



Hornsea Project Four: Derogation Information

PINS Document Reference: B2.8.6
APFP Regulation: 5(2)(q)

Volume B2, Annex 8.6: Compensation measures for FFC SPA: Fish Habitat Enhancement: Roadmap

Prepared GoBe Consultants Ltd. September, 2021
Checked Sarah Randall, Orsted. September, 2021
Accepted Francesca De Vita, Orsted. September, 2021
Approved Julian Carolan, Orsted., September, 2021

Doc. No: B2.8.6
Version: A

Table of Contents

1	Introduction.....	6
2	Description and scope.....	6
3	Next Steps.....	7
4	Indicative timescale for delivery and implementation.....	8
5	Consultation	9
5.2	Post-application	9
5.3	Post-consent	9
6	Design of the restoration project, site selection and further research.....	10
6.2	Development of a new seagrass restoration project.....	10
6.3	Funding expansion of an existing restoration project	11
6.4	Further research	11
7	Monitoring and adaptive management	11
7.1	Monitoring.....	11
7.2	Adaptive management	12
8	Securing key consents and legal agreement(s).....	12
8.1	Consenting requirements.....	12
8.2	Legal agreements.....	12
9	Draft DCO wording.....	13
10	Funding.....	17
11	Conclusion.....	17
12	References	18

List of Tables

Table 1	Indicative timescale for delivery and implementation.....	8
---------	---	---

Appendices

Appendix	Heading
A	Letter of comfort from Project Seagrass
B	Letter of comfort from Yorkshire Wildlife Trust
C	Letter of comfort from Ocean Conservation Trust

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).
Habitats Regulations	The Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017
Habitats Regulations Assessment (HRA)	A process which helps determine likely significant effects and (where appropriate) assesses adverse impacts on the integrity of European sites. The process consists of up to four stages: screening, appropriate assessment, assessment of alternative solutions and assessment of imperative reasons of over-riding public interest (IROPI) and compensatory measures
Hornsea Project Four Offshore Wind Farm	The proposed Hornsea Project Four Offshore Wind Farm project. The term covers all elements of the project (i.e., both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
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).
National Site Network	The network of European Sites in the UK. Prior to the UK's exit from the EU and the coming into force of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 these sites formed part of the EU ecological network known as "Natura 2000".
Ramsar	Wetlands of international importance designated under the Ramsar Convention.
Report to Inform Appropriate Assessment	The information that the Competent Authority needs to inform an Appropriate Assessment at Stage 2 of the HRA process and which has been provided by the Applicant in [the RIAA (Volume 2, Annex 2: Report to Inform Appropriate Assessment)].
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.

Acronyms

Acronym	Definition
AEOI	Adverse Effect on Integrity
CfD	Contracts for Difference
DCO	Development Consent Order
FFC	Flamborough and Filey Coast
FID	Final Investment Decision
GGRIMP	Gannet, Guillemot and Razorbill Compensation Implementation and Monitoring Plan
GKIMP	Gannet and Kittiwake Compensation Implementation and Monitoring Plan
HRA	Habitats Regulations Assessment
MMO	Marine Management Organisation
MoU	Memorandum of Understanding
OOEG	Offshore Ornithology Engagement Group
RIAA	Report to Inform Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SNCBs	Statutory Nature Conservation Bodies
SoS	Secretary of State
SPA	Special Protection Area
UK	United Kingdom

1 Introduction

1.1.1.1 This Fish Habitat Enhancement Roadmap document provides an overview of the anticipated next steps for implementation of fish habitat enhancement as a resilience measure for Hornsea Four, if deemed necessary by the Secretary of State (SoS) following the Appropriate Assessment. It should be noted that this document will be updated as necessary and should compensation be required it will be added to and revised as the Development Consent Order (DCO) application for Hornsea Four progresses. This resilience measure is feasible and can be secured, and this roadmap sets out the approach that will be followed.

2 Description and scope

2.1.1.1 Fish habitat enhancement is being pursued as a 'without prejudice' resilience measure for:

- black-legged kittiwake (*Rissa tridactyla*);
- northern gannet (*Morus bassanus*);
- common guillemot (*Urea aalge*); and
- razorbill (*Alca torda*)

2.1.1.2 Fish habitat enhancement seeks to improve vital habitats for fish species, such as those that provide spawning or nursery grounds, to increase the productivity of key prey species for seabirds. Marine habitats that support fish populations such as seagrass, biogenic reef and mudflats have been considered for restoration in the United Kingdom (UK) to increase biodiversity (ABPmer 2017; MMO 2019). There is substantial evidence that these types of structured habitats enhance the density, growth, and survival of juvenile fishes and invertebrates (Lefcheck *et al.* 2019).

