



Hornsea Project Four

Volume B2, Annex 8.2: Compensation measures for FFC SPA: Guillemot and Razorbill Bycatch Reduction: Roadmap

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01	-	-	Submitted at Application
02	Amended throughout	Amended throughout	Removal of Gannet from the document for Deadline 1
02	7	1	Position on kittiwake AEol conclusion
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Table of Contents

1	Introduction.....	7
2	Description and scope.....	7
3	Indicative timescale for delivery and implementation.....	11
4	Consultation	12
4.1	Pre-examination	12
4.2	Post-consent	12
5	Design and implementation of the bycatch reduction project – Initial technology selection phase 13	
5.2	Implementation of the Bycatch Reduction Technology.....	14
6	Monitoring and adaptive management	15
6.2	Monitoring.....	15
6.3	Adaptive Management	15
7	Legal agreement(s).....	15
8	Draft DCO wording.....	16
9	Funding.....	20
10	Conclusion.....	20
11	References	21

List of Tables

Table 1: Indicative timescale for delivery and implementation.....	11
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Glossary

Term	Definition
Compensation / Compensatory Measures	If an Adverse Effect on the Integrity on a designated site is determined during the Secretary of State's Appropriate Assessment, compensatory measures for the impacted site (and relevant features) will be required. The term compensatory measures is not defined in the Habitats Regulations. Compensatory measures are however, considered to comprise those measures which are independent of the project, including any associated mitigation measures, and are intended to offset the negative effects of the plan or project so that the overall ecological coherence of the national site network is maintained.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Offshore Ornithology Engagement Group (OOEG)	The Hornsea Four Offshore Ornithology Engagement Group means the group that will assist, through consultation the undertaker in relation to the delivery of each compensation measures as identified in the gannet and kittiwake compensation plan and the gannet -razorbill and guillemot compensation plan. Matters to be consulted upon to be determined by the Applicant and will include site selection, project/study design, methodology for implementing the measure, monitoring, and adaptive management options as set out in the gannet and kittiwake compensation plan and the gannet -razorbill and guillemot compensation plan.
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).

Acronyms

Acronym	Definition
CfD	Contracts for Difference
DCO	Development Consent Order
FFC	Flamborough and Filey Coast
FID	Final Investment Decision
GRIMP	Guillemot and Razorbill Compensation Implementation and Monitoring Plan
G GRIMP	Gannet , Guillemot and Razorbill Compensation Implementation and Monitoring Plan
LEB	Looming Eye Buoy
MMO	Marine Management Organisation
NGO	Non-Governmental Organisation
NFFO	National Federation of Fisheries Organisation
OOEG	Offshore Ornithology Engagement Group
PINS	Planning Inspectorate
RSPB	Royal Society for the Protection of Birds
SNCBs	Statutory Nature Conservation Bodies
SoS	Secretary of State
SPA	Special Protection Area
UK	United Kingdom

1 Introduction

1.1.1.1 This Guillemot ~~and~~; Razorbill ~~and Gannet~~-Bycatch Reduction Roadmap document provides an overview of the ~~anticipated~~ next steps for implementation of bycatch reduction as a compensation measure for Hornsea Four, if deemed necessary by the Secretary of State following the Appropriate Assessment. It should be noted that this is a 'live' document and, should compensation be required, it will be added to or revised as the Development Consent Order (DCO) application for Hornsea Four progresses. This roadmap sets out a clear pathway to demonstrate that the compensation measure can be secured and that the mechanism for delivery of the compensation measure can be implemented.

1.1.1.2 Following the Applicant's submission, the Applicant has revisited its conclusion of no potential for an adverse effect on integrity (AEoI) in respect of the kittiwake feature of the Flamborough and Filey Coast Special Protection Area (FFC SPA) from Hornsea Four in combination with other plans and projects. It is important to note however that ~~the Applicant maintains its position of no AEoI alone or in combination for all other qualifying species of the FFC SPA and for all other European sites.~~ -In light of the Applicant's updated position on kittiwake the Applicant has separated the compensatory measures for gannet and kittiwake into separate Roadmaps, Compensation Plans (and consequently separate Implementation and Monitoring plans). Upon reflection the Applicant has also separated the Roadmaps, Compensation Plans (and consequently the Implementation and Monitoring Plans) for the Auk species (Guillemot and Razorbill) and Gannet. All of the compensation measures remain "without prejudice" but this Roadmap has been updated to focus solely on guillemot and razorbill.

