**Equation 1**). Example based on guillemot.

$$Proportion\ of\ individuals\ which\ feedback\ to\ the\ breeding\ population = A_p + (I_p x\ S_b)$$

$$Proportion\ of\ individuals\ which\ feedback\ to\ the\ breeding\ population = 0.57 + (0.43\ x\ 0.34)$$

$$Proportion\ of\ individuals\ which\ feedback\ to\ the\ breeding\ population = 0.715$$

3.3.3.5 To calculate the required decrease in bycatch, the number of adult birds requiring compensation (Table 3-1) is the divided by the outputs of **Equation 4**.

3.4 Compensation Quanta

3.4.1 Total Compensation Quanta

3.4.1.1 Through using the calculations in Section 3.3, the total compensation quanta to fulfil the compensation requirements is provided in Table 3-6.

Table 3-6: Total compensation quanta for both the Guidance and Applicant Approaches for the annual increase in number of chicks fledged (increase in productivity), increase in available nesting space and reduction of bycatch.

Species	Guidance Approach				Applicant Approach			
	Adult Birds Requiring Compensation	Required Increase in Number of Chicks Fledged	Additional Nesting Spaces Required	Required Reduction of Individuals from Bycatch	Adult Birds Requiring Compensation	Required Increase in Number of Chicks Fledged	Additional Nesting Spaces Required	Required Reduction of Individuals from Bycatch
Proposed Development (Offshore)								
Kittiwake	25.93 – 31.09	52.70 – 63.19	76.38 – 91.57	-	N/A	N/A	N/A	-
Guillemot	136.38 – 243.25	405.02 – 722.39	602.70 – 1,074.99	190.80 – 340.31	N/A	N/A	N/A	N/A
Razorbill	12.66 – 21.75	28.01 – 48.12	49.14 – 84.43	16.56 – 28.46	N/A	N/A	N/A	N/A
Puffin	0.86 – 1.45	1.98 – 3.34	3.12 – 5.41	-	N/A	N/A	N/A	-
Gannet*	4.33 – 7.86	16.81 – 30.51	24.01 – 43.59	6.50 – 11.80	4.33	16.81	24.01	6.50
Gannet**	2.66 – 6.19	10.33 – 24.03	14.75 – 34.33	3.99 – 9.30	2.66	10.33	14.75	3.99
Caledonia North								
Kittiwake	8.82 – 17.96	17.93 – 36.50	25.98 – 52.90	-	N/A	N/A	N/A	-
Guillemot	57.84 – 99.81	171.77 – 296.41	255.61 – 441.09	80.92 – 139.63	N/A	N/A	N/A	N/A
Razorbill	6.65 – 11.56	14.71 – 25.58	25.81 – 44.87	8.70 – 15.12	N/A	N/A	N/A	N/A

Species	Guidance Approach				Applicant Approach			
	Adult Birds Requiring Compensation	Required Increase in Number of Chicks Fledged	Additional Nesting Spaces Required	Required Reduction of Individuals from Bycatch	Adult Birds Requiring Compensation	Required Increase in Number of Chicks Fledged	Additional Nesting Spaces Required	Required Reduction of Individuals from Bycatch
Puffin	0.63 – 1.06	1.45 – 2.44	2.35 – 3.96	-	N/A	N/A	N/A	-
Gannet*	1.62 – 2.94	6.29 – 11.41	8.98 – 16.30	2.42 – 4.41	1.62	6.29	8.98	2.42
Gannet**	1.03 – 2.35	4.00 – 9.12	5.71 – 13.03	1.55 – 3.53	1.03	4.00	5.71	1.55
Caledonia South								
Kittiwake	18.30 – 21.91	37.19 – 44.53	53.90 – 64.53	-	N/A	N/A	N/A	-
Guillemot	98.09 – 177.25	291.30 – 526.39	433.49 – 783.32	137.23 – 247.97	N/A	N/A	N/A	N/A
Razorbill	7.19 – 12.25	15.91 – 27.10	27.91 – 47.55	9.41 – 16.03	N/A	N/A	N/A	N/A
Puffin	0.44 – 0.75	1.01 – 1.73	1.64 – 2.80	-	N/A	N/A	N/A	-
Gannet*	3.29 – 5.77	12.77 – 22.40	18.25 – 32.00	4.49 – 8.66	3.29	12.77	18.25	4.49
Gannet**	1.92 – 4.40	7.45 – 17.08	10.65 – 24.40	2.88 – 6.61	1.92	7.45	10.65	2.88

* Guidance Approach to macro-avoidance. As agreed in consultation a macro-avoidance rate of 70% has been applied to gannet densities during the non-breeding season. During the breeding season, the monthly in-flight densities have not been adjusted for macro-avoidance. This approach has been presented as the Guidance Approach.

** Applicant Approach to macro-avoidance. 70% macro-avoidance rate applied to the predicted mortalities in all months.

3.4.1.2 For each of the compensation measures being progressed, Section 6 includes scenario-based calculations illustrating how each compensation measures can deliver the required benefits to meet the compensation quanta. When full site- or collaboration agreements have been secured, site-specific calculations to show predicted benefits will be included within the IMP. To ensure sufficient compensation can be provided, multiple measures have been put forward for each species. Should calculations of predicted benefits show that more than sufficient compensation can be provided for a species through the delivery of one measure (for example through a large-scale collaborative measure, such as the predator management programme proposed with National Trust for Scotland (NTS) and Muir Mhòr), the Applicant may look to use the other proposed measures as adaptive management measures only. This decision would be made in collaboration and agreement with the steering group and would only be considered if one (or a combination of multiple) measures is predicted to significantly exceed the compensation quantum for a given impacted species.

3.4.2 Compensation Ratios

3.4.2.1 Compensation ratios are a key tool in ensuring that the scale and effectiveness of compensatory measures are sufficient to offset predicted adverse impacts on designated sites or ecological features. These ratios reflect both the nature of the impact and the degree of confidence in the success and equivalence of the proposed measures. As explained within the Scottish guidance (Butler *et al*., 2024[3]):

"Compensation ratios are used in order to account for uncertainty, with the aim of ensuring that the magnitude of the benefit provided by compensation will, in reality, be at least as great as the level of adverse impact".

3.4.2.2 A 1:1 ratio may be appropriate where there is a high degree of certainty that the compensation is ecologically equivalent to the impacted feature (i.e., 'like for like'). However, where compensation measures are not directly equivalent, involve novel approaches, or carry a greater degree of delivery risk or ecological uncertainty, higher ratios may be warranted to provide an adequate buffer and ensure no net loss.

3.4.2.3 Following further refinement and development of the IMP, appropriate ratios will be proposed based on the location and confidence in the measure. Proposed ratios will be consulted and decided upon in collaboration with key stakeholders post-consent, as part of the steering group process.

3.4.2.4 It is important to note the precautionary nature of the ornithology assessments. A deliberate level of conservatism is included within assessments to account for inherent uncertainties, leading to precaution

being added into the assessments at numerous stages. This precaution is thus inherently incorporated into the levels of compensation required for each species. While precaution is necessary, overly conservative assumptions and "stacking" of precautions can result in considerable overcompensation and potentially ecologically unrealistic outputs, an issue which is particularly problematic during in-combination assessments. For further information on the precautionary nature of assessment and its effects on assessment outcomes and compensation, see Outer Dowsing Offshore Wind (2025[4]) and Searle *et al.* (2023[5]).

3.4.2.5 In addition, adaptive management is an integral part of compensation delivery in order to address uncertainty in effectiveness, with adaptive management used when monitoring indicates that measures are not successfully compensating for the predicted impacts. Therefore, the requirement for a compensation ratio should be considered in the context of precaution in the assessment and the inclusion of adaptive management in compensation delivery.

3.4.2.6 Although it is important to demonstrate that a compensation measure can deliver outcomes at a reasonable ratio for justifiable ecological reasons (e.g., providing artificial nesting at a 3:1 ratio with the expectation that one-third of a given structure will be colonised), this does not mean that success must be assessed using the same ratio.

3.4.2.7 Considering the precaution already present in the application at the various stages of the assessment process (including but not limited to flight heights, apportioning, displacement rates, mortality and assumptions on adult proportions in the population), and the application of adaptive management in the event of measure underperformance, the Applicant considers that success is appropriately measured by evidencing benefits up to a 1:1 ratio. Calculations of predicted benefits are thus presented in the context of the predicted mortalities presented in Table 3-1, and the compensation quanta derived from that information. The final scale of compensation to be delivered is to be consulted upon with the compensation steering groups post-consent and captured in the final IMP (see Refined Outline IMP (Volume 8, Appendix 30)).

4 Strategic Compensation

4.1.1.1 As discussed in further detail in the Compensation Plans (Application Document 15, Appendix 15-3: Caledonia North Compensation Plan and Site Selection and Application Document 16, Appendix 16-3: Caledonia South Compensation Plan and Site Selection), the Applicant's preference for delivering compensation is through a contribution to a strategic compensation programme. Legislatively, provisions for the delivery of such strategic compensation delivery are provided in Energy Act 2023 (Part 13 Chapter 1, Sections 290 to 295). The Applicant notes the ecological, logistical and financial benefits of delivering compensation at a strategic level, including the potential to deliver significantly greater environmental value compared with individual project-level compensation packages.

4.1.1.2 There are a number of workstreams currently being undertaken which could aid in the delivery of strategic compensation measures and/or funding schemes in the UK, including the Marine Recovery Fund (MRF), the Scottish Marine Recovery Fund, the Scottish Marine Environmental Enhancement Fund (SMEEF) and the development of regional measures (the Applicant is contributing to strategic, regional compensation plans as part of the North-East and East Ornithology Group (NEEOG) of ScotWind developers).

4.1.1.3 The Applicant would consider contributing to a strategic compensation fund or regional compensation measures if given the opportunity, as and when a pathway becomes available. The Applicant would contribute in addition to, or instead of, the Applicant's proposed measures outlined above, or alternatively as an adaptive management measure. Any such use of future strategic measures would be consulted upon with relevant stakeholders and set out in the IMP.

5 Statement on Razorbill

In their representations, NatureScot advised that their assessment of the RIAA has provisionally concluded AEoI for razorbill.

5.1.1.1 No AEoI was included for razorbill at the time of consent application. The updated assessments provided in Volume 8, Appendices 4, 5 and 6 (see Section 3.2) conclude that under the Guidance Approach, AEoI could not be ruled out in-combination with other projects. For the Applicant Approach, AEoI for Razorbill was ruled out at all sites.

5.1.1.2 Given the ecological similarities between guillemot and razorbill, the compensation measures proposed for guillemot are anticipated to benefit razorbill also. The species share a number of ecological traits; for example breeding adults have overlapping distributions at sea during the breeding season and can also share breeding habitats (often co-occurring on cliff ledges within seabird colonies) (Thaxter *et al*., 2010[6]; Furness, 2015[2]; Sansom *et al*., 2018[7]). Whilst Razorbill has been less extensively studied than other seabirds, the species is thought to be vulnerable to the same ecological and anthropogenic threats as guillemot, including overfishing and over-exploitation of sand-eels (Nettleship, 2018[8], Hentati-Sundberg *et al.*, 2020[9], Berwick Bank Wind Farm, 2022[10]) invasive predators (e.g., O'Hanlon and Lambert, 2017)[11], fisheries bycatch (Northridge *et al*., 2020[12]), and oil pollution (Biliavskiy and Golod, 2012[13]; Furness, 2013[14]).

5.1.1.3 Therefore, should AEoI be concluded for razorbill, the same compensation measures as proposed for guillemot can be used to benefit razorbill. In the event that measures targeting guillemot do not provide sufficient benefits to razorbill to compensate for the predicted impacts, the proposed measures could be readily scaled up to ensure the compensation quantum for razorbill is successfully met.

6 Additional Information on Proposed Compensation Measures

6.1 Overview

6.1.1.1 The following information should be considered alongside the Compensation Plans (Application Document 15, Appendix 15-3: Caledonia North Compensation Plan and Site Selection and Application Document 16, Appendix 16-3: Caledonia South Compensation Plan and Site Selection), which provide details regarding the proposed compensation measures; species-specific ecological evidence and wider ecological considerations, as well as a discussion on the timing of delivery, monitoring, adaptive management and feasibility. The information presented below supplements that already provided in the Compensation Plans.