2.1.1.3 Seagrass meadows are amongst the most productive marine habitats in the UK. Seagrass provides rich nursery habitat for a fifth of the world's most fished species including pollock, herring and whiting, meaning their restoration can improve prey availability (Unsworth *et al.* 2021). Seagrass meadows provide shelter and food for juvenile fish, stabilise the sediment, reduce erosion, improve water quality, absorb excess nutrients and improve nutrient cycling, produce oxygen and store significant amounts of carbon. Prey forage fish for seabird species, kittiwake, gannet, guillemot and razorbill, include planktivorous pelagic species (e.g. sandeel, sprat, herring). While seabirds such as kittiwake, gannet, guillemot and razorbill often feed miles away from any seagrass, the species that they prey on, such as gadoids and clupeoids, often utilise seagrass as nursery habitats (Bertelli and Unsworth 2014; Lefcheck *et al.* 2019; Lilley and Unsworth 2014; McDevitt-Irwin *et al.* 2016). The Evidence Report ([B2.8.5 Compensation measures for FFC SPA: Fish Habitat Enhancement: Ecological Evidence](#)) sets out the ecological evidence for fish habitat enhancement resilience measure and supports it as a likely successful resilience measure.

2.1.1.4 The fish habitat enhancement measures will provide resilience to the compensation measures for the predicted impact of Hornsea Four as part of a suite of measures. The suite of compensation measures will increase the biogeographic population of each species as required to compensation for Hornsea Four's impact (see [Table 2 of B2.6 RP Volume B2 Chapter 6 Compensation measures for FFC SPA Overview](#)) See [B2.2: Report to Inform Appropriate Assessment](#), [B2.7 FFC SPA: Kittiwake and Gannet Compensation Plan](#) and [B2.8 FFC SPA Gannet, Guillemot and Razorbill Compensation Plan](#) for further details on the

suite of compensation measures).

2.1.1.5 For kittiwake the provision of artificial nesting structures is proposed as a potential compensation measure and fish habitat enhancement is also included as a resilience measure.

2.1.1.6 Guillemot and razorbill would be sufficiently compensated through a suite of compensation measures which includes:

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

2.1.1.7 Gannet will be compensated through a suite of compensation measures which includes:

- Artificial nesting structures;
- Bycatch reduction measures; and
- Fish habitat enhancement (as a resilience measure).

2.1.1.8 The increased resilience to seabird populations through the implementation of the fish habitat enhancement measures collectively with the predator eradication and bycatch reduction measures and artificial nesting structures for gannet and kittiwake would provide further resilience to the compensation measures, in addition to the considerable compensation levels secured by the other compensation measures. The Applicant is confident that the measure of extensive large-scale seagrass restoration (up to a total of 30 ha) would provide resilience to the compensation measures and compensate as part of a package for Hornsea Four.

2.1.1.9 Based upon a precautionary assessment the Applicant would consider provision of fish habitat enhancement measures through seagrass restoration at two locations (potentially one on the east coast of England and one on the south coast of England) which would be determined following feasibility studies, in addition to the further additional measures as part of the suite of compensation measures (see paragraphs 2.1.1.6-2.1.1.7).

2.1.1.10 Hornsea Four is expected to operate for 35 years following construction. If required, the accepted measure(s) would be implemented and monitored throughout the operational lifespan of the Hornsea Four.

3 Next Steps

3.1.1.1 Prior to obtaining consent of Hornsea Four, the Applicant will begin seagrass restoration efforts with a trial scheme. It should be noted that the potential for trials, methodologies and exploration of potential broad areas for large scale seagrass restoration is ongoing with a number of stakeholders, including academics and experts in the field (see [Appendices A and B](#)). Evidence of the most suitable seagrass restoration site(s) will be provided through site feasibility studies and results of planting/trial studies. The goal of the trial studies are to restore seagrass habitat and determine success at a smaller scale, prior to planting at a larger scale, in order to maximise likelihood of success and monitor prey fish responses. The

Applicant has entered into a supply contract for the collection of seed and planting of an area of 2 ha and this work has already commenced (September 2021). The Applicant will consider other trial locations if required. Once collected, these seeds will either be planted immediately or stored in an appropriate facility until the following season.