2 Description and scope

2.1.1.1 Bycatch reduction forms part of a suite of compensation measures also including predator eradication and fish habitat enhancement to compensate for the number of seabirds, specifically guillemot and razorbills, ~~guillemots and gannet~~ that may be at risk of displacement from the operation of the Hornsea Four Wind Farm. The Applicant proposes to support the overall numbers of these birds through the reduction of bird bycatch in selected UK fisheries ~~with connectivity to the colonies~~ within the guillemot and razorbill biogeographic region. Seabirds are at risk from multiple anthropogenic threats, including ~~as~~ bycatch in UK fisheries ~~ing activities~~ (Miles *et al.*, 2020). Bycatch – the incidental capture of non-target species in fisheries – can present a significant pressure on seabird populations (Miles *et al.*, 2020). Within recent decades, seabird populations have plummeted, largely due to commercial fisheries (direct competition and bycatch) (Croxall *et al.*, 2012). It has been estimated globally that hundreds of thousands of seabirds are killed each year in gillnets (400,000; Żydelski *et al.*, 2013) and longline fisheries (320,000; Anderson *et al.*, 2011). Despite this, monitoring of the issue is lacking with onboard observer monitoring coverage relatively low compared to the scale of commercial fishing (Pott and Wiedenfeld, 2017).

2.1.1.2 The reduction of seabird bycatch will be achieved through the use of deterrent equipment attached to fishing nets at regular intervals. There are multiple types of reduction techniques that can be used to reduce the interaction between birds and fishing equipment. The Evidence Report **B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence (APP-194)** sets out the ecological evidence for bycatch reduction measures and supports likely successful compensation measures. Bycatch reduction

techniques are designed to be suited to specific gear types and bycatch species. Defra and Cefas' joint Clean Catch initiative recommends bird bycatch reduction measures including modifications to fishing gear, changes to fishing and processing techniques, and devices for attachment to fishing gear. The proposed reduction methods considered as part of a suite of compensation measures are above water deterrents, net lights, and net panels. Above water deterrents are usually fixed to buoys or markers attached to set fishing gear, which work to scare birds away from fishing nets.

2.1.1.3

~~2.1.1.2.1.1.4~~ 2.1.1.4 In order to determine the most effective bycatch reduction method, the Applicant ~~entered~~ commenced a bycatch reduction technology selection phase ~~November~~ in 2021, focusing on the use of Looming Eye Buoys (LEB) within an active gillnet fishery within the biogeographic range of guillemot and razorbill. LEB were selected as they are one of the most developed forms of above water deterrent, which have been developed and trialled by BirdLife International/ RSPB in conjunction with Fishtek Marine (i.e., Rouxel *et al.*, 2021). The LEB is a rotating device (approximately 200 mm wide) with two panels which simulate predator eye patterns mounted on a pole to a fishing buoy. The opposite face of each LEB panel exhibits eyes of a difference size which creates a 'looming' effect when the panels rotate. The LEB is designed to rotate using wind power which provides unpredictable movements and speed rotations which intensify the likelihood of behavioural responses by seabirds and reduce the chances of habituation (Gregor *et al.*, 2014). Further information is presented within the Applicant's **B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence (APP-194)**. ~~The Applicant will pursue consideration of bycatch reduction measures and trials of the Looming Eye Buoys (LEB) to further examine the efficacy of the LEB as a bycatch reduction measure.~~

2.1.1.5 ~~A-b~~ The bycatch reduction technology selection phase ~~is planned for 2021-23, to~~ will gather further corroborate the substantial evidence already obtained on the efficacy of the ~~selected bycatch reduction technology~~ LEB, specific to guillemot and razorbill bycatch within a commercial gillnet setting. The technology selection phase has been implemented within an area of high guillemot and razorbill bycatch (determined by Northridge *et al.* (2020) and bycatch risk mapping undertaken by the Applicant and presented in **B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence (APP-194)**). The technology selection phase focuses on the non-breeding season when high densities of guillemot and razorbill occur along the south coast of the UK and overlap with high levels of gillnetting activity.

2.1.1.6 The Applicant is undertaking the LEB selection phase with two companies:

- 1) FishTek Marine Ltd

- FishTek are a global leader in developing bycatch reduction techniques, and have previously developed techniques which have successfully aided in reducing bycatch in fisheries (e.g., Hookpod, Lumo lead, pingers).

- 2) SeaScope Fisheries Research

- SeaScope are an independent consultancy who specialise in fisheries monitoring and research.

2.1.1.7 Through collaborating with two companies which have both undertaken successful studies within fisheries science, the Applicant is confident with the progress of the testing of the LEB and that the measures required for a successful study have been undertaken.

