



Hornsea Project Four

Predator eradication and control: Opportunities within the Bailiwick of Guernsey

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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).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
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, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
Hornsea Zone	The former Hornsea Zone was one of nine offshore wind generation zones around the UK coast identified by TCE during its third round of offshore wind licensing. In March 2016, the Hornsea Zone Development Agreement was terminated and project specific agreements, AfLs, were agreed with TCE for Hornsea Project One, Hornsea Project Two, Hornsea Three and Hornsea Four. The Hornsea Zone has therefore been dissolved and is referred to throughout the ES as the former Hornsea Zone.
Invasive species control	Invasive species removal methods leading to a reduction in the population size of the invasive species by sustained and constant effort (Towns & Broome, 2003).
Invasive species eradication	The complete removal of a species from a location into which there is little chance of reinvasion by natural dispersal (Towns & Broome, 2003).
Invasive species re-incursion (re-infestation)	Invasive species arriving on a site that was previously eradicated (Thomas & Varnham, 2016). Also referred to as re-infestation.
Invasive species re-invasion	Breeding population of an invasive species established following re-incursion which have not effectively been dealt with (Thomas & Varnham, 2016).
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
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

Term	Definition
DCO	Development Consent Order
FFC	Flamborough and Filey Coast
SPA	Special Protection Area

1 Document purpose

- 1.1.1.1 As part of the development of the 'without prejudice' compensation case for rat eradication for the benefit of guillemot and razorbill, an eradication implementation study is being undertaken across the Channel Islands of Herm, Sark and Alderney (which includes islands and islets associated with each main island). Provisional results from the study have indicated that some islands or islets are within swimming distance from the main island (i.e., Alderney or Sark) for either brown or black rat species. While it is possible to undertake a full eradication of rats, the Applicant is aware of the potential challenge of re-incursions and re-invasions. This document provides an overview of islands which are potentially within swimming distance of rats from Alderney and Sark and highlights how re-eradication and/ or control opportunities can still provide significant benefits to guillemot and razorbill. Hornsea Four has built a strong and trusted relationship with Alderney Wildlife Trust and The States of Guernsey, who are keen to eradicate rats on all the islets with bird populations, and the Applicant is keen to support them through compensation as much as possible.
- 1.1.1.2 The Applicant originally provided this report to Natural England on 4th May 2022 for comment prior to submission in the Examination process. Following support from Natural England on the proposal to undertake control on some islands if eradication was to prove unsuccessful, the Applicant has decided to submit the report, with consideration to Natural England feedback, at Deadline 5a (4th July 2022).

2 Factors influencing re-incursion

- 2.1.1.1 The Applicant is cognisant of the RSPB Island Biosecurity Manual¹ and has employed eradication experts (which have undertaken numerous comparable island eradications on behalf of the RSPB and other clients) to lead the eradication implementation study, which aims to gather evidence in support of predator eradication for guillemot and razorbill at shortlisted islands and islets. The Island Biosecurity Manual provides a number of influencing aspects which may determine the likelihood of rats reaching an island or islet following eradication.
- 2.1.1.2 While swimming distance for both rat species is an obvious proxy for determining the likelihood of a re-incursion (and potential re-infestation), other influencing factors include tides, current, access and human assistance. The Island Biosecurity Manual also suggests that the distance between islands may determine the frequency of re-incursions between

¹ [RSPB Shiants LIFE Biosecurity Manual.pdf](#)

an island with no rats and an island which is rat infested (noting uncertainty around swimming distances):

- At a swimming distance of 500m black rat could invade but the frequency of incursions may be low.
- At a swimming distance of 500m brown rat could, in many circumstances, be expected to reach the island every year.
- If the distance is near the currently known record for the species, the rats can be expected to invade (brown rat c.2km (with 4km a worst-case scenario); black rat c.750m, house mouse c.500m), but may not reinvade.
- If the distance is twice the currently known record, reinvansion by swimming may not occur but we do not consider it impossible.

