Hornsea Project Four

Predator eradication island suitability assessment: Bailiwick of Guernsey

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Revision Change Log			
Rev	*Page*	*Section*	*Description*
01	-	-	First submission at Deadline 1.
02	Amended throughout	Amended throughout	Update and clarification of approach for delivery of compensation.
02	8	1.1.1.6	Amended footnote number 2 in-text to superscript font, amended footnote font to Orsted font.
02	10	2.1.1.2	Additional reference on guillemot nesting densities added.
02	Amended throughout Section 3	3	Updates to nesting space estimates for additional locations following availability of new photographic evidence.
02	15	3.3.1.1	Paragraph was rephrased to clarify "full island". Further information on photographic coverage for each island was also included.
02	16	3.3.2.1	Text has been added to clarify choice of multiplication factor of two. Text has also been amended to clarify identification of ledges and platforms from photographs.
02	22 - 24	3.4.4; 3.4.5; 3.4.9; 3.4.10	Provided clarification in the text relating to estimated nesting habitat to confirm that estimates of birds are pairs, rather than individuals.
02	33	5.1.1.1	Clarified text around data collection on rat access to potential breeding ledges.

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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.
DCO (Development Consent Order)	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 Impact Assessment (EIA) Report.
Habitat 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/ national site network 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 Four/ 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.

Acronyms

Term	Definition
AEoI	Adverse Effect on Integrity
DCO	Development Consent Order
EIA	Environmental Impact Assessment
ES	Environmental Statement
FFC	Flamborough and Filey Coast
HRA	Habitats Regulations Assessment
IROPI	Imperative reasons of overriding public interest
NE	Natural England
NSIP	Nationally Significant Infrastructure Projects
PINS	Planning Inspectorate
RIAA	Report to Inform Appropriate Assessment
SPA	Special Protection Area

Units

Unit	Definition
km	Kilometre
km^2	Square-kilometre
m	Metre
m^2	Square-metre

1 Background

1.1.1.1 Orsted Hornsea Project Four Limited (hereafter the 'Applicant') is proposing to develop Hornsea Project Four Offshore Wind Farm (hereafter 'Hornsea Four'). Hornsea Four will be located approximately 69 km offshore of East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone.

1.1.1.2 The Applicant has submitted an application for a Development Consent Order (DCO) to the Planning Inspectorate (PINS), supported by a range of plans and documents including an Environmental Statement (ES) which sets out the results of the Environmental Impact Assessment (EIA). The Applicant has also submitted a Report to Inform Appropriate Assessment (RIAA) (Revision 3 of **B2.2: Report to Inform Appropriate Assessment** updated revision to be submitted at Deadline 5)) 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) of the national site network.

1.1.1.3 The Habitats Regulations[1] acknowledges that there may be imperative reasons of overriding public interest for some plans and projects to proceed, i.e., the public gain from the plan or project can outweigh the possible harm to a European site, provided that harm is adequately compensated. The Regulations provides a derogation under Article 6(4) that allows projects that may have an AEoI to be consented ("the HRA Derogation Provisions").

1.1.1.4 Hornsea Four have submitted a "without prejudice derogation case" which forms part of the Application. Its purpose is to provide, without prejudice, information to demonstrate that the derogation tests could be met for Hornsea Four if it is necessary to apply them to authorise the project.

1.1.1.5 The Guillemot and Razorbill Compensation Plan (**B2.8: Guillemot and Razorbill Compensation Plan**) sets out compensation measures for Hornsea Four for common guillemot *Uria aalge* (hereafter referred to as guillemot) and razorbill *Alca torda* associated with the Flamborough and Filey Coast (FFC) Special Protection Area (SPA). One of the proposed compensation measures is the removal of invasive predators at chosen sites to achieve an improvement in guillemot and/or razorbill population numbers.

1.1.1.6 **B2.6: Compensation measures for FFC SPA: Overview** presents the Applicant's estimated impact for guillemot and razorbill.

1.1.1.7 The ecological evidence and plans for predator eradication are discussed in detail in **B2.8.3: Compensation measures for FFC SPA: Predator Eradication: Ecological Evidence (APP-196)** of the Applicant's DCO submission. An internal short-listing of candidate sites for predator eradication was undertaken in quarter three of 2021 where 63 UK candidate sites were identified. Sites unsuitable for predator eradication were not considered further. Reasons for removing islands from the list included lack of stakeholder support, predators not being present, eradication programmes already having been planned or undertaken, large human populations, and predators not being considered a limiting factor to guillemot and razorbill populations. The following locations made the short list and were consulted on as part of the pre-application compensation measures consultation:

- Channel Islands – Bailiwick of Guernsey:
- Alderney: A number of islands/ islets around the main island;
- Herm: Including Herm, The Humps and Jethou (plus other smaller islets); and
- Sark: A number of islands/ islets around the main island.
- Isles of Scilly: A number of islands/ islets;

[1] https://www.legislation.gov.uk/uksi/2017/1012/contents/made

- Rathlin Island; and
- Several islands/ islets along the south coast of England.

1.1.1.8 Following preliminary site visits, further refinement and shortlisting of potential locations has taken place. Rathlin Island has secured partial LIFE funding for an eradication project and is therefore not being considered further at this time. There is currently a lack of available evidence in support of an eradication on the Isles of Scilly or the locations along the south coast of England for the benefit of guillemot and razorbill. Therefore, these locations were also removed from further consideration. The Bailiwick of Guernsey (Alderney, The Humps, Sark and associated islands and islets of each) is the preferred location for predator eradication and therefore the focus of this document.

1.1.1.9 Next steps for the implementation of predator eradication, as a 'without prejudice' compensation measure for Hornsea Four, are outlined in **B2.8.4: Compensation Measures for FFC SPA: Predator Eradication: Roadmap (REP2-012)**. In summary, site selection (which this work forms part of), predator surveys and habitat surveys have been undertaken during 2021 and will continue into 2022, with anticipated granting of the Hornsea Four DCO in 2023, and implementation of compensation from 2023/2024 onwards. Further information in relation to the Applicant's predator surveys and seabird census is presented within **G5.4 Predator Eradication Implementation Update** (submitted at Deadline 5).

1.1.1.10 Following the production of the first revision of the Roadmap (**REP2-012**) and **B2.8.3: Compensation measures for FFC SPA: Predator Eradication: Ecological Evidence (APP-196)**, initial site visits and stakeholder engagement has been undertaken and a predator eradication implementation study has been developed with surveys underway (for the Bailiwick of Guernsey (Alderney, The Humps, Sark and associated islands and islets of each)). This Predator Eradication Island Suitability Assessment has been informed by and is also contributing to the implementation studies. Full details of the implementation studies are provided within the latest revision of the aforementioned Roadmap (**2.8.4: Compensation measures for FFC SPA: Predator Eradication: Roadmap (REP2-012)**) **and the G5.4 Predator Eradication Implementation Update** (submitted at Deadline 5).

1.1.1.11 This document provides a summary of relevant work on the predator eradication compensation measure, completed since the production of **B2.8.3: Compensation measures for FFC SPA: Predator Eradication: Ecological Evidence (APP-196)** of the Applicant's DCO submission. Specifically, this document:

- Provides background on guillemot nesting requirements (noting that due to the difficulty in determining nesting cervices from photographs and the low number of razorbill required (12 pairs) it has been assumed with confidence that the compensation population of both species can easily be achieved at Alderney. Further detail is provided in the following sections).
- Discusses follow-on work, including a summary of preliminary site visits, carried out by the Applicant to select suitable candidate islands for predator eradication to benefit guillemot.
- Provides a preliminary well-informed estimate of nesting space available to guillemot following a predator eradication project in the Bailiwick of Guernsey.
- Outlines the predator eradication implementation study which will form the next step in the process of delivering predator eradication to benefit guillemot and razorbill.

1.1.1.12 This report focuses on the suitability of selected islands/islets for predator eradication to benefit guillemot. Whilst razorbill is not included explicitly here, they are also a target species for 'without prejudice' compensation through predator eradication. Guillemot and

razorbill nest in broadly similar habitat types and share colony space (Harris and Wanless, 1987), although razorbill show a preference for nesting in cavities and crevices as well as nesting on ledges (Plumb, 1965; Hipfner and Dussureault, 2001). This makes the visual estimation of full potential nest-site availability from whole-island photographs, as conducted in this report, unfeasible for razorbill (as the current images do not allow cervices to be identified). However, as low numbers are required for razorbill compensation (12 pairs), and a multitude of cavities and crevices will be available in addition to the guillemot/razorbill ledges identified in this report, it is reasonable to assume that any sites identified as potential candidate breeding sites for guillemot will also provide more than sufficient additional cavity/crevice breeding space for the required razorbill compensation.