2.1.1.8 The Applicant has secured 101 fishers to take part in ~~the first year of~~ the reduction technology selection phase, with all boats being fitted with a dual camera monitoring systems to determine seabird bycatch when fishing with control and experimental nets (i.e. with the LEB deterrent attached). ~~The first year of the~~ reduction technology selection phase ~~will run~~ is taking place from November 2021 until March 2022 with data being subsequently analysed by fisheries experts and ornithologists to determine the ~~efficiency~~ effectiveness of the LEB as a compensation measure. The applicant notes that as the bycatch reduction selection phase is being undertaken within the target fishery, the findings will quantify the level of bycatch reduction achieved through using the LEB, and can therefore directly indicate the scale of deployment that the Applicant would be required to deliver to fulfil compensation.

2.1.1.9 The ~~p~~Preliminary findings from the bycatch reduction technology selection phase using the LEB are promising, with an initial reduction in bycatch of auks identified. The significance of this reduction will be fully analysed following completion of the 2021/2022 bycatch reduction selection phase. Due to contractual restrictions, the results of the bycatch reduction selection phase can only be disclosed as percentage reductions in bycatch i.e. not specific numbers of birds, without consent from the participating fishers. However, a similar trial is running simultaneously under RSPB management which will likely have results published following analysis. without such restrictions.

2.1.1.10 There is scope to complete a second year in the winter of 2022/2023 should it be deemed necessary as a similar technology selection phase using LEBs is running simultaneously under RSPB management, or otherwise the Applicant will proceed to implementation. The Applicant is confident in securing the number of vessels required to fulfil compensation.

~~———— If deemed necessary by the results from the first year, a second year of technology selection will be undertaken by the Applicant.~~

2.1.1.11

~~2.1.1.32.1.1.12~~ 2.1.1.12 The technology taken forward as part of the compensation measure will be selected from this phase. The implementation of the bycatch compensation measure is flexible and scalable depending on the outcome of the bycatch technology selection phase and other compensation measures proposed. Work will be undertaken with local representatives and contacts within the target fishery areas (determined by fisheries consultation, published literature (i.e., Northridge et al., (2020) and bycatch risk mapping

undertaken by the Applicant and presented in **B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence (APP-194)** to ensure uptake of the bycatch reduction equipment. It is acknowledged by the Applicant that use of the equipment may need to be incentivised to ensure uptake and continued usage.

~~2.1.1.4~~2.1.1.13 To ensure that the equipment continues to be used and that further evidence can be gathered to confirm the ~~success~~~~efficiency~~~~effectiveness~~ of the measures, a monitoring programme will be required during the operational use of the technology, should they be taken forward as a compensation measure. There are many examples of fishing gear monitoring around the world, which include but are not limited to onboard observers, gear cameras, self-reporting, blue-tooth tags and equipment trackers. The exact method of monitoring will be decided based upon further evidence gathering and discussion with industry experts.

~~2.1.1.5~~2.1.1.14 Hornsea Four is expected to operate for 35 years following construction. If required, the accepted measure(s) will be used and monitored throughout the operational lifespan of the Wind Farm. Following the monitoring programme, overall measure uptake and success of the reduction measure, the equipment may continue to be used as a bycatch deterrent.

~~2.1.1.6~~2.1.1.15 Having 12 operational windfarms in UK waters, the Applicant, has a longstanding relationship with the UK fishing industry, especially on the east and west coasts of England where positive and trusting relationships have been built over time. The Applicant also supports local fishing industries, providing good-will funding to fishers, and related organisations, that work within the vicinity of their wind farms which has further encouraged good relationships. The Applicant has a track record of encouraging co-existence between renewable energy development and the fishing industry and are often used as an example of best practise between the industries. The Applicant is positive that their pre-existing relationship with the fishing industry and representatives will aid the technology selection phase and compensation measure implementation.

~~2.1.1.7~~2.1.1.16 The Applicant has started, and will continue, to enhance connections and relationships with fishers in regions of England, where netting activity is high. The Applicant has a high degree of confidence in the feasibility of delivering the compensation measure. Throughout the development of the technology selection phase and compensation implementation the Applicant will seek to further strengthen fisheries engagement, collaboration and relationships in the Southeast and Southwest.

~~2.1.1.8~~2.1.1.17 The Applicant will take an appropriately precautionary approach for assessment work in order to increase the biogeographic population of adult birds by a sufficient margin to offset the predicted impact of Hornsea Four on an annual basis (see **Table 2 of B2.6 RP Volume B2 Chapter 6 Compensation measures for FFC SPA Overview (APP-183)**). The bycatch reduction measures will be used to compensate as part of a suite of measures. It is considered that guillemot, and razorbill can be sufficiently compensated through a suite of measures:

- Bycatch reduction;
- Predator eradication; and
- Fish habitat enhancement (as a resilience measure).