6.2 Non-lethal Avian Predator Control

In their Representations, NatureScot advised it agreed that avian predator management has potential to compensate for impacts from offshore wind, but do not support it as a measure at this stage.

In their Representations, RSPB noted difficulties of carrying out non-lethal avian predator control and flagged potential impacts upon species associated with other designated SPAs.

6.2.1.1 Non-lethal avian predator control was included as a proposed measure in the Compensation Plans and Outline IMPs submitted at application.

6.2.1.2 Following receipt of the NatureScot (dated 27 March 2025) and RSPB (dated 28 March 2025) representations, the Applicant has decided to not progress avian predator management at this time, on the basis that NatureScot and RSPB do not support it as a potential compensation measure.

6.3 Reduction of Disturbance at Colonies

6.3.1 Overview

6.3.1.1 The reduction of disturbance at colonies was deemed suitable to be taken forward for next steps for compensation development for all species (kittiwake, gannet, guillemot and puffin). For further evidence of the effects of disturbance on breeding performance, see Section 6.3.5 below, as well as the Compensation Plan for Caledonia North and South (Application Document 15, Appendix 15-3 and Application Document 16, Appendix 16-3).

6.3.1.2 Since consent application potential opportunities for deployment of this compensation measure have been identified at the Isle of May and East Caithness Cliffs. In June 2025, the Applicant undertook a site visit to both the Isle of May and East Caithness Cliffs to assess the feasibility of implementing seabird compensation measures, with evidence of visitor-related disturbance observed during the site visits (see Section 6.3.4 below and Volume 8 Appendix 34: East Caithness Cliffs Site Assessment Report (Confidential)). The Applicant has not yet been able to secure a meeting with the site managers due to a lack of response and/or limited availability. The Applicant remains keen to engage and will continue to seek opportunities for discussion, and NatureScot is facilitating contact between the Isle of May site manager and the Applicant.

6.3.1.3 The Applicant is looking to continue to progress site investigations and discussions with the relevant site managers and other key stakeholders during the remainder of 2025, with feasibility site visits, measure design finalisation and baseline monitoring carried out thereafter (for further details and indicative timelines see Volume 8 Appendix 30: Refined Outline Implementation and Monitoring Plan). Final details regarding site selection will thus be confirmed within the next iteration of this IMP.

6.3.1.4 Numerous other sites across Scotland were contacted to investigate the potential for delivering disturbance reduction measures, with limited response. In addition to progressing the measure at the Isle of May and East Caithness Cliffs, the Applicant also continues to be open to progressing this measure at other locations, where contact with site managers can be successfully made and opportunities are identified.

6.3.2 Predicted Benefits and Scale

In their Representations, NatureScot advised that further evidence is required to show that the measures can compensate for the predicted losses.

6.3.2.1 As set out in Section 3, disturbance affects seabird productivity and nest site use, therefore disturbance reduction has the potential to benefit seabird populations through both an increase in available nesting space and an increase in productivity (see also Application Document 15, Appendix 15-3: Caledonia North Compensation Plan and Site Selection and Application Document 16, Appendix 16-3: Caledonia South Compensation Plan and Site Selection). However, it is important to acknowledge that there are numerous ecological factors that underpin seabird nest-site use and productivity, and the scale at which disturbance reduction will deliver re-colonisation of past breeding sites and improvements to productivity is therefore inherently unclear until baseline data is collected, and to some extent until disturbance reduction is implemented and monitoring for effectiveness is carried out. To ensure sufficient benefits can be delivered, the measure can be readily scaled up to other sites with adaptive management implemented if required.

6.3.2.2 As the amount of available additional nesting space will be site-specific and dependent on the locations and nature of disturbance, predicted benefits will need to be refined through site visits as part of site-selection (proposed timelines for site visits and implementation can be found in the Volume 8 Appendix 30: Refined Outline Implementation and Monitoring Plan). Nevertheless, indicative comparisons of current populations to historical counts have been undertaken to provide worked examples evidencing how potential increases in nesting space availability can deliver compensation from the implementation of disturbance reduction measures, based on the plausible assumption that a proportion of the unused nesting habitat is not used due to disturbance effects (see Section 6.3.5). When delivery sites have been secured, finalised predicted benefits and scale will be provided within the forthcoming IMP.

6.3.2.3 Similar to nest-site use, productivity is ecologically complex and can be affected by a large number of factors. As such, potential benefits from increases in productivity from disturbance reduction measures need to be calculated on a site-by-site basis and consider the baseline level and nature of disturbance along with site-specific productivity rates. However, the scenarios based on existing sites presented below serve to evidence the fact that small increases in productivity achieved from disturbance reduction measures can deliver the number of fledglings required to deliver the compensation quantum. A more precise estimate of benefits can be

provided following site selection and baseline monitoring prior to implementation. Details on the proposed timelines for site visits and baseline data collection can be found in the Refined Outline IMP (Volume 8 Appendix 30).

6.3.2.4 As site selection is not currently finalised, example colonies from the initial short-listed sites (Application Document 15, Appendix 15-3: Caledonia North Compensation Plan and Site Selection and Application Document 16, Appendix 16-3: Caledonia South Compensation Plan and Site Selection) and shortlisted sites in this document have been used to demonstrate the potential benefits from the disturbance reduction measure. West Westray and/or Isle of May have been chosen as these sites were shortlisted as potential delivery sites for the majority of the impacted species (kittiwake, guillemot and puffin). Hermaness, Saxa Vord and Valla Field SPA has been chosen for gannet.

6.3.2.5 To calculate the potential benefits from an increase in productivity, calculations have been undertaken to compare the current estimated number of fledglings to the potential number of fledglings under an increase in productivity.

6.3.2.6 The current number of annual estimated fledglings (pre-implementation) has been calculated through multiplying the colony size by the productivity rate (**Equation 5**). Where possible, site specific colony rates are used as a pre-implementation (i.e., baseline) level of productivity, and where not available the national average is used instead (Table 3-3; Horswill and Robinson, 2015[1]).

Equation 5
Calculation of the number of annual fledglings pre-implementation of the compensation measure.

$$Current\ Estimated\ Fledglings = Colony\ Size\ \times Productivity\ Rate$$

6.3.2.7 To calculate the increase in fledglings from the implementation of the disturbance reduction compensation measure, **Equation 5** is repeated using the estimated "new" productivity rate (the increased rate following implementation of the measure). Subtracting the baseline outputs calculated from **Equation 5** from the predicted outputs using the increased productivity rate determines the number of additional fledglings generated (**Equation 6**).

Equation 6
Calculation of the number of additional annual fledglings from the implementation of the compensation measure.

$$Additional\ Fledglings = (Colony\ Size \times Increased\ Productivity\ Rate) - Current\ Estimated\ Fledglings$$

6.3.2.8 The potential benefits from a productivity increase and additional available nesting space for each species is described below.

Kittiwake

6.3.2.9 As shown in Beale and Monaghan (2004[32]), human disturbance can negatively effect on the nesting success of kittiwake, and kittiwake exhibit a greater sensitivity to disturbance due to their closer proximity to visitors compared to other seabird species. Disturbance reduction can thus be used to improve kittiwake breeding performance, through targeting an increase in both available nesting space and productivity.

Available Nesting Space

6.3.2.10 The kittiwake population at West Westray SPA has decreased over the past few decades, decreasing from an estimated 34,864 apparently occupied nests (AON) in 1999 to 2,755 AON in 2017 (Table 6-1). Based on this comparison to historical populations, it is therefore inferred that there is potential space for 32,109 nests which are not currently being occupied. It is noted that within the 2023 count, West Westray 2 has further decreased by an additional 336 pairs to 1,486 AON, however the other sites were not monitored that year.

Table 6-1: Kittiwake AON at West Westray SPA in 1999 and 2017, figures extracted from the SMP database (BTO, 2025).

Site	1999	2017	Percentage Reduction
West Westray 1	103	12	-88%
West Westray 2	17,546	1,822	-90%
West Westray 4	1,583	Unknown*	Unknown*
West Westray 5	8,890	495	-94%
West Westray 6	6,742	426	-94%
Total	34,864	2,755	-92%
* No count present for West Westray 4 in 2017.			

6.3.2.11 The identified upper level for additional nesting space required for kittiwake is calculated as an additional 92 nests for the Proposed Development (Offshore), or 53 nests and 65 nests for Caledonia North and Caledonia South respectively (as presented in Table 3-6 and calculated through the calculations in Section 3.3). This indicative exercise shows that there is the potential to increase kittiwake populations at this site, and that there are more available nesting spaces than the required compensation quantum. The same applies to other breeding sites where the number of kittiwake AONs has declined by more than 92 AONs (or 53 and 65 AONs for Caledonia North and Caledonia South respectively). As discussed in further detail at the start of Section 6.3.2, these are illustrative examples evidencing how potential increases in nesting space availability can deliver compensation from the implementation of disturbance reduction measures, and the number of nesting spaces specifically impacted by disturbance are to be confirmed following site visits.

Productivity Increase

6.3.2.12 Human disturbance has the potential to impact kittiwake productivity rates; further details are provided in Section 6.3.5. However, there is limited publicly available quantitative data to inform assessment of the potential benefits from reducing disturbance. Potential benefits will be assessed on a site-by-site basis and will consider the baseline level of disturbance along with site-specific productivity rates. Nevertheless, to provide an indication of potential productivity benefits, illustrative scenarios are provided below.

6.3.2.13 Based on the published data on the 2024 Isle of May kittiwake colony size of 5,443 AONs (BTO, 2025[16]) and productivity of 0.95 (Newell *et al.,* 2025[15]), it can be calculated that a small increase in productivity of 0.05 to a productivity rate of 1.00 would deliver 273 additional annual fledglings, which is substantially more than the additional number of fledglings calculated under the compensation quanta (see Table 3-4, a maximum of 63.19 for Caledonia OWF, 36.5 for Caledonia North, and 44.53 for Caledonia South). In other words, a modest increase in productivity from the reduction in disturbance would be viable to provide compensation for this species. An increase to a productivity of 1.05 is considered ecologically realistic, given that in past years, productivity on the island has been as high as 1.38 (Newell *et al.,* 2025[15]).

6.3.2.14 Kittiwake productivity at West Westray SPA is also shown to fluctuate annually, with recorded productivity rates varying between 0.46 to 1.13 between 2017 and 2022 (i.e., each AON raised, on average, between 0.46 to 1.13 young to fledging)(BTO, 2025[16]). Moreover, there has also been a variation is productivity between plots within the same year of monitoring. The drivers for these observations are not presently known, but given the known link between disturbance and productivity (see Section 6.3.5), it is again plausible that disturbance may have influenced the productivity rates

at these plots, and there thus being potential for productivity increases from the implementation of disturbance reduction.

Gannet

Available Nesting Space

6.3.2.15 Given the growth of the gannet colony at the Hermaness, Saxa Vord and Valla Field SPA (very roughly a doubling in the number of AONs from 10,000 to 20,000 between 1990 and 2024 (BTO, 2025[16])), demonstrating a link between an implemented measure and further increases in colony size, would not be possible without extensive additional study beyond the scope of the project. As such, any calculation of benefits from a measure implemented for gannet at this colony would likely be based solely on increases in productivity. However, if sites are identified where nesting spaces or seemingly suitable nesting habitats near locations of heavy disturbance are not (or no longer) used, these areas can be targeted for disturbance reduction, and monitored for effectiveness. The predicted benefits will be captured in the IMP when sites have been selected.

Productivity Increase

6.3.2.16 To provide an example of how productivity increases from disturbance reduction measures can deliver additional fledglings as compensation, breeding success data were obtained from three plots of 100 AONs at the Hermaness, Saxa Vord and Valla Field SPA in 2024. Average productivity was 0.54; i.e. each AON raised, on average, 0.54 young to fledging (BTO, 2025[16]). This is lower than the average productivity 0.7 calculated in Horswill and Robinson (2015[1]). Assuming that the plots are a representation of the situation across the colony as a whole, increasing the average productivity from 0.54 to 0.7 could increase the number of annual fledglings per year from 10,693 to 13,862 (based on the 2024 count of 19,803 breeding pairs). The additional number of 3,169 fledglings under an increase in productivity from 0.54 to 0.7 is far greater than the 30.51 increase in fledglings for the Proposed Development (Offshore) (and 11.41 and 22.40 increase in fledglings for Caledonia North and Caledonia South respectively) as calculated as per the compensation quantum (Table 3-6), illustrating that small increases in productivity achieved from disturbance reduction measures can deliver the number of fledglings required to deliver the compensation quantum.

