RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Dogger Bank South Offshore Wind Farms

Habitats Regulations Derogation: Provision of Evidence

Volume 6

Appendix 2 - Guillemot [and Razorbill] Compensation Plan

June 2024

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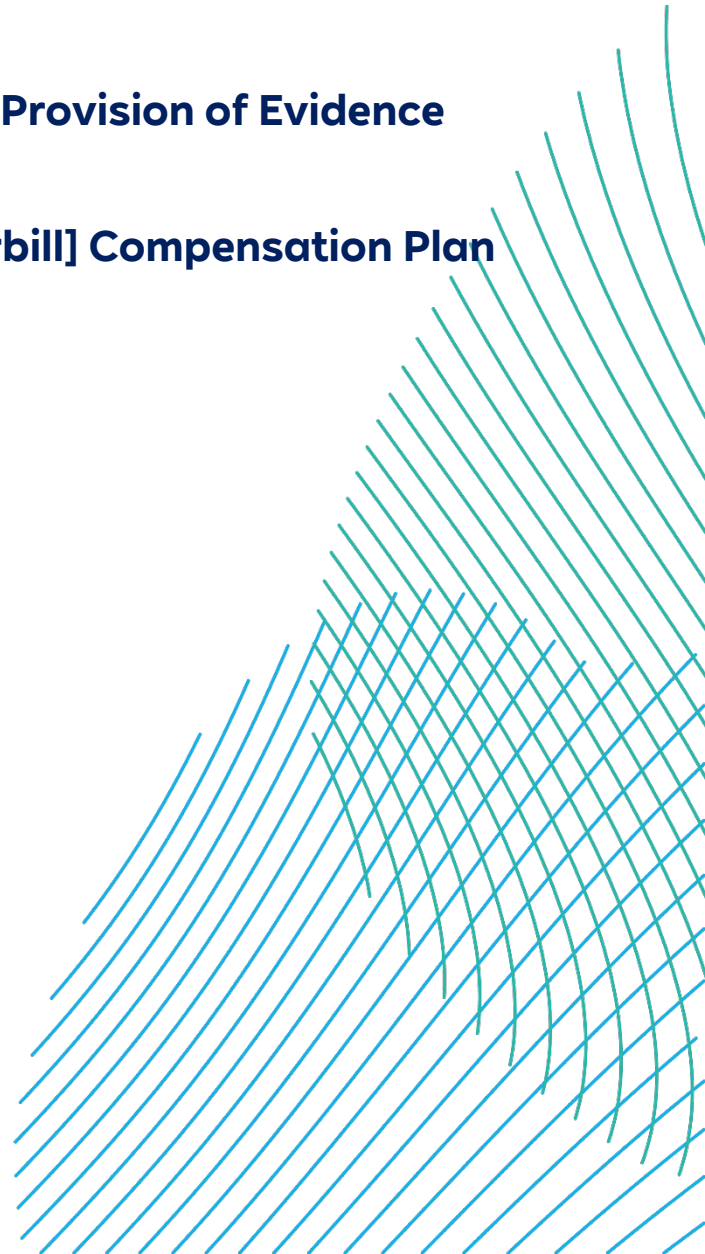

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Company:	**RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited**	Asset:	**Development**
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Glossary

Term	Definition
Array Areas	The DBS East and DBS West offshore Array Areas, where the wind turbines, offshore platforms and array cables would be located. The Array Areas do not include the Offshore Export Cable Corridor or the Inter-Platform Cable Corridor within which no wind turbines are proposed. Each area is referred to separately as an Array Area.
Array cables	Offshore cables which link the wind turbines to the Offshore Converter Platform(s).
Baseline	The existing conditions as represented by the latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of the Projects.
Concurrent Scenario	A potential construction scenario for the Projects where DBS East and DBS West are both constructed at the same time.
Development Consent Order	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Development Scenario	Description of how the DBS East and / or DBS West Projects would be constructed either in isolation, sequentially or concurrently.
Dogger Bank South (DBS) Offshore Wind Farms	The collective name for the two Projects, DBS East and DBS West.
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the value, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Environmental Statement (ES)	A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.

Term	Definition
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive. This includes candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas, and is defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017.
Expert Topic Group	A forum for targeted engagement with regulators and interested stakeholders through the EPP.
Habitats Regulations	Conservation of Habitats and Species Regulations 2017 and Conservation of Offshore Marine Habitats and Species Regulations 2017.
Habitats Regulations Assessment (HRA)	The process that determines whether or not a plan or project may have an adverse effect on the integrity of a European Site or European Offshore Marine Site.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current (HVDC)	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
Impact	Used to describe a change resulting from an activity via the Projects, i.e. increased suspended sediments / increased noise.
In Isolation Scenario	A potential construction scenario for one Project which includes either the DBS East or DBS West array, associated offshore and onshore cabling and only the eastern Onshore Converter Station within the Onshore Substation Zone and only the northern route of the onward cable route to the proposed Birkhill Wood National Grid Substation.

Term	Definition
Inter-Platform Cable Corridor	The area where Inter-Platform Cables would route between platforms within the DBS East and DBS West Array Areas, should both Projects be constructed.
Inter-Platform Cables	Buried offshore cables which link offshore platforms.
Offshore Converter Platforms (OCPs)	The OCPs are fixed structures located within the Array Areas that collect the AC power generated by the wind turbines and convert the power to DC, before transmission through the Offshore Export Cables to the Project's Onshore Grid Connection Points.
Offshore Development Area	The Offshore Development Area for ES encompasses both the DBS East and West Array Areas, the Inter-Platform Cable Corridor, the Offshore Export Cable Corridor, plus the associated Construction Buffer Zones.
Offshore Export Cable Corridor	This is the area which will contain the offshore export cables (and potentially the ESP) between the Offshore Converter Platforms and Transition Joint Bays at the landfall.
Offshore Export Cables	The cables which would bring electricity from the offshore platforms to the Transition Joint Bays (TJBs).
Ramsar site	Wetlands of international importance, designated under the Ramsar convention.
Sequential Scenario	A potential construction scenario for the Projects where DBS East and DBS West are constructed with a lag between the commencement of construction activities. Either Project could be built first.
Special Area of Conservation (SAC)	Strictly protected sites designated pursuant to Article 3 of the Habitats Directive (via the Habitats Regulations) for habitats listed on Annex I and species listed on Annex II of the Directive.

Term	Definition
Special Protection Area (SPA)	Strictly protected sites designated pursuant to Article 4 of the Birds Directive (via the Habitats Regulations) for species listed on Annex I of the Directive and for regularly occurring migratory species.
Statutory Nature Conservation Bodies (SNCBs)	Comprised of JNCC, Natural Resources Wales, Department of Agriculture, Environment and Rural Affairs/Northern Ireland Environment Agency, Natural England and Scottish Natural Heritage, these agencies provide advice in relation to nature conservation to government.
The Applicants	The Applicants for the Projects are RWE Renewables UK Dogger Bank South (East) Limited and RWE Renewables UK Dogger Bank South (West) Limited. The Applicants are themselves jointly owned by the RWE Group of companies (51% stake) and Masdar (49% stake).
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South Offshore Wind Farms).
Wind turbine	Power generating device that is driven by the kinetic energy of the wind.

Acronyms

Term	Definition
AA	Appropriate Assessment
AEoI	Adverse Effect on Integrity
AfL	Agreement for Lease
ANS	Artificial Nesting Structure
ABW	Above Water Deterrents
BDMPS	Biologically Defined Minimum Population Scales
BESS	British Energy Security Strategy
BEIS	Business, Energy and Industrial Strategy
CIMP	Compensation Implementation and Monitoring Plan
COWSC	Collaboration on Offshore Wind Strategic Compensation
DBS	Dogger Bank South
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
DML	Deemed Marine Licence
DNA	Deoxyribonucleic acid
Defra	Department for the Environment and Rural Affairs
EC	European Commission
EEZ	European Economic Zone
ES	Environmental Statement
ETG	Expert Topic Group

Term	Definition
FFC	Flamborough and Filey Coast
FID	Financial Investment Strategy
GIS	Geographic Information System
GPS	Global Positioning System
HRA	Habitats Regulations Assessment
IROPI	Imperative Reasons of Over-riding Public Interest
JNCC	Joint Nature Conservation Committee
LEB	Looming Eye Buoy
MMO	Marine Management Organisation
MPA	Marine Protected Area
MRF	Marine Recovery Fund
NSN	National Site Network
OWEIP	Offshore Wind Environmental Improvement Programme
OWF	Offshore Wind Farm
OWIC	Offshore Wind Industry Council
PVA	Population Viability Analysis
RIAA	Report to Inform Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SEP and DEP	Sheringham Shoal and Dudgeon Offshore Extension Projects
SNCB	Statutory Nature Conservation Body

Term	Definition
SPA	Special Protection Area
SoS	Secretary of State
UK	United Kingdom

1 Introduction

1.1 Background

1. RWE Renewables UK Dogger Bank South (East) Limited and RWE Renewables UK Dogger Bank South (West) Limited ('the Applicants') are applying for a single Development Consent Order (DCO) for both the Dogger Bank South (DBS) East and DBS West Offshore Wind Farms (hereafter referred to as 'the Projects'). When fully operational, the Projects would have the potential to generate renewable power for over 3 million homes[1] in the United Kingdom (UK) from up to 200 wind turbines.

2. The Applicants are submitting as part of their DCO application **Volume 6, Report to Inform Appropriate Assessment (RIAA) (application ref: 6.1)**, which provides the information necessary for the competent authority to undertake an appropriate assessment (AA) to determine if there is any adverse effect on integrity (AEoI) of sites within the UK National Site Network (NSN).

3. For guillemot from the Flamborough and Filey Coast Special Protection Area (FFC SPA), the Applicants' **Volume 6, RIAA (application ref: 6.1)** considers the effects of disturbance and displacement mortality and concludes that AEoI can be ruled out for the Projects alone. However, the Applicants, taking cognizance of the most recent decisions (i.e. Hornsea Project Four and the Sheringham Shoal and Dudgeon Extensions) on offshore wind farms by the Secretary of State (SoS), conclude that an AEoI for guillemot at the FFC SPA could not be ruled out for in-combination displacement risk. The Applicants have therefore proposed compensation measures for guillemot.

[1] Calculation based on 2021 generation, and assuming average (mean) annual household consumption of 3,509 kWh, based on latest statistics from Department of Energy Security and Net Zero (Subnational Electricity and Gas Consumption Statistics Regional and Local Authority, Great Britain, 2021, Mean domestic electricity consumption (kWh per meter) by country/region, Great Britain, 2021.

4. For razorbill from the FFC SPA, the Applicants' **Volume 6, RIAA (application ref: 6.1)** considers the effects of disturbance and displacement mortality and concludes that AEoI can be ruled out. This is consistent with the outcome of The Crown Estate's Plan-Level Habitats Regulations Assessment (HRA) (The Crown Estate, 2022) with respect to FFC SPA razorbill (see section 1.2 for further information). However, it is possible that the SoS may not agree with this conclusion and as such the Applicants have proposed 'without prejudice' compensation measures for razorbill.

1.2 The Crown Estate's Plan Level HRA

5. As part of the Plan-Level HRA (The Crown Estate, 2022) for the Fourth Offshore Wind Seabed Leasing Round (the 'Round 4 Plan'), The Crown Estate (as the competent authority) concluded that an AEoI as a result of the Round 4 Plan, could not be ruled out for the FFC SPA breeding kittiwake feature and the Dogger Bank Special Area of Conservation (SAC) sandbanks feature, in-combination with other plans and projects. With respect to guillemot and razorbill the HRA concluded that there would be no AEoI as a result of the Round 4 Plan.

6. On 15th July 2022, the SoS for Business, Energy and Industrial Strategy (BEIS) (now the Department for Energy Security and Net Zero (DESNZ)) approved The Crown Estate's derogation case and thus, The Crown Estate adopted the Round 4 Plan and subsequently entered into Agreements for Lease (AfL) for the six projects comprising Round 4.