2.1.1.3 However, these distances and frequencies do not take into account the other factors influencing re-incursion, such as those listed above in 2.1.1.2.

2.1.1.4 As detailed within the Island Biosecurity Manual, *'it is only islands several kilometers offshore where we can categorically say that rodents will not be capable of swimming there. However, the risk of quarantine failure on human assisted pathways is ever present no matter how far it is.'* This therefore highlights the importance of biosecurity measures and subsequent control programs.

2.1.1.5 If eradication or control projects were only ever undertaken on islands beyond the swimming capabilities of invasive mammalian predators (such as rats), very few projects would have been actioned. It would also mean a large number of potential locations and associated benefits to nesting seabirds would be lost. Consequently, this is not the case, with a significant number of eradication and control projects having been undertaken well within the swimming distance of invasive mammalian predators (for example, St Agnes, Gugh and more recently in February 2022 Round Island rat eradication, in the Isles of Scilly, were within the 2 km potential swimming distance for brown rat). Further examples are provided within [Section 4](#). As supported by Natural England via their feedback on the Revision 1 of this document, the above factors convey the importance of adequate biosecurity measures and the acceptability of undertaking eradication on islands and islets within swimming distance even if full eradication could prove impossible.

2.1.1.6 The Applicant is aware of rodenticide resistance in some cases of constant exposure to certain bait. The Applicant remains abreast of the best practice for limiting, and where possible, avoidance of rodenticide resistance and has employed global eradication experts to inform the process. The Applicant is keen to use other lethal methods, such as the Goodnature A24 kill traps which do not use rodenticide and therefore avoid resistance issues. The Alderney wildlife trust have experience of using such traps, and SNCBs are known

to be supportive on previous eradication projects (i.e., NatureScot with the use of A24 traps on Handa Island).

2.1.1.7 **Section 3** below provides further information on managing re-incursions and re-invasions.

3 Bailiwick of Guernsey opportunities

3.1.1.1 The Applicant is proposing to deliver compensation in the form of rat eradication within the Bailiwick of Guernsey (Herm Island and surrounding islets of Sark and Alderney) in the Channel Islands, with the aim of benefiting guillemot and razorbill populations. Of equal importance is the Applicant's commitment to deliver biosecurity measures across all eradicated locations for the full 35 years of the Hornsea Four offshore wind farm operation. Biosecurity measures vastly reduce the chances of re-incursions, even at locations within swimming distance of rats. Additionally, the Applicant has committed to developing an adaptive management plan in consultation with key stakeholders to manage unexpected events. If re-incursions occur, the Applicant will aim to re-eradicate the target predator.

3.1.1.2 The Applicant is currently developing its evidence base for which islands would be most suitable for an eradication programme, with a number of locations being determined to be beyond the swimming distance for the relevant invasive mammalian predator. These islands/islets are not considered in detail within this report, rather we outline islands and islets within swimming distance from rat populations on Alderney and Sark and highlight the likelihood of success for undertaking an eradication, implementing biosecurity measures and any potential control measures which may occur if rats were to re-incur.

3.1.1.3 Herm has not been included as it is currently being considered on a whole island eradication basis and is beyond the swimming distances of both rat species from the Guernsey mainland.

3.2 Potential islands

3.2.1.1 A number of candidate islands or islets supporting both rats and guillemot or razorbill (or hold historic records of the species nesting or suitable habitat) have been identified across the Bailiwick of Guernsey as being suitable for rat eradication or control (**G1.33: Predator eradication island suitability assessment: Bailiwick on Guernsey (REP1-061)**). A number of these locations are within swimming distance for rats from a mainland island, therefore presenting a risk of natural (or 'unassisted') re-invasion.