Guillemot

Available Nesting Space

6.3.2.17 Based on SMP data, the guillemot population at West Westray SPA has decreased greatly over the past few decades, from an estimated 54,728 individuals in 1999 to 28,679 individuals in 2017 (Table 6-2). Based on this comparison to historical populations, it is inferred that there is potential

space for over 26,000 individuals which is not currently being occupied. To convert the number of individuals into breeding pairs (and therefore to demonstrate the potential of the measure in breeding pairs) the number of individuals is multiplied by a conversion factor of 0.67, obtained from Walsh *et al.* (1995[63]). Therefore, returning the West Westray SPA to its historic peak population would be equivalent to an increase of 17,452 breeding pairs. This scenario shows that there is the potential to increase guillemot populations at this site, and that there are more available nesting spaces than the required compensation quantum. As discussed in further detail at the start of Section 6.3.2, these are illustrative examples evidencing how potential increases in nesting space availability can deliver compensation from the implementation of disturbance reduction measures, and the number of nesting spaces specifically impacted by disturbance are to be confirmed following site visits.

Table 6-2: Guillemot individuals at West Westray SPA in 1999 and 2017, figures extracted from the SMP database (BTO, 2025[16]).

Site	1999	2017	Percentage Reduction
West Westray 1	141	76	-46%
West Westray 2	37,390	22,930	-39%
West Westray 4	1,751	Unknown*	Unknown*
West Westray 5	8,670	2,405	-72%
West Westray 6	6,776	3,286	-52%
Total	54,728	28,679	-48%
* No count present for West Westray 4 in 2017.			

6.3.2.18 The identified upper level for additional nesting space required for guillemot is calculated as an additional 1,075 nests for the Proposed Development (Offshore) (441 nests and 784 nests for Caledonia North and Caledonia South respectively) (as presented in Table 3-6 and calculated through the calculations in Section 3.3). Although the number of nesting spaces specifically impacted by disturbance cannot be fully understood until site visits have been undertaken, this indicative exercise shows that there is the potential to increase guillemot populations at this site, and that there are more than sufficient nesting spaces at this site to meet the required compensation quantum (~16, ~40 and ~22 times greater available nesting space than the calculated compensation quantum for the Proposed Development (Offshore), Caledonia North and Caledonia South respectively).

Productivity Increase

6.3.2.19 The most recently available productivity rates for guillemot at West Westray SPA are from 2012 (BTO, 2025[16]), which reports a productivity rate of 0.24, far below the national average of 0.67 (Horswill and Robinson, 2015[1]). Although there is limited publicly available quantitative data to assess the potential benefits from reducing disturbance, a study at Skomar compared disturbed (open) and undisturbed (protected) plots. The undisturbed plots had a higher average productivity rate for both years monitored (0.75 in 2011, and 0.78 in 2012) compared to the disturbed plots (0.51 in 2011, and 0.53 in 2021) (Kipling, 2013[17]).

6.3.2.20 Under a precautionary assumption that reducing disturbance at West Westray SPA will increase productivity to a lesser degree, it is estimated that the productivity could increase as follows:

- Based on increasing the 0.24 productivity rate by 0.1, the number of annual fledglings could increase from 4,170 to 5,907 (1,737 additional fledglings);
- Based on increasing the 0.67 productivity rate by 0.1, the number of annual fledglings could increase from 11,641 to 13,378 (1,737 additional fledglings); or
- Based on increasing the 0.24 productivity rate to the national average of 0.67, the number of annual fledglings could increase from 4,170 to 11,641 (7,471 additional fledglings).

6.3.2.21 The additional number of 1,737 fledglings under an increase in productivity by 0.1 is greater than the 722.39 increase in fledglings required for the Proposed Development (Offshore) (and 296.41 and 526.39 increase in fledglings for Caledonia North and Caledonia South respectively) as calculated as per the compensation quantum (Table 3-6), illustrating that small increases in productivity achieved from disturbance reduction measures can deliver the number of fledglings required to deliver the compensation quantum. Moreover, the additional number of 4,170 fledglings under an increase in productivity from 0.24 to 0.67 is far greater than the increase in fledglings as calculated as per the compensation quantum (~five, ~14 and ~eight times greater than the calculated compensation quantum for the Proposed Development (Offshore), Caledonia North and Caledonia South respectively) (Table 3-6).

6.3.2.22 Although the above calculations are illustrative only, they show that modest increases in productivity from the reduction in disturbance would be viable to provide compensation for this species. Site-specific calculations of predicted benefits will be presented in the forthcoming IMP.

Puffin

Available Nesting Space

6.3.2.23 The puffin population at West Westray SPA has decreased over the past few decades, decreasing from an estimated 278 individuals in 1999 to 38 individuals in 2017 (Table 6-3). Based on this comparison to historical populations, it is inferred that there is potential space for 240 individuals. Unlike with other species of auk, there is no published correction factor to convert the number of individuals into a population of breeding pairs. As such, a precautionary approach has been taken here, whereby counts of individuals at colonies have been divided by two, to give a number of breeding pairs. Therefore, an additional 240 individuals should be considered equivalent to 120 breeding pairs.

Table 6-3: Puffin individuals at West Westray SPA in 1999 and 2017, figures extracted from the SMP database (BTO, 2025[16]).

Site	1999	2017	Percentage Reduction
West Westray 1	19	1	-95%
West Westray 2	24	17	-29%
West Westray 4	19	Unknown*	Unknown*
West Westray 5	28	8	-71%
West Westray 6	188	11	-94%
Total	278	38	-86%
* No count present for West Westray 4 in 2017.			

6.3.2.24 The identified upper level for additional nesting space required to compensate for puffin is calculated as an additional 6 nests for the Proposed Development (Offshore) (4 nests and 3 nests for Caledonia North and Caledonia South respectively) (as presented in Table 3-6 and calculated through the calculations in Section 3.3). Although the number of nesting spaces specifically impacted by disturbance cannot be fully understood until site visits have been undertaken, this indicative exercise shows that, should the population be returned to its historical peak by implementing the measure there is sufficient nesting spaces at this site to meet the required compensation quantum (~20, ~30 and ~40 times greater available nesting space than the calculated compensation quantum for the Proposed Development (Offshore), Caledonia North and Caledonia South respectively). In addition, benefits can be provided through increasing productivity (as set out below). More precise calculations of potential benefits of selected sites will be provided in the final version of

the IMP upon completion of site selection (see discussion at the start of Section 6.3.2).

Productivity Increase

6.3.2.25 Data on puffin productivity at the West Westray SPA are not available from the SMP, meaning that a worked example specific to this colony cannot be provided for this site. However, at other sites Horswill and Robinson[1] present colony specific productivity rates that demonstrate high levels of variability in productivity that show no correlation with geographical location or colony size, with rates ranging from 0.415 at the Farne Islands to 0.870 at Skomer. Productivity is affected by a range of ecological factors, including human disturbance (see Section 6.3.5), thus appropriate management has the potential to increase productivity at disturbed sites.

6.3.2.26 Based on the published data on the 2024 Isle of May puffin colony size of 52,104 AOBs (BTO, 2025[16]) and productivity of 0.77 (Newell *et al.,* 2025[18]), it can be calculated that a small increase in productivity of 0.05 to a productivity rate of 0.82 would deliver 2,605 additional annual fledglings, which is substantially more than the additional number of fledglings calculated under the compensation quanta (see Table 3-4, a maximum of 3.34 for Proposed Development (Offshore), 2.44 for Caledonia North, and 1.73 for Caledonia South). In other words, very small increases in productivity from the reduction in disturbance would be viable to provide compensation for puffin. An increase to a productivity of 0.87 is considered ecologically realistic, given that historically, productivity on the island has been as high as 0.93 (Newell *et al.,* 2025[15]).

6.3.3 Indirect Impacts on Other Species or Habitats

In their Representations, NatureScot advised they require more consideration of any indirect effects of the measure.

6.3.3.1 Disturbance reduction measures have the potential to impact the wider ecosystem both positively and negatively.

6.3.3.2 As noted in the Compensation Plans, disturbance-reducing measures may also reduce disturbance of predator species such as herring gull (*Larus argentatus*) with a potential risk of increases predation on other breeding seabirds). However, human disturbance can also increase vulnerability to predation by flushing adults from nests, meaning disturbance reduction could also potentially reduce avian predation (Chokri *et al*., 2022[19]). Appropriately designed monitoring will be used in order to establish whether disturbance reduction has any effect (positive or negative) on avian predation rates, and adaptive management implemented where significant negative effects are noted.

6.3.3.3 Furthermore, disturbance reduction measures may also provide non-like for like benefits to other breeding species at the site by improving productivity and/or survival of individuals and in turn increasing recruitment into the population. On islands in Scotland, this could include species such as fulmar and eider.

6.3.3.4 Potential negative impacts on other (breeding) bird species (at all stages of measure development) will be a key design consideration of any measure put forward. For disturbance reduction measures for instance, consideration needs to be given to the fact that installation of infrastructure related to the measure (e.g., signage, footpaths, fencing) around the breeding site has the potential to disturb breeding birds and in turn reduce productivity. However, this impact is temporary and reversible, and can be readily avoided by undertaking any necessary construction at the site outside of the breeding season. Consultation with the steering group will be undertaken where required to ensure negative effects on non-target species are avoided or minimised.

6.3.4 Site Selection Refinement

In their Representations, NatureScot advised they require more detail on which colonies and species would benefit, quantification of existing pressures, how the measure integrates with existing management measures and any landowner agreements.

In their Representations, RSPB advised that whilst the proposed disturbance reduction activities can have a practical effect, little detail is included [in the consent application] regarding how this would actually work.

6.3.4.1 The Applicant is currently in the process of refining site selection through engagement with site managers and the completion of initial site visits. Further details and landowner agreements will be confirmed within the IMP when site selection is complete.

6.3.4.2 Whilst confirmed sites have not yet been identified, potential opportunities have been recognised at the Isle of May and the East Caithness Cliffs through site visits in 2025, the findings of which are summarised below. The Applicant will continue to progress site investigations related to these sites (and others) and continue discussions with the relevant landowners and stakeholders. Final details regarding site selection will be confirmed within the forthcoming IMP (See Volume 8 Appendix 30: Refined Outline Implementation and Monitoring Plan).

Isle of May

6.3.4.3 In June 2025, the Applicant undertook a site visit to the Isle of May to understand the various pressures affecting seabirds and their habitats, see management activities first-hand, and to identify measures which could be deployed elsewhere. Although the visit was not conducted with the aim of delivering measures at the Isle of May, the visit did highlight potential opportunities at the reserve which the applicant viewed as having the potential to alleviate both direct and indirect anthropogenic pressures on seabird populations at their breeding sites, particularly those arising from visitor activity.

6.3.4.4 During the site visits instances of visitor proximity to puffin individuals and burrows were noted, particularly where individuals or groups of visitors remained stationary for extended periods. Puffin with sandeels (presumably recently returned from foraging) were seen nearby in these situations, suggesting potential hesitation or disruption in their return to burrows, within which it was assumed a chick was waiting to be fed. Puffin burrows, as well as occasional eider and large gull nests, were identified along paths in the southern part of the island, highlighting the close interface between visitor routes and nesting habitats.

6.3.4.5 While many visitors adhered to designated paths, areas of heavier foot traffic were observed, particularly at the end of the path leading from the ferry jetty to the South Horn. These areas may be contributing to increased pressure on nearby habitats due to congregation and prolonged presence of visitors. According to 2024 annual report of the Isle of May National Nature Reserve a total of 14,787 people visited the island, compared to 15,603 visitors in 2023 (NatureScot, 2024[20]).