2 Guillemot nest habitat requirements

2.1.1.1 The guillemot (*Uria aalge*) is a colonial, sea-cliff nesting species found in the North Atlantic and Pacific (Harris and Birkhead, 1985). The species is widespread along the British and Irish coasts (Balmer *et al.*, 2013).

2.1.1.2 Guillemot breed at varying, often high, densities on ledges, in cliff niches, among boulders or on rock platforms (Harris *et al.*, 1996). In the book "The Atlantic Acidae", Harris and Birkhead (1985) state that guillemot breed at densities of around 20 pairs/m^2. Much higher densities, such as 46 pairs/m^2 (Harris and Wanless, 1987) and 70 pairs/m^2 (Birkhead, 2010) have also been reported.

2.1.1.3 Guillemots nest from the top of cliffs down to two meters above wave height at high tide and appear to show a preference for sites further away from cliff tops, sites that slope inwards and sites that have walls (Harris *et al.*, 1997).

2.1.1.4 They can nest on ledges that are substantially sloped, with slopes recorded to vary "*from +50° (sloping down, outwards) to -30° (sloping inwards)",* but generally place their eggs on spots that are almost completely level (+5° to -5°) (Harris *et al.*, 1997). Birds show a preference for breeding next to conspecifics, and new breeders generally join existing sub-colonies (Birkhead, 1977; Harris *et al.*, 1997).

2.1.1.5 On seabird islands, Heaney and St Pierre (2017) noted that guillemot were also found to nest under boulders and on ledges in cavities, potentially related to high predation pressure and/or the absence of preferred ledges.

3 Candidate locations for predator eradication

3.1.1.1 The following locations within the Bailiwick of Guernsey were identified as being potentially suitable for a predator eradication project:

- Alderney: A number of islands/ islets around the main island;
- Herm: Including Herm, The Humps, Grande Fauconniere and Jethou; and
- Sark: A number of islands/ islets around the main island.

3.1.1.2 Habitat suitability, potential predator presence and local guillemot populations are discussed below for the Bailiwick of Guernsey. Where preliminary site visits were carried out during August 2021, summary findings from those visits are also included. Estimates of potential nesting space availability after rat eradication for those islands for which sufficient photographic evidence was available has also been presented.

3.1.1.3 In line with recent Natural England advice, evidence collected by the Applicant, and support by Alderney Wildlife Trust and eradication experts, the Applicant is considering islands and islets within 500m of the coast of Alderney, Herm and Sark (in addition to islands and islets beyond this distance), due to benefits associated with predator

eradication (or significant predator population suppression if natural reinvasion occurs and could not be re-eradicated) to a wide range of seabird species, including but not limited to guillemot and razorbill.

3.1.1.4 Risk of rodenticide resistance during the compensation measure will be managed with the use of kill traps (such as the Goodnature A24) which operate without the use of rodenticide.

3.2 Bailiwick of Guernsey

3.2.1.1 The Bailiwick of Guernsey is part of the Channel Islands, located in the English Channel, off the coast of Normandy. The Channel Islands are comprised of seven inhabited islands in the Bailiwick of Jersey (Jersey) and the Bailiwick of Guernsey (Guernsey, Herm, Jethou, Sark, Alderney, and Brecqhou), as well as a range of smaller uninhabited islands/ islets. The two Bailiwicks are separate institutions, this document focuses on the Bailiwick of Guernsey only.

3.2.1.2 Many of the islands in the Bailiwick of Guernsey have some suitable nesting habitats for seabirds, although evidence collected to date suggests it is lacking in availability for guillemot and razorbill. Unpublished data from the Alderney Wildlife Trust and Bailiwick of Guernsey (*pers. comm.*, 2021) show that guillemot nest on Longue Pierre (Herm – The Humps), Les Autelets (Sark) and Little Sark (Sark), as well as on Coque Lihou, Fourquie, La Nache and Les Etacs (all islets around Alderney). As guillemot and razorbill already breed on islands within the Bailiwick of Guernsey this suggest that there is a nearby potential source population from which birds could be recruited from following rat eradication.

3.2.2 Preliminary site visits

3.2.2.1 Preliminary site visits to the Bailiwick of Guernsey were carried out in August 2021 to study the implementation of predator eradication for the potential benefits to guillemot and razorbill breeding populations (**Figure 1** and **Figure 2**). The aim of the site visits was to see and assess the following initial locations, as they contain potentially suitable guillemot and razorbill breeding habitats, and have vegetation to support rats over winter:

- Herm: southwest of the island;
- Jethou and Grande Fauconniere;
- The Humps; and
- Sark: Les Autelets, Grand Moie, Little Sark (South Sark) and L'Etac de Sark.

3.2.2.2 However, weather restrictions and logistical issues meant that The Humps, Les Autelets, SW Herm and Little Sark were not visited on foot or photographed by boat.

3.2.2.3 Alderney was not included in the preliminary site visits, but images of the following selected candidate sites were obtained from the Alderney Wildlife Trust:

- La Nache;
- Fourquie; and
- L'Etac de la Quoire.

3.2.2.4 For those islands, Alderney Wildlife Trust provided their expert opinion on areas deemed suitable for guillemot and razorbill nesting by highlighting potential breeding areas on the provided images (see **Appendix A**). In addition, information was provided by Alderney Wildlife Trust regarding rats and rat eradication on the islands and stacks of Burhou, Coque Lihou, Le Puits Jervais, Hanaine Bay stack and Rousset. Whilst insufficient data were available to provide nest estimates from photographs, the sites are discussed in **Section 3.4**

with estimates of potential nesting space provided by Alderney Wildlife Trust (*pers. comm.*, 2021) or estimates based on images from the internet or Google Earth, where possible.

3.2.2.5 Other locations, namely Petite Moie, Burons and La Grune and Bec du Nez, have subsequently been added to the process as information from the eradication implementation study and stakeholder engagement has conveyed other suitable locations for consideration. These locations were included within the Applicant's 2022 seabird census, with results presented within **Table 6.** Further information in relation to the Applicant's seabird census is presented within **G5.4 Predator Eradication Implementation Update** (submitted at Deadline 5).

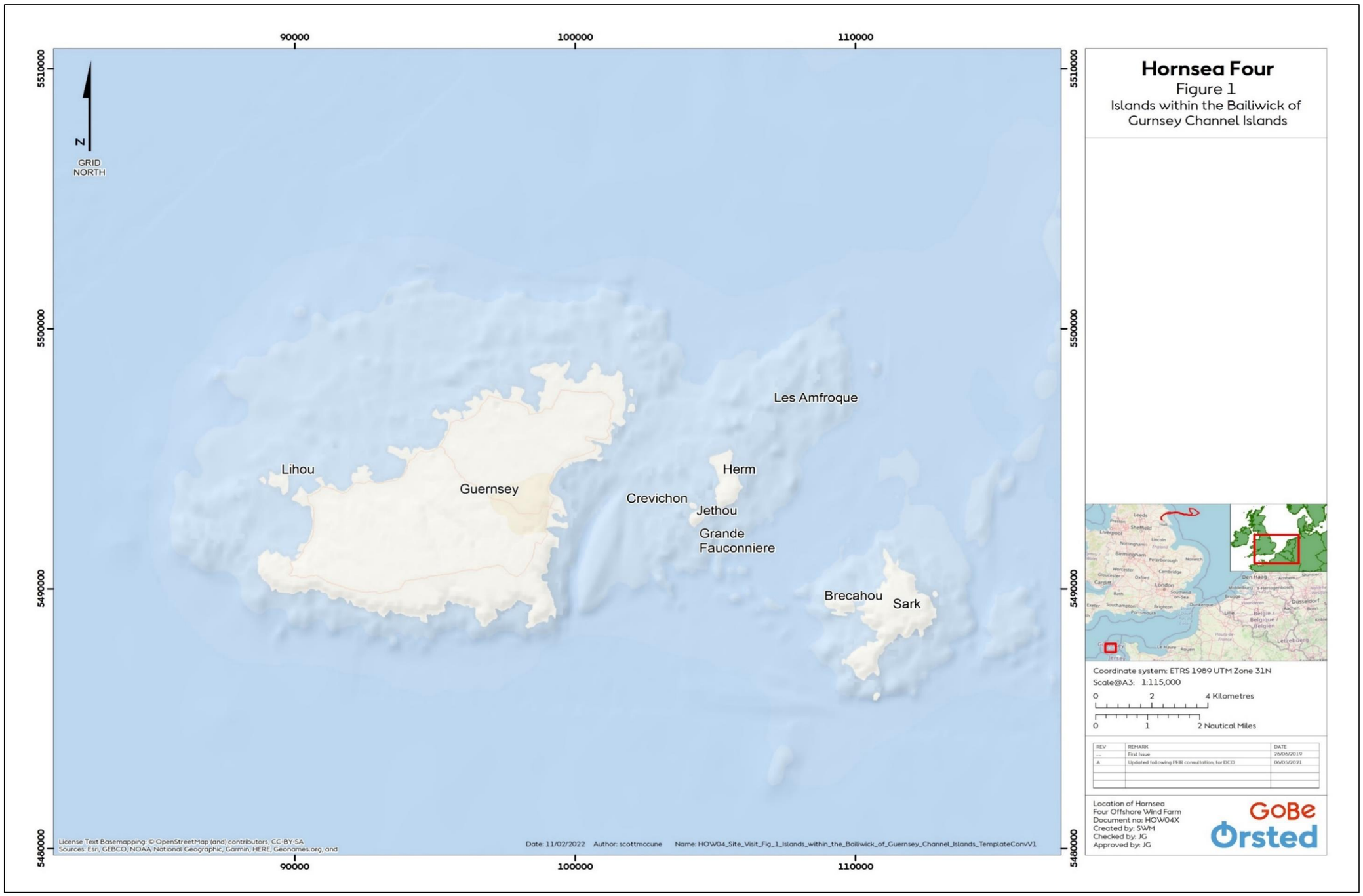

Figure 1: Islands of the Bailiwick of Guernsey.