7. Each of the Round 4 projects is required to undertake their own project-level assessment of effects on the designated sites of the UK NSN. The DBS project-level assessment is presented in **Volume 6, RIAA (application ref: 6.1).**

1.3 Strategic Compensation for Offshore Wind

8. In April 2022, the UK Government published the 'British Energy Security Strategy' (BESS) (HM Government, 2022). The BESS committed to implementing an Offshore Wind Environmental Improvement Package (OWEIP), which included, among others, measures to:

   - Revise the HRA process for offshore wind to facilitate the delivery of compensation measures whilst maintaining valued protection for wildlife;
   - Facilitate the delivery of strategic environmental compensation measures, including development of a library of compensation

measures, through the Collaboration on Offshore Wind Strategic Compensation (COWSC)[2];

- Implement an industry-funded Marine Recovery Fund (MRF) to which developers can choose to contribute to meet their environmental compensation obligations; and
- Implement a strategic monitoring programme to improve understanding of the environmental impacts of offshore wind projects.

9. The purpose of the OWEIP and these measures is to accelerate and de-risk, the consenting of offshore wind whilst ensuring environmental protections are maintained and domestic and international law is adhered to.

10. As outlined in National Policy Statement (NPS) for renewable energy infrastructure EN-3 (DESNZ, 2023a), the UK Government is still developing its policies on strategic compensation through the COWSC programme. However, in February 2024, the SoS for the Department for Environment, Food and Rural Affairs (Defra) approved the following compensatory measures recommended by COWSC for inclusion within the library of strategic compensatory measures (LoSCM) and for strategic delivery as compensation for offshore wind projects (Defra, 2024a):

- For benthic habitats:
  - Designation and / or extension of Marine Protected Areas (MPAs).
- For seabirds:
  - Offshore artificial nesting structures (ANS) for kittiwake in English waters (only available for projects up to and including Round 4); and
  - Predator eradication and reduction.

11. The COWSC group will be responsible for implementing the measures in the LoSCM, with the exception of the designation and / or extension of MPAs which will be implemented and delivered by Defra.

[2] COWSC brings together industry, environmental non-government organisations (NGOs), statutory nature conservation bodies (SNCBs), the UK Government and Devolved administrations and other relevant stakeholders with the purpose of finding strategic compensation solutions that enable the required development of offshore wind, whilst offsetting any impacts to the environment.

12. COWSC is currently in the process of developing implementation groups for each of the strategic compensation measures. It is the Applicants' understanding that these groups will be responsible for developing delivery plans which will outline key aspects of implementation, for example, site selection, design, delivery timescales, monitoring and adaptive management, etc. However, the timescales for the establishment of the COWSC implementation groups and delivery of the implementation plans as well as the measures themselves are currently unknown. The Applicants will continue to engage with Defra, the COWSC group and relevant industry forums post-application on progress with respect to the implementation of these strategic compensatory measures.

13. Sections 291 and 292 of the Energy Act 2023 enable the use of strategic compensation measures and the SoS to make regulations related to the establishment, operation and management of one or more MRFs for the development of offshore wind and associated infrastructure, respectively. The MRF is expected to be operational in 2025.

14. It is the Applicants' understanding that the DESNZ is currently preparing advice for OWF developers on how strategic compensation and the MRF can be referred to in planning applications in advance of any statutory instruments coming into force. However, this information was not available at the time of writing. Further information with respect to strategic compensation will be provided to the Examining Authority during DCO examination at appropriate points and as it becomes available.

1.3.1 Offshore Wind Industry Council (OWIC)

15. The Applicants are active members of the Offshore Wind Industry Council (OWIC) derogation sub-group which was formed in 2021 to support the work of the Pathways to Growth[3] (P2G) Coordination Group and to aid collaboration across the offshore wind industry. The P2G is the Sector Deal's workstream focussed on identifying and addressing the key environmental and consenting challenges that will be a barrier to the UK meeting its offshore wind 2030 target and playing its full role in delivering net zero. This includes HRA derogation, which is recognised as a key barrier to the growth of offshore wind.

16. The OWIC derogation sub-group has supported the work of the COWSC group in developing strategic compensation measures for offshore wind. The Applicants will continue to actively engage in the OWIC derogation sub-group and support the development and delivery of strategic compensation measures for the relevant sites / features through this collaborative initiative.

1.4 Purpose of Document

17. This document sets out the detail of the proposed compensatory measures for guillemot and razorbill (without prejudice). It demonstrates how the proposed compensatory measures can be secured and that the mechanism for delivery can be implemented. The Guillemot Compensation Implementation and Monitoring Plan (CIMP) will be produced by the Applicants and approved by the SoS prior to the start of construction. Should compensation for razorbill be required, a combined Guillemot and Razorbill CIMP will be produced, based on the outline version provided in **Volume 6, Annex A - Outline Guillemot [and Razorbill] Compensation Implementation and Monitoring Plan (application ref: 6.2.2.1)**. The CIMP will set out the detailed delivery proposals for the agreed compensatory measures based on those set out in this Guillemot [and Razorbill] Compensation Plan.

[3] https://www.owic.org.uk/our-work/pathways-to-growth (accessed April 2024]. The Sector Deal's workstream focussed on identifying and addressing the key environmental and consenting challenges that will be a barrier to the UK meeting its offshore wind 2030 target and playing its full role in delivering net zero. Recognising the scale of the challenge, P2G brings together government representatives, SNCBs and industry across the UK's Devolved Administrations to work together in partnership.

18. As such this document provides the following details for the predator eradication / control measure taken forward for guillemot [and razorbill] (section 5.3.1):

- Overview;
- Delivery mechanism;
- Scale;
- Location;
- Outline design details;
- Timescales;
- Monitoring, maintenance and adaptive management;
- Outline implementation and delivery roadmap; and
- Potential impact from the implementation of the compensation.

1.5 Implications of the Proposed Development Scenarios

19. The Projects may be delivered under a range of project Development Scenarios. Details of the scenarios and how these are assessed in the DCO application are set out in section 5.1.1 of **Volume 7, Chapter 5 Project Description** (**application ref**: **7.5**) of the Environmental Statement (ES). The Applicants' approach to the development of the proposed compensatory measures has assumed that both DBS East and DBS West are developed and that the package of measures proposed for each of the relevant sites and features outlined in section 5.3 is considered to deliver the necessary level of compensation (factoring in the risks and uncertainty associated with delivering successful compensation) to address the worst-case impacts of both DBS East and DBS West, as required by draft Defra guidance (Defra, 2021).

20. The Development Scenarios for the Projects include:

- In Isolation Scenario – where only DBS East or DBS West is developed;
- Concurrent Scenario– where DBS East and DBS West are both constructed at the same time; or
- Sequential Scenario – both DBS East and DBS West are developed sequentially.

21. As outlined in **Volume 7, Chapter 5 Project Description (application ref: 7.5)** of the ES, the Applicants would develop DBS East and DBS West transmission infrastructure as co-ordinated projects and where practicable, the Projects would co-locate infrastructure to reduce overall environmental impacts and disruption. However, there is no predicted impact on guillemot or razorbill from the development of the Projects transmission infrastructure.

22. For guillemot [and razorbill], it is the disturbance and displacement mortality as a result of turbine construction and operation that requires compensation. In all three Development Scenarios, turbine foundation installation for one or both Projects is expected in 2028 at the earliest. Up to 100 wind turbines will be installed at each of DBS East and DBS West (subject to the final turbine technology), equating to a maximum of 200 turbines across the two Projects.

23. Where DBS East and DBS West are delivered in the Sequential Scenario, the overall final package of compensation to be delivered will be the same as in the Concurrent Scenario. The Applicants therefore consider it practical to deliver all of the compensation together under either the Sequential or Concurrent Scenario (although if two or more sites are required, implementation could be staggered under the Sequential Scenario). In the Sequential Scenario, this may mean that one project delivers compensation earlier than may have otherwise been required if it were a standalone project, which could be at risk e.g. prior to Final Investment Decision (FID). The Applicants consider however that the second project would have the benefit of the compensation being in place slightly longer than the first project thereby reducing pressure on the onward project programme.

24. Should DBS East or DBS West be delivered in isolation then it would be necessary to deliver only the scale of measures required to achieve adequate compensation in proportion to the impacts predicted from the given project (DBS East or DBS West). Compensation would be delivered on a scale appropriate to the nature and extent of the predicted impact from DBS East, or DBS West.

25. The scale of compensation to be delivered by the Projects will be confirmed within the Guillemot [and Razorbill] Compensation and Implementation Monitoring Plan (CIMP) once project-level impacts have been determined by the SoS.

2 Legislation and Guidance

26. The HRA process covers those features designated under the European Council Directive 2009/147/EC on the Conservation of Wild Birds (the 'Birds Directive') and Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the 'Habitats Directive').

27. The Birds Directive provides a framework for the conservation and management of wild birds in Europe. The relevant provisions of the Directive are the identification and classification of SPAs for rare or vulnerable species listed in Annex I of the Directive and for all regularly occurring migratory species (required by Article 4). The Directive requires national Governments to establish SPAs and to have in place mechanisms to protect and manage them. The SPA protection procedures originally set out in Article 4 of the Birds Directive have been replaced by the Article 6 provisions of the Habitats Directive.

28. Further details of the relevant legislative and policy context are provided in **Volume 6, Habitats Regulations Derogation Provision of Evidence (application ref: 6.2)**.

2.1 UK National Legislation

29. In England and Wales, the Conservation of Habitats and Species Regulations 2017 ('the Habitats Regulations'), the Wildlife and Countryside Act 1981 and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (the Offshore Habitats Regulations) (which applies outside of 12 nautical miles) transposed the Habitats Directive and Birds Directive into English and Welsh law. The UK is also required to meet its obligations under relevant international agreements such as the Ramsar Convention.

30. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (EU Exit Regulations) make changes to the Habitats Regulations so that they continue to work (are operable) following the UK's exit from the EU on 31st January 2020. While the basic legal framework for HRA is maintained, the EU Exit Regulations transfer functions previously undertaken by the European Commission (EC) to UK Ministers. Furthermore, where the Habitats Regulations continue to use the term 'European sites', those sites now form part of a UK NSN rather than the European 'Natura 2000' site network.

31. The Habitats Regulations place an obligation on 'competent authorities' to carry out an AA of any proposal likely to significantly affect a designated site, to seek advice from Natural England and not to approve an application that would have an adverse effect on a designated site unless certain conditions are met (where there are no alternative solutions, the plan or project can only proceed if there are Imperative Reasons of Over-riding Public Interest (IROPI) and if the necessary compensatory measures can be secured). The competent authority in the case of the Projects is the SoS for the DESNZ.

2.2 Guidance on Compensatory Measures

32. If the competent authority determines, after conducting an AA, that an AEoI on a European site cannot be ruled out, and that there are no alternative solutions and IROPI, Regulation 36 of the Conservation of Offshore Marine Habitats and Species Regulations 2017 requires that "*The appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of Natura 2000 is protected.*"

33. The European Commission (EC) (2019) explains that for SPAs, the overall coherence of the European site network can be maintained by:

- Compensation that fulfils the same purposes that motivated the site's designation;
- Compensation that fulfils the same function along the same migration path; and
- The compensation site(s) are accessible with certainty by the birds usually occurring on the site affected by the project.

34. Defra has recently released for consultation[4], updated policy information for Marine Protected Area (MPA) assessments (Defra, 2024b). This document expands upon the best practice guidance for developing compensatory measures in relation to MPAs which was consulted upon in July 2021 (Defra, 2021) and is intended to inform updated guidance which is anticipated to be published in late 2024.

[4] Consultation ran from 9 February 2024 to 1 April 2024. The consultation document (Defra, 2024) expressly states in section 3.1 that "*the draft guidance set out below for consultation should not be relied upon by stakeholders, statutory bodies or decision makers during the planning process*".

35. Defra (2021) introduced a hierarchical approach for determining appropriate compensatory measures within the marine environment. The central tenet of this approach is to prioritise compensatory measures that address the same impact at the same location. However, in cases where this isn't feasible, measures supporting similar or comparable ecological functions at alternative locations could serve as adequate compensation and should be considered. This hierarchical approach offers flexibility, acknowledging that it may not always be practical to compensate for the same feature at risk within the impacted site. Defra (2024b) proposes refinements to the hierarchical approach outlined in Defra (2021) but maintains this core principle, stating:

"*The location of measures should not take priority over the ecological outcomes that might be secured. Proximity and local circumstances are considerations which must be balanced against the confidence that measures will be effective and the ecological outcomes which will be secured.*"

36. Ideally, compensation should be functioning before the effect takes place, although it is recognised that this may not always be possible, as stated in the Defra (2021) guidance:

"*A protected feature should not be impacted before compensation is secured. Ideally, measures should be in place, functioning and contributing to the network before development begins. Defra recognises that in some cases and for certain habitats and species this could take several years and therefore it may not be feasible for the compensatory measures to be complete before the impact takes place. Where this is not possible, it is important that necessary licences are in place, finances are secured, and realistic implementation plans have been agreed with the appropriate bodies to demonstrate that the compensatory measure is secured.*"

37. Compensatory measures for the guillemot [and razorbill] features of the FFC SPA are presented in the following sections in line with Defra's draft best practice guidance (Defra, 2021) and the hierarchy presented within it.