6.3.4.6 Further evidence of visitor-related disturbance was observed during the site visit, particularly in areas where individuals or groups loitered near cliff edges. This behaviour appeared to impede adult seabirds, including puffins, fulmars and eider ducks from returning to nest sites with food, potentially affecting chick provisioning. Additional signs of disturbance included:

- Birds in flight altering their landing routes to avoid human presence; and
- Nesting birds displaying behaviours potentially associated with stress, such as wing adjustments, alert postures, and shuffling, suggesting readiness to flee.

6.3.4.7 These behavioural responses indicate a potentially significant sensitivity to human proximity, especially during provisioning and nesting activities.

6.3.4.8 To inform future management decisions, the Applicant proposes a site-wide visitor tracking study using electronic tags carried by visitors. This study would aim to:

- Map preferred visitor routes and duration of stay at key locations;
- Identify high footfall areas and correlate them with observed seabird responses; and
- Generate actionable data to guide site planning and disturbance mitigation.

6.3.4.9 Based on the outcomes of such a study, potential interventions could include:

- Re-alignment of paths away from high-sensitivity nesting sites;
- Installation of non-intrusive viewing aids, such as unpowered periscopes or solar-powered closed-circuit television (CCTV) units, allowing close observation of seabirds without physical proximity; and/or
- Construction of bird-hides at strategic locations to shield visitors from view and reduce direct disturbance to nesting birds.

6.3.4.10 These measures aim to balance visitor experience with seabird conservation, ensuring that public engagement with the site does not compromise its ecological integrity.

East Caithness Cliffs

6.3.4.11 In June 2025, the Applicant conducted a habitat survey on the landward side of the East Caithness Cliffs SPA, carried out by an ecologist highly experienced in habitat recovery programmes. The aim was to identify potential sites for seabird compensation measures, focusing on guillemot, kittiwake, gannet, and puffin. The survey locations were selected based on a prior desk study. Field observations revealed limited opportunities for implementing compensation measures across most of the East Caithness Cliffs SPA. However, locations potentially suitable for interventions such as disturbance reduction, rabbit and vegetation management, and drainage improvements were identified.

6.3.4.12 The John O'Groats trail runs adjacent to the cliffs and, while generally low in foot traffic, certain features along the coastline attract high localised visitor numbers. The Whaligoe steps area is a popular tourist destination, featuring steps carved into the cliffs leading to an old fishing harbour. During the site visit, the car park was full, and visitor activity was constant. Most visitors only ventured as far as the Elephant Cliff viewing point, which lies outside the grazing fence and adjacent to the cliff edge. Although the path to the harbour is well maintained, the track to the viewing point is rough and informal. The John O'Groats trail continues beyond this point but as stated above this trail sees less foot traffic. The Whaligoe steps area

may be relevant for disturbance management due to its high visitor presence.

6.3.4.13 Further details on the site visit can be found in Volume 8 Appendix 34: East Caithness Cliffs Site Assessment Report (Confidential). The areas identified for potential compensation works warrant further investigation, with further surveys currently in planning.

6.3.5 Other Additional Information

In their Representations, RSPB advised that whilst the proposed disturbance reduction activities can have a practical effect, little detail is included [in the consent application] regarding how it would increase productivity.

Disturbance and Breeding Performance

6.3.5.1 Anthropogenic disturbance is widely recognised as a threat to seabirds and coastal birds, particularly during the breeding season. Effects include impacts on for example incubation, feeding, chick growth, predation rates and ultimately productivity (Fuller *et al.*, 2025)[21]. In addition to affecting nesting success, disturbance can result in habitat avoidance and thereby this reduces nest site availability (Pearce-Higgins *et al.*, 2007)[22]. Recreational activities including walking/hiking, horse-riding, birdwatching and using watercrafts can all contribute to the disturbance of nesting birds (Buckley, 2004[23]).

6.3.5.2 Disturbance responses can range from a visible behavioural change to a non-visible physiological response. The presence of stimuli (i.e., people, dogs, and vessels) close to a colony can be perceived as a predation risk for breeding birds (Frid and Dill, 2002[24]) and as such energy and time can be redirected to vigilance and fleeing (Price, 2008[25]). Disturbance can result in flushing (temporarily or permanently) from nests to escape danger (Carney and Sydeman, 1999[26]; Short, 2020[27]; DTA, 2020[28]). Seabirds nesting at sites that are frequently visited are less likely to flush from nests, for instance kittiwake breeding on the Isle of May have become habituated to the presence of visitors to the site and as such their nesting success has been unaffected by this disturbance (Harris and Wanless, 1995[29]).

6.3.5.3 An increase in anthropogenic activity close to a breeding colony can result nest abandonment temporarily or for the remainder of the season, therefore leaving eggs or chicks vulnerable to predation and/or thermal stress (Frederiksen, 2010[30]; Short, 2020[27]). Guillemot (and razorbill) can be at risk of breeding failure in areas of high disturbance. According to Cairns (1980[31]) higher rate of disturbance impacted chick hatching success for these species compared to undisturbed control plots. Furthermore, at St

Abbs Head, the presence of visitors at colonies during the breeding season was strongly related to reduced productivity in guillemot and kittiwake (Beale and Monaghan, 2004[32]). It should be noted, Beale and Monaghan (2005[33]) and Beale (2007[34]) undertook further analysis via modelling studies to explore how visitor distribution can influence levels of disturbance on breeding kittiwake and guillemot. The results presented by Beale (2007[34]) indicated that spreading visitors evenly across a site versus clustering them in designated zones can affect disturbance sensitivity differently depending on the species. For guillemot, aggregating visitors in small zones can minimize disruption in high-pressure areas, while even distribution is more effective under lower visitor pressure (Beale, 2007[34]). Moreover, for kittiwake, results were inconclusive, reinforcing the need for site-specific guidelines and adaptive management strategies but an even distribution of visitors is recommended (Beale, 2007[34]).

6.3.5.4 Even species considered more tolerant of anthropogenic activity (i.e., gulls) can experience disturbance. For example, kittiwake nest on urban buildings in some European coastal towns without apparent ill effect, and urban colonies often show higher breeding success (Christensen-Dalsgaard *et al*., 2019[35]). However, Skeate (2022[36]) found that breeding numbers of kittiwake in part of the Dunbar Harbour colony declined, indicating that even adaptable species may be vulnerable under certain conditions. Walking and hiking around colonies can disturbance ground nesters (gulls and terns) in particular, due to their proximity to recreational activity (Burger, 1981[37]). As such, a high level of visitor presence concentrated around coastal paths can drive disturbance behaviours to kittiwake and impact reproductive success and productivity.

6.3.5.5 Disturbance impacts are not limited to visually exposed nesters. Although guillemot (and razorbill) nest 'out of sight' on narrow ledges along sheer cliffs, cliff nesting birds can still be vulnerable to of non-visible disturbance such as noise, vibrations, and odours (Watson *et al*., 2014[38]). Dog-walking is a popular recreational activity with a significant impact on birds. Dogs can be disruptive especially when they are off a lead. As per Banks and Bryant (2007[39]) dog-walking in woodlands reduced bird diversity by 31% and caused a 41% reduction in bird abundance. Auks are particularly affected by barking noise with mass flushing events of puffin on the Isle of Staffa (Scotland) caused by dog barking within 10m of the colony (Cully, 2023[40]).

6.3.5.6 Moreover, there is evidence that burrow nesting species (e.g., European storm petrel, *Hydrobates pelagicus*) experience lower reproductive success on islands frequently visited by tourists (Watson *et al*., 2014[38]). Although their nests are hidden, elevated stress levels in adults (measured via corticosterone levels) were linked to increased nest abandonment and reduced chick survival (Watson *et al*., 2014[38]). Similarly, studies on petrels have demonstrated that disturbed chicks exhibit slower growth and

reduced body mass, suggesting long-term fitness consequences (Soldatini *et al*., 2015[41]). These effects are driven by increased baseline stress hormone levels in adults, which in turn affect parental care behaviours.

6.3.5.7 Similarly, Stearns (1992[42]) described gannet as highly prone to abandoning nests under frequent disturbance, and DTA (2020[28]) estimated that human presence contributes to the annual loss of approximately 40 gannet chicks at Bass Rock. In addition, species like little tern (*Sternula albifrons*) and sandwich tern (*Thalasseus sandvicensis*) are especially vulnerable, with several breeding sites having been lost entirely due to sustained human pressure (Mitchell *et al*., 2004[43]; Forrester *et al*., 2007[44]; Furness *et al*., 2024[45]).

6.3.5.8 Photographers are most likely to closely approach colonies compared to regular visitors (Allbrook and Quinn, 2020[46]). According to Aas *et al*. (2023[47]) there were 44 incidents of illegal or potentially harmful behaviour towards seabirds over a 20-day period during peak birdwatch season at Hornøya. Most were photographers and frequent behaviour was to ignore no access signs, crossing ropes and general disturbance in the vicinity of nests. Similarly, disturbance of cliff nesting seabirds at the Isle of May, which was mainly caused by photographers leaving the path (Harris and Wanless, 1995[29]). Without any visitor management protocol in place there can be an increase in avoidable disturbance incidents.

6.3.5.9 Beyond nesting, human activity affects foraging behaviour, which indirectly influences breeding success. Increased disturbance can contribute to a high proportion of energy being invested into anti-predation behaviours, such as vigilance and avoidance (flushing), rather than parental activities or resource acquisition, thus impacting survival and productivity rates (Frid and Dill, 2002[24]; Buckley, 2004[23]). A study in Malaysia found that humans accounted for nearly 48% of disturbances to shorebirds and waterbirds, causing many birds to stop feeding and either flee or remain alert, thereby reducing foraging efficiency (Ramli and Norazlimi, 2017[48]). These behavioural changes can result in lower energy intake and affect parental provisioning rates, which are critical for chick survival (Ramli and Norazlimi, 2017[48]).

6.3.5.10 Recreational watercrafts, including tourist boats, motorboats, canoes, and jet skis can also significantly reduce seabird breeding success (Buckley, 2004[23]). The proximity and duration of watercraft presence near colonies are key factors influencing disturbance levels. As per Marcella *et al*. (2017[49]), 68% of Kittlitz's and marbled murrelets (*Brachyramphus brevirostris* and *B.marmoratus*) were disturbed (flushed or dived) when cruise ships approached within 850m. Furthermore, boat-based tourism reduced foraging activity and displaced birds from critical feeding areas (Velando and Munilla, 2011[50]). Guillemot (and razorbill) displayed alarm behaviour and ceased breeding/feeding when boats approached within 22m (Hearne, 1999[51]). Disturbance responses can occur even at 200m

(Blanchard, 1994[52]; Chardine *et al*., 1998[53]; Lavers *et al*., 2020[54]; Ainley *et al*., 2021[55]).

6.3.5.11 Loud noises from tour boats, such as shouting and music, intensified disturbance particularly for razorbill (Hearne, 1999[51]). Fast-moving boats often cause birds to flush, but slow, non-motorised craft (e.g., kayaks) can be equally or more disruptive due to prolonged presence and frequent stops. A single kayak approaching within 30m caused 600 Brandt's Cormorant (*Phalacrocorax penicillatus*) to flush (Acosta *et al*., 2008)[56]. Moreover, Great and Snowy Egret (*Ardea alba* and *Egretta thula*, respectively) were more likely to flush due to extended visits by slow-moving craft (Stolen, 2003[57]).

6.3.5.12 Additionally, stand-up paddleboarding poses a growing threat as they allow close, prolonged access to colonies. The upright posture of paddlers is more visually intrusive, triggering stronger flight responses compared to seated individuals in kayaks or boats (Baker *et al*., 2021[58]; Kleiner and Hunxkier, 2023[59]).

6.3.5.13 Each of the key species for the Proposed Development (Offshore) (kittiwake, gannet, guillemot and puffin) are negatively impacted by human disturbance. For further details see Section 5.8 and 5.9 in the Caledonia North Compensation Long List and Short List (Application Document 15, Appendix 15-2) and in the Caledonia South Compensation Long List and Short List (Application Document 16, Appendix 16-2).

6.3.5.14 Considering this, a variety of disturbance-reduction measures have been implemented at breeding sites/SPAs to mitigate impacts on productivity including the introduction of wardens, signs and fencing. Batey (2013)[60] undertook a review of several disturbance management techniques and grouped the measures in one of the following categories:

- Access management (e.g., path management, limiting visitor numbers);
- Habitat management (e.g., habitat improvement or creation); and
- Public education and enforcement (e.g., signage, leaflets, wardens).