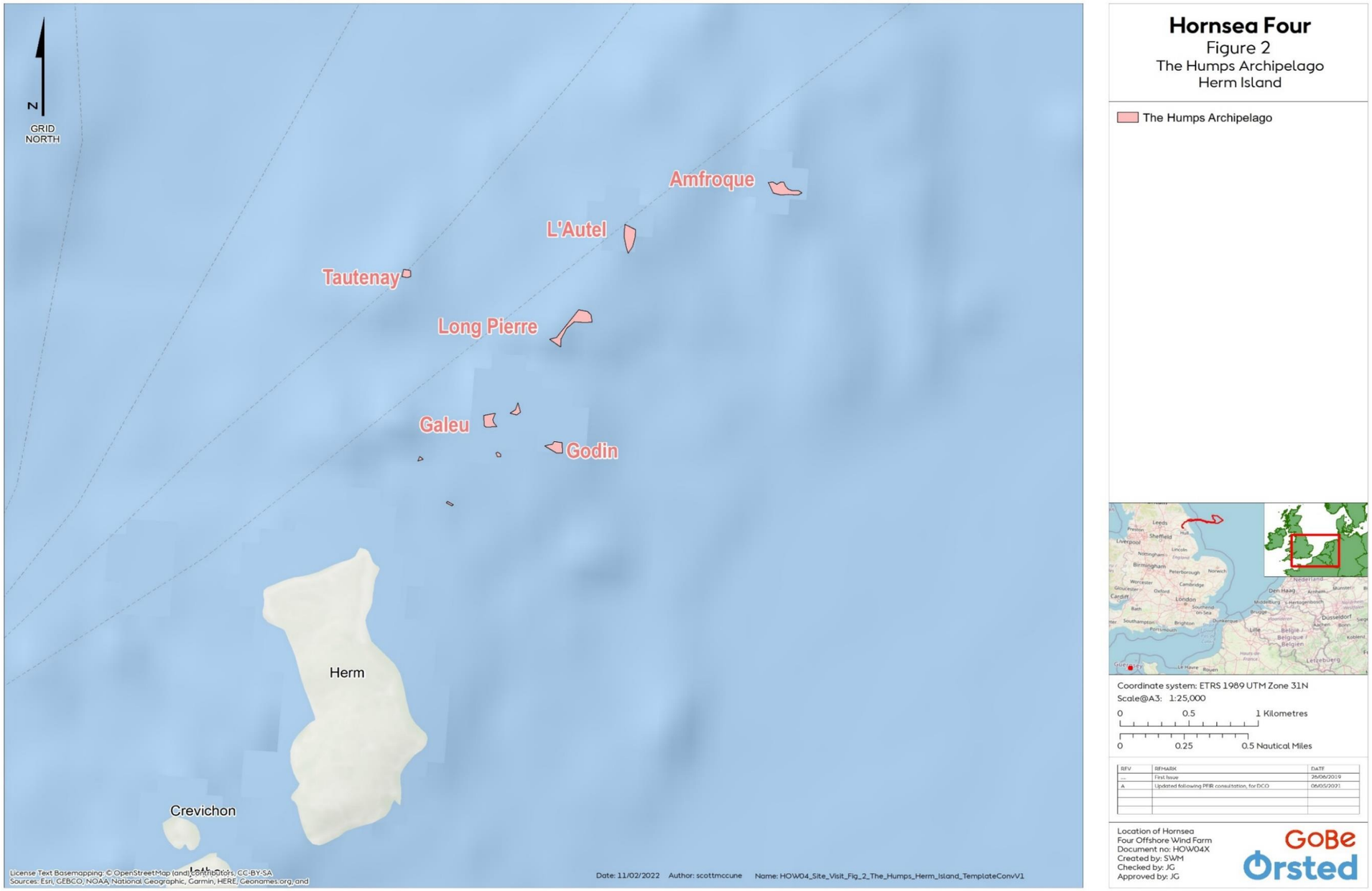

Figure 2: The Humps, Herm.

3.2.2.6 To summarise, based on the collated information from preliminary site visits and communications with Alderney Wildlife Trust (see **Sections 3.2.2.1** to **3.2.2.4**), the final list of islands considered in this report is:

- Alderney:
  - Burhou;
  - Coque Lihou;
  - Fourquie;
  - La Nache;
  - Le Puits Jervais;
  - Hanaine Bay stack;
  - Rousset; and
  - L'Etac de la Quoire.
- Guernsey:
  - Jethou;
  - Grande Fauconniere;
  - Herm (SW); and
  - The Humps.
- Sark:
  - Grand Moie;
  - Les Autelets;
  - L'Etac de Sark;
  - Little Sark;
  - Petite Moie;
  - La Grune and Bec du Nez; and
  - Burons.

3.3 Potential nesting space following eradication

3.3.1.1 An estimate of nest-site availability following predator eradication was calculated for those islands and islets of interest for which photographs of the height of the full island (sea level to top of island) were taken (see **Section 3.3**) during the site visits or provided by the Alderney Wildlife Trust. These islands are:

- Alderney - L'Etac de la Quoire;
- Alderney – Fourquie;
- Alderney - La Nache; and
- Guernsey - Grande Fauconniere.

3.3.1.2 For L'Etac de la Quoire and Grande Fauconniere, a photograph of one side of each island was taken or provided. For both Fourquie and La Nache, two photographs from opposing sides of the island were available.

3.3.1.3 Whilst Grand Moie and L'Etac de Sark (both islands off Sark) were photographed, island height data could not be obtained for these sites. As island elevation data is needed to provide scale and information on the vertical area available for nesting (see methodology in **Section 3.3.2**), available nest habitat could not be calculated for these islands. Instead, **Section 3.3.2** provides an initial estimate, with island photographs included to show potentially suitable ledges.

3.3.1.4 For the remainder of the islands, no photographs were available from the initial island site visits to estimate nest site availability. As a result, a collection of smaller islands have been included, with their nesting potential estimated based on expert opinion from photographs gleaned from Google Earth and other locations. Where necessary and possible, this

process will be ground truthed during the predator eradication implementation study. For these sites, nest site suitability is discussed in **Section 3.4**.

3.3.2 Methodology

3.3.2.1 Nest site availability was estimated using the following methodology:

1) Harris *et al.* 1997 found that guillemot breed from "*the top of the cliff down to 2 m above normal wave height at high tide*". The height from the bottom of the cliff unavailable for nesting was calculated and identified on island photographs, and potential nesting sites estimated, using the following steps:

2) Tide height (Mean High Water Springs) was obtained from the National Tidal and Sea Level Facility website[2] for the nearest tidal gauge to the islands, located at St Helier (Jersey). Mean High Water Springs at that tidal gauge was 5.12 m (relative to Ordnance Datum, i.e. mean sea level[3]).

3) Wave height information was visually derived from the Atlas of UK Marine Renewable Energy Resources[4]. Wave height was 1.55 m (annual mean significant wave height) for the Bailiwick of Guernsey[4].

4) Based on the tide and wave height obtained above, the height from the bottom of the cliff unavailable for nesting was calculated (**Table 1**)

Table 1: Tide height (in m relative to mean sea level), wave height and height from bottom of cliff unsuitable for nesting. Height from bottom of the cliff unsuitable for nesting was calculated as wave height + tide height + 2 m (Harris *et al.* 1997).