38. In addition, Natural England has developed a list of those aspects of compensatory measures that it considers need to be described in detail when developers are submitting or updating applications where impacts on marine MPAs are anticipated. Whilst not exhaustive, it lists key areas where Natural England considers sufficient detail is needed to provide the SoS with appropriate confidence that compensatory measures can be secured. The list is summarised below:

- What, where, when: clear and detailed statements regarding the location and design of the proposal.
- Why and how: ecological evidence to demonstrate compensation for the impacted site feature is deliverable in the proposed locations.
- Demonstrate that on ground construction deliverability is secured and not just the requirement to deliver in the DCO i.e. landowner agreement is in place.
- Policy/legislative mechanism for delivering the compensation (where needed).
- Agreed DCO / DML conditions.
- Clear aims and objectives of the compensation.
- Mechanism for further commitments if the original compensation objectives are not met – i.e. adaptive management.
- Clear governance proposals for the post-consent phase – we do not consider simply proposing a steering group is sufficient.
- Ensure development of compensatory measures is open and transparent as a matter of public interest, including how information on the compensation would be publicly available.
- Timescales for implementation esp. where compensation is part of a strategic project, including how timescales relate to the ecological impacts from the development.
- Commitments to monitoring specified success criteria.
- Proposals for ongoing 'sign off' procedure for implementing compensation measures throughout the lifetime of the project. Including implementing feedback loops from monitoring.
- Continued annual management of the compensation area and ensure other factors are not hindering the success of the compensation e.g. changes in habitat, increased disturbance as a result of subsequent plans / projects.

39. The Applicants have prepared this Compensation Plan in accordance with the Natural England checklist outlined above, and an equivalent list provided by Royal Society for the Protection of Birds (RSPB). The necessary information is provided in section 5. A summary of the status of the Applicants' overall compensatory proposal for guillemot [and razorbill] against the Natural England checklist is provided in section 7.

3 Development of Compensatory Measures

3.1 General Approach

40. The approach taken by the Applicants to identify potential compensatory measures followed the process below:

- Review of the compensatory measures in Furness *et al.* (2013).
- Iterative development of the proposals through consultation with relevant stakeholders, in the form of the Auk Compensation Expert Topic Group (ETG) which group includes the Marine Management Organisation (MMO), Natural England, RSPB and Lincolnshire Wildlife Trust. Details of the consultation undertaken are provided in **Volume 5, Consultation Report (application ref: 5.1)**.
- Engagement with other stakeholders where necessary including with other offshore wind farm (OWF) developers, Natural England and Defra through the Offshore Wind Industry Council (OWIC) Derogation Subgroup.
- Ongoing review of other OWF applications for which compensatory measures have been presented (e.g. Hornsea Project Three, Hornsea Project Four and Sheringham Shoal and Dudgeon Offshore Extension Projects (SEP and DEP)), including those accepted as appropriate in the determination.
- Consideration of emerging evidence on wind farm and seabird interactions and influences on seabird ecology more widely to determine whether novel options may be appropriate.
- Consideration of the feasibility of delivery and confidence of success of each measure.

41. The Applicants were mindful of the strategic nature of compensation measures for features other than guillemot and razorbill and the ongoing development of potential strategic measures for auks. However, in the absence of a definitive timeframe for this or for implementation of the MRF, a focus was placed on measures suitable for delivery on a project-led basis or in collaboration with other developers.

3.2 Stakeholder Engagement

42. The Applicants have consulted with a range of stakeholders during the consideration of compensation measures for guillemot [and razorbill]. This has predominantly taken the form of engagement with the Auk Compensation Expert Topic Group (ETG) and has been used to shape the development of compensatory measures. A summary of the ETG meetings to date is given in **Table 3-1**. Engagement with the ETG will continue throughout the post-application process.

Table 3-1 Details of ETG meetings

Meeting Date	Main Points of Discussion
9th May 2023	This meeting was intended to cover all potential options for compensation measures and refine the options to a shortlist for further consideration. The following potential measures were discussed: • ANS – instances of auks nesting on ANS do occur, but insufficient evidence exists on the scale and if there are particular features that could increase uptake. This was not deemed suitable as compensation at this meeting but worthy of further investigation. • Prey Management – This was deemed suitable only as a strategic measure, not at a project level. On-going consultation with regards to the closure of the sandeel fishery was noted, so it was considered that this may be worth considering another species such as sprat. • Designation of additional SPAs – It was agreed that there was no opportunity for designation of additional SPAs. However, it was noted that compensation being delivered for the Dogger Bank SAC (i.e. potentially new seabed designation) could provide benefits to prey species and by extension auks. • Reduction of bycatch – It was considered that the evidence base for bycatch exists for gannets but not for auks. RSPB have ongoing trials [Rouxel *et al.*, 2023]. It was considered that given the unknowns further trials would be beneficial. • Predator management – It was considered that, in principle, predator eradication would work as compensation, however there is a lack of evidence specific to auks. There was discussion around some specific sites

Meeting Date	Main Points of Discussion
	and the difficulties associated with reinvasion and proving connectivity of auk populations. • Marine Recovery Fund – this was discussed as a generic compensation measure, however uncertainties around timing and implementation of the MRF were raised. • OWIC studies – uncertainty over timescales aligning with DBS.
29th February 2024	Discussions focussed on the results of the RIAA and the utilisation of different displacement and mortality rates in various assessments. Compensation measures were also discussed: • Predator reduction – The ETG agreed that this is a feasible measure. Focus needs to be on identifying suitable sites. It was noted that this measure had been put forward by COWSC for inclusion within the LoSCM. Delivery is likely to be project-led but may be collaborative with other OWF developers. A short list of potential sites was discussed as well as how this measure would be undertaken. • Bycatch reduction – measure not confirmed by COWSC for inclusion within the LoSCM. Still a lack of evidence however it should be kept in the plan. • ANS - measure not confirmed by COWSC for inclusion within the LoSCM. • Discussion around new guidance on additionality and the implications for compensation within existing SPAs.
10th April 2024	Brief discussion around the updated results of the RIAA. • Predator eradication – discussions about the short list of sites and their potential feasibly provide the required compensation. Agreement to revisit some sites. Importance of social acceptability highlighted. The plan for taken forward feasibility on sites was presented to the ETG, with an update on progress to be provided by Deadline 1 of the Examination. • Bycatch reduction and ANS – agreement that there is not sufficient evidence to propose these as primary or supporting compensatory measures but that they should remain in the plan under adaptive management.

Meeting Date	Main Points of Discussion
	• Discussion around potential collaboration with other OWF developers on emerging visitor management measures on the south coast. • The Applicants proposed to update the ETG post-submission of the DCO application and prior to the start of examination.

4 Flamborough and Filey Coast Special Protection Area

4.1 Overview

43. The FFC SPA was designated in 2018. It is a geographical extension to the former Flamborough Head and Bempton Cliffs SPA, which was designated in 1993 (Natural England, 2018).

44. The SPA is located on the Yorkshire coast between Bridlington and Scarborough and is composed of two sections. The northern section runs from Cunstone Nab to Filey Brigg, and the southern section from Speeton, around Flamborough Head, to South Landing. The seaward boundary extends 2km offshore and applies to both sections of the SPA.

45. The predominantly chalk cliffs of Flamborough Head rise to 135m and have been eroded into a series of bays, arches, pinnacles and gullies. The cliffs from Filey Brigg to Cunstone Nab are formed from various sedimentary rocks including shales and sandstones. The adjacent sea out to 2km off Flamborough Head as well as Filey Brigg to Cunstone Nab is characterised by reefs supporting kelp forest communities in the shallow subtidal, and faunal turf communities in deeper water. The southern side of Filey Brigg shelves off gently from the rocks to the sandy bottom of Filey Bay. This site does not support any priority habitats or species (Natural England, 2018).

46. The coastal areas of the SPA cover cliffs supporting internationally important breeding populations of seabirds, the marine extension includes areas close to the colony used by seabirds for maintenance behaviours (loafing, preening etc).

47. None of the qualifying features of the SPA are priority species. This compensation document considers only guillemot [and razorbill].

4.2 Conservation Objectives

48. The site's conservation objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The populations of each of the qualifying features; and
- The distribution of qualifying features within the site.

4.3 Designated Feature – Guillemot

49. Guillemot is an abundant species of seabird in the northern hemisphere and can be found nesting in, often large densely packed, colonies on coastal cliffs around the UK. Like many seabirds, guillemot are resident in UK waters year-round, but come to shore only during the summer breeding season. The guillemot diet comprises primarily small fish species including clupeids (sprat and herring) and sandeels.

50. The SPA breeding population at classification was 41,607 pairs (83,214 breeding adults) for the period 2008 to 2011 (Natural England, 2018). The most recent published count was of 111,925 individuals in 2022 (Clarkson *et al.*, 2022), which once adjusted using standard approaches gives an AON of 74,989 (or 149,978 breeding adults) (**Volume 6, RIAA (application ref: 6.1)**). It is clear that the population of guillemot at the FFC SPA has increased between designation and 2022 (JNCC, 2023; Clarkson *et al.*, 2022).

51. Supplementary advice on the conservation objectives were added for qualifying features (Natural England, 2023a). For guillemot, these are:

- Maintain the size of the breeding population at a level which is above 41,607 breeding pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent;
- Maintain safe passage of birds moving between nesting and feeding areas;
- Restrict the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and / or loafing birds so that they are not significantly disturbed;
- Restrict predation and disturbance caused by native and non-native predators;
- Maintain or recover productivity so that breeding success is maximised within the constraints of the site;
- Maintain concentrations and deposition of air pollutants at below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System;
- Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and / or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised;

- Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding) at: current extent;
- Maintain the distribution, abundance and availability of key food and prey items (e.g. sandeel, herring, sprat) at preferred sizes;
- Reduce aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels;
- Maintain the DO concentration at levels equating to High Ecological Status (specifically ≥5.7mg per litre (at 35 salinity) for 95% of the year), avoiding deterioration from existing levels;
- Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and features, avoiding deterioration from existing levels; and
- Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.

4.4 Designated Feature – Razorbill

52. Razorbill are found throughout UK coastal waters, coming to shore to breed on small ledges or in cracks of rocky cliffs and in associated scree and boulder fields. The main prey species of razorbill are sandeel, sprat and herring.

53. The FFC SPA breeding razorbill population was 10,570 pairs or 21,140 breeding adults, for the period 2008 to 2012 (Natural England, 2018). The most recent published count was 27,967 pairs or 55,934 individuals in 2017 (JNCC, 2023). This is used as the reference population for the assessment in **Volume 6, RIAA (application ref: 6.1)**.

54. Supplementary advice on the conservation objectives were added for qualifying features (Natural England, 2023a). For razorbill, these are:

- Maintain the size of the breeding population at a level which is above 10,570 breeding pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent;
- Maintain safe passage of birds moving between nesting and feeding areas;
- Restrict the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed;

- Restrict predation and disturbance caused by native and non-native predators;
- Maintain or recover productivity so that breeding success is maximised within the constraints of the site.
- Maintain concentrations and deposition of air pollutants at below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System;
- Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised;
- Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding);
- Maintain the distribution, abundance and availability of key food and prey items (e.g. sandeel, herring, sprat) at preferred sizes;
- Reduce aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels;
- Maintain the DO concentration at levels equating to High Ecological Status (specifically ≥ 5.7mg per litre (at 35 salinity) for 95% of the year), avoiding deterioration from existing levels;
- Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and features, avoiding deterioration from existing levels.; and
- Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.