~~2.1.1.9 Gannet will be compensated through the suite of bycatch and fish habitat enhancement compensation measures, in addition to artificial nesting structures.~~

~~2.1.1.10~~ 2.1.1.18 Therefore, the bycatch reduction measures, could collectively with the compensation measures, be scaled up to provide a ratio of 1:2. The reduction in mortality through the implementation of the suite of measures collectively are capable of over-compensation of ~~26 gannet, 70 guillemot and 3 razorbill to compensate~~ for the estimated potential impact ~~to guillemot and razorbills from~~ of Hornsea Four (see [Table 2 of B2.6: Compensation Measures for FFC SPA Overview \(APP-183\)](#)).

~~2.1.1.11~~ 2.1.1.19 Based upon a precautionary assessment the Applicant would consider provision of bycatch reduction measures across 7 vessels which would be confirmed following the bycatch reduction ~~trial~~ [technology selection phase](#), in addition to the further additional measures as part of the compensation measures package (see 2.1.1.17). Following the bycatch technology selection phase, the number of vessels (and extent of the predator eradication programme) may increase or decrease depending on the level of success of the bycatch trial. These compensation measures have the benefit of being flexible and scalable to enable successful delivery of the compensation.

3 Indicative timescale for delivery and implementation

3.1.1.1 The high-level anticipated programme presented below ([Table 1](#)) is applicable to the implementation and delivery of the bycatch reduction compensation measure. Implementation of compensation measures will be subject to successful progression of the Hornsea Four project and determination of the need for compensation by the SoS. The decision on the requirement for and the scale of the suite of measures and inclusion of the predator eradication measure will be subject to the outcome of monitoring of the bycatch reduction technology selection phase to be determined in 2023. The timing of implementation of the bycatch reduction compensation measure is provisional as the timeframe for Examination, consent award, reaching final investment decision (FID) and Contracts for Difference Allocation Round Five [and Six](#), have not yet been set. The programme has been carefully considered to ensure timely delivery of the compensation measure.

~~3.1.1.2~~

Table 1: Indicative timescale for delivery and implementation

Activity	Year	2021	2022	2023	2024	2025	2026	2027	2028
Design of technology selection phase	2021								
Bycatch technology selection phase	2021 2023								
Scale and package consideration	2023								
Anticipated Hornsea Four DCO Granted	2023								

Activity	Year	2021	2022	2023	2024	2025	2026	2027	2028
Compensation Implementation ¹	2022/2023-TBC								
Bycatch implementation detailed design	2024								
Establishment of Offshore Ornithology Engagement Group (OOEG)	Following consent award								
Gannet , Guillemot and Razorbill Compensation Implementation and Monitoring Plan (GGRIMP)	Following consent award								
GGRIMP submitted to SoS	Following consent award								
Offshore Construction of Hornsea Four Foundations	2026								
Offshore Construction of Hornsea Four Offshore Turbines	2027								
First Power (partially operational windfarm)	2028								

4 Consultation

4.1 Pre-examination

4.1.1.1 Technology selection for bycatch reduction ~~is planned for~~ was initiated in November 2021. The first year of bycatch reduction technology selection phase will run until the end of March 2022. If deemed necessary by the results from the first year, a second year of technology selection will be undertaken by the Applicant 2021-23 to determine the most feasible technique to progress and implement (see [Section 5](#) for further details). This technology selection phase is being designed in consultation with industry experts, the SNCB and the RSPB. Initial advice was sought to influence the methodology of the technology selection phase. It is planned that further consultation will be undertaken with these parties ahead of examination, as the technology selection phase is progressing, to review the implementation of the bycatch reduction techniques, along with the Applicant's proposed bycatch reduction measure. Following the bycatch reduction technology selection phase phase, currently anticipated to end March 2022, the Applicant will start the planning and processes for implementation.

4.2 Post-consent

4.2.1.1 A steering group named the OOEG shall be convened by the Applicant to assist the design, implementation, reporting, any necessary adaptive management and other relevant matters of the compensation measures as determined by the Applicant. The OOEG core

¹ Due to the uncertainty regarding Allocation Round 5 and 6 of the Contracts for Difference (CfD) scheme the date cannot be confirmed at this time.

members would be the relevant SNCB(s) and the MMO. The RSPB and NFFO would also be invited to form part of the OOEG as advisors. The purpose of this group would be to help shape and inform the nature and delivery of the compensation post consent.