6.3.5.15 Of these, wardens and signage were the most implemented measures in areas with high visitor pressure (Batey, 2013[60]). The combination of education and enforcement through leaflets, signage, and wardens was found to be effective in reducing disturbance. However, Batey (2013[60]) also noted there is a lack of consistent monitoring, which can make it difficult to determine the effectiveness of specific measures in reducing disturbance and in turn improving productivity. However, there is clear evidence of disturbance reduction measures successfully improving habitat use, productivity and population sizes. Pearce-Higgins *et al.* (2007[22]) showed that the creation of surfaced footpaths increases habitat use in disturbed areas. A review by Fuller *et al.* (2025[21]) showed that fencing, closures, warden enforcement and education (e.g. signage, flyers) are successful in

improving productivity and populations in shorebirds and seabirds, and that combining multiple disturbance-reduction approaches is particularly effective. Michel *et al.* (2021[61]) showed that for four of 12 target coastal species population trends were more positive, and two to 34 times greater, at sites where disturbance reduction was actively managed compared to at other protected sites. Furthermore, five species showed more positive trends at disturbance-managed sites compared to unprotected sites, and no species had more negative trends than at unprotected sites (Michel *et al.*, 2021[61]).

6.3.5.16 In summary, human disturbance negatively affects seabird breeding performance, though the severity can vary across sites and species. There is evidence of behavioural and physiological impacts on several species including those key to the Proposed Development (Offshore), with long-term implications for population viability. However, management strategies such as signage, public outreach, and warden presence have shown to benefit breeding birds and reduce the impacts of disturbance, especially when tailored to local visitor behaviours and species sensitivity. Effective conservation will require adaptive, species-specific approaches, informed by ongoing monitoring and engagement with the public.

6.4 Mammalian Predator Management and Eradication

In their Representations, RSPB noted that the Applicant suggested that the development of an existing predator control programme is more beneficial than individual project-based proposals, but that no detailed proposals were put forward.

6.4.1 Overview

6.4.1.1 Since the consent applications were submitted, the Applicant has partnered with National Trust for Scotland (NTS) and Muir Mhòr OWF to develop a programme of predator control and biosecurity on NTS islands. NTS owns and manages seven of the 25 islands which are deemed a priority for predator control.[62] NTS is looking to expand its biosecurity and predator control efforts across multiple seabird islands, and a collaborative programme with Caledonia and Muir Mhòr can provide the resources to realise this, whilst at the same time being a substantial opportunity to provide a pilot programme which could be scaled up to deliver strategic compensation measures involving a larger group of developers, sites and target species. By delivering this measure through a collaborative programme, rather than undertaken by the Applicant independently, benefits can be maximised and scalability ensured. Caledonia and Muir

Mhòr are looking to commit to operating the project for a duration of, at a minimum, 35 years.

6.4.1.2 A letter of intent from NTS has been received by the Applicant (Volume 8 Appendix 33), and an MoU has been signed between Caledonia and Muir Mhòr. Both developers are working with NTS to refine the programme plans. The sites for implementation of this measure are currently under consideration by NTS, and will be decided upon with both Caledonia and Muir Mhòr over the coming months. A joint Implementation Plan is being drafted during the remainder of 2025 (to be refined post-consent), within which further information on the scale of the measure and priority islands for implementation will be set out. See Volume 8 Appendix 30: Refined Outline Implementation and Monitoring Plan for indicative timelines for measure refinement and implementation.

6.4.1.3 Discussions are also underway for Caledonia and Muir Mhòr to provide the funding for a full-time coordinator for the predator control programme. This dedicated role provides focused capacity to ensure the planning and implementation of the measure is carried out as efficiently and swiftly as possible. The Implementation Plan will include details on the programme coordinator role and governance of the role.

6.4.1.4 To evidence the extent to which the measure is contributing to meeting Caledonia and Muir Mhòr OWFs individual compensation requirements, it is essential that a methodology is developed to split and attribute the delivered compensation to Caledonia and Muir Mhòr OWFs separately and proportionately. Discussions on this methodology are underway, and the joint Implementation Plan will therefore also include information and agreements on how the compensation delivered through the joint NTS measure will be divided and attributed to Caledonia and Muir Mhòr's compensation quanta.

6.4.1.5 As set out in the NTS letter of intent (Volume 8 Appendix 33), in addition to delivering predator control and biosecurity, the partnership between NTS, Caledonia and Muir Mhòr provides a substantial opportunity for a wider (scalable) programme of seabird conservation. Opportunities for additional beneficial activities to improve seabird numbers and productivity will thus be discussed within the partnership, and where identified will be presented in the joint Implementation Plan and consulted upon in due course.

6.4.2 Predicted Benefits and Scale

In their Representations, NatureScot advised that further evidence is required to show that the measures can compensate for the predicted losses.

6.4.2.1 The management and eradication of mammalian predators was deemed suitable to be taken forward for next steps for compensation development for all species (kittiwake, gannet, guillemot and puffin).

6.4.2.2 As site selection is not currently finalised (see Section 6.4.3) example colonies from the initial short-listed sites (Application Document 15, Appendix 15-3: Caledonia North Compensation Plan and Site Selection and Application Document 16, Appendix 16-3: Caledonia South Compensation Plan and Site Selection) have been used to demonstrate the potential benefits from the predator eradication measure. Since most of the species for which compensation is required are known to occur at West Westray and Fair Isle, these sites have been selected to demonstrate the potential benefits of this measure.

6.4.2.3 It is noted that these scenarios are illustrative to provide confidence that benefits can be provided from the predator control measure, based on the evidence that predation reduces productivity and habitat availability (see Application Document 15, Appendix 15-3: Caledonia North Compensation Plan and Site Selection and Application Document 16, Appendix 16-3: Caledonia South Compensation Plan and Site Selection).

6.4.2.4 Predator management and/or eradication has the potential to benefit seabird populations through both an increase in available nesting space and an increase in productivity (see Section 3). As discussed in further detail in Section 6.3.2, it is important to acknowledge that in addition to predation, there are numerous other ecological factors that affect seabird nest-site use and productivity. This ecological complexity makes the quantification of benefits challenging, however additional baseline data collection on predation pressures, breeding performance and (unused) breeding habitats will aid improved understanding and more precise benefit estimates. As site selection continues, refined (and eventually finalised) predicted benefits and scale will be provided in the joint Implementation Plan being drafted by Caledonia, Muir Mhòr and NTS (see Volume 8 Appendix 30: Refined Outline Implementation and Monitoring Plan for indicative timelines for measure refinement and implementation).

6.4.2.5 In the sections below, indicative comparisons of current populations to historical counts have been undertaken to identify the potential available habitat not currently being used by each seabird species, and to provide worked examples evidencing how potential increases in nesting space availability can deliver compensation from the implementation of predator management.

6.4.2.6 To calculate benefits from an increase in productivity, the methods presented in Section 6.3.1 have been applied.

Kittiwake

Available Nesting Space

6.4.2.7 The kittiwake population at West Westray SPA has decreased over the past few decades, decreasing from an estimated 34,864 AON in 1999 to 2,755 AON in 2017 (Section 6.3.1; Table 6-1). Based on this comparison to historical populations, it is therefore inferred that there is potential space for 32,109 nests which are not currently being occupied. It is noted that within the 2023 count, West Westray 2 has further decreased by an additional 336 pairs to 1,486 AON, however the other sites were not monitored that year.

6.4.2.8 The identified upper level for additional nesting space for kittiwake is calculated as an additional 92 nests for the Proposed Development (Offshore) (53 nests and 65 nests for Caledonia North and Caledonia South respectively) (as presented in Table 3-6 and calculated through the calculations in Section 3.3). Although the number of nesting spaces specifically currently impacted by predators cannot be fully understood until site visits have been undertaken, this indicative exercise shows that there is the potential to deliver kittiwake compensation at this site, and that there are more available nesting spaces than the required compensation quantum (~350, ~605 and ~494 times greater available nesting space than the calculated compensation quantum for the Proposed Development (Offshore), Caledonia North and Caledonia South respectively).

Productivity Increase

6.4.2.9 As set out in Section 6.3.1 with a productivity increase scenario calculation for Isle of May, small increases in productivity can readily deliver the required compensation quanta.

6.4.2.10 Given that predation of kittiwake and resulting effects on the population have been reported at UK sites, including St Abb's Head (managed by NTS), it is highly plausible that the proposed NTS measure can be implemented to benefit kittiwake productivity. As set out above, implementation sites are currently under consideration by NTS, and

benefits for kittiwake (and other seabird species) can be calculated more precisely upon site selection.

Gannet

Available Nesting Space

6.4.2.11 The gannet population at Fair Isle SPA has increased greatly over the past five decades, increasing from an estimated 258 individuals in 1986 to the highest ever recorded, 5,592 individuals, in 2024. A link between an implemented measure and further increases in colony size, without extensive additional study beyond the scope of the project, would not be possible. As such, any calculation of benefits from a measure implemented for gannet at this colony would likely be based solely on increases in productivity.

Productivity Increase

6.4.2.12 The most recently available productivity rates for gannet at Fair Isle SPA from 2024 reports an average productivity rate of 0.57 (range between 0.47 and 0.67) (BTO, 2025[16]), which is below the national average of 0.7 (Horswill and Robinson, 2015[1]). There is the potential that predators could have influenced the productivity rates at these plots, however this cannot be confirmed until site visits have been undertaken.

6.4.2.13 As such, there is likely to be some opportunity to improve productivity at this SPA. For example, increasing the average productivity from 0.57 to 0.7 could increase the number of annual fledglings per year from 3,187 to 3,914 (based on the 2024 count of 5,592 breeding pairs). The potential for an additional number of 727 fledglings is far greater than the 30.51 increase in fledglings for the Proposed Development (Offshore) (and 11.41 and 22.40 increase in fledglings for Caledonia North and Caledonia South respectively) as calculated as per the compensation quanta (Table 3-6).

Guillemot

Available Nesting Space

6.4.2.14 The guillemot population at West Westray SPA has decreased greatly over the past few decades, decreasing from an estimated 54,728 individuals in 1999 to 28,679 individuals in 2017 (Section 6.3.1; Table 6-2). Based on this comparison to historical populations, it is inferred that there is potential space for over 26,000 individuals which is not currently being occupied. To convert the number of individuals into breeding pairs (and therefore to demonstrate the potential of the measure in breeding pairs) the number of individuals is multiplied by a conversion factor of 0.67, obtained from Walsh *et al.* (1995[63]). Therefore, returning the West Westray SPA to its historic peak population would deliver the equivalent of 17,452 breeding pairs as compensation.

6.4.2.15 The identified upper level for additional nesting space for guillemot is calculated as an additional 1,075 nests for the Proposed Development (Offshore) (441 nests and 784 nests for Caledonia North and Caledonia South respectively) (as presented in Table 3-6). Although the number of nesting spaces specifically impacted by predators cannot be fully understood until site visits have been undertaken, this indicative exercise shows that there is the potential to deliver guillemot compensation at this site (~16, ~40 and ~22 times greater available nesting space than the calculated compensation quantum for the Proposed Development (Offshore), Caledonia North and Caledonia South respectively).

Productivity Increase

6.4.2.16 As discussed in Section 6.3.1, the most recently recorded productivity rate at the example site of West Westray SPA is far below the national average. Reducing pressures at this site and increasing productivity to the national average could increase the annual number of fledglings by over 7,000. Detailed scenarios of increases of guillemot productivity are provided Section 6.3.2, which show that modest increases in productivity would provide the required compensation quantum for this species.

Puffin

Additional Nesting Space

6.4.2.17 The puffin population at West Westray SPA has decreased over the past four decades, decreasing from an estimated 278 individuals in 1999 to 38 individuals in 2017 (Section 6.3.1; Table 6-3). Based on this comparison to historical populations, it is inferred that there is potential space for 240 individuals. Unlike with other species of auk, there is no published correction factor to convert the number of individuals into a population of breeding pairs. As such, a precautionary approach has been taken here, whereby counts of individuals at colonies have been divided by two, to give a number of breeding pairs. Therefore, an additional 240 individuals should be considered equivalent to 120 breeding pairs.