4.5 Summary of Potential Impacts

55. The following sections provide a summary of the potential impacts on guillemot and razorbill at FFC SPA in order to set the context for the proposed compensatory measures. The SoS will determine the level of effect based on the AA conclusions for the potential impact of the Projects on the breeding adult birds associated with the FFC SPA.

4.5.1 Guillemot

4.5.1.1 Overview

56. The ornithological assessment presented in **Volume 7, Chapter 12 Offshore Ornithology (application ref: 7.12)** of the ES identified guillemot as being recorded in high numbers during baseline surveys and classified the species as having medium sensitivity to disturbance and displacement during construction.

57. DBS East and DBS West are 125km and 103km respectively from the FFC SPA. The mean maximum foraging range of guillemot is 153.7km (73.2km + 80.5km, Woodward *et al.*, 2019). Therefore, the Projects are both within potential foraging range for breeding guillemot from the FFC SPA. The proportion of adult guillemots attributed to the FFC SPA was estimated in **Volume 6, RIAA (application ref: 6.1)**, to be 55.2%, based on species demographics. Following feedback received from the ETG, the proportion of the guillemots recorded at the Projects during the breeding season that could be breeding adult birds from the FFC SPA is calculated as 100%.

58. Outside the breeding season, breeding guillemots from the SPA are assumed to range widely and to mix with guillemots from breeding colonies in the UK and beyond. The relevant non-breeding season reference population is the UK North Sea and Channel Biologically Defined Minimum Population Scales (BDMPS), consisting of 1,617,306 individuals (August to February) (Furness, 2015).

59. During the non-breeding season, 90% of the FFC SPA breeding adults are assumed to be present in the BDMPS. It is estimated that 4.4% of birds present at the Projects are considered to be breeding adults from the FFC SPA, and impacts are apportioned accordingly. Note, this percentage has been calculated using the populations in Furness (2015) in order to ensure consistent colony estimates have been applied.

4.5.1.2 Quantification of Effect – Displacement

60. The displacement mortality from the Projects together (i.e. DBS West and East) is presented in **Volume 6, RIAA (application ref: 6.1)** for two combinations of displacement effect and mortality. One combination was based on the guidance from SNCBs applying a highly precautionary rate of 70% displacement and 10% mortality of displaced birds. The second combination, based more closely on evidence, applied a 50% displacement rate combined with 1% mortality (MacArthur Green, 2019). Additional rates presented in **Table 4-3** include 70% displacement and 2% mortality, as has been accepted for other OWFS, and 70% displacement and 5% mortality as was recommended by Natural England for Hornsea Project Four (DESNZ, 2023b). Based on advice from Natural England, displacement impacts on offshore ornithological interests during construction have been assessed for the duration of construction (taken here as construction of foundations and installation of turbines) on the basis these on average represent 50% of the impact for the constructed wind farm.

4.5.1.3 Dogger Bank South Projects Alone

61. For construction the displacement mortality from the Projects together is presented in **Volume 6, RIAA (application ref: 6.1)** for two combinations of displacement effect and mortality. Using Natural England's precautionary rates of displacement (35%) and mortality (10%) the estimated mortality is 327.4 (55.2% adults) to 567.3 (100% adults). Evidence-based estimates assuming a 25% displacement rate (APEM, 2022) and 1% mortality of displaced birds reduces the predicted impact to 30.8 (55.2% adults) to 53.3 (100% adults) individuals. Using Natural England's precautionary rates this would represent an adverse effect on integrity of the FFC SPA (increase in background mortality of between 3.6 – 6.2%). Using evidenced- based estimates this would be maximum increase in mortality of 0.33 – 0.58%.

62. For operation the displacement mortality from the Projects together is presented in **Volume 6, RIAA (application ref: 6.1)** for two combinations of displacement effect and mortality. Using Natural England's precautionary rates of displacement (70%) and mortality (10%) the estimated mortality is 639 (55.2% adults) to 1107 (100% adults). Evidence-based estimates assuming a 50% displacement rate (APEM, 2022) and 1% mortality of displaced birds reduces the predicted impact to 45.6 (55.2% adults) to 79.0 (100% adults) individuals. Using Natural England's precautionary rates this would represent an adverse effect on integrity of the FFC SPA (increase in background mortality of between 6.9 -12.1%). Using evidenced- based estimates this would be maximum increase in mortality of 0.49 – 0.86%.

63. After further consideration of this effect via Population Viability Analysis (PVA) it was concluded that even based upon the worst case prediction (using 70% displacement and 10% mortality) this displacement this does not represent an adverse effect on integrity of the FFC SPA.

4.5.1.4 In-Combination with Other Offshore Wind Farm Projects

64. The estimated total number of guillemots at risk of displacement from all OWFs within the UK North Sea BDMPS combined is 614,112 of which between 38,809 and 46,789 (not including Hornsea Project Four as this project's impacts are subject to compensation) are estimated to be breeding adults from FFC SPA (see **Volume 6, RIAA (application ref: 6.1)**). Using displacement rates of 30% to 70% and a mortality rate of 1% to 10% for displaced birds, the number of FFC SPA birds predicted to die each year would be between 116 and 3,275.

65. After further consideration of this effect via PVA it was concluded that even based upon the worst case prediction (using 70% displacement and 10% mortality) this displacement this does not represent an adverse effect on integrity of the FFC SPA.

66. Notwithstanding the above conclusion, the Applicants acknowledge that previous decisions on offshore wind farms by the SoS have concluded that an AEoI for guillemot at the FFC SPA could not be ruled out for in-combination displacement risk (e.g. Hornsea Project Four). Given this, it is the Applicants' assumption that the SoS will conclude AEoI in this case also. Therefore, the Applicants do not consider it worthwhile to contest this point and on this basis concede AEoI on the FFC SPA.

4.5.1.5 Compensation Requirement

67. The compensation requirement for guillemot has been calculated as the number of breeding pairs required to produce enough fledglings to replace the adults lost from the population as a result of DBS. This was done using the equation below, taking account of the national average productivity and the mean survival rate each year, as detailed in **Table 4-1**, and based on a recruitment age of six years (Horswill and Robinson, 2015).

$$N_{Fledglings\ required} = \frac{N_{New\ breeding\ recruits\ required}}{\prod_{Age=0}^{Age=6} Survival_{Age}}$$

$$N_{Breeding\ pairs\ required} = \frac{N_{Fledglings\ required}}{Productivity}$$

Table 4-1 Productivity and survival rates for guillemot (Horswill and Robinson, 2015)

Parameter	Demographic Rate
Productivity	0.672
Survival 0-1 year	0.560
Survival 1-2 year	0.792
Survival 2-3 year	0.917
Survival ≥4 year	0.939

68. Applying these demographic rates estimates that 4.42 breeding pairs are required to replace a single recruiting adult guillemot. The compensation requirement for the range of potential impacts is shown in **Table 4-4** and **Table 4-5**. Using the evidence-based 50% displacement and 1% mortality rates with 100% apportionment gives a compensation requirement of 349 breeding pairs at a 1:1 ratio or 698 breeding pairs at a 2:1 ratio.

4.5.2 Razorbill

4.5.2.1 Overview

69. Razorbill were reported in **Volume 7, Chapter 12 Offshore Ornithology of the Environmental Statement (application ref: 7.12)** as being recorded in high numbers during baseline surveys and were classified as having medium sensitivity to disturbance and displacement during construction.

70. DBS East and DBS West are 125km and 103km respectively from the FFC SPA. The mean maximum foraging range of razorbill is 164.6km (88.7 + 75.9km, Woodward *et al.*, 2019). Therefore, the Projects are both within potential foraging range for breeding razorbill from the FFC SPA. The proportion of adult guillemots attributed to the FFC SPA was estimated in **Volume 6, RIAA (application ref: 6.1)**, to be 61.3%, based on species demographics. The estimated proportion of the razorbills recorded at the Projects during the breeding season that could be breeding adult birds from the FFC SPA (based on the most recent count of 55,967 breeding adults) is calculated as 100%.

71. Outside the breeding season, breeding razorbills from the SPA are assumed to range widely and to mix with razorbills from breeding colonies in the UK and further afield. The relevant background population is considered to be the UK North Sea and Channel BDMPS, consisting of 591,874 individuals during autumn and spring passage periods (August to October and January to March), and 218,622 individuals during winter (November and December) (Furness, 2015).

72. During the autumn and spring migration, 100% of the FFC SPA breeding adults are assumed to be present in the BDMPS, representing 3.4% of the BDMPS population. During the winter season, 30% of the SPA breeding adults are assumed to be present in the BDMPS, representing 2.7% of the BDMPS population. These percentages (i.e. 3.4% and 2.7%) are the proportions of birds present at the Projects that are presumed to originate from the FFC SPA during the relevant seasons. Note, these percentages have been calculated using the populations in Furness (2015) in order to ensure consistent colony estimates have been applied.

4.5.2.2 Quantification of Effect – Displacement

73. The displacement mortality from the Projects together (i.e. DBS East and West) is presented in **Volume 6, RIAA (application ref: 6.1)** for two combinations of displacement effect and mortality. One combination was based on the guidance from SNCBs applying a highly precautionary rate of 70% displacement and 10% mortality of displaced birds. The second combination, based more closely on evidence, applied a 50% displacement rate combined with 1% mortality (MacArthur Green, 2019). Additional rates presented in **Table 4-3** include 70% displacement and 2% mortality, as has been accepted for other OWFs, and 70% displacement and 5% mortality as was recommended by Natural England for Hornsea Project Four (DESNZ, 2023b). Based on advice from Natural England, displacement impacts on offshore ornithological interests during construction have been assessed for the duration of construction (taken here as construction of foundations and installation of turbines) on the basis these on average represent 50% of the impact for the constructed wind farm.

4.5.2.3 Dogger Bank South Projects Alone

74. For construction displacement mortality from the Projects together is presented in **Volume 6, RIAA (application ref: 6.1)** for two combinations of displacement effect and mortality. Using Natural England's precautionary rates of displacement (35%) and mortality (10%) the estimated mortality is 79.5 (63.1% adults) to 118.6 (100% adults). Evidence-based estimates assuming a 25% displacement rate (APEM, 2022) and 1% mortality of displaced birds reduces the predicted impact to 7.2 (63.1% adults) to 10.8 (100% adults) individuals. Using Natural England's precautionary rates this would represent an adverse effect on integrity of the FFC SPA (increase in background mortality of 2.7 – 4%). Using evidenced- based estimates this would be maximum increase in mortality of 0.25 – 0.36%.

75. For operation displacement mortality from the Projects together is presented in **Volume 6, RIAA (application ref: 6.1)** for two combinations of displacement effect and mortality. Using Natural England's precautionary rates of displacement (70%) and mortality (10%) the estimated mortality is 155.5 (63.1% adults) to 232.0 (100% adults). Evidence-based estimates assuming a 50% displacement rate (APEM, 2022) and 1% mortality of displaced birds reduces the predicted impact to 11.2 (63.1% adults) to 16.6 (100% adults) individuals. Using Natural England's precautionary rates this would represent an adverse effect on integrity of the FFC SPA (increase in background mortality of 5.3 – 7.8%). Using evidenced- based estimates this would be maximum increase in mortality of 0.37 – 0.56%.

76. After further consideration of this effect via PVA it was concluded that even based upon the worst case prediction (using 70% displacement and 10% mortality) this displacement this does not represent an adverse effect on integrity of the FFC SPA.

4.5.2.4 In-Combination with Other Offshore Wind Farm Projects

77. The Round 4 RIAA (NIRAS, 2022) states that the Round 4 projects (which include the Projects) would not '*make an appreciable difference to any in combination impact*'.

78. The Applicants' assessment is presented in **Volume 6, RIAA (application ref: 6.1)**. The estimated total number of razorbills at risk of displacement from all OWFs within the UK North Sea BDMPS combined is 180,805 of which between 9,943 and 11,031 are estimated to be breeding adults from FFC SPA. Using displacement rates of 30% to 70% and a mortality rate of 1% to 10% for displaced birds, the number of FFC SPA birds predicted to die each year would be between 30 and 772. The predicted annual in-combination mortality on the breeding razorbill population would result in a predicted change in adult mortality rate of between 1.0% and 26%.

79. After further consideration of this effect via PVA it was concluded that even based upon the worst case prediction (using 70% displacement and 10% mortality) this displacement this does not represent an adverse effect on integrity of the FFC SPA.