- 4.2.1.2 A ~~Gannet,~~ Guillemot and Razorbill Implementation and Monitoring Plan (GGRIMP) will be produced. The GGRIMP (following the content in the outline GGRIMP (B2.8.7 Outline Gannet Guillemot and Razorbill Compensation Implementation and Monitoring Plan (APP-200)) noting that separate versions will be produced for gannet alone (Gannet Compensation Implementation and Monitoring Plan Bycatch and Gannet Compensation Implementation and Monitoring Plan Artificial Nesting Structure) and will be submitted at Deadline 53, which will result follow in the removal of gannet from certain guillemot and razorbill documents.) The GRIMP will document all of the proposed compensation measures for ~~gannet,~~ guillemot and razorbill (including mechanisms and programme for delivery, monitoring, adaptive management, reporting). The OOEG will be consulted during development of the GGRIMP. The GGRIMP will be submitted to the Secretary of State for approval.
- 4.2.1.3 The implementation phase will involve consultation with stakeholders via the OOEG process to ensure cooperation across the monitoring aspects of the compensation measure. The proposed implementation process described below will be documented in the GGRIMP and will be submitted to the Secretary of State for approval.
- 4.2.1.4 The implementation of the compensation measures will be monitored to ensure that the bycatch reduction method is being applied in accordance with the GGRIMP. The details of the monitoring phase of the compensation measure will be discussed with the OOEG and will be set out within the GGRIMP for approval by the Secretary of State.
- 4.2.1.5 Monitoring will inform any adaptive management required by the compensation measure and will be discussed with OOEG members before implementation. This will be continued until Hornsea Four has been decommissioned or a determination is made by the Secretary of State following consultation with the relevant statutory nature conservation body, that compensation is no longer required.
- 4.2.1.6 Reporting of the results of implementation of the compensation measure will be carried out according to timescales discussed with the OOEG and set out in the GGRIMP.

5 Design and implementation of the bycatch reduction project – Initial technology selection phase

- 5.1.1.1 The Applicant has identified locations ~~in UK waters~~ with high guillemot and razorbill bycatch along the English south coast of England, particularly south east, southeast and south west. This has been determined by the risk mapping process outlined within the Guillemot and Razorbill Bycatch Evidence Report (B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence (APP-194)), consultation with fisheries and other relevant stakeholders. The south east and south west locations ~~will form~~ have formed the basis ~~of any potential the first year of the~~ bycatch reduction technology selection phase, ~~further bycatch sampling (if necessary)~~ and potentially the location of the compensation measure. The scale of compensation relative to the location specific factors (i.e., number of vessels

to be included in the bycatch reduction technology selection and implementation) along with the methodology would be defined in consultation with the SNCB, the RSPB and relevant industry stakeholders.

5.1.1.2 As mentioned above, the Applicant will commence the first year of bycatch technology selection using the LEB in November 2021. The Applicant has entered into a supply contract for the supply of the LEB equipment, has put the necessary contractual arrangements in place for payments to be made to the participating fishers to use the technology, has arranged for the necessary monitoring during the bycatch technology phase and has undertaken stakeholder engagement which will continue during the phase. Ten vessels were secured for the bycatch reduction technology selection phase within two months (with most of the fishers signing up within two weeks), demonstrating how rapidly fishers could be secured by the project. A number of other vessels are already expressing interest in participating in future trials or long-term implementation of the measure. Such implementation would be secured via contracts between the Applicant and the fishermen with the support of a specialist fisheries consultancy. This would be organised following the bycatch reduction technology selection phase.

5.1.1.25.1.1.3 Following the analysis of the first year of the bycatch technology selection phase, the Applicant will ~~may~~ consider undertaking technology selection of other potentially suitable bycatch reduction techniques, should it be deemed necessary, such as net illumination, visual net modifications (reflective nets and warning panels) and other above water deterrents (as identified in the Bycatch Evidence Report **B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence (APP-194)**). The LEB currently presents the most promising potential for bycatch reduction in UK waters as identified in discussions with relevant stakeholders and peer reviewed published research (Rouxel et al., 2021), and so will form the focus of the initial selection phase. This ~~will~~ has involved at-sea deployment of bycatch reduction technology within an active fishery. This phase ~~will~~ involves control nets as well as experimental nets where the technology ~~will~~ is ~~be trialled~~ being used. The methodology of the selection phase has been developed in conjunction with delivery partners, advisors (such as NGO's and fisheries stakeholders) and bycatch reduction technology developers to ensure best practice and a robust approach, which does not cause any safety or working implications for fishers. Preliminary findings from the LEB are promising, with an initial reduction in bycatch of auks identified. The significance of this reduction will be fully analysed following completion of the bycatch reduction selection phase and presented to the ExA at Deadline 5.

5.2 Implementation of the Bycatch Reduction Technology

5.2.1.1 Following the selection phase, a final bycatch reduction technology, or combination of technologies, will be selected for the compensation measure. Members of the OOEG will be consulted on the final fishery/fisheries location. Relevant fisheries stakeholder discussions will also be undertaken.

5.2.1.2

5.2.1.3 The approach taken to the delivery of bycatch reduction will be discussed with the OOEG as part of the development of the GGRIMP, taking into account the considerations of fisheries stakeholders and any relevant additional consideration of location specific issues.