Location	Tide height (m)	Wave height (m)	Height (m) unsuitable for nesting
Bailiwick of Guernsey	5.12	1.55	8.67

5) During the preliminary site visits, pictures of the islands of interest were taken. The date- and time-stamp on each island picture was recorded, and the tide height for the date and time at which photograph was taken was then read from the corresponding tide graph on the National Tidal and Sea Level Facility website[2,]. This tide height was subtracted from the number calculated in step 3 to obtain the total distance from the bottom of the cliff unavailable for nesting at the time the island photo was taken (see **Table 2**), thereby taking into account the area of the island already covered by water at the time the photograph was taken.

[2] National Tidal and Sea Level Facility (2021), Real-time data - UK National Tide Gauge Network. https://ntslf.org/data/uk-network-real-time, National Tidal and Sea Level Facility. [Accessed October 2021].
[3] About Chart Datum & Ordnance datum: National Tidal and Sea Level Facility: https://ntslf.org/tides/datum [Accessed November 2021].
[4] Atlas of UK Marine Renewable Energy Resources (2008). http://www.renewables-atlas.info/, ABPmer, [Accessed October 2021].

Table 2: Total island height, tide height and visible vertical area (height) on island photographs that is unsuitable for nesting. Tide height is shown as meters above mean sea level (i.e. relative to Ordnance Datum).

Island	Total height (m) unsuitable for nesting	Tide height (m) at time of photograph	Visible vertical area (m) unsuitable for nesting
L'Etac de la Quoire	8.67	1.62	7.05
Fourquie	8.67	2.92	5.75
La Nache	8.67	0.22	8.45
Grande Fauconniere	8.67	-2.1	10.77

6) Island height information (highest point on each island in meters above sea level, **Table 3**) was obtained, and the height of the island visible in the photograph was then calculated by subtracting the tide height at the time the photograph was taken. Island heights for the Bailiwick of Guernsey were therefore obtained, where available, from various sources through an internet search (sources detailed in **Table 4**).

Table 3: Total island height (highest point in metres above sea level), tide height at time of photograph (shown as meters above mean sea level), and height visible when island photographs were taken, taken into account the vertical area covered by the tide at the time of photographing.

Island	Height (m)	Tide height (m) at time of photograph	Visible height of island (m)
Alderney – L'Etac de la Quoire*	*NA*	*NA*	*21*
Alderney – Fourquie	37.9	5.75	32.2
Alderney – La Nache	49.9	8.45	41.5
Jethou – Grande Fauconniere	36	-2.1	38.1

*For L'Etac de la Quoire island height was derived directly from height markers provided on photos by the Alderney Wildlife Trust.

Table 4: Island height and their sources for selected islets within the Bailiwick of Guernsey. Heights were assumed to be above sea level unless otherwise stated in the source.

Island	Height (m)	Source
L'Etac de la Quoire	21	Estimated visually from Alderney Wildlife Trust photographs
Fourquie*	37.9	https://www.ukclimbing.com/logbook/crags/sister_rocks-11952/
La Nache*	49.9	https://www.ukclimbing.com/logbook/crags/sister_rocks-11952/
Grande Fauconniere	36	https://www.mudandroutes.com/summit/grand-fauconniere/

*Fourquie and La Nache were stated to be 43 and 55 m respectively at high tide, so the tide height of 5.1 m calculated in **Table 1** was subtracted to provide estimated height above sea level.

7) Based on the visible island height obtained in **Table 3**, a 5 m measurement grid was superimposed over the photo (see **Figure 3** for an example). Using the measurement grid, the photograph was then cropped to remove the area calculated as unsuitable for nesting (see **Figure 4** for an example).

Figure 3: Example of island photograph with superimposed 5 m grid.

Figure 4: Example of island photograph with superimposed 5 m grid - cropped to show only the area suitable for breeding. The area unsuitable for breeding due to tide and waves (in this example 6.1 m in height) was cropped from the image.

8) Areas visually deemed to match known guillemot nesting preferences were marked on the image of the section of the island accessible for nesting (as obtained in step 6 above). See **Figure 5** for an example. Only horizontal ledges clearly visible on either the whole-island photographs or any higher-resolution close-ups were selected. This is a conservative estimate, as short ledges and small rocky areas can also be used, and inclined ledges can be used if flat areas for egg placement are present (Harris *et al.* 1997, see **Section 2**).

Figure 5: Example of ledges marked as potentially suitable nesting space (pink). 5m measurement grid shown in black.

9) A visual estimate of the total length of the marked areas (total ledge length) was made.

10) Based on the topography of the cliffs and the width/depth of the ledges as observed during the preliminary site visits, a conservative estimate of an average 0.3 m ledge depth was assumed. This width also aligns well with the published literature, with Birkhead (1977) recording a 0.29 m mean width for ledges occupied by guillemot. In instances where photographs clearly showed larger, flat rock areas, these locations were deemed to represent wider nesting "platforms", for which depth was estimated as 0.6 m.

11) Whilst guillemot have been known to breed at densities as high as 46 pairs/m^2 (Harris and Wanless, 1987), a conservative estimate of 20 pairs/m^2 (as reported in Harris and Birkhead, 1985) was used. See **Section 2.1.1.1** for more information on breeding densities.

12) A preliminary estimate of potential number of pairs which could be accommodated by the island following predator eradication was calculated as:

Potential nesting space (nr of pairs) on photograph = Total ledge length (m) x ledge depth (0.3 m) and/or platform depth (0.6 m) x bird density (20 pairs/m^2)

13) This number was then multiplied by two, on the crude assumption that the remaining areas of the island which are not photographed provide the same amount of nesting habitat as that estimated above:

Potential nesting space (nr of pairs) on island = Total ledge length on photograph (m) x ledge depth (0.3 m) and/or platform depth (0.6 m) x bird density (20 pairs/m2) x 2

For example, potential nest space for the example image above was estimated as 120 pairs, based on a visual estimate of 10 meters of suitable ledge length (see **Figure 3**) and the formula outlined in the methodology (**Section 3.3.2**) above:

Total ledge length on photograph (m) x ledge depth (0.3 m) and/or platform depth (0.6 m) x bird density (20 pairs/m²) x 2

For example: 10 x 0.3 x 20 x 2.

Whilst islands do not conform to a two-sided shape, a multiplier of 2 was deemed most appropriate, as photographing a circular/oblong island from two opposing sides would show the majority of the island's coasts. Therefore, for islands photographed from one side, multiplying by 2 would ensure that the calculation represents a conservative approximation of full coverage; a higher multiplication factor would risk over-estimating site availability.

For Forquie and La Nache, photographs of two faces of the cliff were unavailable. For these sites, the estimates were therefore not multiplied by two, i.e. only the formula in **Section 3.3.2.1** step 11 was used.

3.3.3 Nesting space estimates

3.3.3.1 Conservative nesting space estimates for the assessed islets within the Bailiwick of Guernsey are shown in **Table 5**. Images with measurement grids and visual nesting space estimates for the islands can be found in **Appendix A**.

Table 5: Nesting space estimates for the Channel Islands which were photographed during preliminary site visits. These estimates do not take potential competition with other breeding seabirds into consideration.

Island	Estimated ledge length (m)	Estimated platform length (m)	Estimated available nesting space (pairs)
Channel Islands			
Alderney – L'Etac de la Quoire	7.5	NA[2]	90
Alderney – Fourquie[1]	19	NA[2]	114
Alderney – La Nache[1]	14	NA[2]	84
Jethou – Grande Fauconniere	2.5	2	78

[1]For Forquie and La Nache, photos of two faces of the cliff were available. For these sites, the estimates were therefore not multiplied by 2, i.e. only the formula in **Section 3.4.3** step 11 was used.

[2]No platforms identified in photographs.

3.3.4 Assumptions and limitations

3.3.4.1 It is important to note that the numbers above are a preliminary estimate of potentially suitable nesting space. It is based on the information available to date, using visual estimates based on approximate measurement grids, and conservative assumptions on ledge length, width, and available nesting space on the sides of the island not photographed. The dimensions of ledges, platforms and cliffs may, if possible, be recorded with precision, for example by using laser rangefinders.

3.3.4.2 Current use by guillemot and other species could be assessed to understand potential competition for nest sites, as competition could reduce the availability of suitable breeding spaces. However, this is mitigated by the fact that the total number of suitable breeding

sites is expected to be significantly higher than the conservative estimates calculated in this report.

3.3.4.3 Many smaller niches and short sections of ledge, not clearly distinguishable on whole-island images, are likely to be available and could provide substantial additional nest habitat. Such sites can be identified as part of on-site visits during follow-up work and are likely to result in an increased nest habitat availability calculation. In addition, Heaney and St Pierre (2017) found that guillemot on the Isles of Scilly can also nest in concealed sites under boulders and on ledges in cavities. Guillemots in the Bailiwick of Guernsey also show this habit (for example, on The Humps), and as a result, substantial additional habitat is likely to be available. The estimates on nest site suitability presented therefore represent a conservative estimate, and the true number of suitable breeding locations is likely to be substantially higher.