6.4.2.18 The identified upper level for additional nesting space for puffin is calculated as an additional 6 nests for the Proposed Development (Offshore) (4 nests and 3 nests for Caledonia North and Caledonia South respectively) (as presented in Table 3-6 and calculated through the calculations in Section 3.3). Although the number of nesting spaces specifically impacted by predators cannot be fully understood until site visits have been undertaken, this indicative exercise shows that, should the population be returned to its historical peak by implementing the measure there is sufficient nesting spaces at this site to meet the required compensation quantum (~20, ~30 and ~40 times greater available nesting space than the calculated compensation quantum for the Proposed Development (Offshore), Caledonia North and Caledonia South

respectively). In addition, benefits can be provided through increasing productivity (as set out below). Further discussion surrounding potential benefits of selected sites will be provided in the final version of the IMP.

Productivity Increase

6.4.2.19 As set out in Section 6.3.1 with a productivity increase scenario calculation for Isle of May, very small increases in productivity can readily deliver the required compensation quanta for puffin. Indirect Impacts on Other Species or Habitats

In their Representations, NatureScot advised they require more consideration of any indirect effects of the measure.

6.4.2.20 Predator eradication and/or control programmes have the potential to impact the wider ecosystem both positively and negatively. For instance, non-target species can be impacted, through direct consumption of poison bait (primary) or via the consumption of a poisoned individual (secondary). And as such mitigation needs to be considered to reduce the risk to non-target species.

6.4.2.21 It should be noted that birds (particularly corvids and raptors) can be particularly sensitive to poisoning during predator eradication/control programmes. To mitigate this, adaptions were made to the bait stations at Canna (e.g., corvid proof lids) to prevent access to bait by corvids (Bell, 2004[64]; Bell *et al*., 2011[65]). Moreover, diversionary feeing for white-tailed eagle (*Haliaeetus albicilla*) were implemented on the Shaint Isles during an eradication programme[i]. The risk can be minimised further through regular collection and disposal of dead or dying individuals from the target population.

6.4.2.22 Seabirds are unlikely to either directly consume bait, or to consume dead or dying rodents as their diet of primarily marine fish and invertebrates. However, the poison could be introduced to the site outside of the breeding season to further reduce the risk to breeding seabirds at the site.

6.4.2.23 Furthermore, there is evidence to suggest other seabird species can benefit from predator control programmes at the target site and at nearby colonies. Between 2002 and 2004, a project to improve conditions on the island for puffin and European storm petrel was established. As part of this improvement project brown and black rats were eradicated from Lundy Island in the (UK) Bristol Channel. Following the eradication, guillemot and razorbill populations increased by 321% and 272%, respectively, between 2000 (before eradication) and 2021 (after the island was declared rat free) (Ørsted, 2021[66]). In addition, populations of guillemot and razorbill also

[i] Identified through grey literature: Wildlife Management International Facebook post [Posted 03 November 2015].

increased at nearby colonies (Skomer and Castlemartin Coast). Between 2000 and 2017, guillemot populations increased by 79% (Skomer) and 94% (Castlemartin Coast), while the razorbill populations increased by 93% and 32%, respectively. It should be noted that whilst relatively large, these changes were not as great as that reported on Lundy Island with an increase of 164% (guillemot) and 83% (razorbill) recorded at Lundy Island between 2000 and 2017 (Ørsted, 2021[66]).

6.4.2.24 The installation of predator exclusion fencing around the breeding site has the potential to disturb breeding birds and in turn reduce productivity. However, this can be avoided by undertaking any necessary construction at the site outside of the breeding season.

6.4.2.25 There is potential that plants and other flora/habitats could be damaged during the construction of predator exclusion fencing. However, these impacts are likely to be of small spatial scale, temporary and can be reduced through mitigation (e.g., careful selection and use of access routes, limited vehicle size and usage and replacing turves following the fence installation). Additionally, the presence of the fence has the potential to change plant assemblages and habitats within the fenced are as a result of the exclusion of grazing animals. And as such a grazing regime or maintenance scheme may need to be introduced.

6.4.3 Site Selection Refinement

In their Representations, NatureScot advised they require more detail on which colonies and species would benefit, which predators would be targeted (and evidence of their impacts), how the measure integrates with existing management measures and any landowner agreements.

6.4.3.1 As set out in paragraph 6.4.1.2, the sites for implementation of this measure are currently under consideration by NTS, and will be set out in a joint Implementation Plan being drafted during the remainder of 2025, within which further information on the scale of the measure and priority islands for implementation will be set out. See Volume 8 Appendix 30: Refined Outline Implementation and Monitoring Plan for indicative timelines for measure refinement and implementation.

6.4.4 Other Additional Information

6.4.4.1 The available research demonstrates that mammalian predation poses a significant threat to seabird breeding success, including guillemot, razorbill, puffin, and herring gull. Predation has been identified as a leading cause of breeding failure, with studies showing that predator control, especially rat eradication, can lead to substantial population recovery. On Lundy Island,

the removal of brown and black rats between 2002 and 2004 resulted in dramatic increases in seabird populations: guillemot and razorbill numbers rose by 321% and 272%, respectively, while puffin numbers surged from just 13 individuals in 2000 to an estimated 1,335 by 2024 (Ørsted, 2021[66]). These increases were linked to colonisation of previously unoccupied nesting habitats that had been vulnerable to predation. Similar population growth was observed at neighbouring colonies, reinforcing the regional benefits of predator management (Ørsted, 2021[66]).

6.4.4.2 Both lethal methods (e.g., rodenticides in bait boxes) and non-lethal approaches (e.g., exclusion fencing) have proven effective, with island eradication programmes showing the greatest success. Predator control has also improved breeding productivity for herring gulls, particularly where red fox (*Vulpes vulpes*) predation was mitigated (Mavor *et al*., 2001)[67]. Globally, predator management has yielded positive outcomes at seabird colonies, including those in New Zealand and other regions (Towns and Broome, 2003[68]; Rayner *et al*., 2007[69]). Invasive mammals such as rats, feral cats, and mink are known to predate seabird eggs, chicks, and adults (Latorre *et al*., 2013[70]; Ratcliffe *et al*., 2010[71]; Doherty *et al*., 2016[72]), and their removal has consistently led to improved breeding outcomes.

6.4.4.3 While kittiwakes are less affected due to their cliff-nesting habits, they remain vulnerable in accessible locations (Luxmoore *et al*., 2019[73]; Furness, 2021[74]), and further research is needed to assess predator pressures at Scottish colonies. Should opportunities to benefit kittiwake using predator control and biosecurity measures be identified through the refinement of the NTS measure, the Applicant is open to exploring and supporting activities related to this species.

6.4.4.4 Biosecurity measures are essential to maintain the long-term success of eradication efforts. Overall, predator control, eradication and biosecurity implementation are viable and effective conservation strategies that can deliver substantial benefits for seabird populations across national and Natura 2000 site networks. For further details, see Application Document 15, Appendix 15-3: North Compensation Plan and Site Selection and Application Document 16, Appendix 16-3: South Compensation Plan and Site.

6.4.4.5 Furness *et al*. (2024[45]) identified mammalian predators (particularly rats) as one of the major threats to breeding seabird colonies in Scotland. This report highlighted the need to for the eradication of mammalian predators from islands, the introduction of predator exclusion fences to protect mainland nesting habitat and biosecurity measures to prevent reintroduction of predators (Furness *et al*., 2024[45]).

6.4.4.6 Biosecurity for Scotland works alongside island managers, communities and others responsible for biosecurity checks and predator control measures across 38 island SPAs (Biosecurity for Life, 2025[75]). The Shiant

Isles, Handa Island, Canna and Sanday, Isle of May, Rum, and St Kilda SPAs are among these 38 SPAs, each of which face varying levels of predation. For example, rats have been successfully eradicated from the Shiant Isles and Canna and Sanday leading to the recovery of species like Manx shearwater and European storm petrel. Others, including Handa Island and Isle of May, remain under active biosecurity surveillance to prevent incursions that could endanger razorbill, puffin, and other burrow-nesting seabirds. Furthermore, Rum and St Kilda also maintain ongoing monitoring due to historical and/or current potential predator presence (Biosecurity for Life, 2025[75]).

6.5 Bycatch Mitigation

6.5.1 Overview

6.5.1.1 Bycatch mitigation was deemed suitable to be taken forward for next steps for compensation development for gannet and guillemot. See the Compensation Plan for Caledonia North and South (Application Document 15, Appendix 15-3 and Application Document 16, Appendix 16-3) for further information on the proposed measure, with additional information provided in the sections below.

6.5.2 Predicted Benefits and Scale

In their Representations, NatureScot advised that further evidence is required to show that the measures can compensate for the predicted losses.

6.5.2.1 The benefits of the bycatch reduction measure will be dependent on the fishery identified. Further exploration into guillemot and gannet bycatch is ongoing, and the predicted benefits from implementing bycatch mitigation will be confirmed within the final version of the IMP.

6.5.2.2 Further details are provided below to provide confidence in delivering bycatch reduction in Scotland.

Seabird Bycatch

6.5.2.3 Bycatch from commercial fishing activity is acknowledged as a global concern for seabirds (Žydelis *et al.*, 2013[76]; Anderson *et al.*, 2011[77]; Miles *et al.*, 2020[78]), with approximately 100 species impacted globally. Within European waters the most affected seabird species (number of bycaught individuals annually) are guillemot (>31,000), fulmar (*Fulmarus glacialis*) (>22,000) and gannet (>18,000) (Ramírez *et al.*, 2024[79]). As such bycatch

is one of the top three threats to seabird populations worldwide alongside habitat loss and invasive species (Dais *et al*., 2019[80]).

6.5.2.4 Gannet were identified to be within the top ten (out of 53) species vulnerable to bycatch by surface, pelagic and benthic fishing gears (Bradbury *et al*., 2017[81]). According to Northridge *et al*. (2020[12]) hundreds of gannet are bycaught each year within UK fisheries, with 220 birds bycaught during 2016 and a further 241 birds the following year (2017) within longline fisheries. In addition, gannet bycatch has been observed in coastal static nets on a smaller scale, with 117 birds bycaught in 2016 and 102 birds in 2017 (Northridge *et al*., 2020[12]).

6.5.2.5 Gannet can utilise surface feeding and are also plunge divers, diving from heights of 30m to depths of up to 20m (JNCC 2021[82]; Wildlife Trust 2021[83]; Garthe *et al*., 2007[84]) to feed on high-energy prey (e.g., sandeels, *Ammodytes* sp.) (Hamer *et al*., 2007[85]), therefore individuals are unlikely to notice certain fishing gears prior to diving. Furthermore, individuals have been observed feeding on fisheries discards and as such are attracted to active fishing vessels (JNCC, 2021[82]) which increases their risk of bycatch.

6.5.2.6 Guillemot have also been identified as particularly vulnerable to bycatch, according to the risk assessment model used in Bradbury *et al*. (2017[81]). This species are within the top ten (of 53) of the most sensitive species to bycatch by surface, pelagic, and benthic fishing gear according to Bradbury *et al*. (2017[81]). Approximately 1,800 to 3,300 guillemot are estimated to be caught annually in UK vessels in UK waters, predominantly within coastal net fisheries (Northridge *et al*., 2020[12]).

Trawls

6.5.2.7 Guillemot were among the three species identified by Northridge *et al*. (2020[12]) to be vulnerable to bycatch within mid-water trawl fisheries in UK waters. Although, the level of bycatch is thought to low and as such it is not considered a conservation concern. The primary cause of bycatch is likely net entanglement rather than warp cable strikes, due to the birds' size. Bycatch typically occurs during active trawling when the trawl headline is near the surface, potentially flushing birds that then dive and become caught in the net. Some incidents may also happen during net hauling in these cases Anderson *et al*. (2022[92]) recommends safe retrieval and handling of live individuals is key. Anderson *et al*. (2022[92]) also highlighted effective mitigation measures may be limited within this type of fishery. Furthermore, given the low numbers involved, other fisheries may warrant higher priority for bycatch reduction. However, targeted monitoring, such as using cameras, could help better understand how bycatch occurs and inform future reduction techniques (Anderson *et al*., 2022[92]).