5.2.1.4

- 5.2.1.5 The implementation of the bycatch reduction compensation measure will be overseen by a suitably qualified delivery partner such as a commercial fisherman/ technical specialist contractor.

6 Monitoring and adaptive management

- 6.1.1.1 A detailed monitoring and adaptive management protocol will be provided in the ~~Gannet, Guillemot and Razorbill Implementation and Monitoring Plan~~ GRIMP. This will be produced in consultation with OOEG members and other relevant parties so it is fit for purpose.

6.2 Monitoring

- 6.2.1.1 A monitoring package shall be designed with the delivery partner and the OOEG. Monitoring will focus on the progress and confirmation of a reduction in bycatch numbers for ~~gannet,~~ guillemot and razorbill. This would be informed by the bycatch technology selection phase (comparing the bycatch rate in the control nets to the experimental nets). The monitoring of results will be dependent on the implementation method. However, reduction monitoring for bycatch of other taxa is well known and synergies can be drawn and incorporated into the monitoring relevant to ~~gannet,~~ guillemot and razorbill. This would be developed with experienced stakeholders from both a conservation and fisheries background to ensure monitoring requirements are met.

- 6.2.1.2 Monitoring will continue for the operational phase of the compensation measure, at a frequency and method to be detailed in the GRIMP. It is envisaged that the delivery partner would lead the monitoring component of this measure.

6.3 Adaptive Management

- 6.3.1.1 Adaptive management is an iterative, post-consent process which combines management measures and subsequent monitoring with the aim of improving effectiveness whilst also updating knowledge and improving decision making over time. An adaptive management plan ~~will~~ be produced and outlined in the GRIMP, which would list a set of options to ensure the long-term resilience of the measure. This process would be developed in consultation with the OOEG. If it becomes clear that some of the assumptions relating to key parameters that influence the establishment of the measure are not being realised as anticipated, adaptive management measures will be implemented to improve effectiveness and another technique or fishery type may be trialled and chosen for bycatch reduction, in consultation with the OOEG.

7 -Legal agreement(s)

- 7.1.1.1 In order to undertake the bycatch reduction technology selection phase, the Applicant has entered into a supply contract with the bycatch reduction technology provider Fishtek Marine and the monitoring technology provider Seascope Fisheries Research Ltd. The agreements include provisions governing the supply and deployment of the technology, intellectual property rights relating to the specific technology, collection and dissemination of the data amongst other obligations to ensure the timely execution of the technology selection phase.

- 7.1.1.2 The contract requires the monitoring technology provider Seascope Fisheries Research Ltd to enter into individual agreements with fishers participating in the trial incorporating a payment and outlining the obligations on both parties to cover monitoring and the collection of data.
- 7.1.1.3 Following the bycatch technology selection phase it is anticipated that the technology that is deemed to have generated the most favourable outcomes will form the compensation measure. A long-term supply contract will be entered into to supply the technology and ensure its ongoing maintenance. In addition, the Applicant will enter into long term individual agreements with fishers to pay an annual sum for utilising the technology on their boats and monitoring bycatch.
- 7.1.1.4 The Applicant has confirmed that a marine licence would not be required for the selection phase or future implementation of the technology as the LEB forms part of the fishing equipment used by the fishers, and fishing is an exempted activity from marine licensing.

8 Draft DCO wording²

Schedule []

Ornithology Compensation Measures

PART 1

The Hornsea Four Offshore Ornithological Engagement Group

1. In this Schedule:

“The FFC” means the site designated as the Flamborough and Filey Coast Special Protection Area;

“the gannet and kittiwake compensation plan” means the document certified as the gannet and kittiwake compensation plan by the Secretary of State for the purposes of this Order under article 38 (certification of plans and documents etc.);

“the gannet guillemot and razorbill compensation plan” means the document certified as the gannet razorbill and guillemot compensation plan by the Secretary of State for the purposes of this Order under article 38 (certification of plans and documents etc.);

“the Hornsea Four Offshore Ornithology Engagement Group” or “H4 OOEG” means the group that will assist, through consultation, the undertaker in the delivery of the compensation measures identified in the gannet and kittiwake compensation plan and the gannet razorbill and guillemot compensation plan;

² The DCO wording has been updated to reflect the wording in the draft DCO submitted at Deadline 1 for Kittiwake Compensation Measures and further amendments to guillemot and razorbill and the gannet Compensation Measures will be made at Deadline 2.

“the offshore compensation measures” means, as the context requires, bycatch reduction and/or the offshore nesting structure(s); and

“the onshore compensation measures” means, as the context requires, predator eradication and/or predator control measures and/or the onshore nesting structure(s).