3.2.1.2 Despite this, a wealth of examples exists which document both successful eradications and control of such locations which have ultimately resulted in increases in bird populations (see Section 4 for examples). Furthermore, and even more relevant to the islands and islets under consideration, all locations have support from the Alderney Wildlife Trust and international eradication experts which have experience from a significant number of global eradication projects. Both parties have expressed their expert opinion that potentially significant increases in not only guillemot and razorbill, but also in other nesting seabird species (such as puffin, Manx shearwater and storm petrel) populations will likely result from including the following locations (see bullets below) within the eradication programme. If islands within swimming distance of predators were discounted for that reason alone, a significant opportunity to increase bird populations currently under predation pressure would be lost as no funding currently exists for an eradication programme if not undertaken by the Applicant.

3.2.1.3 The Applicant therefore proposes that some islands and islets within swimming distance from the mainland (i.e. Alderney or Sark) are still viable for inclusion within the compensation package for guillemot and razorbill and will result in profound benefits to both species.

3.2.1.4 For Alderney (which supports a significant population of both brown and black rats), the following islands are within swimming distance for both rat species (note that the below access is without biosecurity considerations):

- La Nache - Currently supports rats and small numbers of guillemot and razorbill. There is evidence of overlap between rats and auk nesting locations and predation (evidenced by camera trap. See [Figure 1](#)). Distance from Alderney is approximately 50m, which is within swimming distance for both brown and black rat and therefore based on this parameter alone, both brown and black rat will likely frequently access this island (in the absence of biosecurity measures).
- Fourquie - Currently supports rats and small numbers of guillemot and razorbill. There is evidence of overlap between rats and auk nesting locations and predation (evidenced by camera trap). Distance from Alderney is approximately 54m, which is within swimming distance for both brown and black rat, but frequency of incursions may be lower for black rat (in the absence of biosecurity measures).
- Rousset - Provides suitable nesting space for both guillemot and razorbill. Both brown and black rats are present on the islet (evidenced by camera trap). Distance from Alderney is approximately 55m, which is within swimming distance for both brown and black rat, but frequency of incursions may be lower for black rat (in the absence of biosecurity measures).
- Hanaine Bay stack – Provides suitable nesting space and has previously supported nesting auks which are now extinct from the location. Black rats are present on the stack and are likely to be the cause of the extirpation. Distance from Alderney is approximately 10m, which is within swimming distance for both brown and black rat and therefore, based on this parameter alone, both species will likely frequently access this island (in the absence of biosecurity measures).
- Le Puits Jervais - Provides suitable nesting space for both guillemot and razorbill. Likely to support rats due to close proximity to the mainland. Inaccessible to monitoring at present. Distance from Alderney is approximately 19m, which is within swimming distance for both brown and black rat and therefore, based on this parameter alone, both species will likely frequently access this island (in the absence of biosecurity measures).

3.2.1.5 For Sark (which supports a significant population of black rats (supported by eradication implementation study evidence)), the following islands or islets are within swimming distance for black rats:

- Bec du Nez – Provides suitable nesting space for both guillemot and razorbill and may support breeding populations of each during the breeding season. Black rats are highly likely to be present on the islet (based on eradication expert judgment following site visit). Distance from Sark is approximately 2m, which is within swimming distance for

black rat and therefore, based on this parameter alone, the black rat species will likely frequently access this island (in the absence of biosecurity measures).

- Grande Moire - Provides suitable nesting space for both guillemot and razorbill and may support breeding populations of each during the breeding season. Black rats are highly likely to be present on the islet (based on eradication expert judgment following site visit). Distance from Sark is approximately 152m, which is within swimming distance for black rat, but frequency of incursions of black rat may be low (in the absence of biosecurity measures).
- Breniere (and islands off the north and east of the mainland of Sark) - a number of which provide suitable nesting space for both guillemot and razorbill and may support breeding populations of each during the breeding season. Black rats are highly likely to be present at the locations (based on eradication expert judgment following site visits). Distance from Sark is 52m, which is within swimming distance for black rat, but frequency of incursions of black rat may be low (in the absence of biosecurity measures).