3.1.1.2 The Applicant will confirm the methodology for trial planting, once location(s) have been confirmed, as it will be dependent on species selected i.e. intertidal (*Zostera noltii*) or subtidal (*Zostera marina*) planting operations. It should be noted that the restoration works, and associated feasibility studies will be carried out by an external provider (to be determined) and as such the methodology and any licences or permits required to restore seagrass within the chosen area will be obtained by the external provider prior to commencing work on at the site. A service agreement Further information on the restoration works is provided in [Section 6](#).

4 Indicative timescale for delivery and implementation

4.1.1.1 The high-level programme presented below ([Table 1](#)) is applicable to the implementation and delivery of the fish habitat enhancement resilience measure. Implementation of the resilience measure will be subject to successful progression of the Hornsea Four project. The timing of implementation of the seagrass restoration is provisional as the timeframe for Examination, consent award, reaching final investment decision (FID) and Contracts for Difference Allocation Round Five, have not yet been set. The programme has been carefully considered to ensure timely delivery of the resilience measure.

Table 1 Indicative timescale for delivery and implementation

Activity	From	2021	2022	2023	2024	2025	2026	2027	2028
Feasibility study and research studies	2021 - 2022								
Trial study	2021 - 2023								
Anticipated Hornsea Four DCO Granted	2023								
Compensation Implementation ¹	2023/ 2024 - TBC								
Site Selection for full-scale restoration	2024 - 2025								
Further site refinement and Ground truthing	2024 - 2025								
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								

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

5 Consultation

5.1.1.1 Stakeholder engagement is considered important for seagrass restoration projects and stakeholder engagement will be required throughout the restoration project development, implementation and monitoring.

5.2 Post-application

5.2.1.1 The Applicant will continue consultation with stakeholders post-consent application, in the period prior to the close of Examination. The Applicant will undertake a pilot restoration project during this period and therefore there will be ongoing engagement with stakeholders to consult on details of the potential pilot project. Updates on the results of the pilot restoration project and associated research will also be provided to stakeholders. Should the pilot studies be successful, the area of seagrass restoration effort may be expanded, or alternative locations considered. Any future increase in the seagrass restoration site will include further consultation and engagement with local stakeholders and advisory bodies.

5.3 Post-consent

5.3.1.1 A steering group named the Offshore Ornithology Engagement Group (OOEG) would be convened by the Applicant to advise on implementation, reporting and any necessary adaptive management of the resilience measure (adaptive management for the resilience measure being limited to achieving the spatial target for seagrass restored). The OOEG core members would be the relevant Statutory Nature Conservation Bodies (SNCB(s)) and the Marine Management Organisation (MMO). The Royal Society for the Protection of Birds (RSPB) and NFFO would also be invited to form part of the OOEG as advisory members. The purpose of this group would be to help shape and inform the nature and delivery of the compensation post consent, as agreed by the Applicant.

5.3.1.2 A Gannet, Guillemot and Razorbill Compensation Implementation and Monitoring Plan (GGRIMP) will be produced (following the content in [B2.8.7 Outline Gannet, Guillemot and Razorbill Compensation Implementation and Monitoring Plan](#)) and the Gannet and Kittiwake Compensation Implementation and Monitoring Plan (GKIMP), will be produced (following the content in the outline GKIMP ([B2.7.6 Outline Gannet and Kittiwake Compensation Implementation and Monitoring Plan](#))) which will document all of the proposed compensation measures for kittiwake, gannet, guillemot and razorbill (including mechanisms and programme for delivery, monitoring, adaptive management, reporting). The OOEG will be consulted during development of the GGRIMP and GKIMP. The GGRIMP and GKIMP will be submitted to the SoS for approval following consent award and prior to the commencement of the offshore foundation construction of the authorised project.

5.3.1.3 Following approval of the GRRIMP and GKIMP by the SoS, the Applicant will carry out restoration of the site(s) using methods described in the GRRIMP and GKIMP. This is likely to be initiated by a pilot trial (unless already completed), particularly for any new restoration location(s).

5.3.1.4 The seagrass restoration will be monitored to report on how the measure is delivering as agreed in the GRRIMP and GKIMP. The details of the monitoring phase of the resilience measure will be discussed with the OOEG. Reporting of the results of implementation of the

resilience measure will be carried out according to timescales set out in the GRRIMP and GKIMP.