2. Work Nos. 1, 2, 3, 4 and 5 together with any associated development offshore may not be commenced until a plan for the work of the “H4 OOEG” has been submitted to and approved by the Secretary of State. Such plan to include:
 - a) terms of reference of the H4 OOEG;
 - b) details of the membership of the H4 OOEG which must include:
 - i. the MMO and the relevant statutory nature conservation body as core members for offshore compensation measures and
 - ii. the relevant local planning authority and statutory nature conservation body as core members for onshore compensation measures;
 - iii. the RSPB and The Wildlife Trust and the National Federation of Fishermens Organisations as advisory members, for both onshore compensation measures and/or offshore compensation measures subject to their area of expertise;
 - c) details of the proposed schedule of meetings, timetable for preparation of the gannet and kittiwake implementation and monitoring plan (“the KGIMP”) and the gannet, guillemot and razorbill implementation and monitoring plan (“GGRIMP”) and reporting and review periods;
 - d) the dispute resolution mechanism and confidentiality provisions;
 - e) the scope of the H4 OOEG to be limited to the topics for discussion as identified by the Applicant as chair of the H4 OOEG to include in relation to each compensation measure, site selection, project/study design, methodology for implementing the measure, monitoring and adaptive management options.

PART 2

Gannet and Kittiwake Compensation Measures

3. The GKIMP must be submitted to the Secretary of State for approval in consultation with the MMO and relevant statutory nature conservation body for offshore compensation measures (if required), and with Natural England and the relevant local planning authority for onshore compensation measures (if required). The KGIMP must be based on the strategy for gannet and kittiwake compensation set out in the gannet and kittiwake compensation plan and include:
 - a) details of locations where compensation measures will be deployed, and in the event onshore structures are required, details of landowner agreements and in the event new offshore structures are required, details of the seabed agreements with the relevant owner of the foreshore;

- b) details of designs of artificial nesting structure(s); and how risks from avian or mammalian predation and for onshore nesting structures how unauthorised human access will be mitigated;
- c) an implementation timetable for delivery of the artificial nesting structure, such timetable to ensure that in the event of the implementation of:
 - i. a new or repurposed onshore or offshore structure that does not host an existing colony, the structure is in place to allow for two kittiwake and gannet breeding seasons prior to operation of any turbine forming part of the authorised development; or
 - ii. a repurposed onshore or offshore structure that hosts an existing colony the structure is in place to allow for one kittiwake and gannet breeding season prior to operation of any turbine forming part of the authorised development;

For the purposes of this paragraph each breeding season is assumed to have commenced on 1 April in each year and ended on 31st August.

- d) details of the proposed ongoing monitoring of the measures including: survey methods; survey programmes and colony and productivity counts;
 - e) recording of H4 OoEG consultations;
 - f) details of any adaptive management measures, with details of the factors used to trigger any such measures;
 - g) provision for reporting to the Secretary of State, to include details of the use of each site by breeding kittiwake and gannet to identify barriers to success and target any adaptive management measures;
 - h) details of the artificial nesting site maintenance schedule for the artificial nesting structure; and
 - i) in the event that the undertaker must implement bycatch reduction measures for gannet the information listed in paragraph 9(b)
4. The undertaker must construct the compensation measures as set out in the GKIMP approved by the Secretary of State.
 5. The undertaker must notify the Secretary of State of completion of implementation of the measures set out in the GKIMP.
 6. The artificial nest structure must not be decommissioned without prior written approval of the Secretary of State.
 7. The GKIMP approved under this Schedule includes any amendments that may subsequently be approved in writing by the Secretary of State. Any amendments to or variations of the approved KGIMP must be in accordance with the principles set out in the gannet and kittiwake compensation plan and may only be approved where it has been demonstrated to the satisfaction of the Secretary of State that it is unlikely to give rise to any materially new or materially different environmental effects from those considered in the gannet and kittiwake compensation plan.