3.3.4.4 Any outward (to sea) or inward (into cliff) slope could be considered, and flat areas on sloping ledges identified, as guillemots are less likely to nest on sites that slope outward but will nest on sloping ledges where flat areas for egg placement are available (Harris *et al.*, 1997). Only (near-) horizontal ledges from the photographs are included in this estimate; numerous additional nest sites are likely to be available on sloping ledges with horizontal areas for egg placement.

3.3.4.5 In addition, further habitat may be available in areas covered by vegetation. Whilst this work focuses on rocky cliff habitat only, there is evidence for guillemot nesting under vegetation cover (Parrish and Paine, 1996). If guillemot nest under vegetation in the Bailiwick of Guernsey, large amounts of additional nesting sites will be available, but further study is needed to confirm whether such nest sites are selected there.

3.3.4.6 The estimate of the vertical area of the cliff accessible for nesting is based on nesting preferences on the Isle of May, Scotland (Harris *et al.*, 1997). Additionally, tidal height information was obtained from publicly available data from tidal gauges located at St Helier (Jersey), rather than recorded at the islands of interest. Local tidal height and nesting preferences may differ, so where possible site-specific information on tides and guillemot cliff use could be collected to further improve estimates.

3.3.4.7 During the preliminary site visits, some islands were photographed from a moving vessel. When merging photographs from parts of larger islands into a larger full-island pictures, some issues with picture alignment and merging means that some small sections of larger islands were lost from the merged photo.

3.3.4.8 This report provides preliminary estimates. A full predator eradication implementation study (see **Section 5**) with site visits is currently underway to confirm, and where necessary refine, the assessments presented in this report.

3.4 Location discussions

3.4.1.1 This section discusses each of the candidate islands to help compare the characteristics of each potential eradication location. The habitat is described, and information on current breeding seabirds provided. Where calculated, the nest site availability estimate is included. Any information on past eradication is also given.

3.4.2 Alderney – Burhou

3.4.2.1 Burhou Island (18 hectares) is the most northerly Channel Island (Sanders, 2008). It lies approximately 2.3 km northeast of Alderney. It has low rocky habitat and large amounts of short vegetation. Alderney Wildlife Trust using non-toxic bait boxes to help detect any

incursions and has reported possible rat presence (Alderney Wildlife Trust, *pers. comm.*, 2021).

3.4.2.2 Burhou is an important site for seabirds. It supports large numbers of breeding puffin, lesser lack-backed gull, shag, herring gull and storm petrel. Guillemot are not currently known to be breeding on the island (Alderney Wildlife Trust, *pers. comm.* 2021). There are historical records of Razorbills nesting (Sanders 2007), although their current breeding status is unknown, they potentially still breed in small numbers.

3.4.2.3 It is currently unknown whether Burhou can support breeding guillemot.

3.4.3 Alderney – Coque Lihou

3.4.3.1 Coque Lihou is an islet south of Alderney. It is a rocky islet with vegetation which could in theory support rats over winter. However, Coque Lihou is currently rat-free, with Alderney Wildlife Trust using non-toxic bait boxes to help detect any incursions (Alderney Wildlife Trust, *pers. comm.*, 2021).

3.4.3.2 Coque Lihou is home to several breeding seabird species, including northern fulmar, shag and razorbill. Guillemot are known to breed on Coque Lihou. Exact numbers are not available, but a count of 138 guillemot rafting around the island in 2019 was assumed to provide "a fair estimate of the colony size".[5]

3.4.3.3 Further work is needed to establish whether Coque Lihou could support additional breeding guillemot.

3.4.4 Alderney – Fourquie

3.4.4.1 Forquie is a sea stack directly off the south coast of Alderney. Alderney Wildlife Trust confirmed that rats are present on Fourquie, and that rat eradication is currently being undertaken in partnership with the Applicant (Alderney Wildlife Trust, *pers. comm.*, 2021).

3.4.4.2 Exact numbers of guillemot and razorbill breeding on Fourquie are unknown (Alderney Wildlife Trust, *pers. comm.,* 2022*)*, but a 2019 survey found that the highest number of guillemots around the Twin Sisters (i.e. Fourquie and La Nache) was three birds[5]. Alderney Wildlife Trust has identified currently unused habitat that is potentially suitable for guillemot that is currently being accessed by rats (*pers. comm.,* 2022).

3.4.4.3 Nest site estimates suggest suitable habitat for 114 guillemot pairs on the identified ledges.

3.4.5 Alderney – La Nache

3.4.5.1 La Nache is a sea stack directly off the south coast of Alderney. Alderney Wildlife Trust confirmed that black rats are present on La Nache, and that rat eradication is currently being carried out in partnership with the Applicant (Alderney Wildlife Trust, *pers. comm.*, 2021).

3.4.5.2 Exact number of guillemot and razorbill breeding on Fourquie are unknown (Alderney Wildlife Trust, *pers. comm.,* 2022*)*, but a 2019 survey found that the highest number of guillemots around the Twin Sisters (i.e. Fourquie and La Nache) was three birds[5]. Alderney

[5] Alderney Wildlife Trust 2019 Seabird Summary, https://www.alderneywildlife.org/sites/default/files/2020-05/2019%20Seabird%20Summary.pdf, accessed November 2021

Wildlife Trust has identified currently unused habitat that is potentially suitable for guillemot which is currently being accessed by rats (*pers. comm.,* 2022).

3.4.5.3 Nest site estimates suggest suitable habitat for approximately 84 guillemot pairs available on La Nache.

3.4.6 Alderney – Le Puits Jervais

3.4.6.1 Le Puits Jervais is a small rocky islet directly off the coast of Alderney. It is not currently known whether rats are present on Le Puits Jervais, but the island has suitable habitat to support rats. Based on the distance to shore, it is highly likely rats inhabit this location.

3.4.6.2 No guillemot and razorbill breed on Le Puits Jervais, however both species nested at this location historically.

3.4.6.3 Nest site estimates could not be provided due to the lack of suitable island photographs, but Alderney Wildlfe Trust (*pers. comm.* 2021) provided a preliminary estimate of space for 10 pairs of guillemot.

3.4.7 Alderney – Hanaine Bay stack

3.4.7.1 Hanaine Bay stack is a rock stack off the Alderney coast. Rats are confirmed to be present on Hanaine Bay stack[6].

3.4.7.2 No guillemot currently breed on Hanaine Bay Stack, but there is evidence of guillemot having bred there in the past (Alderney Wildlife trust, *pers. comm.*, 2022). There is currently one suspected razorbill breeding location on the stack.

3.4.7.3 Nest site calculations for the above locations could not be provided due to a lack of information. However, an initial estimate of nest site estimates has been provided in **Table 6**.

3.4.8 Alderney – Rousset

3.4.8.1 Rousset is an islet off the Alderney coast. Rats are confirmed present on the islet (Alderney Wildlife Trust, *pers. comm.* 2022).

3.4.8.2 No guillemot or razorbill nest on this small tidal islet and there are no records of either species doing so in the past. Nevertheless, the islet does have suitable nesting habitat for both species. Nest site calculations for the above locations could not be provided due to a lack of information. However, an initial estimate of nest sites has been provided in Table 6.

3.4.9 Alderney – L'Etac de la Quoire

3.4.9.1 L'Etac de la Quoire is a steep rocky island near the southeast coast of Alderney. Although the islet has vegetation and could therefore support rats over winter, Quoire is currently rat-

[6] Alderney West Coast and Burhou Islands Ramsar Site Annual Review: 2018.

free and is under a preventative eradication control programme (Alderney Wildlife Trust, *pers. comm.*, 2021).

3.4.9.2 Two razorbill nests (perhaps up to 5, inferred from the number of birds present earlier) currently breed on L'Etac de la Quoire (Alderney Wildlife Trust, *pers. comm.*, 2022). No guillemot have been recorded to nest here.

3.4.9.3 Ledge space for 90 guillemot pairs was calculated to be available in the nest site estimates.

3.4.10 Guernsey – Jethou and Grande Fauconniere

3.4.10.1 Jethou is a small, inhabited island in between Herm and Guernsey which has confirmed brown rat presence. Connected at low tide is Grande Fauconniere, a small islet just off the south coast of Jethou. Due to its proximity to Jethou as well as Herm (within 1 km), there is potential for rats to move between these islands and Grande Fauconniere. Any predator eradication programme would therefore likely have to target these islands together.

3.4.10.2 No guillemot or razorbill currently breed on Grande Fauconniere and Jethou, but there is recent evidence of Razorbill nesting on Grande Fauconniere (2020 survey, Bailiwick of Guernsey ecology team, *pers. comm.*, 2021), along with numerous other seabirds nesting across Jethou and Herm.