6 Design of the restoration project, site selection and further research

6.1.1.1 The Applicant is currently considering either undertaking a new seagrass restoration project or providing funding to expand an existing restoration project (of which there are several being undertaken in the UK). The Applicant intends to undertake some of this work post-consent application, before the consent decision. Specifically, the Applicant plans to complete a trial restoration project of 2 ha in 2021/2022 at a site to confirm feasibility of seagrass restoration. Further trials will be undertaken if required. It is noted if the Applicant provides funding to an existing seagrass restoration project, a trial study may not be required if the restoration site is already established or a trial study in the area has already been undertaken.

6.2 Development of a new seagrass restoration project

6.2.1.1 Should a new project be undertaken, the Applicant would undertake detailed feasibility studies to consider site selection, assess the physical parameters for seagrass to be restored and undertake stakeholder engagement.

6.2.1.2 For a new restoration project, physical surveys (e.g. particle size, depth, slope, light, temperature, total suspended solids, redox layer) and biological surveys would be conducted as well as habitat mapping at each site, these could involve the use of camera drops and diver surveys to assess the suitability of the potential locations. When undertaking site selection studies, the health and nutrient status of the closest seagrass meadows or patch would be examined. It may be necessary, especially with the potential scale restoration, that a series of surveys would be needed to identify potential seagrass meadows for future seed collections. This would be conducted in consultation with Natural England and other stakeholders.

6.2.1.3 The Applicant would undertake studies to understand the most appropriate scale for the restoration project and consider how to maximise the benefits of spatial overlap/proximity to the other compensation measures. The Applicant recognises the importance of encouraging long-term survival by promoting self-facilitation through implementation at a large-enough scale. The Applicant would ensure that significant contingency, which may include reseedling/replanting, is built into the measure to provide the necessary confidence that it would have sufficient resilience, offset the impact and efficacy resilience measure.

6.2.1.4 Following the site suitability surveys, a site selection process (potentially using a decision matrix) would be used to select the optimal site(s) for restoration. Environmental baseline surveys of the site(s) would be undertaken so that change over time can be assessed accordingly. Restoration of the seagrass using replanting and/ or reseedling methods would be undertaken following the methodology devised through engagement with academics and stakeholders. A pilot trial planting scheme is likely to be undertaken particularly for any new restoration location. Following the feasibility trials to gather further evidence on the efficacy of the seagrass restoration, the sites and methods would be selected to take forward.

6.3 Funding expansion of an existing restoration project

6.3.1.1 There are several seagrass restoration projects being considered by a number of organisations in the UK and it may be that a project has already undertaken the required site selection and trial and is looking for the resource to undertake a larger scale scheme. This is considered further as part of the legal requirements detailed below ([Section 8](#)).

6.4 Further research

6.4.1.1 It is recognised that there are knowledge gaps on the specific linkages between seagrass in the UK and non-grazing seabirds and the level of the role of seagrass supporting forage fish for seabirds such as razorbill, guillemot, gannet and kittiwake ([B2.8.5 Compensation measures for FFC SPA: Fish Habitat Enhancement: Ecological Evidence](#)). Nonetheless, there is clear evidence of the ecological benefits of seagrass and for prey species. Whilst the broad understanding of the links between seagrass meadows and fisheries are well understood (Kritzer *et al.* 2016; Unsworth *et al.* 2019), there is currently limited evidence for this role at a UK level, with most data collected from only a handful of sites (Bertelli and Unsworth 2014; Peters *et al.* 2015). The Evidence Report ([B2.8.5 Compensation measures for FFC SPA: Fish Habitat Enhancement: Ecological Evidence](#)) sets out the ecological evidence for fish habitat enhancement as a compensation measure in further detail.

6.4.1.2 A key component of the fish habitat enhancement resilience measure will be research to gather evidence to contribute towards further understanding the links between seagrass and target seabird species. The Applicant has identified a number of initial potential research projects which could be undertaken (in addition to feasibility studies) including:

- Foraging seagrass habitat study for seabirds including species counts, behavioural observations and habitat mapping;
- Fish surveys within seagrass meadows using seine and/or fyke netting; and
- Migratory fish tagging to understand fish movements.

6.4.1.3 These research topics will be explored in greater detail and a research programme will be devised to support the measures with many of these projects starting in 2021/2022. Any site/region-specific data collected by organisation such as the Yorkshire Wildlife Trust, Project Seagrass or the Ocean Conservation Trust, will be utilised where possible to support the feasibility studies either through specific data or methodologically approaches.

