



Hornsea Project Four: Environmental Statement (ES)

Predator Eradication Project Description

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Glossary

Term	Definition
Commitment	Hornsea Four, throughout the pre-Application consultation process, has produced a Commitments Register which forms a quick reference guide to commitments the project has made. Commitment is a term used interchangeably with mitigation and enhancement measures. The purpose of Commitments is to reduce and/or eliminate Likely Significant Effects (LSEs), in EIA terms. Primary (Design) or Tertiary (Inherent) are both embedded within the assessment. Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are acceptable.
Compensation Measures	The measures that have been developed by the Applicant pursuant to the HRA Derogation Provisions "without prejudice" to the Applicants position of no Adverse Effect on Site Integrity at the Flamborough and Filey Coast in respect of the qualifying features. The Compensation Measures are: [offshore and onshore nesting; predator eradication; bycatch and fish habitat enhancement measures]. Each a Compensation Measure and together Compensation Measures.
Cumulative effects	The combined effect of Hornsea Four in combination with the effects from a number of different projects, on the same single receptor/resource. Cumulative impacts are those that result from changes caused by other past, present or reasonably foreseeable actions together with Hornsea Project Four.
Design Envelope	A description of the range of possible elements that make up the Hornsea Project Four design options under consideration, as set out in detail in the project description and this Compensation Project Description. This envelope is used to define Hornsea Project Four for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the "Rochdale Envelope" approach.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement (ES).
Hornsea Project Four Offshore Wind Farm	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, connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction

	works, including the offshore and onshore ECC, intertidal working area and landfall compound. Where the offshore cables come ashore east of Fraisthorpe.
Maximum Design Scenario (MDS)	The maximum design parameters of each Hornsea Four asset (both on and offshore) considered to be a worst case for any given assessment.
Mitigation	A term used interchangeably with Commitment(s) by Hornsea Four. Mitigation measures (Commitments) are embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, or PEIR or ES).
Order Limits	The limits within which Hornsea Project Four (the 'authorised project) may be carried out.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).

Acronyms

Term	Definition
DCO	Development Consent Order
EIA	Environmental Impact Assessment
ES	Environmental Statement
HRA	Habitats Regulations Assessment
MDS	Maximum Design Scenario
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
PEIR	Preliminary Environmental Information Report
PINS	The Planning Inspectorate
PSA	Particle Size Analysis
SAC	Special Area of Conservation
SPA	Special Protection Area
SSS	Side-Scan Sonar
TCE	The Crown Estate
UKHO	UK Hydrographic Office

Units

Unit	Definition
dB	Decibel (sound pressure)
Hz	Hertz (frequency)

1 Introduction

1.1 Project Background

- 1.1.1.1 Orsted Hornsea Project Four Limited (the 'Applicant') is proposing to develop Hornsea Project Four Offshore Wind Farm ('Hornsea Four').
- 1.1.1.2 The purpose of this Environmental Impact Assessment (EIA) Project Description Annex is to provide a description of the proposed Compensation Measures the Applicant may be required to deliver to compensate for potential impacts upon certain seabird species at the Flamborough and Filey Coast Special Protection Area (FFC SPA), located on the East Coast of England. The Compensation Measures are proposed "without prejudice" to the Applicant's conclusion of No Adverse Effect on Integrity (AEoI) upon the seabird species (kittiwake, gannet, guillemot and razorbill) in the Report to Inform the Appropriate Assessment (RIAA).
- 1.1.1.3 The Hornsea Four offshore wind farm will be located approximately 69 km offshore the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone. Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall (at Fraisthorpe), and connection to the electricity transmission network at National Grid Creyke Beck. Detailed information on the project design can be found in [Volume 1: Project Description](#), with detailed information on the site selection process and consideration of alternatives described in [Volume 1: Site Selection and Consideration of Alternatives](#) which are provided on the Hornsea Four website in the Documents Library at:
- 1.1.1.4 <https://hornseaprojects.co.uk/hornsea-project-four/documents-library/formal-consultation>
- 1.1.1.5 The Hornsea Four Agreement for Lease (Afl) area was 846 km² at the Scoping phase of project development. In the spirit of keeping with Hornsea Four's approach to Proportionate Environmental Impact Assessment (EIA), the project has given due consideration to the size and location (within the existing Afl area) of the final project that is being taken forward to Development Consent Order (DCO) application. This consideration is captured internally as the "Developable Area Process", which includes Physical, Biological and Human constraints in refining the developable area, balancing consenting and commercial considerations with technical feasibility for construction.
- 1.1.1.6 The combination of Hornsea Four's Proportionality in EIA and Developable Area Process has resulted in a marked reduction in the array area taken forward at the point of DCO application. Hornsea Four adopted a major site reduction from the array area presented at Scoping (846 km²) to the Preliminary Environmental Information Report (PEIR) boundary (600 km²), with a further reduction adopted for the Environmental Statement (ES) and DCO application (468 km²) due to the results of the PEIR, technical considerations and stakeholder feedback..
- 1.1.1.7 The Applicant is submitting an application for a DCO to the Planning Inspectorate (PINS), supported by a range of plans and documents including an ES which sets out the results of