3.3 Biosecurity Measures

3.3.1.1 A small number of guillemot and razorbill colonies surrounding the Alderney mainland are potentially rat free at present. However, some of the islands or islets are within swimming distance of the Alderney mainland, which therefore presents a re-incursion/ re-invasion risk. There is currently no fit for purpose biosecurity measures in place for each island due to a lack of funding. The Applicant therefore also proposes as part of its compensation measure to provide biosecurity measures for such islands to reduce the risk of re-incursion/ re-invasion. Such islands or islets currently include:

- L'etac de la Quoire;
- Les Etacs;
- Ortac;
- Coque Lihou.

3.4 Other locations within the Bailiwick of Guernsey

3.4.1.1 A number of other islands or islets surrounding Alderney and Sark, in addition to the above, are currently being explored for further evidence through the Applicant's eradication implementation study. Results of the study were presented at Examination Deadline 5.

3.4.1.2 Results of the study will also permit more refined estimates of nesting space availability to be made with the island suitability report ([G1.33: Predator eradication island suitability assessment: Bailiwick of Guernsey \(REP1-061\)](#)). This report was updated with results and presented at Examination Deadline 5.

3.5 Potential for population growth

3.5.1.1 Suitable cliff nesting habitat for guillemot and razorbill was identified at the candidate islands and islets ([Figure 1](#) and [Figure 2](#)). Whilst the total availability of nesting sites for guillemot and razorbill is yet to be confirmed as part of the ongoing implementation study, substantial additional nesting space availability, and thus opportunity for population growth, was identified as part of a provisional assessment ([G1.33: Predator eradication](#)

island suitability assessment: Bailiwick of Guernsey (REP1-061)). Furthermore, La Societe Guernesiaise stated that *"the brown rat is known to inhibit the breeding success of many breeding species locally (e.g. auks)"*, further illustrating the potential for rat control to benefit guillemot and razorbill populations (**B1.1.37: Non Statutory Targeted Compensation Measures Consultation Responses (APP-166)**).



Figure 1: Photos of the guillemot nesting area at La Nache taken by a trail camera and showing an overlap between guillemot nesting locations and black rat.