7 Monitoring and adaptive management

7.1 Monitoring

7.1.1.1 To ensure long-term establishment of a restoration site, a monitoring strategy will be developed. Long-term monitoring of seagrass is likely to include recording the rates and patterns of growth/loss in the restoration site and general monitoring of success. As a result, this information can confirm the efficacy of seagrass restoration methods and can also be used to make adaptive management decisions.

7.1.1.2 The success of the resilience measures will be monitored to ensure that the fish habitat enhancement project is being implemented as agreed via the GGRIMP and GKIMP. The

details of the monitoring phase of the resilience measure will be discussed with the OoEG and will be set out within the GGRIMP and GKIMP for approval by the SoS.

- 7.1.1.3 Hornsea Four is expected to operate for 35 years following construction. The seagrass meadow would be monitored throughout the operational lifespan of Hornsea Four. The exact method and frequency of monitoring would be decided based upon further evidence gathering and discussion with restoration experts and stakeholders.

7.2 Adaptive management

- 7.2.1.1 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. Monitoring will inform any adaptive management required by the resilience measure and will be discussed with OoEG members before implementation.

- 7.2.1.2 Adaptive management will be used as a method to address unforeseen issues or deviations from expected timescales. Adaptive management would be seagrass specific and would be used as a method to address unforeseen issues or deviations from expected time scales (i.e. additional infill planting required). This will be continued until Hornsea Four is no longer operational or a determination is made by the SoS following consultation with the relevant statutory nature conservation body, that compensation is no longer required.

8 Securing key consents and legal agreement(s)

8.1 Consenting requirements

- 8.1.1.1 It is understood that due to the location of potential seagrass restoration a number of consents are likely to be required including a marine licence and consent under section 28E(3)(a) of the Wildlife and Countryside Act 1981 (as amended) if the area is designated as a SSSI in addition to any land agreements. The seagrass restoration project will need to be assessed to ensure that there will be no Adverse Effect on Integrity (AEol) on a site designated as a Special Area of Conservation (SAC), Special Protection Area (SPA) or a Ramsar site under the Conservation of Habitats and Species Regulations 2017. Existing seagrass restoration and enhancement projects that the Applicant has been exploring have previously been able to obtain consents for the seagrass restoration and the Applicant would not anticipate a consent risk for future seagrass restoration. The Applicant is also submitting a Report to Inform Appropriate Assessment (RIAA) ([B2.2: Report to Inform Appropriate Assessment](#)) which sets out the information necessary for the competent authority to undertake a Habitats Regulations Assessment (HRA) to determine if there is any AEol on the national site network.

8.2 Legal agreements

8.2.1 Trial scheme(s):

- 8.2.1.1 The Applicant will shortly be finalising a scope of works and proposes to enter into a Memorandum of Understanding (MoU) with to secure the scope of works. Part of this MoU addresses the funding required to undertake a trial scheme(s) which includes the collection

of seagrass seed, research and planting opportunities authorised for the autumn 2021 and spring 2022.

8.2.1.2 In relation to the specific site where the Applicant is undertaking the trial the necessary consents pursuant to section 28E(3)(a) of the Wildlife and Countryside Act 1981 (as amended) have been obtained.

8.2.1.3 In relation to future trials the MoU envisages a joint site selection process together with consideration of the long-term security of the resilience measure. The parties will act in good faith to negotiate and agree a legally binding agreement for implementation of the resilience measure which is expected to include the scope of work, budget and timeline for the collaboration, allocation of tasks and ongoing funding arrangements.

8.2.2 Long Term Implementation:

8.2.2.1 As noted above it is anticipated that a legally binding agreement will be entered into with the proposed delivery partner to govern the allocation of tasks, funding arrangements and long- term monitoring of the resilience measure. Following the trial scheme, a land referencing exercise will also be undertaken once the final site(s) have been selected and the necessary land and management arrangements put in place for the large scale seagrass restoration, and to secure the rights to access and maintain the resilience measure.

9 Draft DCO wording

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;

“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).

10 Funding

10.1.1.1 The Applicant has identified the costs associated with the development, implementation and ongoing monitoring of the proposed resilience measure. These costs have been included within a detailed Funding Statement ([E1.1 CA Volume E1.1 Funding Statement](#)). This statement is supplemental to the Funding Statement ([E1.1 CA Volume E1.1 Funding Statement](#)) submitted as part of the suite of Application documents. The Funding Statement(s) outlines 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.