80. Recognising that in-combination displacement may lead the SoS to conclude AEoI for the FFC SPA, the Applicants have therefore proposed compensation measures for razorbill on a without prejudice basis.

4.5.2.5 Compensation Requirement

81. The compensation requirement for razorbill has been calculated as the number of breeding pairs required to produce enough fledglings to replace the adults lost from the population as a result of DBS. This was done using the equation below, taking account of the national average productivity and the mean survival rate each year, as detailed in **Table 4-2**, and based on a recruitment age of five years (Horswill and Robinson, 2015).

$$N_{Fledglings\ required} = \frac{N_{New\ breeding\ recruits\ required}}{\prod_{Age=0}^{Age=5} Survival_{Age}}$$

$$\mathrm{N}_{\text{Breeding pairs required}} = \frac{\mathrm{N}_{\text{Fledglings required}}}{\text{Productivity}}$$

Table 4-2 Productivity and survival rates for razorbill (Horswill and Robinson, 2015)

Parameter	Demographic Rate
Productivity	0.570
Survival 0-2 year	0.630
Survival ≥3 year	0.895

82. Applying these demographic rates estimates that 8.76 breeding pairs are required to replace a single recruiting adult razorbill. The compensation requirement for the range of potential impacts is shown in **Table 4-4** and **Table 4-5**. Using the evidence-based 50% displacement and 1% mortality rates with 100% apportionment to the SPA gives a compensation requirement of 102 breeding pairs at a 1:1 ratio, and 205 breeding pairs at a 2:1 ratio.

Table 4-3 Predicted operational impact (individuals) as a result of DBS (worst-case scenario). Percentages in brackets represent apportionment of impacted birds to the FFC population. Evidence-based values in bold.

Species	50% displacement, 1% mortality	70% displacement, 2% mortality	70% displacement, 5% mortality	70% displacement, 10% mortality
Guillemot (55.2%)	45.6	127.8	319.4	638.8
Guillemot (100%)	**79**	221.4	553.5	1106.9
Razorbill (61.3%)	11.2	31.1	77.8	155.5
Razorbill (100%)	**16.6**	46.4	116	232

Table 4-4 Compensation requirement (breeding pairs) based on a 1:1 ratio. Percentages in brackets represent apportionment of impacted birds to the FFC population. Evidence-based values in bold.

Species	50% displacement, 1% mortality	70% displacement, 2% mortality	70% displacement, 5% mortality	70% displacement, 10% mortality
Guillemot (55.2%)	201.5	564.8	1411.5	2823.0
Guillemot (100%)	**349.1**	978.4	2446.1	4891.7
Razorbill (61.3%)	69.1	191.7	479.7	958.7
Razorbill (100%)	**102.3**	286.1	715.2	1430.4

Table 4-5 Compensation requirement (breeding pairs) based on a 2:1 ratio. Percentages in brackets represent apportionment of impacted birds to the FFC population. Evidence-based values in bold.

Species	50% displacement, 1% mortality	70% displacement, 2% mortality	70% displacement, 5% mortality	70% displacement, 10% mortality
Guillemot (55.2%)	403.0	1129.6	2823.0	5646.1
Guillemot (100%)	**698.2**	1956.9	4892.1	9783.4
Razorbill (61.3%)	138.1	383.5	959.4	1917.5
Razorbill (100%)	**204.7**	572.2	1430.4	2860.8

5 Compensatory Measures

5.1 Potential Measures Considered

83. Initial thoughts on guillemot [and razorbill] compensation options were discussed with stakeholders at a 'Non-kittiwake Compensation' ETG meeting on 9th May 2023 (see **Table 3-1**). The stakeholders represented were Natural England, Marine Management Organisation and RSPB[5].

84. Potential measures were based in part on Furness (2013) and consisted of:

- Designation of additional SPAs;
- Strategic fisheries management (prey enhancement);
- Predator eradication from a breeding colony;
- Artificial Nesting Structure (ANS); and
- Fishery bycatch reduction.

85. Of the measures discussed at the ETG meeting, one was discounted. The designation of new SPAs was discounted as a possible compensation measure at the ETG meeting in May 2023, as it is considered that locations meeting the criteria for designation, are already designated.

86. The other measures are discussed in the relevant sections throughout this document. In summary, strategic fisheries management (prey enhancement) is considered unlikely to be available at the project-level and feedback is awaited on whether the recent closure of the North Sea sandeel fishery can be considered as strategic compensation for the Round 4 projects. Predator eradication/control is being progressed by the Applicants as the preferred compensatory measure, while ANS and fishery bycatch reduction may be considered at a later date as potential adaptive management measures, should information become available on their success.

[5] Note that The Wildlife Trusts and Lincolnshire Wildlife Trust were also invited and could not attend but were provided with meeting materials and the minutes.

5.2 Strategic Fisheries Management (Prey Enhancement)

87. Sandeel species (*Ammodytidae*) are a component prey species for guillemot and a main prey species for razorbill in the FFC SPA (Clarkson, 2023) but are also subject to commercial fisheries. Ecosystem modelling suggests the cessation of the sandeel fishery in the North Sea could result in a 40% increase in the biomass of the sandeel stock and consequently result in a 42% increase in the number of seabirds within the first 10-15 years after closure of the sandeel fishery (Bayes and Kharadi, 2022).

88. There is significant potential for the measure to provide far greater compensation than even the most precautionary estimates of losses incurred due to the Round 4 plan and other UK offshore wind proposals in the pipeline. Consequently, a financial contribution towards the establishment of prey enhancement via management of fisheries was recommended as a strategic compensation measure for the Round 4 Plan (NIRAS, 2024).

89. In January 2024 the UK and Scottish governments announced closure of commercial sandeel fisheries in English waters of the North Sea and all Scottish waters, effective from March 2024. As such, there is potential that the management of fisheries to increase prey availability may not be an available compensation option for the Round 4 Plan. At the time of writing this compensation document, no information was available to indicate whether the closure would be permitted as compensation. Therefore, this measure remains within the compensation document until information confirms its availability or not as a compensation measure for the Round 4 Plan.

5.3 Measures Taken Forward

5.3.1 Predator Eradication / Control

5.3.1.1 Overview

90. Seabirds in general are ground nesting birds and have evolved to avoid predation from mammals by nesting on remote islands and inaccessible cliffs. However, the introduction of invasive and non-native mammals, such as rats *Rattus* spp. and American mink *Mustela vision,* to these areas can have devastating effects on seabird colonies, where these predators are known to take eggs, chicks and even some small-bodied adult birds (Moors & Atkinson, 1984; Towns *et al.*, 2006).

91. Eradication or control of predators in these locations has been shown, in several instances, to result in significant improvements in seabird colony success. Although not often the target species of such conservation efforts, guillemot and razorbill have been seen to respond positively to predator eradication or control. For example, eradication of rats from Lundy, off the Devon coast, although targeted at the conservation of burrow nesting seabirds, resulted in guillemot breeding numbers increasing from 2,348 to 6,198 individuals. An increase in breeding distribution of this species was also seen on the island into areas that would have been accessible to rats; therefore, the increase is attributed to the removal of the pressure of predation by rats (Booker *et al.*, 2019).

92. The Lundy case study provides strong evidence that eradication of rats can benefit guillemots in some colonies, but this may depend on the amount of boulder and cave nesting habitat (rather than cliff ledges) and whether or not guillemot numbers can increase into such habitat or are constrained by other factors such as food availability.

93. The island of Canna, off the west coast of Scotland, was subject to a rat eradication programme in 2005-2006. Prior to this, guillemots and razorbills were affected by rat predation on the island. After eradication of rats, there was a slowing of the rate of decline of the guillemot population, but the anticipated increase in abundance and breeding success was not observed. It was considered that other factors, such as adult mortality during severe storms and food shortages, prevented the population from recovering despite removal of the predation by rats (Luxmoore *et al.*, 2019). Numbers of breeding razorbills showed a sharp jump in 2006, following the eradication of rats. Luxmoore *et al.* (2019) attributed this to a reduction in predation by rats, noting that razorbill eggs were laid in areas that had previously been clear of nesting because of the presence of rats. As with guillemot, the razorbill population was thought to be affected by factors other than rat eradication, and breeding success remained low potentially as a result of food shortages (Luxmoore *et al.*, 2019).

94. At the Shiant Isles, of the north-west of Scotland, following successful eradication of the black rat, razorbill breeding success was higher on average in each of the post eradication years compared to the pre-eradication year (RSPB, 2019).

5.3.1.2 Screening of Potential Sites

95. A methodical approach was taken to the identification of potential sites at which predator eradication could be undertaken to provide compensation. The first step involved collation of the following information:

- Location of known colonies of these key species with potential predator issues on the UK mainland and its islands;
- Land ownership details (where known);
- Publicly available information on predator populations at each colony (current and historic); and
- Existing or proposed previous proposals for eradication at sites (e.g. current RSPB Biosecurity for Life Priority Projects or Scottish Marine Environmental Enhancement Fund [SMEEF], enabling investment in tangible, effective marine and coastal restoration projects, amongst others).

96. Consideration was given firstly to locations at which like-for-like compensation could be provided (i.e. compensation for guillemot [and razorbill]) but also to sites where non like-for-like compensation may be possible (i.e. for qualifying species of the SPA, other than guillemot [and razorbill]).

97. A high-level preliminary feasibility assessment was undertaken based on the following criteria in the UK Rodent Eradication Best Practice Toolkit (Thomas *et al.*, 2017) and used to apply a red, amber, green categorisation (red – criteria unlikely to be met, amber – criteria likely to require further study or consultation, green – criteria likely to be met):

- Technically feasible – the entirety of the site can be accessed and bait stations distributed so as to remove every last individual of the population at a rate faster than the target species ability to breed;
- Sustainable - the likelihood of reinvasion by the target species is low, or the risks of reinvasion leading to population re-establishment can be reduced through realistic and affordable biosecurity measures;
- Socially acceptable - the project has full support from the community, landowners and key island users, all of whom understand and accept the implications of the project. Access will be granted to every property and all privately-owned land;
- Politically and legally acceptable - All required permits and consents can be/expect to be obtained. The techniques, equipment and materials required are all legal to import / use in the UK;

- Environmentally acceptable – the impact on the environment can be reduced to an acceptably low level. Removal of the target species is unlikely to lead to permanent negative changes in the ecosystem. However short-term negative impacts should not be shied away from and stakeholders and the public should not expect the project to be 'all gain no pain';
- Capacity - All the required resources, skilled people, and equipment are available, or can be sourced in a timely manner for the duration of the project; and
- Affordable - The total cost of the project and ongoing biosecurity can be funded before the project commences, including an additional contingency (c. 20%) for unforeseen complications.

98. At this stage insufficient information is available to assign any sites to the green category (i.e. criteria likely to be met). However, a shortlist of eight sites was created by removal of sites in the red category, which included sites where political or public support is unlikely, or where the technical feasibility of successful eradication is low.

99. The longlist of sites is provided in **Volume 6, Annex B - Guillemot [and Razorbill] Compensation Predator Eradication / Control Site Longlist (application ref: 6.2.2.2)**. The shortlist of sites is detailed in section 5.3.1.2.2.

5.3.1.2.1 Pre-Application Consultation Feedback

100. The ETG meetings undertaken to date are detailed in section 3.2. During the course of this consultation, feedback has been provided by stakeholders on the perceived suitability of the sites considered. The pertinent feedback is given in **Table 5-1**.

Table 5-1 Stakeholder feedback on predator eradication site list

Stakeholder Comment	Applicants' Response
It has been acknowledged that there may be a shortage of suitable sites in England and it may be necessary to look elsewhere in the UK. However, it will be important to demonstrate connectivity of the auk populations with the FFC SPA.	The Applicants will follow the hierarchy as detailed in the draft Defra guidance (2021, 2024b) looking for sites close to the impacted area but prioritising sites which are more likely to provide effective compensation whilst maintaining benefit to the NSN.
Natural England expressed their opinion that keeping Scottish sites in the list would significantly de-risk the project, whilst acknowledging that there may be challenges in securing these sites.	The Applicants will focus the feasibility studies on the existing shortlisted sites but will re-visit Scottish sites if none of the shortlisted sites prove feasible.
Natural England stated concern over the length of the short-list, indicating that other OWF have previously considered and subsequently ruled out some of the shortlisted sites.	The Applicants note Natural England's concern but considers that more detailed and updated information may be available on these sites which is worth investigating.
Both RSPB and Natural England strongly encouraged the Applicants to re-consider the Scilly Isles as a potential location.	The Applicant will continue with the existing shortlist but will investigate the situation with the Scilly Isles and may reincorporate them into the shortlist.