the EIA on the proposed offshore wind farm and its associated infrastructure, and an Annex to the EIA which assesses the environmental impact associated with the implementation of the proposed Compensation Measures, which are set out in this Compensation Project Description.

- 1.1.1.8 The Applicant is also submitting a RIAA which sets out the information necessary for the competent authority to undertake a Habitats Regulations Assessment (HRA) to determine if there is any Adverse Effect on Integrity (AEoI) on the national site network as a result of the development of the Hornsea Four offshore wind farm and its associated infrastructure. A separate HRA Screening exercise has been complete for the implementation of the Compensation Measures as presented in [Volume B2, Annex 2.2](#).

1.2 The Derogation Provisions of the Habitats Regulations

- 1.2.1.1 The Habitat Regulations transposed into UK law the requirements of the Habitats Directive. Although the UK left the European Union (EU) on 31 January 2020, the Habitats Directive provides the legislative backdrop to the Habitats Regulations. The Habitats Directive seeks to conserve particular natural habitats and wild species across the EU by, amongst other measures, establishing a network of sites ("European sites") which together form the "National Site Network." The aim is to ensure the long-term survival of viable populations of Europe's most valuable and threatened species and habitats, to maintain and promote biodiversity.
- 1.2.1.2 The Habitats Directive acknowledges that the imperative of some plans and projects can outweigh the possible harm to a European site if that harm can be adequately compensated. The Directive provides a derogation under Article 6(4) that allows projects that may have an AEoI to be consented. In such a scenario, a derogation could only be provided under Article 6(4) if three tests are met in a sequential order:
- i. There are no feasible alternative solutions to the project;
 - ii. There are "imperative reasons of overriding public interest" (IROPI) for the project to proceed; and
 - iii. Compensatory measures are secured that ensure that the overall coherence of the network of European sites is maintained.
- 1.2.1.3 The derogation tests thereby underpin a three-step process, which are hereafter referred to as the "HRA Derogation Provisions".

- 1.2.1.4 The Habitats Regulations do not define what is meant by or may comprise "compensatory measures" or when they must be delivered. There is also no definition of the "overall coherence of the National Site Network". In principle, both are broad concepts. The limited case law on compensation confirms only:
- Compensation is distinct from mitigation (i.e., measures which prevent, avoid or reduce the harm to the integrity of the affected European site)¹.
 - Compensation can be delivered inside or outside a European site².
- 1.2.1.5 As there is no binding EU or UK case law that fixes the precise parameters of or timing for delivery of compensation, there is a degree of flexibility and it will be a matter of judgement for the Secretary of State (SoS) to determine what is "necessary" by way of compensation, acting reasonably and proportionately.
- 1.2.1.6 The Applicant firmly maintains the position that in respect of the designated sites, that there would be no AEoI as a result of the project alone and in-combination with other plans and projects and an AEoI can be ruled out beyond reasonable scientific doubt. The offshore wind farm and associated infrastructure RIAA will be submitted with the DCO application and will set out in detail the assessment and conclusion of no AEoI.
- 1.2.1.7 Nonetheless, in light of the SoS's decision letters for recent windfarm applications (e.g. Hornsea Three and Norfolk Vanguard) that future projects should be mindful to ensure consideration of the need for derogation, including possible in-principle compensation measures are presented for consideration during the Examination of DCO application.