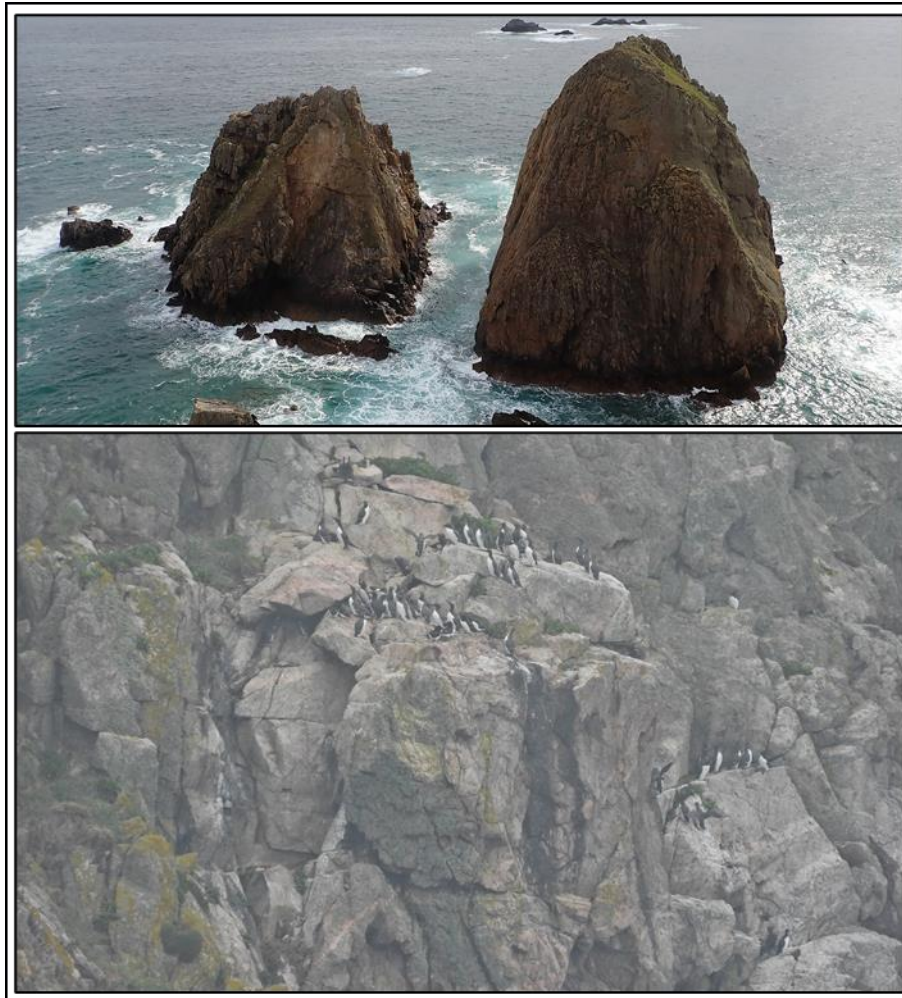


Figure 2: Examples of guillemot nesting sites within the Bailiwick of Guernsey. Top panel shows the islets of Fourquie and La Nache. Bottom panel shows guillemot on cliff habitat on La Nache.

4 Effectiveness of control programmes

- 4.1.1.1 Whilst full and sustained eradication may prove challenging due to the proximity of islets within the Bailiwick of Guernsey, past invasive species control projects show that sites with re-infestations can be successfully and effectively controlled. Additionally, with the use of sufficient biosecurity, re-incursion can be limited even if within swimming distance. For example, in New Zealand, 85% of incursion responses using traps and/or poison successfully prevented reinvasion of islands within swimming distance (Russel *et al.*, 2008).
- 4.1.1.2 As of December 2019, the Database of Island Invasive Species Eradications contained records for over 2,000 eradication events on islands (DIISE, 2020). This includes 1,233 completed mammalian eradications with a success of 88%. From those eradications which failed, a number of these were due to re-incursion of predators from neighboring islands.

Where complete eradication has not been possible, a number of islands have implemented control mechanisms in order to reduce the number of predators present.

- 4.1.1.3 It is worth noting that the recent St Agnes, Gugh and in February 2022 at Round Island rat eradication in the Isles of Scilly were within the 2 km recommended swimming distance for brown rat. These eradications have been undertaken by RSPB and coupled with biosecurity measures to prevent re-incursions.

4.2 Impacts of predator control on seabirds

- 4.2.1.1 The positive impacts of predator eradication on seabird productivity, breeding population and breeding success are addressed in the [B.2.8.3: Compensation measures for Flamborough and Filey Coast \(FFC\) Special Protection Area \(SPA\) Predator Eradication: Ecological Evidence \(APP-196\)](#). Additionally, there are a number of studies which demonstrate the positive effects of predator control on seabird populations including, but not exclusive to:

- Increase in reproductive success and survival;
- Population increase; and
- Recolonisation.

- 4.2.1.2 The following describes some examples of predator control case studies and the impacts on seabird populations.

4.2.2 Motu Kaikoura, New Zealand

- 4.2.2.1 Rat eradication was attempted at Motu Kaikoura in August 2008, however seven months later rats were detected on the island (black rat and Pacific rat) (Lee and Stannard, 2022). Motu Kaikoura is within swimming range of black rats from the closest island with rats having been known to periodically reach Motu Kaikoura from this location (Hamilton, 2011; Bagasra et al. 2013). Following the eradication failure, it was determined that rats would be controlled on a permanent basis using manual methods with the aim of achieving $\leq 5\%$ relative abundance density.