5.3.1.2.2 Shortlist

101. The eight shortlisted sites are shown in **Table 5-2**. In addition, as per **Table 5-1**, the Applicants will investigate options in the Scilly Isles and Scottish sites will be revisited if none of the shortlisted sites are suitable.

Table 5-2 Shortlisted sites for DBS Predator Eradication

Rank	Location	Island/ Headland	Approximate Area (ha)	Comment
1	Sheep Island, Antrim	Island	4	Auks and rats both present
2	Muck Island, Antrim	Island	5	Auks present, rats likely
3	Gobbins, Antrim	Headland	20	Auks present, rats likely
4	St Tudwals East and West, Wales	Islands	20	Auks present, rats likely
4	Middle Mouse, Wales	Island	4	Auks present, rats possible
6	Worms Head, Wales	Headland and Island	16	Auks present, rats likely
6	Needles, Isle of Wight	Headland and Island	10	Auks present, rats likely
8	St Bees, England	Headland	300	Auks present, rats likely

102. The shortlist will be further refined by addressing four key questions:

- Would access be approved and supported?
- Are invasive predators present?
- Is habitat suitable for breeding auks?
- Is there space for additional breeding auks and are they likely to be attracted?

103. See section 5.3.1.8.1 for further detail.

5.3.1.3 Delivery Mechanism

104. In the absence of a strategic plan for auk compensation the Applicants are proposing to deliver this compensation measure independently at a project-led level. However, options for collaborative delivery, whereby the Applicants would seek to deliver the measure through a partnership with other OWF developers, will be explored. Should an opportunity to contribute to strategic mitigation through the MRF become available to the Applicants this will be considered.

105. Post-consent a Guillemot Compensation Steering Group (GCSG), consisting of relevant stakeholders, will be formed in accordance with the DCO. If it is determined that compensation for razorbill is also required, a combined steering group will be formed. The detailed implementation and monitoring of the compensatory measures will be agreed with the Steering Group.

5.3.1.4 Scale

106. The scale of this compensatory measure is dictated by the number of nesting pairs predicted to be required to produce the necessary number of recruiting adults into the population (see section 4.5). Predator eradication is a scalable measure, with different locations capable of providing different levels of compensation. Due to practical considerations, the Applicants intend to identify a single site capable of providing the required compensation, however the measure can be deployed at additional locations as required. The scale of compensation possible at potential locations will be determined by the feasibility study.

5.3.1.5 Location

107. At the time of writing in April 2024, eight sites remain in consideration for implementation of predator eradication (see section 5.3.1.2.2. The final location(s) will be confirmed on completion of the shortlist refinement and feasibility studies. In line with the draft Defra guidance (2021; 2024), the location for compensation will prioritise the ability to deliver effective compensation rather than proximity to the predicted impact, while protecting the overall coherence of the NSN.

5.3.1.6 Timescales

108. The timing of shortlist refinement, feasibility studies and predator eradication stages are shown in **Plate 5-1**. It is anticipated that a location suitable for implementation of the predator eradication compensation measure will be identified prior to the end of DCO Examination process.

109. In accordance with EC guidance (EC, 2019) requiring compensation to be in place at the time when the effect occurs, the Applicants propose to begin predator eradication two years prior to installation of the first wind turbine within the DBS West and / or DBS East Array Areas (depending on the Development Scenario taken forward). In the absence of unforeseen pressures on the guillemot [and razorbill] populations, the predicted benefits of predator eradication are anticipated to be evident in the breeding season following eradication.

5.3.1.7 Monitoring and Adaptive Management

110. Following the implementation of the predator eradication measure, the Applicants will undertake a programme of monitoring to confirm the progress of the eradication, establish the response in guillemot [and razorbill] productivity, and detect possible re-incursions. This monitoring will be detailed in the Guillemot [and Razorbill] CIMP, with further information given in section 5.3.1.8.4 of this document. Monitoring will run in parallel with the eradication activity and will continue for the operational phase of the Projects at a scale and frequency to be agreed with the GCSG.

111. Should monitoring indicate that the compensation measure is not meeting its objectives, the cause will be investigated and appropriate adaptations identified and implemented. Example adaptive management measures are presented in **Table 5-3**. The requirement for adaptive management measures would be agreed with the SoS prior to implementation.

Table 5-3 Example adaptive management measures for predator eradication

Monitoring Outcome	Timeframe	Potential Adaptive Management Measure
Eradication is unsuccessful	After (or during) 1 year of baiting activity	Further eradication with alternative bait or modified baiting station structure.
		Review of waste management practices.
	After 2 years of baiting activity	Relocation to an alternative site.
No increase in target species population	After 3-5 years of baiting activity	Vegetation clearance from around nesting sites.
		Use of attraction methods such as decoys, sound playback, and paint to simulate guano.
		Provision of artificial ground cover if avian predation is an issue.
	2 years after all other management measures have been exhausted	Relocation to an alternative site or exploration of alternative compensation method.

112. Section 5.4 discusses potential adaptive management measures beyond predator eradication.

5.3.1.8 Outline Implementation and Delivery Roadmap

113. An indicative implementation and delivery roadmap is shown in **Plate 5-1** with an indicative implementation programme shown in **Plate 5-2**.

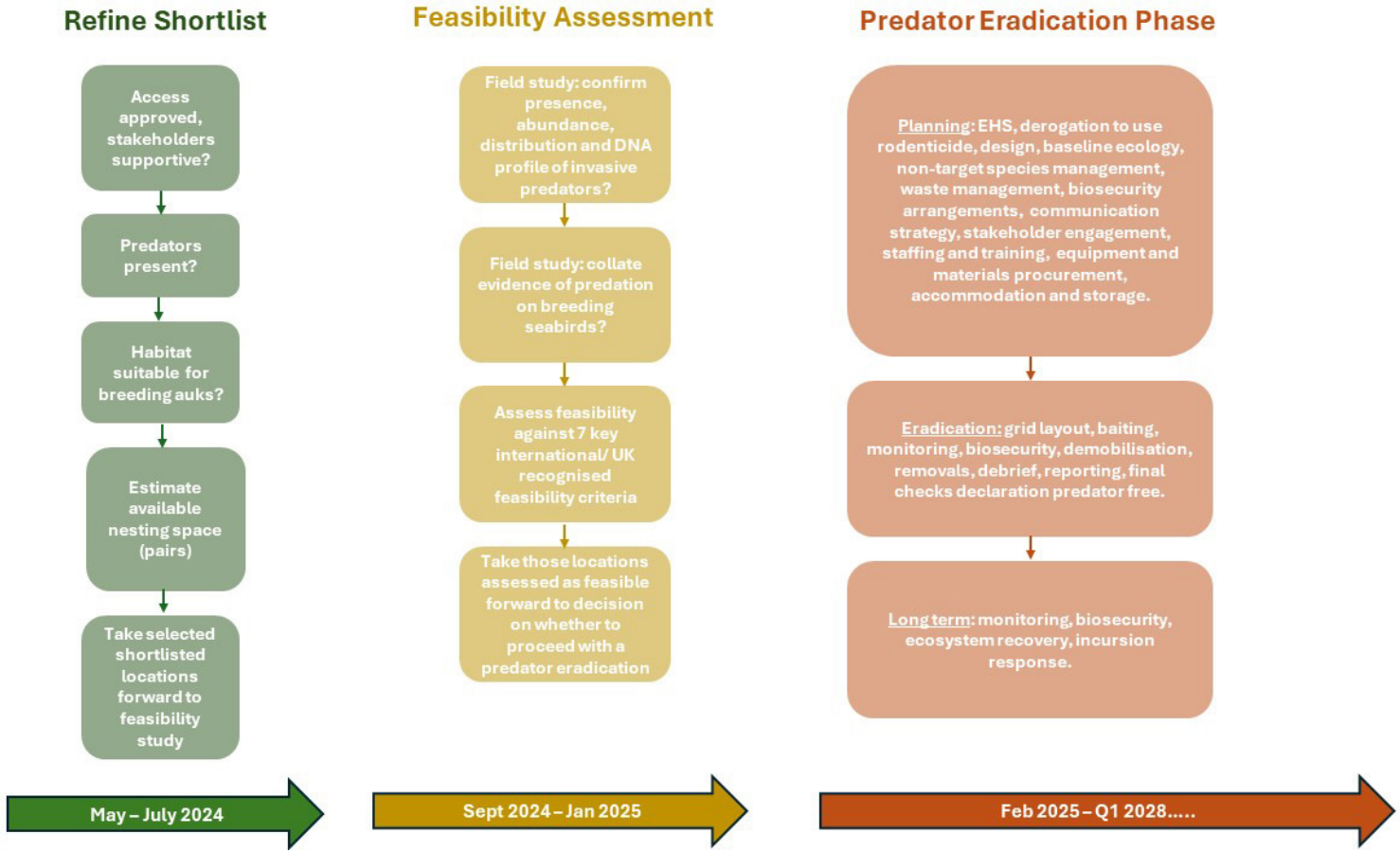

Plate 5-1 Outline implementation and delivery roadmap

114. Following submission of the DCO application, the Applicants will continue to progress refinement of the shortlist and feasibility studies to determine the preferred location for predator eradication. It is anticipated that, prior to completion of DCO Examination, a preferred site(s) capable of providing the required compensation will have been identified.

115. A detailed CIMP will be developed following identification of a suitable site(s) for predator eradication. The outline CIMP is provided in **Volume 6, Annex A - Outline Guillemot [and Razorbill] Compensation Implementation and Monitoring Plan (application ref: 6.2.2.1)**.

5.3.1.8.1 Shortlist Refinement

116. In order to refine the shortlist, the Applicants will progress the following:

- Confirm ownership and make informal inquiries to determine level of support for a habitat improvement programme.
- Talk with owners and local stakeholders (including local councils, local wildlife groups, conservation bodies, tourist operators, etc.) to collate local knowledge around seabird breeding activity and the presence of rats and other predators.
- Undertake preliminary reconnaissance visits to support the above inquiries and to observe and photograph breeding seabird activity. Methods will include a walk by for headlands and a boat circumnavigation for islands, ensuring no disturbance of wildlife.
- Create a photographic record and delineate areas of unoccupied and suitable habitat for additional nesting. Make projections of potential number of pairs of target key auk species which could be accommodated by the areas following a predator eradication.

117. Sites which are found to be unfavourable in terms of access, community support, predator presence or availability of suitable habitat will be removed from the shortlist. Remaining sites will be taken forward to a detailed feasibility study.

118. This process is underway at the time of writing, and it is the Applicants' intention to provide an update on progress at Deadline 1 of the DCO Examination.

5.3.1.8.2 Feasibility Study

119. The Applicants will undertake a feasibility assessment on the sites in the refined shortlist. The feasibility study will follow the protocol as set out in the UK Rodent Eradication Best Practice Toolkit (Thomas *et al.*, 2017).

120. A site visit, undertaken by suitably experienced personnel outside of the seabird breeding season, will gather evidence of the presence, abundance, distribution and DNA profile of invasive predators in addition to investigating evidence of predation on breeding seabirds.

121. Stakeholder and community consultation will also be undertaken. The form of consultation will be tailored to the location and community of the site but will potentially include local public meetings coupled with one-to-one meetings with key stakeholders. At this stage the Applicants can provide stakeholders and the community with realistic expectations of a potential predator eradication project and stakeholders and members of the community will be able to express their support or concerns.

122. This information gathered by the site visit and consultation will be used to conduct a detailed assessment against the following seven criteria (detailed in section 5.3.1.2), thereby ruling potential sites in or out as suitable compensation sites.

- Technical feasibility;
- Sustainability;
- Social acceptability;
- Political and legal acceptability;
- Environmental acceptability;
- Capacity; and
- Affordability.

123. On completion of the feasibility study a site, or combination of sites, will be identified where the required compensation is considered achievable via predator eradication.

5.3.1.8.3 Predator Eradication

124. On identification of a suitable site or combination of sites for implementation of the predator eradication measures, a detailed CIMP will be developed based on the outline plan provided in **Volume 6, Annex A - Outline Guillemot [and Razorbill] Compensation Implementation and Monitoring Plan (application ref: 6.2.2.1)**.