1.3 Development of Compensation Measures

- 1.3.1.1 The Applicant recognises the importance of engaging with the relevant stakeholders with respect to derogation and developing any potential compensation measures, as their knowledge is important. The Applicant has therefore sought to engage openly and transparently with the key stakeholders.
- 1.3.1.2 Consultation on the HRA Derogation Provisions has been ongoing in the latter stages of the pre-application stage during the course of a series of online workshops (employed during the COVID-19 pandemic to substitute meetings in-person). The Evidence Plan Process has been followed during the development of the derogation case and included a number of relevant authorities and stakeholders.
- 1.3.1.3 Throughout the Consultation period, the Applicant has sought the advice of key stakeholders and kept them updated on project developments. The online workshops were attended variably by Natural England, the Marine Management Organisation (MMO), the Department for Environment, Food and Rural Affairs (Defra), the Joint Nature Conservation Committee (JNCC), The Wildlife Trust (TWT), Royal Society for the Protection of Birds (RSPB), National Federation of Fishermen's Organisations (NFFO) the Planning Inspectorate (PINS),

¹ Case C-521/12 Briels and Others, paragraphs 38 – 39.

² Case C-521/12 Briels and Others, paragraphs 38 – 39

East Riding of Yorkshire Council (ERYC) and The Crown Estate (TCE). Detail of consultation activity undertaken will be submitted with the DCO application in the Record of Consultation.

- 1.3.1.4 The Compensation Measures outlined herein could be implemented should the SoS conclude AEoI on any of the qualifying features of FFC SPA.

1.4 Compensation measures

- 1.4.1.1** This EIA Project Description Annex describes the Compensation Measures that could be implemented to compensate for potential impacts upon ornithological features of FFC SPA. In summary, the potential Compensation Measures proposed, sub-options, locations, location ID and species being compensated are set out Table 1. It is anticipated that for guillemot and razorbill a package of measures could be required, rather than a single compensation measure. Compensation Measure Areas of Search are presented in the accompanying Location Plan (see [Figure 1](#)).

Table 1: Compensation Measures, sub-options, locations, location ID and species being compensated.

Compensation Measure	Option	Location	Location ID	Kittiwake	Gannet	Guillemot	Razorbill
Offshore nesting	New	southern North Sea	A1				
Offshore nesting	Repurposed	southern North Sea	A1				
Onshore nesting	New	Cayton Bay to Newbiggin by the Sea	B1				
		Suffolk Coast	B2				
Bycatch		Thames Estuary	C1				
		South coast of England: Broadstairs to Plymouth	C2				
Predator eradication		Isles of Scilly	D1				
		Rathlin Island, Moyle, Northern Ireland	D2				
		Torquay, Devon	D3				
		Guernsey and Alderney	D4				
Fish habitat enhancement	Seagrass	Rathlin Island, Moyle, Northern Ireland	E1				
	Seagrass	Isles of Scilly	E2				
	Seagrass	Celtic Sea, Wales	E3				
	Seagrass	Plymouth Sound to Helford River	E4				
	Seagrass	Solent	E5				
	Seagrass	Essex Estuaries	E6				