PART 3

Gannet Guillemot and Razorbill Compensation Measures

8. The GGRIMP must be submitted to the Secretary of State for approval in consultation with the MMO and the relevant statutory nature conservation body for offshore compensation measures, and with the relevant statutory nature conservation body and the relevant local planning authority and relevant conservation trusts for onshore compensation measures. The GGRIMP must be based on the strategy for gannet, guillemot and razorbill compensation set out in the gannet guillemot and razorbill compensation plan and include:
 - a) in the event that the undertaker must implement predator eradication and/or predator control measures
 - i. details of locations where compensation measures will be deployed;
 - ii. details of how any necessary access rights, licences and approvals have or will be obtained and any biosecurity measures will or have been secured;
 - iii. an implementation timetable for delivery of the predator eradication and/or predator control measure that ensures that the measure has been implemented two years prior to operation of any turbine forming part of the authorised development;
 - iv. proposals for monitoring and reporting on the effectiveness of the measures, including productivity rates; breeding population and distribution of breeding birds;
 - v. recording of H4 OOEG consultations;
 - vi. details of any adaptive management measures, with details of the factors used to trigger any such measures; and
 - vii. provision for reporting to the Secretary of State, to include details of the use of each site by breeding guillemot and razorbill to identify barriers to success and target the adaptive management measures.
 - b) in the event that the undertaker must implement bycatch reduction measures
 - i. details of relevant technology supply agreements and arrangements with fishers to uptake the bycatch reduction technology that will or has been secured;
 - ii. an implementation timetable for provision of the bycatch reduction measures that ensures that the measures are in place prior to the operation of any turbine forming part of the authorised development;
 - iii. proposals for monitoring and reporting on the effectiveness of the measures, including the collection of data from participating fishers;
 - iv. recording of H4 OOEG consultations;
 - v. details of any adaptive management measures and details of the factors used to trigger adaptive management measures for each species; and
 - vi. provision for annual reporting to the Secretary of State, to identify barriers to success and target the adaptive management measures.
9. The undertaker must implement the compensation measures as set out in the GGRIMP approved by the Secretary of State.
10. The undertaker must notify the Secretary of State of completion of implementation of the measures set out in the GGRIMP.
11. The GGRIMP approved under this Schedule includes any amendments that may subsequently be approved in writing by the Secretary of State. Any amendments to or variations of the approved GGRIMP must be in accordance with the principles set out in the

gannet, guilemot and razorbill compensation plan and may only be approved where it has been demonstrated to the satisfaction of the Secretary of State that it is unlikely to give rise to any materially new or materially different environmental effects from those considered in the kittiwake compensation plan.

PART 4

Fish Habitat Enhancement

12. No turbine forming part of the authorised development may begin operation until the fish habitat enhancement measures have been implemented in accordance with the principles as set out in the GKIMP and the GGRIMP (as relevant).

9 Funding

9.1.1.1 The Applicant has identified the costs associated with the implementation of the proposed compensation measure. These costs have been included within a detailed Derogation Funding Statement ([B2.10 RP Volume B2 Chapter 10 Without Prejudice Derogation Funding Statement \(APP-202\)](#)). This statement is supplemental to the Funding Statement ([E1.1 CA Volume E1.1 Funding Statement \(APP-224\)](#)) submitted as part of the suite of Application documents. The Funding Statement(s) outline the overall project cost based on the capital expenditure and operational expenditure assumptions in the "Review of Renewable Electricity Generation Cost and Technical Assumptions" (DECC 2016). The Funding Statement(s) also detail the corporate structure and a robust explanation to allow the SoS to conclude that the necessary funding to deliver the compensation measure can be secured.

10 Conclusion

10.1.1.1 The Applicant is confident that the compensation measure is viable, will be effective and can be delivered. The Applicant will continue stakeholder engagement to demonstrate the design and implementation of the bycatch reduction project and ensure the compensation measure can be readily achieved and secured.

11 References

Anderson, O., Small, C., Croxall, J., Dunn, E., Sullivan, B., Yates, O., and Black, A. (2011), 'Global seabird bycatch in longline fisheries', *Endangered Species Research*, 14/2: 91-106.

Croxall, J., Butchart, S., Lascelles, B., Stattersfield, A., Sullivan, B., Symes, A. and Taylor, P. (2012), 'Seabird conservation status, threats and priority actions: a global assessment', *Bird Conservation International*, 22/1: 1-34.

[Gregor AL, Clayton NS, Phalan B, Thornton A. 2014 Comparative cognition for conservationists. *Trends Ecol. Evol.* 9, 489–495. \(doi:10.1016/j.tree.2014.06.004\)](#)

Miles, J., Parsons, M. and O'Brien, S. (2020), 'Preliminary assessment of seabird population response to potential bycatch mitigation in the UK-registered fishing fleet', Report prepared for the Department for Environment Food and Rural Affairs (Project Code ME6024).

Pott, C. and Wiedenfeld, D. (2017), 'Information gaps limit our understanding of seabird bycatch in global fisheries', *Biological Conservation*, 210: 192-204.

[Rouxel, Y., Crawford, R., Cleasby, I.R., Kibel, P., Owen, E., Volke, V., Schnell, A.K. and Opper, S., 2021. *Buoys with looming eyes deter seabirds and could potentially reduce seabird bycatch in gillnets. *Royal Society open science*, 8\(5\), p.210225.*](#)

Žydelis, R., Small, C. and French, G. (2013), 'The incidental catch of seabirds in gillnet fisheries: A global review', *Biological Conservation*, 162: 76-88.