125. The predator eradication will be undertaken by a suitably experienced Contractor(s) and will align with best practice (Thomas *et al.*, 2017). There are several elements to a successful predator eradication.

126. An extensive planning stage will be required during which the scope of the project and access permissions are finalised. The licensing and permitting requirements will also be confirmed at this stage and relevant applications submitted, including a derogation for rodenticide use and wildlife licences for any potential disturbance. A number of detailed plans will be developed during this preparatory stage, including:

- Eradication operational plan;
- Biosecurity and incursion response plan;
- Species monitoring and management plan;
- Health and safety plan;
- Waste management plan; and
- Stakeholder management plan.

127. The operational stage of the predator eradication will require a variety of onsite preparations including confirmation of office and storage facilities, procurement of equipment and establishment of safety systems. It is at this stage where the Applicants will initiate the operational stakeholder and community engagement, with the launch of a project website, installation of information boards at key locations, and appointment of a Community Liaison Officer. The biosecurity network will also be established at this stage, in advance of the eradication. The biosecurity network will be tailored to the specific risks of the site and will be detailed in the Biosecurity and Incursion Response Plan.

128. Predator eradication methods will be dependent on the target predator species however it is assumed at this stage that the target predator will be black or brown rat. Measures will include the placement of lethal bait stations in a grid formation with spacing ranging from 25m x 25m to 50m x 50m depending on habitat suitability and target species. It will be necessary to check bait stations regularly, both for animal welfare purposes and to monitor bait uptake. Additional bait stations can be placed in specific areas of known predator presence. Predator carcasses will be removed in line with the Waste Management Plan.

129. After several weeks of baiting, an intensive phase of monitoring is undertaken, described in section 5.3.1.8.4. If signs of predator activity are detected at the end of March (prior to the onset of the seabird breeding season), eradication activity will cease but an additional season of eradication will be required.

5.3.1.8.4 Monitoring and Adaptive Management

130. There are two elements in predator eradication monitoring:

- Monitoring predator activity to track progress of the eradication and enable a declaration of predator-free status, and post-eradication monitoring to determine if a re-incursion has occurred; and
- Monitoring the wider ecosystem, including seabirds, during the eradication to detect effects on non-target species, and post-eradication to track the ecosystem recovery.

131. Intensive monitoring for rats will be undertaken after several weeks of baiting, when bait uptake has ceased. An intensive monitoring grid of rat-attractive items (flavoured wax, soap, chocolate, candles, chew cards, and apple etc.) and passive monitoring tools (tracking tunnels and automated trail cameras and inspection for footprints on beach sand) will be established. The coverage of the monitoring grid extends beyond that of the bait stations; one monitoring point at each bait station and one in-between two stations. All intensive monitoring points will be recorded on Global Positioning System (GPS), entered on the Geographic Information System (GIS)-linked database, and mapped to ensure coverage of the island. Each monitoring site will be checked every two days to detect rat signs (usually teeth marks or footprints or footage on camera). If any rat sign is detected, an intensive targeting programme (e.g. alternative bait, reduced spacing in the bait station grid, trapping etc.) is started until rat signs in the area cease. The intensive monitoring phase would begin in December (assuming baiting starts in October) and continue through to March.

132. If rats are detected at the end of winter, second baiting the following winter, and continued monitoring, would have to be completed at active areas to finish the eradication. However, for most projects, this is not required.

133. Long-term monitoring for rats will commence at the end of the eradication and, following best practice, continue for two years, to account for the life expectancy of a wild adult rat which is around 18 months.

134. The two-year long-term monitoring programme will have a four-weekly check regime to confirm the success of the eradication phase (i.e., to detect any surviving (or possible invasion) of rats). Permanent monitoring (biosecurity) stations will be placed around the island (i.e., within known seabird areas, optimum rat habitat and in high-risk areas) to aid with detecting any surviving rats or intercepting invading rats.

135. All long-term monitoring points will be recorded on GPS, entered into the GIS-linked database, and mapped to ensure coverage of the site. Any sign or indication of rodents should be photographed and if possible, collected or sampled for expert opinions on identification.

136. This long-term monitoring for the presence of rodents after the eradication operation will be done as part of the biosecurity programme using a range of detection devices (such as flavoured and plain wax, chew cards, traps, rodent motels, trail cameras and indicator dogs) and have a regular search effort.

137. Once the two-year monitoring phase has been completed and no rats have been detected, one further intensive site-wide monitoring check will be completed. This involves putting a range of monitoring devices over the entire site and checking every two days for six weeks. Once this check is completed and no rats have been detected the site can be declared rat-free.

138. To quantify the impacts of rats of the native biodiversity, the ecology of the site will be monitored. Seabird, land bird, invertebrate, vegetation, and non-target mammal species surveys will be completed using standardised, repeatable methods. Biodiversity monitoring methodology will include point counts, bird and non-target mammal abundance surveys and counts, vegetation plots and photo points, and invertebrate counts. It is important to expand the monitoring to detect changes of these species and ecosystems in the absences of rats. It will be important to determine population recovery for all seabirds, particularly guillemots [and razorbills], and other birds and mammal species as well as monitoring other ecological changes on the island as this information can support and inform future eradication proposals. This monitoring will help to inform the benefits (and identifying any unforeseen negative impacts) of eradicating rats from the site and will determine if the predator eradication has achieved the necessary compensation requirements.

139. Monitoring of the wider ecosystem, specifically seabirds, will continue for the operational phase of the project at a scale and frequency to be agreed with the ETG and detailed in the CIMP.

ID	Task Name	Duration	Start
1	**Refine Shortlist**	**40 days**	**Wed 01/05/24**
2	Initial Contact	1 mon	Wed 01/05/24
3	Determine presence of predators	1 mon	Wed 01/05/24
4	Habitat assessment for auks	2 mons	Wed 01/05/24
5	Determine availability of unoccupied suitable habitat	2 mons	Wed 01/05/24
6	Confirmation of sites progressing to feasibility study	0 days	Tue 25/06/24
7	**Feasibility Phase**	**100 days**	**Mon 02/09/24**
8	Eradication feasibility site visit (after seabird breeding season)	2 mons	Mon 02/09/24
9	Comprehensive stakeholder and community consultation	3 mons	Mon 02/09/24
10	Assessment against feasibility criteria	3 mons	Mon 28/10/24
11	Conclusions, recommendations and decisions.	3 mons	Mon 28/10/24
12	Confirm site(s) progressing to eradication	0 days	Fri 31/01/25
13	**Eradication Planning**	**329 days**	**Mon 03/02/25**
14	Confirm land access permissions	1 mon	Mon 03/02/25
15	Finalise scope of target site(s)	2 mons	Mon 03/03/25
16	Apply for derogation to use preferred rodenticides.	4 mons	Mon 03/02/25
17	Safety planning visit to target site	2 mons	Mon 31/03/25
18	Pre-eradication key species (seabird census, other birds, animals, and flora) monitoring and ongoing habitat assessment.	2 mons	Mon 26/05/25
19	Biosecurity and Incursion Response Plan.	3 mons	Mon 02/06/25
20	Communication Strategy	3 mons	Tue 01/07/25
21	Final field studies to address residual uncertainties	4 mons	Tue 01/07/25
22	Confirm and action licensing and waste management	2 mons	Mon 01/09/25
23	Waste Management Plan.	2 mons	Wed 01/10/25
24	Eradication Operational Plan	3 mons	Mon 01/12/25
25	Species monitoring and Management Plan	3 mons	Mon 01/12/25
26	Health and Safety Plan	3 mons	Tue 06/01/26
27	Stakeholder Communication Plan and materials	3 mons	Mon 02/03/26
28	**Eradication Process**	**523 days**	**Mon 02/03/26**
29	Establish access safety system	2 mons	Mon 02/03/26
30	Project website	22 mons	Fri 01/05/26
31	Community Liaison Officer (CLO) and Eradication Team Leads arrive (on site)	1 mon	Mon 03/08/26
32	Install information boards at key locations	2 mons	Mon 03/08/26
33	On-going stakeholder engagement (including fortnightly	17 mons	Mon 28/09/26
34	Appointment of field team including specialist contractors for boat operation and cliff	2 mons	Mon 01/06/26
35	Procurement and delivery of equipment.	6 mons	Fri 01/05/26
36	Confirm storage, office accommodation (on island and mainland)	1 mon	Mon 01/06/26
37	Eradication team arrive (on island and mainland)	6 mons	Mon 24/08/26
38	Establish biosecurity network	2 mons	Wed 01/04/26
39	Eradication Readiness check	1 mon	Mon 24/08/26
40	Establish bait station grid.	2 mons	Mon 24/08/26
41	Non-target species monitoring	6 mons	Mon 19/10/26
42	Community and local agency personnel trained in biosecurity, monitoring and incursion response techniques. (In conjunction with eradication and	7 mons	Mon 24/08/26
43	Baiting phase, (including removal and safe disposal of rat carcasses where recovered).	6 mons	Mon 19/10/26
44	Intensive monitoring phase (targeting surviving rats)	5 mons	Mon 25/01/27
45	Confirmation of eradication succe	1 mon	Mon 19/04/27
46	Removal of surplus equipment	2 mons	Mon 22/03/27
47	Eradication operational debrief	1 mon	Mon 19/04/27
48	Eradication Operation Technical Report	2 mons	Mon 17/05/27
49	Final check (confirmation of eradication success; extend eradication into a second winter if required)	1 mon	Wed 01/03/28
50	Declaration of rodent-free status	0 days	Tue 28/03/28
51	**Post-Eradication Monitoring**	**718 days**	**Mon 19/04/27**
52	Post-eradication key species monitoring	6 mons	Mon 19/04/27
53	Seabird nesting habitat adaptive management and maintenance (ongoing).	5 mons	Mon 01/11/27
54	Biosecurity and Incursion (ongoin	11 mons	Mon 19/04/27
55	Long-term post eradication rat monitoring phase	24 mons	Wed 29/03/28
56	Long-term monitoring of ecosystem recovery (ongoing activity during lifecycle)	24 mons	Wed 29/03/28

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Plate 5-2 Indicative implementation programme

5.3.1.9 Consideration of Potential Impacts from Implementation of the Compensatory Measure

140. Potential unintended consequences of predator eradication include:

- Poisoning of non-target species either directly through consumption of bait, or indirectly through predation or scavenging of poisoned individuals; and
- Wider trophic effects such as hyperpredation (increase predator pressure on a secondary prey due to increased predator abundance or removal of primary prey), mesopredator release (increased abundance of a medium-sized carnivore as a result of removal of a larger carnivore), competitor release and herbivore release.

141. The potential for such unintended consequences can often be predicted and controlled but requires knowledge of site specific communities and interactions. These will be fully explored in the feasibility studies undertaken for the shortlisted sites.

5.4 Potential Adaptive Management Measures

5.4.1 Artificial Nesting Structure

142. The creation of artificial colonies or ANS is being taken forward as a measure to provide compensation for kittiwake as detailed in **Volume 6, Appendix 1 - Project Level Kittiwake Compensation Plan (application ref: 6.2.1)**, however there is a lack of current evidence supporting the utilisation of offshore ANS by guillemot [and razorbill]. For this reason, the Auk Compensation ETG concluded that this measure should not be taken forward as primary compensation for guillemot and/or razorbill at this time.

143. The ETG did, however, note that ANS for auks are worthy of further investigation. In 2023 Ørsted constructed three nearshore ANS as compensation for effects on kittiwake as a result of the Hornsea Project Three Offshore Wind Farm and have committed to additional ANS as compensation for Hornsea Project Four. As monitoring data becomes available from these structures the suitability of ANS as compensation for auks can be evaluated.

144. Sufficient data will not be available in the timeframe required to consider ANS as a compensatory measure for guillemot [and razorbill]. However, the Applicants will look to incorporate provision for suitable nesting locations for guillemot [and razorbill] on the ANS(s) being provided for kittiwake. Such provisions will take cognizance of the nesting preferences of guillemot [and razorbill], predominantly narrow ledges, rock platforms and boulder fields (Plumb, 1965; Hipfner and Dussereault, 2001, Harris *et al.*, 1997). Guillemot tend to nest in dense congregations on open ledges, whereas razorbill have shown a preference for more enclosed nest sites (Olsthoorn & Nelson, 1990) often scattered throughout or on the periphery of colonies (Hipfner and Dussereault, 2001; JNCC, 2021). As such a combination of open, narrow ledges for guillemot and more enclosed nesting compartments may be incorporated into the kittiwake structure.