11 Conclusion

11.1.1.1 The Applicant is confident that the resilience compensation measure is viable, will be effective and can be delivered. The Applicant will continue stakeholder engagement to demonstrate the suitability of the site selection and development of the seagrass restoration programme and ensure the resilience measure can be readily achieved and secured.

12 References

- ABPmer (2017). UK Marine Habitat Creation Schemes – A summary of completed managed realignment and regulated tidal exchange projects (1991–2016). White Paper. Ref. 2781.
- Bertelli, C.M. and Unsworth, R.K.F. (2014). Protecting the hand that feeds us: Seagrass (*Zostera marina*) serves as commercial juvenile fish habitat. *Marine Pollution Bulletin*, 83, 425-429
- Kritzer, J.P., DeLucia, M.-B., Greene, E., Shumway, C., Topolski, M.F., Thomas-Blate, J., Chiarella, L.A., Davy, K.B. and Smith, K. (2016). The Importance of Benthic Habitats for Coastal Fisheries. *BioScience*, 66, 274-284.
- Lefcheck, J.S., Hughes, B.B., Johnson, A.J., Pfirrmann, B.W., Rasher, D.B., Smyth, A.R., Williams, B.L., Beck, M.W., Orth, R.J. (2019). Are coastal habitats important nurseries? A meta-analysis. *Conservation Letters* 12, e12645.
- Lilley, R.J. and Unsworth, R.K.F. (2014). Atlantic Cod (*Gadus morhua*) benefits from the availability of seagrass (*Zostera marina*) nursery habitat. *Global Ecology and Conservation*, 2, 367-377.
- McDevitt-Irwin, J.M., Iacarella, J.C. and Baum, J.K. (2016). Reassessing the nursery role of seagrass habitats from temperate to tropical regions: a meta-analysis. *Marine Ecology Progress Series*, 557, 133-143.
- MMO (2019). Identifying sites suitable for marine habitat restoration or creation. A report produced for the Marine Management Organisation by ABPmer and AER, MMO Project No: 1135, February 2019, 93pp
- Orth, R.J., Lefcheck, J.S., McGlathery, K.S., Aoki, L., Luckenbach, M.W. Moore, K.A., Oreska, M.P.J., Snyder, R., Wilcox, D.J. and Lusk, B. (2020). Restoration of seagrass habitat leads to rapid recovery of coastal ecosystem services. *Science Advances*, 6(41), eabc6434.
- Peters, J.R., McCloskey, R.M., Hinder, S.L. and Unsworth, R.K.F. (2015). Motile fauna of sub-tidal *Zostera marina* meadows in England and Wales. *Marine Biodiversity*, 45(4), 647-654.
- Unsworth R.K.F., Bertelli C.M., Esteban, N.E., Rees S.R. and Nuuttila H.K. (2019). Methodological trials for the restoration of the seagrass *Zostera marina* in SW Wales. SEACAMS Report SC2-R&D-S07.
- Unsworth R.K.F. & Butterworth E. (2021). Project Seagrass - Potential sites for seagrass restoration to benefit target seabird species.
- Unsworth, R.K.F., Butterworth, E., Freeman, S., Fox, E. and Priscott, K. (2021). The ecosystem service role of UK Seagrass meadows. Project Seagrass.

Appendix A Letter of comfort from Project Seagrass



Project Seagrass
PO Box 412
Bridgend, CF31 9RL
United Kingdom

19th September 2021

Dr. Sarah Randall
Environment Manager & Derogation Lead
UK Consents, Development
Orsted

Re: Hornsea Four Compensation Measures

Dear Dr Sarah Randall,

Seagrass ecosystems are globally endangered and declining at rapid rates, but their ecosystem service value is critical for the well-being of coastal human populations.

Project Seagrass is the only globally focused charity totally dedicated to seagrass conservation. Project Seagrass is an environmental charity devoted to the conservation of seagrass ecosystems through education, influence, research, and action.

Our four key principles define how we act. As such, we're passionate about:

- educating the wider community on the presence and importance of seagrass ecosystems, the services they provide and current seagrass management issues
- building the capacity of local stakeholders in the use of standardised scientific methodologies,
- promoting and assisting with long-term monitoring of seagrass condition,
- assisting with scientific research and supporting conservation measures that help facilitate the long-term resilience of seagrass ecosystems.