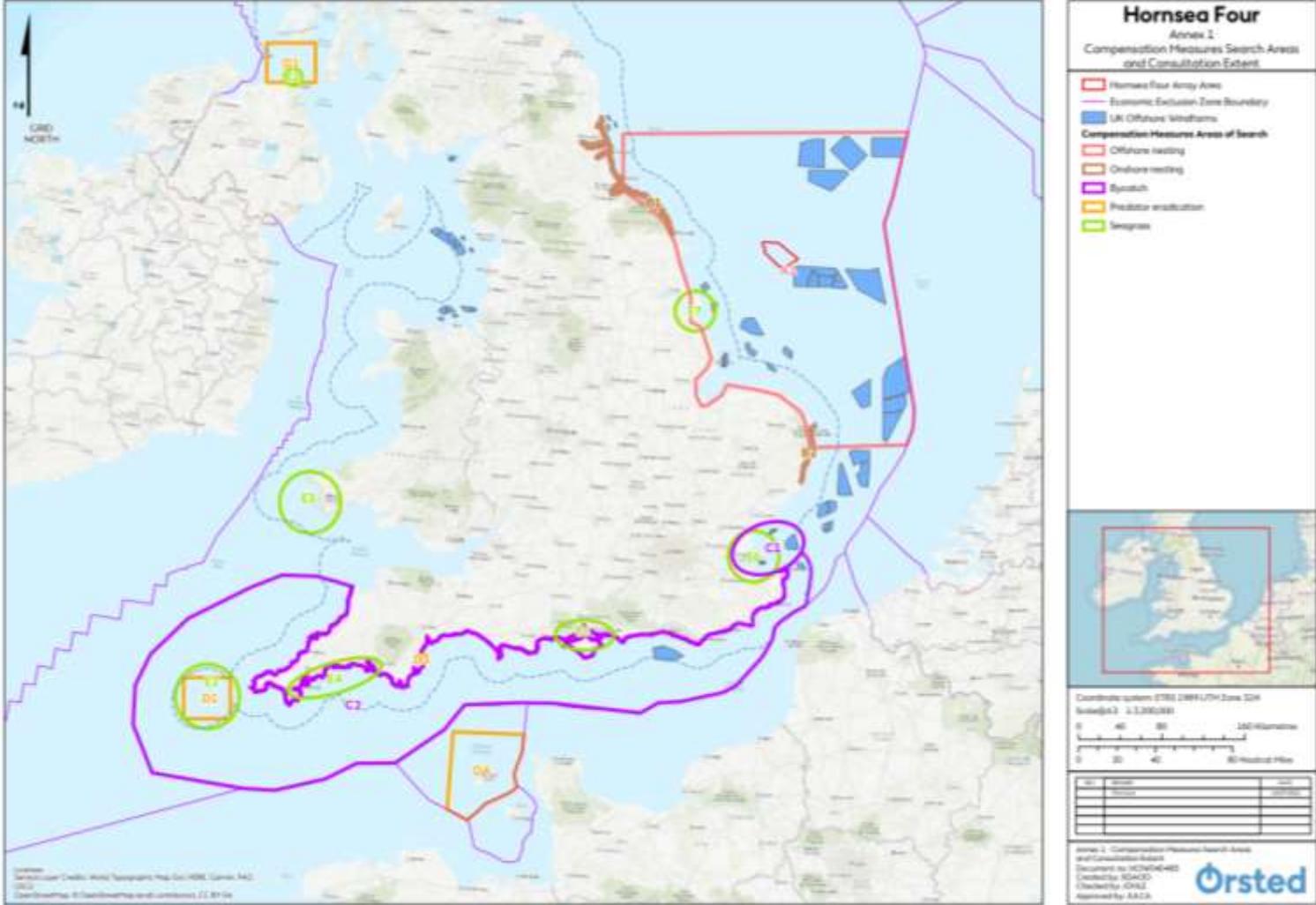


Figure 1: Compensation Search Areas

1.5 Programme

1.5.1.1 The high-level programme presented below is applicable to the implementation and delivery of all compensation measures.

- Anticipated Hornsea Four DCO Granted – Q1 2023
- Compensation implementation licencing – 2022/24
- Compensation Implementation – 2023/24
- Offshore Construction of Hornsea Four Offshore Wind Farm – 2027/28

1.6 Decommissioning

1.6.1.1 The requirement for, and the exact nature of decommissioning the offshore and onshore nesting structures, will be determined in consultation with the relevant authorities towards the end of the 35-year operational life of Hornsea Four. The Applicant will design the structures for a design life equal to that of the windfarm (i.e. 35 years plus 4 years to establish the compensation measures, pre-wind farm operation. Therefore, the lifetime of the structure is approximately 39 years). In the final few years of wind farm operation, the Applicant will commence inspections and surveys of the bird nesting structures to determine if an extension of the lifetime is possible.

1.6.1.2 It is currently anticipated that the predator eradication and bycatch measures implementation will result in new management practices which shall continue for the lifetime of Hornsea Four. Fish habitat enhancement (seagrass) compensation measure sites will be left in perpetuity.