3.4.10.3 The August 2021 preliminary site visits identified a number of ledges suitable for guillemot nesting on Grande Fauconniere. Nest site estimates suggest potential space for 78 guillemot pairs across these ledges. Nest site calculations for Jethou could not be provided due to a lack of information gathered during the site visit. However, an initial estimate of nest site estimates has been provided in **Table 6**.

3.4.11 Guernsey - Herm (SW)

3.4.11.1 Herm is the largest island within the Bailiwick of Guernsey. It is 199 hectares in size, and home to approximately 62 people. Herm lies within 1 km of Jethou and Grande Fauconniere; due to their proximity any eradication programme would therefore likely have to target these islands together. The study by Stanbury *et al.* (2017), prioritised UK islands according to the benefits that invasive mammal eradication would bring to 66 of the most significant and threatened species, including guillemot and razorbill, vulnerable to invasive species impacts. Herm was ranked 25th out of 9688 considered islands.

3.4.11.2 Weather restrictions and logistical issues meant that Herm was not photographed by boat. Nest site estimates using the methodology in **Section 3.3.2** could therefore not be completed for this site. Some potentially suitable rocky cliff habitat for guillemot is present on the southwest of Herm (**Figure 6**); the full predator eradication implementation study (**Section 5**) will need to determine whether additional sites for guillemot and razorbill are likely to be present. No guillemot or razorbill were found during the Applicant's 2022 seabird census of the area (see **G5.4 Predator Eradication Implementation Update** for further details on the seabird census (submitted at Deadline 5).

Figure 6: Southwest Herm.

3.4.12 Guernsey – The Humps

3.4.12.1 The Humps consist of small rocky islets and several sandbanks located northeast of Herm (Figure 7). Several of the islets have vegetation to support rats over winter. No information on recent rat presence on the Humps was found, although the locations are within rat swimming range from Herm. Stanbury *et al*. (2017) stated that both brown and black rats are present on nearby Herm.

3.4.12.2 A seabird census was undertaken of the Humps by the Applicant in 2022 (see **G5.4 Predator Eradication Implementation Update** for further details on the seabird census (submitted at Deadline 5). but the following counts were recorded: Godin (two guillemot and four razorbill), Galeu (five razorbill), Longue Pierre (141 guillemot and 14 razorbill) and Grande Amfroque (one razorbill). Other seabirds, such as cormorant, shag and great black-backed gull also breed on the islets.

3.4.12.3 Weather restrictions and logistical issues meant that The Humps could not be visited and photographed by boat during the visit in summer 2021. Nest site estimates using the methodology in Section 3.3.2 could therefore not be completed for this site. However, an initial estimate of nest site availability has been provided in Table 6.

Figure 7: Islets within The Humps.

3.4.13 Sark – Grand Moie and Petite Moie

3.4.13.1 Grand Moie and Petite Moie are located off the east coast of Sark. Both islands have vegetation which could support rats over winter. Both locations are within rat swimming distance of Sark, which is confirmed to support rats

3.4.13.2 No guillemot and one razorbill were recorded by the Applicant's 2022 seabird sensus of the area. However,45 razorbill and no guillemot were observed in a 2020 survey) (Bailiwick of Guernsey ecology team, *pers. comm.*, 2021).

- Low numbers of lesser black-backed and herring gull[7].

3.4.13.3 The August 2021 preliminary site visit showed availability of cliff habitat potentially suitable for nesting guillemot. Due to a lack of data on island height, nest site availability could not be quantified, but 11 potentially suitable ledges were identified (**Figure 8**). If it were crudely assumed that these ledges are on average 1 m long, this would suggest breeding space for approximately 132 pairs (see **Section 3.3.2.1** for calculation methodology). However, Grand Moie is made up of several stacks and islets (**Figure 9**), suggesting there is large amounts of rocky cliff habitats not visible on the photo, so more breeding space may well be available. Nest site calculations for Petit Moie could not be provided due to a lack of information gathered during the site visit. However, an initial estimate of nest site estimates has been provided in **Table 6**.

Figure 8: Potentially suitable Guillemot breeding sites (pink) on Grand Moie.

[7] Gull Breeding Sites in the Bailiwick of Guernsey, https://web.archive.org/web/20160304112807/http://www.paulveron.com/gullbreeding%20sites%20-%20burhou.html (archived site accessed November 2021].

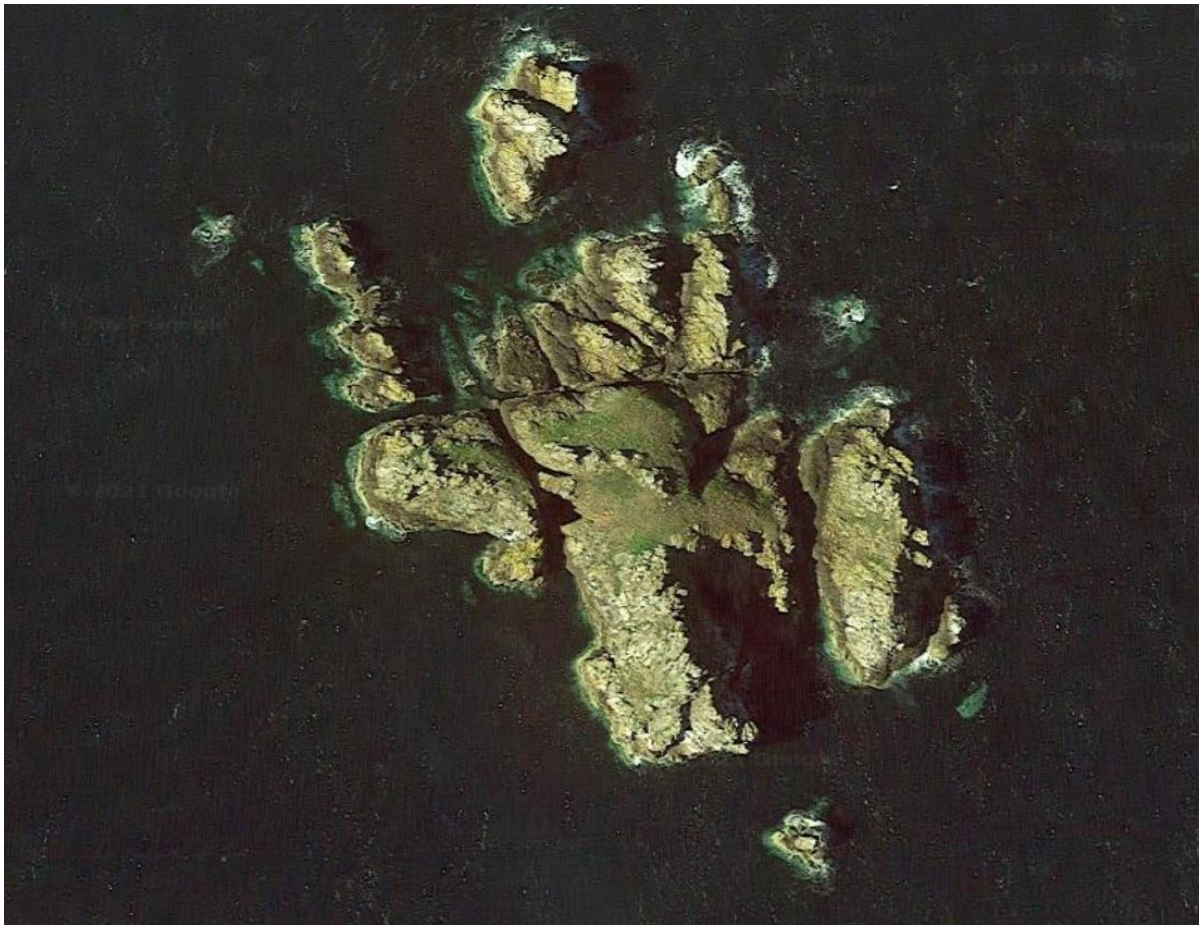

Figure 9: Grand Moie. Source: Google Earth [Accessed November 2021].

3.4.14 Sark – Les Autelets

3.4.14.1 Les Autelets (Figure 10) is a steep rock stack Northwest of Sark. It has only a small patch of vegetation. Whilst nearby Sark is known to support rats, it is uncertain whether Les Autelets can support a rat population due to its steep topography.

3.4.14.2 Les Autelets has the largest guillemot population of the Channel Islands, estimated at 190 guillemot and two razorbill during the Applicant's 2022 seabird census..