We believe that in the right circumstances seagrass restoration offers an opportunity to enhance biodiversity in the coastal environment. Consequently, I undersigned *Richard Unsworth*, in my capacity as director of Project Seagrass would like to confirm our willingness to collaborate with Orsted Power (UK) with respect to their proposed compensation measures for the Hornsey Four development. I confirm that we have no in-principle objection to the proposed compensation measure. We believe that through the planting of seagrass there exists the potential to enhance coastal biodiversity, such a strategy could be used as part of these compensation packages.

Yours sincerely

Dr Richard Unsworth

Director Project Seagrass
Associate Professor in Marine Biology, Swansea University

Appendix B Letter of comfort from Yorkshire Wildlife Trust



Yorkshire
Wildlife Trust



Dr Sarah Randall
Environment Manager & Derogation Lead,
UK Consents, Development.
Orsted
5 Howick Place
London
SW1P 1WG

13th August 2021

Dear Sarah,
Ref: Humber Seagrass Meadow Restoration

Thank you for your letter of support and our discussions over a potential partnership to support wider restoration of seagrass meadows in the Humber Estuary.

We note your specific references to the Hornsea Four Offshore Windfarm and potential for seagrass restoration to be included as part of a package of without prejudice secondary compensatory measures for the project. Seagrass meadows have numerous well documented benefits for a variety of marine life, and in the Humber support a number of SPA features.

Yorkshire Wildlife Trust agree that this letter can be placed on the public record as part of the examination of the Hornsea Project Four to demonstrate support for collaboration on seagrass restoration.

On the basis of our discussions we have provided an outline of our existing programme which could be scaled to this projects ambition in Annex One.

Yours Sincerely,

Dr James Wood
North Sea Fisheries and Research Manager
Yorkshire Wildlife Trust

www.ywt.org.uk

Love Yorkshire, Love Wildlife

Yorkshire Wildlife Trust is registered in England No. 409650 and is a registered charity No. 210807

1 St. George's Place,
York, YO24 1GN

T 01904 659570

F 01904 613467

E info@ywt.org.uk

VAT No. 170 3914 75



Yorkshire Wildlife Trust

Annex One

Yorkshire Wildlife Trust

- The Trust operates throughout the traditional county of Yorkshire from the Humber to the Pennines and from the Dales and Moors to the urban conurbations of the south. It is the second oldest of the 47 Wildlife Trusts which work in partnership together covering the whole of the UK. Our purpose is to lead the way in achieving our vision of a Yorkshire rich in wildlife for everyone through pursuing our mission of creating Living Landscapes and securing Living Seas in Yorkshire. We will do this by being passionate leaders and natural partners whose objectives are to:
 - demonstrate how nature works
 - inspire people and communities to value and take action for wildlife
 - champion wildlife and our work

Employing 160 staff and drawing on support from our 45,000 members, The Trust manages 106 nature reserves covering more than 2,500 hectares, also engaging in a portfolio of projects including river and wetland management, community development, environmental education activities, campaigning and specialist technical programmes including peatland and marine.

- The vision for our 'Living Seas' marine programme is: "A thriving, productive, wildlife rich North Sea, resilient to a changing climate and increasing human demands by 2040. We want the North Sea to be full of once abundant animals again and recognised for its beauty and diverse nature by the public. We want the North Sea to be an area where all activities are managed to allow wildlife to thrive and recover with those that benefit from its many goods and services contributing towards its sustainable use."
- To deliver this vision, Yorkshire Wildlife Trust has targeted investment into its marine programme and hosts the largest team of marine practitioners in the Trust movement, supporting 7 specialist technical staff. Encompassing focused workstreams of advocacy, education, marine pollution, fisheries and restoration, our remit is significant, but has achieved demonstrable impact and innovation.



Humber Seagrass Restoration Context and Pilot

- References to seagrass presence in the Humber Estuary have been recorded since 1888, with records of significant meadows located within Spurn Head and at Horseshoe Point. In 1936 a more comprehensive assessment and review within this locality mapped the known extent of these beds, where Philips¹ identified an extensive bed spanning 400 to 500 hectares noting aggregations of seagrass within and surrounding the saline pools and intertidal mudflats ranging over 10km from Skeffling to Spurn. Significant loss was then recorded on a periodic basis attributed to declining water quality and wider anthropogenic impacts.
- In 2010 to 2012 a series of baseline surveys associated with the Defra commissioned UK review into European Marine Site management (EMS)² qualified a smaller and less extensive bed remaining within Spurn Bight ranging just 2km and widely dispersed. As a consequence a new protected area byelaw was introduced, designating a 100 hectare area for seagrass encompassed within an area of foreshore privately owned by Yorkshire Wildlife Trust. Seagrass coverage within this protected areas equates to approximately 50 acres, leaving considerable scope for restoration of the remaining 200 acres which are currently sparsely or un-colonised.
- In 2020 the Trust secured funding from the Green Recovery Challenge Fund for a restoration pilot for 2 acres of seagrass, matched by support from an external donor funding a further 2 acres. Supporting staffing resource and capacity building, these funds have allowed the Trust to bring into a post a dedicated technical seagrass restoration officer until March 2022 and have also funded the capital purchase of our specialist nursery system and development of a restoration facility onsite at Spurn Point.