2 Predator Eradication

2.1 Introduction and Background

- 2.1.1.1 Seabirds encounter many factors which influence adult survival and breeding success. These factors include (but are not limited to); predation (Craik 1997; Buchadas & Hof 2017), climate change related shifts to prey availability (Gaston & Elliott 2014; Divoky *et al.*, 2015) and abundance and, fisheries practices (Furness & Tasker 2000; Frederiksen *et al.*, 2004). Other factors may also include seabird bycatch (Miles *et al.*, 2020) and plastic pollution (O'Hanlon *et al.*, 2017).
- 2.1.1.2 Colony population and nest surveys are undertaken to assess the overall adult breeding population and breeding success of a colony which can be consequently linked to external factors influencing a population (Gjerdrum *et al.*, 2003). Predation of seabird eggs, nestlings and adult birds may be one such influencing factor. For example, guillemot and razorbill have been shown to be vulnerable to numerous species of predator.
- 2.1.1.3 Seabirds have several natural predators distributed across their range. Natural predators generally pose a low risk to breeding seabirds as they have coevolved with predation pressure and have mechanisms or behaviours to avoid or withstand it. For example, many seabirds choose to nest on remote islands which are free from ground dwelling predators.
- 2.1.1.4 When non-native predators are introduced to these island colonies, they may have profound impacts on the native fauna (Jones *et al.*, 2016; Thomas *et al.*, 2017). Many offshore islands around the UK have established populations of invasive mammals, originating from mainland Britain or from further afield (stow away on ships etc) (Stanbury *et al.*, 2017).
- 2.1.1.5 Rats are among the most common and invasive species impacting native wildlife worldwide through predation, competition of resources and modification of habitat (Jones *et al.*, 2008). Previous estimates of the prevalence of rats have indicated more than 80% of islands globally support a rat population (Atkinson, 1985). Rat is the general term used to describe the various species within the genus *Rattus*. Of the large number of species in this genus throughout the world, the key species in a UK context are the brown rat (also referred to as the Norwegian rat) (*Rattus norvegicus*) and the black rat (commonly referred to as the ship rat) (*Rattus rattus*).
- 2.1.1.6 Both brown and black rats are known predators of many small-bodied seabird species, however, when available, the majority of predation is focused on eggs and chicks (Atkinson, 1985). This is particularly relevant when rats are concentrated around coastal zones during the breeding season (Main *et al.*, 2019), with the predation focus on eggs and chicks having been evidenced through numerous monitoring methods, including stable isotope analysis extracted from rat tissues (Stapp, 2002).
- 2.1.1.7 Rats are known to impact guillemot and razorbill colonies (e.g. Swann, 2002; Mavor *et al.*, 2004; Russel, 2011) especially those breeding on islands (Thomas *et al.*, 2017). For example, prior to their eradication in 2005/2006, black rats were associated with the population declines of the 13,000 pairs of nesting guillemot and 11,000 pairs of nesting razorbill on the Shiant Isles (Scotland) due to the predation of eggs and chicks (Swann, 2002).
- 2.1.1.8 At Canna Island, Scotland, brown rats were responsible for the predation of auk eggs (Russell, 2011) and the redistribution of nesting guillemot into areas which were inaccessible

to rats (Mavor *et al.*, 2004). This prompted the initiation of an island wide rat eradication scheme in 2006. Both brown and black rat have been recorded at multiple other UK colonies (Lockley, 1953; Harris, 1984; Lovegrove *et al.*, 1994). Rats present at guillemot and razorbill colonies have therefore formed the focus of location searches for eradication schemes. Despite this focus, other predators will also be considered if information comes to light of a pressure to guillemot and razorbill populations.

2.2 Proposals for Hornsea Four

- 2.2.1.1 To compensate the potential displacement impact on guillemot and razorbill from the operation of the Hornsea Four Wind Farm, The Applicant proposes to implement a predator eradication programme at selected guillemot and/ or razorbill breeding colonies. The selected colony will be chosen based on delivery and connectivity to the populations within the wider site network. This would be part of a package of compensation measures for these species.
- 2.2.1.2 Predator eradication will be undertaken using well established methods evidenced throughout the wealth of previous predator eradication examples from the UK and further afield. For ground predators, such as rats, this usually involves poison bait stations. The primary species the measures of predator eradication would be focussed upon are rat and house mouse but could extend to include mink or crow as a supportive measure pending ecological advice and stakeholder discussions, whilst ensuring non-targeted species are accidentally eradicated.
- 2.2.1.3 Following the removal of the invasive species, biosecurity measures will subsequently be installed to prevent re-invasion. Biosecurity measures form a vital consideration in ensuring that efforts to remove invasive species have not be undertaken in vain. There are a significant number of biosecurity measures available depending on the location and species being considered, all of which have been tried and tested at previous predator eradication schemes (i.e., Biosecurity for LIFE project³).