- 4.2.2.2 The rat control operation began in 2014 and is operated by an island ranger. As of December 2021, the network comprises of 702 stations with bait stations and traps normally being serviced monthly. The original goal of a 5% or less abundance level of rodents was first achieved in the Spring quarters of 2015 and routinely achieved since 2019.

- 4.2.2.3 Since this control system has been in place, there has been indications of ecosystem recovery including increasing visibility of birds such as breeding species (Lee and Stannard, 2022).

4.2.3 Galapagos

- 4.2.3.1 In the Galapagos Islands, before-and-after studies have been undertaken on effects of seabird success following the control of black rat and other feral animals (Cruz and Cruz, 1996). These studies found that control of predators led to an increase in fledging success of dark-rumped petrel (*Pterodroma phaeopygia*) and a decrease in predation of adults. On

Floreana, fledging success increased from 31% in 1981-2 to 46% in 1983 and 72% in 1984 (Cruz and Cruz, 1996).

4.2.4 Madeira, Portugal

4.2.4.1 On Madeira, Portugal, between 1985 and 2000, a before-and-after study was conducted following the control of black rat and feral cat. This study found that the population of Zino's petrel (*Pterodroma madeira*) on five known breeding ledges increased by 142% from 1987 to 2000 (Zino *et al.* 2001).

4.2.5 Congreso, Spain

4.2.5.1 Between 1997 and 2004 a study was undertaken on Congreso, Spain which found that breeding success of Cory's shearwaters (*Calonectris diomedea*) increased at two sub-colonies when black rats were intensively controlled (Iguar *et al.* 2005). These decreased again when control was relaxed, suggesting it was the control which resulted in the change in breeding success, as opposed to an external factor. When there was little or no control success was 27-44% and 51% during two different periods compared to 70% and 71% during intensive control. These increases were due to decreased chick mortality from 52% and 23% to 11% (Iguar *et al.* 2005).

4.2.6 Hawaii

4.2.6.1 Control of black rat (and other predators including feral cats, feral pigs and barn owls) was undertaken in Hawaii to manage the effects of predation on Newell's shearwater (*Puffinus newelli*) and the Hawaiian petrel (*Pterodroma sandwichensis*) (Raine *et al.*, 2020). Once predator control operations were in place, depredations by black rat decreased (by 86.2%) and reproductive success increased at all sites (Raine *et al.*, 2020). Population trajectories were modelled for both with and without predator control. When undertaking predator control, seabird populations increased, however, rapid declines were estimated if control was not used (Raine *et al.*, 2020).

4.2.6.2 These examples demonstrate how, despite full eradications not being undertaken on these islands for rats, use of control has the potential to significantly benefit seabird species.

5 Conclusions

5.1.1.1 The Bailiwick of Guernsey provides a highly feasible opportunity for a successful rat eradication and control project which can be delivered as compensation by the Applicant. The archipelago contains numerous candidate islets where both rat eradication and control can be carried out. The opportunity for guillemot and razorbill population growth following rat control is illustrated by the fact that suitable additional nesting habitat for guillemot and razorbill is abundant, and that local organisations have shared that auk breeding success is limited by rat predation. The Applicant and supporting organisations (such as Alderney Wildlife Trust) are keen to use methods which reduce the chance of rodenticide resistance, such as the Goodnature A24 rat traps, and therefore this would not be a reason to avoid including islands and islets within swimming distance of the main islands. Furthermore, there is strong local support for a rat control project, and local organisations such as the Alderney Wildlife Trust are already collaborating closely with the Applicant to increase bird populations through removal of rats from the islands and islets. Alderney Wildlife Trust planned and have permissions to undertake the eradication/control but just not the funding

to implement a full programme. It would be a lost opportunity if these islets within swimming distance cannot be included within the Applicant's compensation. Furthermore, this document has shown that the Applicant will aim to re-eradicate the target predator, but in the event that re-incursions cannot be avoided, rat populations can be effectively controlled, and substantial benefits to bird populations provided.

6 References

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