Longlines

6.5.2.8 According to Northridge *et al*. (2023[86]), seabird bycatch within longline fisheries is concentrated around north and west Scotland. This is likely due to the concentration of longline fishery effort within Scottish waters, specifically within the International Council for the Exploration of the Sea (ICES) divisions IVa (4.a.) and VIa (6.a.) (Northridge *et al*., 2020[12]) and along the shelf break at the end of the continental shelf north and west of Scotland during the summer and winter (Bradbury *et al*., 2017[81]).

6.5.2.9 As per Northridge *et al*. (2020[12]) hundreds of gannet are bycaught annually with most deaths occurring in longlines in ICES division 6.a. off the west coast of Scotland (and 4.a. in static nets). Furthermore, annual reports produced by the bycatch monitoring programme (BMP), starting from 2011, reported a total of 13 gannet have been bycaught between 2013 and 2019 within UK waters. It should be noted sampling of longline fisheries by the BMP only began in 2010 and as such the overall coverage of longline fisheries is relatively low (Northridge *et al*., 2023[86]).

6.5.2.10 The most recent BMP report, published in 2023, reflects data collected in 2020 (Kingston *et al*., 2023[87]). This and the 2019 report (Kingston *et al*., 2021[88]) are the only additional datasets published not included in the Northridge *et al*. (2020[12]) review (covered 1996 to 2018). The available 2020 data shows limited coverage, with a total of 130 hauls (88 nets, 4 ring nets, 28 long-lines, 10 pelagic trawls) sampled across the UK ICES divisions. Within the divisions considered to be most relevant to the Proposed Development (Offshore) (spatially), divisions IVa (4.a.) and IVb (4.b.), no hauls were sampled in 2020. The 28 longlines observed in 2020 occurred with division Via (6. a.) off the west coast of Scotland, seven gannet were recorded as bycatch within these longlines. And across all hauls sampled in 2020, a total of 20 seabirds were bycaught; 12 fulmar, 7 gannet and 1 cormorant (*Phalacrocorax carbo*).

6.5.2.11 It should be noted, the Covid-19 pandemic significantly impacted sampling in 2020. However, the previous report published in 2021, which presents data collected in 2019, also reveals limited coverage, with a total of 545 hauls (497 nets, 7 ring nets, 35 long-lines, 6 pelagic trawls) sampled across the UK ICES divisions (Kingston *et al*., 2021[88]). Within division 4.a., a total of 34 longlines were sampled in 2019 across which a total of 91 seabird were bycaught (89 fulmar, 1 great skua (*Stercorarius skua*) and 1 gannet (Kingston *et al*., 2021[88]).

6.5.2.12 More recently, 21 gannet (out of 332 bycaught birds) were recorded as bycatch within the Greater North Sea region (ICES divisions 4.a – c.) during 2022, 4 of which were observed in a longline fishery (ICES, 2024)[89]. According to the results presented in ICES (2024[89]) between >1,000 and 3,000 days at sea were recorded by longline fisheries within the Greater North Sea region, but only 20 to 50 days of observer effort were recorded in division 4.a.(no data was available for division 4.b.) (ICES, 2024[89]).

Overall, a monitoring coverage of longlines in division 4.a. was reported to be 0.363% (ICES, 2024[89]).

6.5.2.13 Outside of Scottish waters, there are scattered records of gannet bycatch around the UK reported particularly in the south-west of England and the outer Thames estuary (Bradbury *et al*., 2017[81]). Furthermore, a further three ICES divisions (VIIb (7.b.), VIIc (7.c.) and VIIj (7.j.)), located off the west and southwest coast of Ireland, were deemed to be important areas for gannet longline bycatch with 91 birds bycaught in 2016 and a further 80 birds in 2017 (Northridge *et al*., 2020[12]).

Static Nets

6.5.2.14 In Scotland, England and Ireland there is extensive evidence of seabird bycatch in gillnets. Žydelis *et al*. (2009[90]) reported evidence of auk bycatch in gillnet fisheries operating off 'north-east' Scotland. This is confirmed in Northridge *et al*. (2020[12]), showing guillemot bycatch is concentrated around Shetland and off southwest England, with approximately 1,600 to 2,500 guillemot bycaught per year in UK coastal net fisheries.

6.5.2.15 Static net fishery effort accounts for the majority of the data within the UK BMP dataset and that presented by Northridge *et al*. (2020[12]) (71% in 2020 to 95% in 2016). According to the 2020 UK BMP data, a total of 92 nets (88 nets and 4 ring nets) were sampled within division 6.a. (west of Scotland) no guillemot were recorded as bycatch within these nets. The only observed bycatch within the sampled nets was a single cormorant in a tangle net. As noted above the Covid-19 pandemic impacted the level of sampling that could be undertaken in 2020. Guillemot bycatch was recorded in previous years ranging from 30 birds in 2016 (29 in gillnets and one in a tangle net) to eight in 2014, 2018 and 2019.

6.5.2.16 A total of 1,150 hauls (1,094 static nets, 27 long-lines, 29 pelagic trawls) were sampled across the UK ICES divisions in 2016 (Northridge *et al*., 2017[91]). Within division 4.a., no nets were sampled. The 29 bycaught guillemot were recorded within divisions VIIe (7.e.), VIIf (7.f.) and VIIg (7.g.), with 14, 15 and one guillemot recorded respectively by division (Northridge *et al*., 2017[91]).

6.5.2.17 In 2019, a total of 545 hauls (497 nets, seven ring nets, 35 long-lines, and six pelagic trawls) were sampled across UK waters (Kingston *et al*., 2021[88]). Within division 4.a., no nets were sampled. The eight bycaught guillemot were recorded within divisions 7.e. and 7.f., with one individual in recorded in a gillnet and the remaining seven in tangle nets (Kingston *et al*., 2021[88]).

6.5.2.18 More recently, two guillemot and two unidentified *Alcidae* (out of 332 bycaught birds) were recorded as bycatch within the Greater North Sea region (ICES divisions 4.a - c.) during 2022. All four were observed in a static net fishery (ICES, 2024[89]). According to the results presented in

ICES (2024[89]) between 10,000 and 25,000 days at sea were recorded in net fisheries within the Greater North Sea region, but only 100 to 500 days of observer effort were recorded in region. Overall, a monitoring coverage of nets in division 4.b. was reported to be 1.611% while a coverage of 0.690 of seine nets in division 4.a.(ICES, 2024[89]).

Benefits

6.5.2.19 Further monitoring is required to identify the scale of bycatch for both guillemot and gannet in Scottish fisheries. As discussed above, there is the potential for high levels of bycatch for both species, however the scale of monitoring is low in comparison to the total fishing effort, therefore there is a high level of uncertainty around the total bycatch estimates (i.e. bycatch could be much higher or lower than predicted).

6.5.2.20 Further research into gannet and guillemot bycatch will continue to be undertaken to refine the measure and provide further confidence on delivering bycatch reduction as a compensation measure, building on the information from the literature review above and the trial studies presented in Section 6.5.4 below.

6.5.3 Indirect Impacts on Other Species or Habitats

In their Representations, NatureScot advised they require more consideration of any indirect effects of the measure.

6.5.3.1 Bycatch reduction measures have the potential to benefit not only the key species to the Proposed Development (Offshore) but also a wider range of seabird species and other taxa (e.g., marine mammals).

6.5.3.2 However, there is evidence to suggest bycatch reduction techniques may reduce bycatch rates of some species while others may increase. For example, Anderson *et al*. (2022[92]) noted night setting can be an effective bycatch reduction technique. However, consideration should be given to species including northern fulmar that may be at higher risk of bycatch at night. Kennedy and Sigurdsson (2024[93]) noted that depth restrictions can reduce bycatch rates of bird species, however, bycatch rates may increase for other species following the implementation of such measures, particularly for deeper diving animals. Moreover, Sigurdsson (2023[94]) caveated the use of net illumination as a bycatch reduction technique as some species may be attracted to light emitting diodes (LEDs) on nets which in turn would increase their risk of bycatch, particularly during net hauling and setting.

6.5.3.3 It should be noted, net illumination techniques namely, chemical light sticks are discarded daily as a result of being single use and are considered the largest source of plastic waste from underwater fishing lights (Nguyen

and Winger, 2019[95]). As such, the implementation of light sticks by fisheries could contribute to the risk of plastic waste and lead to mortalities of seabirds, marine mammals, and turtles as well as wider environmental issues (Nguyen and Winger, 2019[95]).

6.5.4 Other Additional Information

In their Representations, NatureScot advised they require more detail on which elements the Applicant has the ability to deliver.

6.5.4.1 The Applicant is currently in the process of refining the bycatch reduction measure (See Volume 8 Appendix 30: Refined Outline Implementation and Monitoring Plan).

6.5.4.2 The Applicant has the capacity to deliver a range of voluntary and collaborative actions to support the implementation of bycatch mitigation measures, as outlined in Section 6.5.4.3. Specifically, the Applicant is undertaking pilot studies and monitoring programmes to assess the scale and nature of seabird bycatch in relevant fisheries, including voluntary bycatch report and the use of electronic monitoring systems to record activities during gear setting and retrieval on vessels operating in the Moray Firth (see Section 6.5.4.5). The ongoing pilot study will help to inform the design of future monitoring and mitigation efforts.

6.5.4.3 The Applicant is also able to trial and evaluate a suite of bycatch reduction technologies - such as bird-scaring lines, hook-shielding devices, line weighting, and visual deterrents (e.g., looming eye buoys) - in collaboration with willing fishers, as discussed in Anderson *et al*. (2022[92]) and Sigurdsson (2023[94]). To encourage uptake, the Applicant may provide voluntary or paid incentives, including funding for equipment, training, or compensation for operational impacts associated with mitigation. Engagement with stakeholders, including fishers, industry bodies, and non-governmental organisations (NGOs), is central to this approach and builds on the Applicant's longstanding relationships with key stakeholders in the Moray Firth region.

6.5.4.4 However, it is important to clarify that the Applicant does not have the authority to mandate or enforce changes to national fishing regulations or practices, such as compulsory gear modifications or closed areas; these fall within the remit of the Scottish Government and relevant regulatory bodies (see Section 6.5.4.3). Similarly, statutory requirements for bycatch mitigation cannot be implemented by the Applicant unless adopted through national policy or legislation. As such, the measure would be designed to operate within the scope of voluntary collaboration and incentivised uptake. While this approach cannot guarantee universal adoption, it

enables meaningful and targeted action that can deliver measurable conservation benefits, particularly when focused on high-risk areas and fisheries (Northridge *et al*., 2020[12]; Bradbury *et al.,* 2017[81]).

In their Representations, NatureScot advised they require more detail on the methodology and results of the pilot study in order to assess the effectiveness of a scaled-up measure.

6.5.4.5 Between March and October (inclusive) in 2024, a self-reporting seabird bycatch study was run by the Applicant involving ten fishing vessels working in the Moray Firth region. These vessels were a mixture of static gear boats (three), trawlers (seven), and dredgers (one). Information collected by the vessels included seabird interactions with fishing vessels and/or gear, information on seabirds in the proximity of the fishing vessels when engaged in fishing, and measurements of fishing effort (number of days fished and number of gear deployments and retrievals per day).

6.5.4.6 A similar self-reporting study is currently being carried out to cover the 2025 seabird breeding season. Across the 2024 and 2025 study, hundreds of deployments and retrievals were monitored. To date, no instances of seabird entanglement or bycatch have been self-reported; next steps for data collection for 2026, including consideration of increased sample size and additional or alternative study regions, are currently under consideration by the Applicant pending the findings from the full 2025 datasets (see also paragraph 6.5.4.7).

6.5.4.7 In addition to the self-reporting study, video data collection of gear setting and retrieval on a subset of vessels has been undertaken during 2025. The video recordings are being systematically reviewed for evidence of seabird interactions with fishing gear.

6.5.4.8 Data from the self-reporting and video studies are being processed and will be used to inform subsequent data collection and refinement of the planned location(s), methodology and implementation of the bycatch measure. As such, appropriate mitigation methods and implementation locations are still under development. The Applicant is looking to deliver benefits through mitigation trials and bycatch monitoring using electronic monitoring (supported by on-board observers where vessel size and fishing practices allow this). Longline and static gear vessels are likely to be prioritised, as bycatch in trawls for the target species (gannet and auks) is thought to be low, with trawls thus lower priority for bycatch reduction (see paragraph 6.5.2.7).