2.3 Location

- 2.3.1.1 It is proposed that predator eradication will be undertaken on an island or islands where both invasive mammalian predators and guillemot and/ or razorbill are present. The Applicant is currently liaising with site managers at multiple islands to understand the prevalence of invasive mammalian species and ascertain the level of pressure posed to breeding guillemot and razorbill. The potential broad areas currently being considered for predator eradication include:
- Rathlin Island;
 - Channel Islands;
 - Isles of Scilly; and
 - Islands off the south coast of Devon.
- 2.3.1.2 The specific locations within these broad areas (see [Figure 1](#)) are continuing to be explored and The Applicant will remain open to considering other locations if identified and/or deemed suitable. Those islands where invasive mammalian predators have increased access to breeding locations will be favoured due to the high degree of overlap.

³ <https://biosecurityforlife.org.uk/>

- 2.3.1.3 Before any predator eradication schemes are implemented at a specific location, an eradication feasibility assessment will be undertaken to ensure measures can be employed to remove the invasive species and that biosecurity measures can be subsequently installed to prevent reinvasion, whilst not affecting the native species and/or species that may not affect guillemot and/or razorbills.

2.4 Operation, implementation, and monitoring

- 2.4.1.1 The objective of the eradication programme will be to remove mammalian predators from the island(s) that are currently suppressing the breeding success (and therefore, population size) of guillemot and razorbill (amongst other species) at these locations. The removal of this pressure will therefore lead to an increase in productivity and ultimately an increase in the population size of these species, whilst not affecting any other species that are not known to be detrimental to guillemot and/or razorbills.
- 2.4.1.2 Following the feasibility assessment and in partnership with site managers, invasive species eradication specialists will be contracted to undertake the island(s) eradication. Consideration of the timing of a predator eradication programme will be made to ensure that they are undertaken at the optimal time and that will not for example affect a species/habitat that are not known to be detrimental to guillemot and/or razorbills.
- 2.4.1.3 The primary aim of an eradication scheme is always to completely remove the introduced animal from the chosen area. In theory, just a single pregnant female of the invasive animal could repopulate the area. Two years intensive monitoring for the presence of the eradicated animal is required to receive the invasive-free status (Nathan *et al.*, 2015; Russell *et al.*, 2017). For example, this was the process taken for the eradication of rats on Canna and Sanday under contract by Wildlife Management International, starting in late 2005. By February 2006 the last rat sign was detected, and after a two-year period of intensive monitoring, the island was declared rat-free in 2008 (see Bell, *et al.*, 2011). The predator eradication programme would only be undertaken by appropriate qualified people and all methods will be agreed with the appropriate stakeholders.
- 2.4.1.4 Following the invasive species status, seabird recovery monitoring will continue for the lifetime of Hornsea Four. Monitoring will include population census and productivity monitoring. This will be compared to pre-eradication data (which will be collected to characterise the baseline and supplement historic seabird data for the location where available). The presence of invasive species will also be monitored to detect signs of repopulation.

2.5 Summary of Predator Eradication Compensation Measure

- 2.5.1.1 Predator eradication is a primary Compensation Measure. In-combination with other primary razorbill and guillemot measures, predator eradication will be able to deliver the required level of compensation for Hornsea Four. A detailed evidence report, and roadmap will be submitted with the DCO application to demonstrate the potential compensation deliverable by the predator eradication programme both alone and combined with the other primary compensation measures. The evidence report will include a summary of the supporting evidence for predator eradication compensation and the roadmap will outline the further steps that will be undertaken from submission to demonstrate that the Compensation Measure can be secured. These Compensation Measures are effective, feasible and securable measures that can be implemented prior to the impact occurring

and sustainable for the lifetime of the project. In designing this compensation measure the Applicant has consulted and worked with Natural England, JNCC, the RSPB, The Wildlife Trust, other statutory bodies and other relevant stakeholders to ensure this compensation measure is both robust, deliverable and effective.

3 References

3.1 Introduction

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