145. Should the primary compensation (predator eradication) prove to be less effective than anticipated and the ANS have been colonised by guillemot [and razorbill], the Applicants may consider this as appropriate adaptive management.

5.4.2 Bycatch Reduction

5.4.2.1 Introduction

146. At the Auk Compensation ETG meeting on 10 April 2024, Natural England advised that bycatch reduction be included within this document as an adaptive management compensation measure (**Table 3-1**). Therefore, in the unlikely event that predator eradication was demonstrated as being unsuccessful at delivering on the Projects' compensation requirements, and that robust evidence demonstrating the effectiveness of techniques to reduce the bycatch of auks became available, then it could, if required, be implemented as a compensatory measure for the Projects in place of or in addition to predator eradication. This could be as part of a project-led, collaborative or strategic delivery mechanism.

147. The requirement for adaptive management will be built into the annual programme of review through the GCSG.

148. A summary of the issue of auk bycatch and how its reduction represents a potentially suitable adaptive management compensation measure for the Projects is provided in the following sections.

5.4.2.2 Overview

149. Auks in UK waters are not thought to be caught in longline fisheries but are at risk of bycatch in trawl and in set-net (gillnet) fisheries. Northridge *et al.* (2020) noted bycatch of 27 guillemots and three razorbills in 2,239 midwater trawls sampled between 1996-2018 and bycatch of 267 guillemots and 12 razorbills in 18,916 hauls of gillnets sampled over the same period. Their sampling extended slightly beyond the UK territorial limit (see Figure 1 in Northridge *et al.*, 2020) but was predominantly within UK waters. The evidence therefore indicates bycatch of these species in UK waters to be most severe in set-net fisheries.

150. Using the bycatch data in Northridge *et al.* (2020), scaled up to the entire fishery, Miles *et al.* (2020) estimated that bycatch of guillemots in UK set-net fisheries in the UK European Economic Zone (EEZ) (a median estimate of 1,984 birds per year) may represent 1.7% of annual mortality of breeding adult guillemots (assuming that bycatch was equally distributed across all age classes in the population and only affected birds from the UK population rather than birds visiting UK waters from other countries). Similarly, bycatch of razorbills in UK gillnet fisheries in the UK EEZ (a median estimate of 130 birds per year) may represent 0.4% of annual mortality of breeding adult razorbills.

151. Miles *et al.* (2020) suggest that because Northridge *et al.* (2020) did not include sampling from non-UK vessels fishing in UK waters, the results they presented *"are likely to underestimate the potential population increases that could be achieved by bycatch mitigation"*.

152. However, it should be noted that the sampling period (1996-2018) included many years before bycatch mitigation was put into effect at Filey Bay which has considerably reduced bycatch of guillemots and razorbills in the gillnet fishery there; before mitigation the bycatch was estimated as 200 guillemots and 323 razorbills in 2008, and 186 guillemots and 277 razorbills in 2009 (Quayle, 2015). After mitigation was introduced in 2010 the bycatch was reduced to an average of 11 guillemots and 43 razorbills per year in 2010-2014 (Quayle, 2015).

153. In a review of bycatch data, Northridge *et al.* (2023) reported that guillemot bycatch rate is affected by season and water depth, with the highest bycatch occurring in set-net fisheries operating during the winter months and in shallow waters. The same review reported the highest occurrences of winter set-net fishing, in 2017, along the south coast of England, with hotspots of guillemot bycatch per unit effort in the northeast and the Cornish coast (Northridge *et al.*, 2023).

154. Set-net fishing effort has reduced in recent years because of declines in salmon stocks to critically low levels. However, set-nets are still being used to catch sea trout, and those nets are likely to be responsible for a major part of the bycatch of guillemots and razorbills (Environment Agency, 2020).

155. The UK set-net fishery is concentrated in the south and southwest coasts of England which is where bycatch reduction efforts would be focussed if it was required to be taken forward as an adaptive management compensatory measure for the Projects.

5.4.2.3 Techniques to Reduce Bycatch

156. There are multiple techniques that can be used to reduce the interaction between diving seabirds and fishing equipment. Evidence of the effectiveness of the various methods is relatively limited but is collated and presented in Anderson *et al.* (2022). One of the available techniques is the use of above water deterrents (AWD) attached to fishing nets at regular intervals. AWDs are usually fixed to buoys or markers attached to set fishing gear, which work to scare birds away from fishing nets. Looming eyes buoys (LEBs) are one of the most highly developed forms of AWD and have shown some success in the reduction of seabird bycatch, including guillemot however further trials are needed to confirm effectiveness (Ørsted, 2022; Rouxel *et al.*, 2021).

157. The Applicants recognise that both Natural England and the RSPB have raised a number of concerns regarding the approach taken and the evidence provided to date by Hornsea Project Four, and SEP and DEP, and have indicated that they do not consider bycatch reduction through implementation of LEBs to be a viable compensation measure based on current knowledge (Natural England 2022a; 2022b 2023b; RSPB 2022; 2023). Whilst investigation of the efficacy of LEBs has been the focus of recent studies to reduce seabird bycatch (Rouxel *et al.*, 2021; 2023), other technologies are currently undergoing research and there is potential for novel approaches to be shown to be effective in future. For example, bird scarer kites (alongside LEBs) are currently being trialled as part of a Defra Fisheries Industry Science Partnership (FISP) bycatch reduction project[6] in the southwest of England which could be shown to be effective at reducing bycatch of auks. Fishtek Marine Ltd, the RSPB, University of Exeter, Cornwall Inshore Fisheries and Conservation Authority and SeaScope Fisheries Research Ltd are involved in this study, which, unlike Rouxel *et al.* (2023), does not rely on self-reporting of bycatch events by fishers which is prone to underreporting. Instead, remote electronic monitoring equipment is installed on vessels with data being independently verified to record bycatch events. Therefore, it can be expected that the methodological and data analysis concerns encountered on the Hornsea Project Four trials will not be experienced at the FISP project. The controlled study is analysing both LEBs and bird scarer kites and will result in a peer-reviewed scientific paper.

158. Therefore, that project can be expected to provide fully quantified and independently ratified success rates, and a quantified assessment of actual bycatch rates at the target fishery with consideration given to variation across vessels and other co-variates. However, this study is currently only planned to gather one year of data and so further studies to demonstrate effectiveness are likely to be required before SNCBs can support bycatch reduction as a compensation measure for auks.

[6] Above-water deterrents: mitigating seabird bycatch in set-net fisheries: https://www.gov.uk/government/publications/fisp-projects/fisp-projects-contracts-awarded-in-round-4-of-the-scheme#fishtek-marine

5.4.2.4 Outline Delivery Mechanism for Bycatch Reduction

159. If bycatch reduction was required to be implemented as an adaptive management compensatory measure for the Projects, the Applicants would seek to sign up fishers to implement AWDs and remote electronic monitoring systems building on the bycatch mitigation trials undertaken by Ørsted for Hornsea Project Four and the Defra funded FISP project. The following steps to secure vessel involvement as described in Fishtek Marine Limited (2023) for SEP and DEP would be followed:

1) Liaise with relevant IFCA and identify skippers who will engage positively and for a long period, will be diligent with data collection, trustworthy with respect to data confidentiality and reliable with regard to data collection and reporting;
2) Make an approach to the skippers by phone outlining the key requirements and expectations of them in their involvement and outline the proposed remuneration for participation in the scheme;
3) On verbal agreement, contact the Maritime and Coastguard Agency to ensure all vessel safety certification is complete and up to date;
4) Meet fishers face-to-face with 'Participant Consent Form' for signature; and
5) Install equipment.

6 Funding

160. Funding information for the compensatory measures outlined in this plan can be found in the **Volume 4, Funding Statement (application ref: 4.4)**. The Applicants have estimated the costs associated with developing, constructing and operating the compensatory measures outlined in this Compensation Plan, the **Volume 6, Appendix 1 - Project Level Kittiwake Compensation Plan (application ref: 6.2.1)** and the **Volume 6, Appendix 3 - Project level Dogger Bank Compensation Plan (application ref: 6.2.3)**. This estimate includes project lead, strategic & collaborative compensation measures and is for the lifetime of the Projects.

161. Based on the information presented in the **Volume 4, Funding Statement (application ref: 4.4)**, SoS can be satisfied that the financial viability of the Projects will not be compromised by the delivery of all or some of the compensatory measures proposed by the Applicants and set out in the compensation plans, and furthermore that these compensatory measures can be financed through the existing financial arrangements in place to develop, construct and operate the Projects.

7 Summary

162. A number of measures have been explored to provide compensation for adverse effects on guillemot as a result of the Projects in combination with other offshore wind farms. Compensation is also discussed for razorbill 'without prejudice' in the event that the SoS determines it is required.

163. Predator eradication / control has been identified as the most suitable measure to achieve the compensation requirements of DBS for guillemot [and razorbill]. Other measures considered: strategic fisheries management (prey enhancement), ANS and bycatch reduction, are either unavailable at the project-level or still in trial phases with limited evidence of success. However, the Applicants will monitor the progress of ANS and bycatch reduction trials to evaluate them as future adaptive management measures should they be required.

164. Assessment of the proposed predator eradication measure against Natural England's compensation checklist is provided in **Table 7-1**.

Table 7-1 Assessment of the proposed compensation against Natural England's checklist

Criteria	Predator Eradication / Control Measure Assessment Against Criteria
What, where and when	Predator eradication measure as presented in this compensation document and to be further detailed in future iterations of this document and the CIMP. Shortlist of sites presented in section 5.3.1.2.2 of this document with roadmap for identification of a final site(s) in section 5.3.1.8. Outline implementation programme provided in **Plate 5-2** of this document.
Why and how	Summarised in this document and will be detailed further in future iterations of this document and the CIMP.
Deliverability is secured	Roadmap for delivery is provided in section 5.3.1.8 of this document. Deliverability will be secured following feasibility studies and selection of a suitable site(s).
Policy / legislative mechanism for delivering the compensation	Delivery will be through agreement with individual landowners. These agreements will be confirmed post-consent.

Criteria	Predator Eradication / Control Measure Assessment Against Criteria
Agreed DCO/DML conditions	The **Volume 3, Draft DCO (application ref: 3.1)** includes condition wording similar to other consented OWFs. It is expected that further advice may be forthcoming from DESNZ in mid-2024 on how implementation through strategic means or the MRF may be conditioned (at the time of writing this advice is not public).
Clear aims and objectives & links to the conservation objectives of the site or feature and addresses the specific damage caused by the project and will not negatively impact other sites.	Clear aim to improve productivity of auks through successful predator eradication / control to replace auks lost as a result of the Projects. Potential negative impacts of the compensation are explored in this document (section 5.3.1.9) but will be assessed in full by the feasibility study.
Mechanism for further commitments if the original compensation objectives are not met – monitoring, adaptive management & ongoing sign-off procedure	Monitoring and adaptive management included in sections 5.3.1.7 and 5.3.1.8.4 of this document and to be detailed in the CIMP. Future potential adaptive management measures included in section 5.4 as agreed with the ETG.
Clear governance proposal for the post-consent phase (e.g. ToR agreed)	A GCSG will be formed post-consent. Governance will be defined in the CIMP.
Ensure development of compensatory measures is open and transparent	Continued stakeholder engagement throughout the lifetime of the project.
Timescales for implementation & how quickly the measures will contribute to the network	Indicative timeline for implementation included in **Plate 5-2** of this document. Increased productivity should become evident quickly after implementation.
Commitment to continued annual management of the compensation area throughout the lifetime of the project	Monitoring commitments summarised in sections 5.3.1.7 and 5.3.1.8.4 of this document with details to be provided in the CIMP.

165. The information provided demonstrates how the proposed measures can be implemented to provide the required compensation. At the time of writing, it is anticipated that the measures will be delivered by the Applicants at the project-led level. However, options for collaboration with other OWF developers are being explored, as will opportunities for contribution to strategic compensation through the MRF should they become available.

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RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Windmill Hill Business Park
Whitehill Way
Swindon
Wiltshire, SN5 6PB