Consents and Permissions

- As Spurn Point Nature Reserve is encompassed within the Humber Estuary European Marine Site, carrying multiple designations including SAC, SPA, SSSI and Ramsar, any activities require authorisation from multiple statutory agencies. The Trust has worked closely with the relevant regulators and agencies, in particular Natural England, to agree a suite of rolling permissions and consents for our restoration and accompanying survey works, including seagrass seed collection, two methods of seagrass planting, and a suite of technical surveys ranging from benthic, environmental to fisheries.

¹ Philip G (1936) An enhalid plant association in the Humber estuary. J. Ecol. **24**:205-219

² <http://publications.naturalengland.org.uk/publication/36006>



Yorkshire Wildlife Trust

- The seagrass protection box was designed and designated through a working group comprising of North Eastern IFCA, Natural England and Wildlife Trust officers, and protected through a jointly designed IFCA byelaw. The box was designated to protect the remaining seagrass fragments from disturbance and support its longterm restoration.
- The Trust engaged these partners and agreed our existing consents and authorisation programme for the pilot restoration, and have also now sought confirmation to formalise our agreed longterm approach for restoration of the full protected seagrass box.
- Spurn Point Nature Reserve is a former military base which covered both terrestrial and marine areas. Upon purchase the Trust acquired both sets of rights, and therefore uniquely holds the freehold to Spurn's beaches and a significant intertidal expanse of mudflats which includes the remaining seagrass bed.
- Spurn Point operates under a longterm management plan agreed with Natural England for our general operations and a series of site works and maintenance. Vehicular access, management and maintenance of the estate, public access management and functions such as boundary marking are all preapproved activities.
- The Trust sought guidance and advice on required permissions from the Local Authority, Marine Management Organisation, CEFAS / Fish Health Inspectorate, DEFRA, Environment Agency and North Eastern IFCA, either confirming no consent was necessary, or discharging requirements through self-service notification of exemptions prior to initiating our restoration works at Spurn.
- All evaluation and survey works undertaken by the Trust and University of Hull staff have been approved through an ethics review and health safety panel process.

Appendix C Letter of comfort from Ocean Conservation Trust

Dr. Sarah Randall
Orsted Hornsea Project Four Ltd.
5 Howick Place
Westminster
London
SW1P 1WG

27th September 2021

Ref. HOW04 OCT Letter of Comfort

Hornsea Four Letter of Support – OCT Seagrass Restoration Project

Dear Sarah.

I'm writing in support of Orsted Power (UK) Ltd planned efforts to restore subtidal seagrass habitat to contribute towards biodiversity gain with the aim of supporting the function of seagrass as a nursery habitat for seabird prey species. Seagrasses are evidenced to be one of the most valuable habitats on the planet providing ecosystems services through fisheries and nutrient sequestration. Recover of subtidal seagrasses needs to form part of the U.K climate emergency strategy and the OCT is at the forefront of understanding how to achieve this aim.

The Ocean Conservation Trust is currently undertaking the largest seagrass restoration trials in the British Isles in support of the E.U Life Recreational ReMEDIES project led by Natural England. The project is targeting 8 ha of lost subtidal *Zostera marina* habitat within Special Areas of Conservation to restore and return valuable ecosystems services. The OCT is placed to offer support to Orsted with expertise developed through the delivery of this project to grow success and expand seagrass restoration to other geographical locations around Britain.

As leaders in the field of seagrass research and restoration the Ocean Conservation Trust can support in principal the merits of a proposed compensation measure of restoring seagrasses. When required the researchers and staff at the OCT would be happy to discuss collaborating in the delivery of large-scale restoration with the Hornsea Project Four.

I wish you all the best with the development and am happy to answer further questions when required.

Kind Regards

Mark Parry

OCT Development Officer