6.5.4.9 Data from both studies and the literature review in Section 6.5.1 will be used to inform subsequent data collection and refinement of the planned methodology and implementation of the bycatch measure in 2026 (see

Volume 8 Appendix 30: Refined Outline Implementation and Monitoring Plan).

In their Representations, NatureScot advised they require more detail on which colonies would benefit and how this is established.

6.5.4.10 As this measure is not carried out at a colony, but rather at sea in areas potentially used by birds originating from multiple colonies, this measure will benefit the biogeographic population and site network more generally. Nevertheless, published data on seabird distribution, connectivity and foraging sites can be used to identify which colonies are likely to benefit from this measure. When a specific fishery has been identified to undertake this measure, further information will be provided within the IMP (See Volume 8 Appendix 30: Refined Outline Implementation and Monitoring Plan).

In their Representations, NatureScot advised they require quantification of the existing pressures, existing management measures, and information on how this measure integrates with existing management measures.

6.5.4.11 An initial quantification of the existing pressures for bycatch are provided in Section 6.5.1. Further information of how bycatch mitigation would fit integrate into existing management measures will be discussed with the final IMP when the target fishery is identified.

6.6 Restoration or Maintenance of Breeding Sites

6.6.1 Predicted Benefits and Scale

In their Representations, NatureScot advised that further evidence is required to show that the measures can compensate for the predicted losses.

6.6.1.1 The restoration or maintenance of breeding sites was deemed suitable to be taken forward for next steps for compensation development for puffin.

6.6.1.2 Whilst site selection is not currently finalised (see Section 6.4.3 and Volume 8 Appendix 30: Refined Outline Implementation and Monitoring Plan), data from the Isle of May (as identified in Section 6.7.3) has been used to provide indicative calculations of potential benefits.

6.6.1.3 Habitat restoration or maintenance has the potential to benefit seabird populations through both an increase in available nesting space and an increase in productivity (see Section 3). As discussed in further detail in Section 6.3.2, numerous ecological factors underpin seabird nest-site use and productivity, and the scale of benefits that can be provided will be clearer following site visits and baseline data collection. As site selection continues and locations of habitat degradation in relation to available nesting space are investigated in detail, refined (and eventually) finalised predicted benefits and scale will be provided within the IMP. Nevertheless, indicative comparisons of current populations to historical counts have been undertaken to identify the potential available habitat not currently being used by each seabird species.

6.6.1.4 To calculate benefits from an increase in productivity, the methodology presented in Section 6.3.1 has been applied.

Available Nesting Space

6.6.1.5 The puffin population at Isle of May SPA has fluctuated over the past five decades, with a lowest estimate of 12,000 apparently occupied burrows (AOB) in 1984 to a highest estimate of 69,300 AOB in 2003. The most recent count estimated 52,104 AOB in 2024. Based on this comparison to historical populations, it is inferred that there is potential nesting space for over 17,196 pairs.

6.6.1.6 The identified upper level for additional nesting space for puffin is calculated as an additional 6 nests for the Proposed Development (Offshore) (4 nests and 3 nests for Caledonia North and Caledonia South respectively) (as presented in Table 3-6 and calculated through the calculations in Section 3.3). Although the number of nesting spaces specifically impacted by habitat degradation cannot be fully understood

until further site visits have been undertaken, this indicative exercise shows that there is the potential to deliver puffin compensation at this site, and that there are substantially more available nesting spaces than the required compensation quantum (>2,800, >4,000 and >5,700 times greater available nesting space than the calculated compensation quantum for the Proposed Development (Offshore), Caledonia North and Caledonia South respectively).

Increase in Productivity

6.6.1.7 The most recently available productivity rates for puffin at Isle of May SPA from 2024 reports an average productivity rate of 0.77 (range between 0.70 and 0.84) (BTO, 2025[16]), which is above the national average of 0.62 (Horswill and Robinson, 2015[1]). The Isle of May long-term study (IMLOTS) shows that historically, productivity has frequently been higher than 0.80, particularly prior to the mid-1990's, and has peaked as high as 0.93 (1987) (Newell *et al.*, 2025[15]). Therefore, whilst puffin productivity is higher than the national average at the Isle of May, historical data suggests improvements are possible. Given the small compensation quantum for puffin (Section 3), small increases in productivity (see productivity increase scenario calculations in Section 6.3) can readily deliver the required compensation quanta for this species.

6.6.2 Indirect Impacts on Other Species or Habitats

In their Representations, NatureScot advised they require more consideration of any indirect effects of the measure.

6.6.2.1 The restoration and/or maintenance of breeding sites has the potential to impact the wider ecosystem both positively and negatively.

6.6.2.2 Invasive plant species such as tree mallow (*Lavatera arborea*) reduce available nesting space for seabirds, particularly burrow nesters like puffin by growing over their burrows and increasing soil erosion (van der Wal, 2006[96]). The presence of tree mallow on Craigleith, in the Firth of Forth led to drop in the number of puffins from approximately 5,000 pairs to less than 1,000 pairs (SSC, 2024[97]). Furthermore, there is evidence to suggest gull species, namely herring and lesser black-backed gulls have been negatively impacted by the expansion of tree mallow on Craigleith (van der Wal, 2006[96]). Therefore, the removal of this plant species from sites would increase nesting space availability and as such improve productivity and/or survival of individuals would improve leading to an increase of recruitment into the population. However, this could also increase avian predation at these sites due to an increase in gull numbers, which may negatively impact other breeding populations (van der Wal, 2006[96]).

6.6.2.3 Invasive plant species often outcompete native species for light, nutrients and space (Senator and Rozenburg, 2017[98]) which then reduces the coverage of native plants. For example, the presence of tree mallow on Craigleith led to an almost complete loss of the grass cliff vegetation including red fescue (*Festuca rubra*) that helped to stabilise the soil (van der Wal, 2006[96]). By removing the invasive plants from breeding sites native plants will have the opportunity to recover, with red fescue and Yorkshire fog (*Holcus lanatus*) now covering a significant area of the cliffs at Craigleith. (Anderson, 2021[99]).

6.6.2.4 While the removal of invasive plants is beneficial in the long term, it increases soil exposure in the short term especially when dense root mats are removed quickly. Soil erosion is also likely in areas on dry slope as grasses and other native vascular plants will recover slowly (van der Wal, 2006[96]). As such a management plan with staged removal and other mitigation measures (if deemed necessary) will be required.

6.6.2.5 Additionally, restoration and/or management programmes have the potential to disturb breeding birds and in turn reduce productivity. However, this can be avoided by undertaking any necessary maintenance at the site outside of the breeding season. It is anticipated that any programme of measures can be designed to prevent and/or minimise this issue.

6.6.3 Site Selection Refinement

In their Representations, NatureScot advised they require quantification of existing pressures and more detail on which colonies would benefit, existing management measures and any landowner agreements.

6.6.3.1 The Applicant is currently in the process of refining site selection through engagement with site managers and the completion of initial site visits. While a confirmed site has not yet been identified, potential opportunities have been recognised at the Isle of May and the East Caithness Cliffs (see also Section 6.3). The Applicant will continue to progress site investigations related to these sites and continue discussions with the relevant landowners and stakeholders (See Appendix 8 Volume 30: Refined Outline Implementation and Monitoring Plan). Final details regarding site selection will be confirmed within the forthcoming IMP.

6.6.3.2 The restoration and maintenance of breeding sites was proposed as a compensation measure for puffin. Site visits to the Isle of May and East Caithness Cliffs (set out below) identified a number of potential habitat improvement activities which may also benefit other breeding seabirds (e.g. erosion reduction, drainage management). Where site investigations

identify opportunities to benefit species other than puffin, these will be set out within the IMP.

Isle of May

6.6.3.3 During the site visits to Isle of May, the Applicant noted signs of habitat degradation and erosion, particularly affecting puffin burrows. Visitors were observed off-path, and although no visitors were observed off-path directly over areas with puffin burrows during the site visit, evidence of previous off-path movement in sensitive areas was apparent, including:

- Bare earth patches adjacent to narrow paths and path ends.
- Vegetation loss in areas where paths traverse boulder steps.
- Collapsed burrows, suspected to be puffin nesting sites, indicating structural instability and potential loss of breeding habitat.

6.6.3.4 These observations suggest that erosion and trampling are contributing to habitat loss and reduced nesting success.

6.6.3.5 To inform future management decisions, the Applicant proposes undertaking the following:

- Mapping burrow collapse and habitat loss using site visits and historical data.
- Review of path network to identify erosion-prone areas and improvement opportunities.
- Literature review on the consequences of inaction regarding burrow collapse.
- Analysis of puffin population trends and changes in habitat availability over time.
- Evaluation of puffin nest box designs and their effectiveness in supporting breeding success.

6.6.3.6 These studies will be conducted in collaboration with the site warden and NatureScot to ensure alignment with local conservation priorities and logistical feasibility

6.6.3.7 To address these issues, the Applicant proposes a targeted package of erosion-reduction and habitat restoration measures, including:

- Boardwalks over soft ground: Preventing further erosion and protecting underlying burrow structures.
- Path creation using stabilising materials: Employing rock, gravel, or ground stabilisation techniques to reinforce paths and reduce lateral erosion.
- Puffin nest box installation: Providing artificial nesting sites to compensate for lost or degraded burrows.

- Native ground cover restoration: Replanting vegetation and implementing targeted watering to support habitat recovery and reduce soil loss.
- These measures are intended to stabilise the landscape, protect existing burrows, and enhance breeding habitat availability.

East Caithness Cliffs

6.6.3.8 During the site visit to East Caithness Cliffs, there are a few small areas in the northern part of the SPA which could potentially benefit from drain blocking works. The consented Green Volt OWF project has identified one area for such works. There is another area further south of this which could also benefit from drain blocking, as water is running off from the land above, down the cliffs in an area which supports nesting fulmar and kittiwake. Further details on the site visit can be found in Volume 8, Appendix 34: East Caithness Cliffs Site Assessment Report (Confidential).

6.7 Conservation Management Funding

6.7.1 Predicted Benefits and Scale

In their Representations, NatureScot advised that further evidence is required to show that the measures can compensate for the predicted losses.

6.7.1.1 Conservation Management Funding was deemed suitable to be taken forward for next steps for compensation development for all species (kittiwake, gannet, guillemot and puffin).

6.7.1.2 As set out under the disturbance reduction (Section 6.3), predator management (Section 6.4), and habitat restoration measures (Section 6.6) above, the Applicant has identified a number of opportunities where conservation action can be implemented at colonies to benefit seabirds (e.g., at East Caithness Cliffs, on Isle of May and at multiple NTS-owned sites). These will be progressed as part of the measures set out above and may be delivered through the funding of conservation action (rather than being delivered by the Applicant directly). The governance and funding structure of the measures is to be determined with stakeholders and developed as part of the IMP development.

6.7.1.3 Other conservation management funding options are not currently being actively sought out by the Applicant, with the focus of compensation planning currently on the measures and collaborations set out in the section above. However, should other opportunities for compensation delivery arise, for instance through conservation management funding, and

be progressed by the Applicant, predicted benefits in relation to predicted losses would be set out as part of the IMP process.

6.7.2 Indirect Impacts on Other Species or Habitats

In their Representations, NatureScot advised they require more consideration of any indirect effects of the measure.

6.7.2.1 Potential positive or negative impacts of any conservation funding project will be set out as part of the IMP process if progressed further in the future. Depending on the funded activity, the establishment and implementation of a conservation management fund has the potential to provide non-like for like benefits to non-target breeding seabird species and their habitats by supporting conservation programmes aiming to improve productivity, survival and/or (sea) bird breeding habitats.

6.7.3 Site Selection Refinement

In their Representations, NatureScot advised they require quantification of existing pressures and more detail on which colonies would benefit, existing management measures and any landowner agreements and/or details on the funding body.

6.7.3.1 Colonies benefiting from any proposed conservation funding project will be set out as part of the IMP process if progressed further in the future, along with information on links with existing management measures and further details on agreements, funding and governance.

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