3.4.14.3 Weather restrictions and logistical issues meant that Les Autelets was not visited and could only be photographed from a boat. Nest site estimates using the methodology in Section 3.3.2 could therefore not be completed for the full site. However, a photograph of part of Les Autelets (Figure 11) was used to illustrate the extensive seabird habitat available on the stack. On the section of the stack photographed, large rock platforms seemingly suitable for guillemot and razorbill nesting are present. Using Google Earth[8] to estimate the dimensions (width and length) of the stack, it was estimated that the photograph shows a nesting surface area of at least 13.6m^2 (Figure 11). Using a nesting density of 20 pairs/m^2, this would thus provide nesting space for 272 pairs of guillemot or razorbill within the

[8] Google Earth 9.159.0.0. https://earth.google.com/, accessed April 2022

sections photographed, with total nest site availability on the entirety of Les Autelets thus likely substantially higher.

3.4.14.4 However, as Les Autelets already supports large populations of seabirds it is currently unknown how much additional space for guillemot may be present. A full breeding bird survey and nest site availability assessment will be needed to establish this.

Figure 10: Les Autelets.

Figure 11: Suitable cliff habitat for guillemot nesting on Les Autelets. Based on inference of dimensions of the islet on Google Earth, platform A, B and C are approximately 12m², 1m² and 0.6m² in size. In total, this section of Les Autelets could provide habitat for 272 guillemot (based on a breeding density of 20 birds/m2).

3.4.15 Sark – L'Etac de Sark

3.4.15.1 L'Etac de Sark is a small islet situated several hundred meters south of Sark. It consists of a mix of steep grassy slopes and rocky boulders. It has vegetation which could support rats over winter. Rats are present on nearby Sark, and are therefore likely to be present

3.4.15.2 for the Applicant recorded no guillemot breeding on L'Etac de Sark in 2022, but did recorded six razorbill. Furthermore, local recent sightings suggests the island is home to shag, puffin and small numbers of great black-backed, lesser black-backed and herring gull[7,9].

3.4.15.3 The site visit showed the availability of cliff habitat potentially suitable for nesting guillemot. Due to a lack of data on island height, nest site availability could not be quantified, but three small potential ledges were identified (**Figure 12**). If it were crudely assumed that these ledges are on average 0.5m long, this would suggest breeding space for approximately 18 guillemot pairs (see **Section 3.3.2** for calculation methodology). In an additional close-up photo of part of the island, a further 3.5m of suitable ledge length is identified, providing habitat for approximately 24 pairs within that section of the islet. Adding this to the estimate from the full-island photograph gives an approximate total site availability of 42 pairs. A full predator eradication implementation study will be undertaken to quantify the estimated number of breeding guillemot that could breed across the island.

[9] The Sark Society – Ornithology, https://www.socsercq.org/ornithology, accessed November 2021

Figure 12: Potentially suitable guillemot breeding sites (denoted by the pink lines) on L'Etac de Sark.

Figure 13: Potentially suitable guillemot breeding sites (denoted by the pink lines) on a section of L'Etac de Sark

3.4.16 Sark – Little Sark

3.4.16.1 Little Sark is not a separate island, but rather a peninsula at the southern section of Sark. Sark is 545 hectares in total. Little Sark is joined to the larger part of the island by a narrow

isthmus (a ridge 80 m high, 3 m wide), therefore there is the potential for rats to easily move between. Sark and Little Sark have large amounts of vegetation to support rats, and rats are confirmed to be present. No record of past eradication projects was found.

3.4.16.2 Surveys in 2015 recorded 16 guillemot and seven razorbill on Little Sark, however, none were recirded during the Applicant's 2022 census. The area also supports large numbers of herring gull and lesser black-backed gull (210 and 74 birds recorded respectively). Smaller numbers of shag, petrel, great black-backed gull and puffin have also been reported in recent years.

3.4.16.3 Weather restrictions and logistical issues meant that Little Sark was not photographed by boat. Nest site estimates using the methodology in **Section 3.3.2** could therefore not be completed for this site. The full predator eradication implementation study (**Section 5**) will need to investigate whether additional guillemot breeding space is available, however, true islands and islets, rather than peninsulas, are the preferred option in terms of location for an eradication.

3.4.17 Summary table

3.4.17.1 **Table 6** below summarises the relevant information for predator eradication site selection from the habitat suitability analysis (**Section 3.3.3**) and location discussions (**Section 3.4**). The table provides an overview of the following: Location: island or islet of interest; Guillemot (Guil.) habitat: whether the site contains rocky cliff habitat seemingly suitable for nesting guillemot; Vegetation: whether the island contains vegetation to support rats over winter; Eradication history: any past or current eradication projects; Rats confirmed present: whether rats have been recorded on the island (TBC if uncertainty remains and will be surveyed in the predator eradication implementation study); Could support rats: whether the island is deemed likely to be able to support rats (sources added as footnotes); Guil. No: current numbers of guillemot (see main text for sources) (HE: historic evidence of species nesting at location; TBC: To be confirmed as part of the predator eradication implementation study); Guil. Nest site estimate (pairs): potential available nesting space estimated for guillemot pairs in this report (see main text for details) (TBC: To be confirmed as part of the predator eradication implementation study).

Table 6: Table summarising island characteristics relevant for predator eradication site selection.

Location	Guil. Habitat	Vegetation	Eradication history	Rats confirmed present	Could support rats	Guil. No. (INDV)	Guil. Nest site estimate (pairs)
Alderney							
Burhou	✓	✓	Ongoing	✓#	✓	0	TBC
Coque Lihou	✓	✓	Ongoing	X#	✓	138	TBC
Fourquie	✓	✓	Ongoing	✓#	✓	3	114
La Nache	✓	✓	Ongoing	✓#	✓		84
Le Puits Jervais	✓	✓	None	✓✓##	✓	0	10*
Hanaine Bay stack	✓	✓	Ongoing	✓#	✓	0	10**
Rousset	✓	✓	Ongoing	✓#	✓	0	20*
L'Etac de la Quoire	✓	✓	Ongoing	X#	✓	0	90
Guernsey							
Jethou	✓	✓	None	✓#	✓	0	30**
Grande Fauconniere	✓	✓	None	✓✓##	✓	0	78
Herm (SW)	✓	✓	None	✓#	✓	0	10**
The Humps	✓	✓	None	✓✓##	✓	143	200**
Sark							
Grand Moie	✓	✓	None	✓✓##	✓	0	132
Burons	✓	✓	None	✓✓##	✓	317	400**
Petite Moie	✓	✓	None	✓✓##	✓	0	55**
Les Autelets	✓	✓	None	X##	?	190	272
L'Etac de Sark	✓	✓	None	✓✓##	✓	0	75**
Little Sark	✓	✓	None	✓#	✓	0	TBC
La Grune & Bec du Nez	✓	✓	None	✓✓##	✓	0	25**

Confirmed by site managers or predator eradication implementation study.
Determined likely by site managers or predator eradication experts based on distance from known rat population and accessibility.
* Based on expert opinion provided by Alderney Wildlife Trust.
** Preliminary estimate based on review of Google Earth and internet search images. Assessment will be updated where possible following further data collection by the eradication implementation study.

4 Improving predator eradication success

4.1.1.1 A wide range of factors may affect guillemot recruitment and success following predator eradication. Various techniques could be considered as part of an eradication package as adaptive management to further improve breeding numbers.

4.2 Artificial ground cover

4.2.1.1 Guillemot nests are susceptible to avian predation. In a study on a breeding colony in California, Parrish and Paine (1996) showed that areas with artificial covers installed over the cliff tops produced nearly twice as many eggs. Artificial ground cover could thus be considered as an additional measure following predator eradication, to further increase breeding performance at potential cliff-top breeding sites.

4.3 Decoys and playbacks

4.3.1.1 Social attraction methods, such as playbacks and decoys, can be used to increase the likelihood of recruitment, and has shown to be highly effective in a past study by Parker *et al.* (2007). Breeding guillemot were lost from a colony in California following an oil spill in 1986 and did not naturally recolonise over the following eight years. In January 1996, Parker *et al.* (2007) installed guillemot decoys, playbacks and mirrors to attempt to attract guillemot. No guillemot were observed before these social attraction techniques were installed. Following social attraction installation, birds were seen on all but two days (observations were carried out until the post-fledging period in August). Over 90% of 68,332 guillemot observations was in decoy plots vs. less than 10% in control plots and outside of study plots. Guillemot started breeding on the site during the 1996 breeding season, and numbers increased from 1996 (6 pairs) to 2004 (190 pairs) with continued but decreased use of the social attraction techniques (Parker *et al.* 2007).

4.4 Simulated guano

4.4.1.1 In other seabird species, white paint has been used to simulate guano at potential breeding sites (Gummer, 2003; Sawyer and Fogle, 2013). This could be used for guillemot, potentially alongside the use of decoys and playbacks, with the aim of increasing colonization rates following rat eradication.

4.5 Invasive plant removal

4.5.1.1 Several of the islands have sour fig *Carpobrotus edulis*, an invasive creeping succulent which grows over boulders, providing habitat for rats and potentially reducing available nesting space for breeding seabirds. Removal of sour fig could increase breeding habitat availability for guillemot (and razorbill) and could therefore be considered alongside predator eradication to maximise gains.

5 Next steps – predator eradication implementation study

5.1.1.1 A full predator eradication implementation study including surveys has been initiated by the Applicant and includes :

- Surveying of all candidate islands for the presence of invasive mammalian predators, including abundance estimates.
- Collecting evidence of predation pressures, such as egg caches and gnawed carcasses (using camera traps). This survey could also include collecting camera evidence of where/whether rats accessing selected (potential) breeding ledges.
- Assessing the amount of potential nest habitat for each island, including data on current colony usage and potential nesting space.
- Full guillemot and razorbill breeding bird census for each island, providing a baseline for future population and productivity assessments.

5.1.1.2 For Guernsey and Sark, this eradication implementation study has been undertaken by international eradication experts. For Alderney, experienced site managers with significant expertise in ornithology have undertaken the predator eradication implementation study. The Final Implementation Study Report is expected to be completed in the autumn following the breeding bird surveys and further information gathering and will report on the following criteria based on the UK Rodent Eradication Best Practice Toolkit (Thomas *et al.* (2017):

- Technically feasible;
- Sustainable;

- Socially acceptable;
- Politically and legally acceptable;
- Environmentally acceptable;
- Capacity; and
- Affordable.

5.1.1.3 Results of the predator eradication implementation study are presented within **G5.4: Predator Eradication Implementation Study Update**, submitted by the Applicant at Deadline 5.

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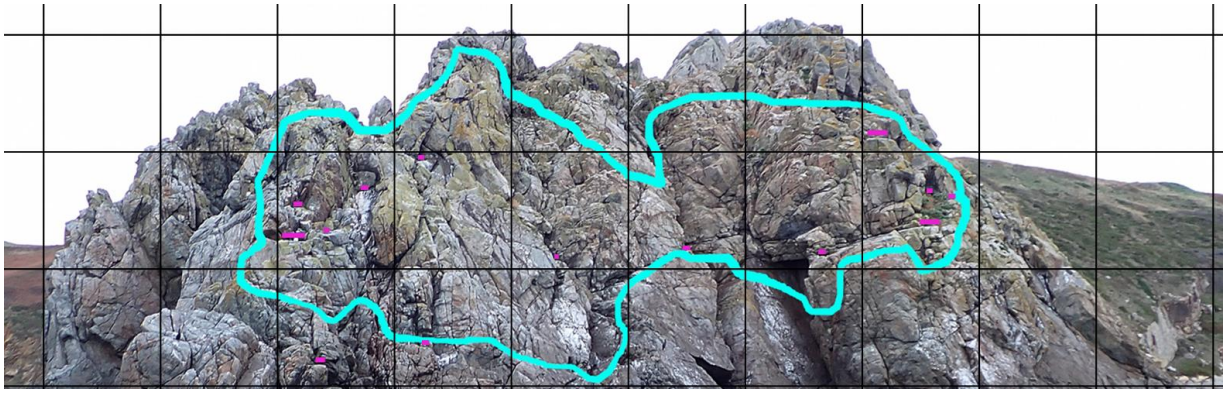
Appendix A Nesting space images

1 Introduction

1.1.1.1 The photographs below show the areas of the assessed islands deemed potentially available for guillemot nesting. Suitable nesting ledges and platforms are marked in pink and blue respectively. A 5 m measurement grid is superimposed on each image. Where the image had to be split to fit on the page, a yellow dashed line denotes where the image has been split.

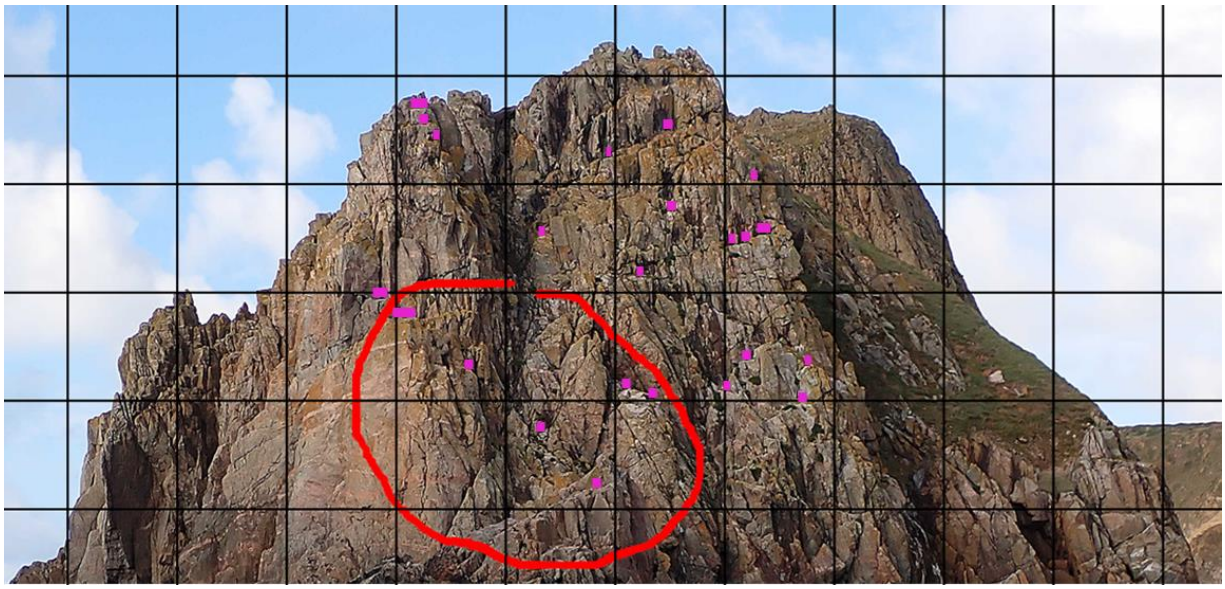
2 Alderney – L'Etac de la Quoire

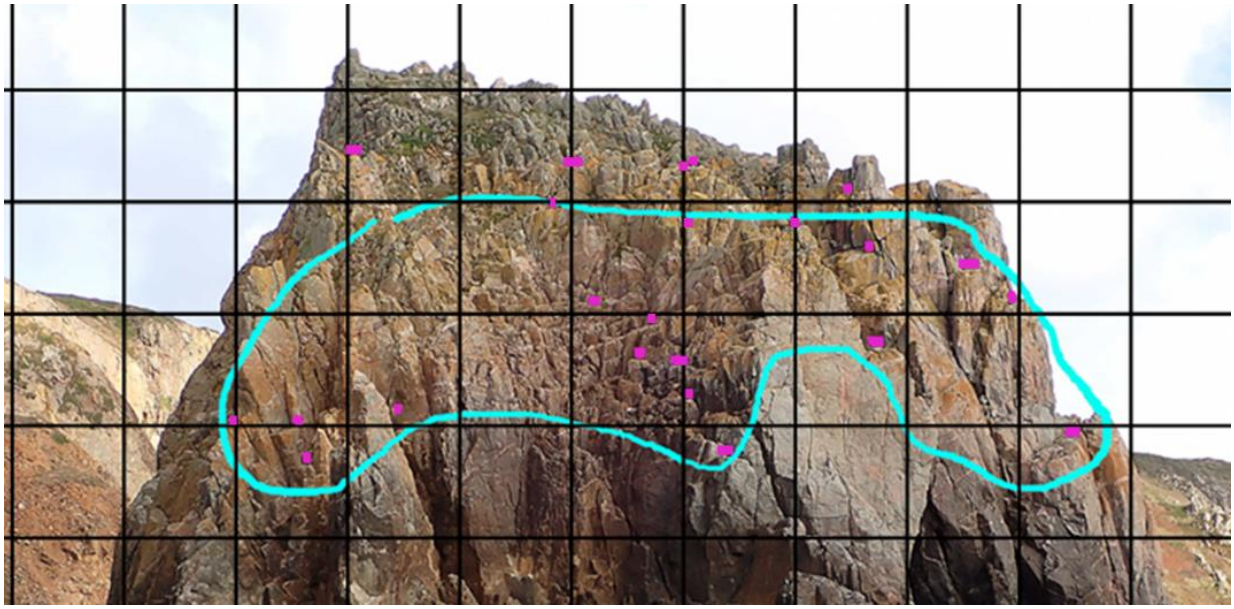
2.1.1.1 Suitable nesting ledges are marked in pink. The area circled in blue was highlighted by Alderney Wildlife Trust as suitable nesting habitat for guillemot and razorbill (*pers. comm.,* 2022) prior to the detailed habitat analysis.



3 Alderney – Forquie

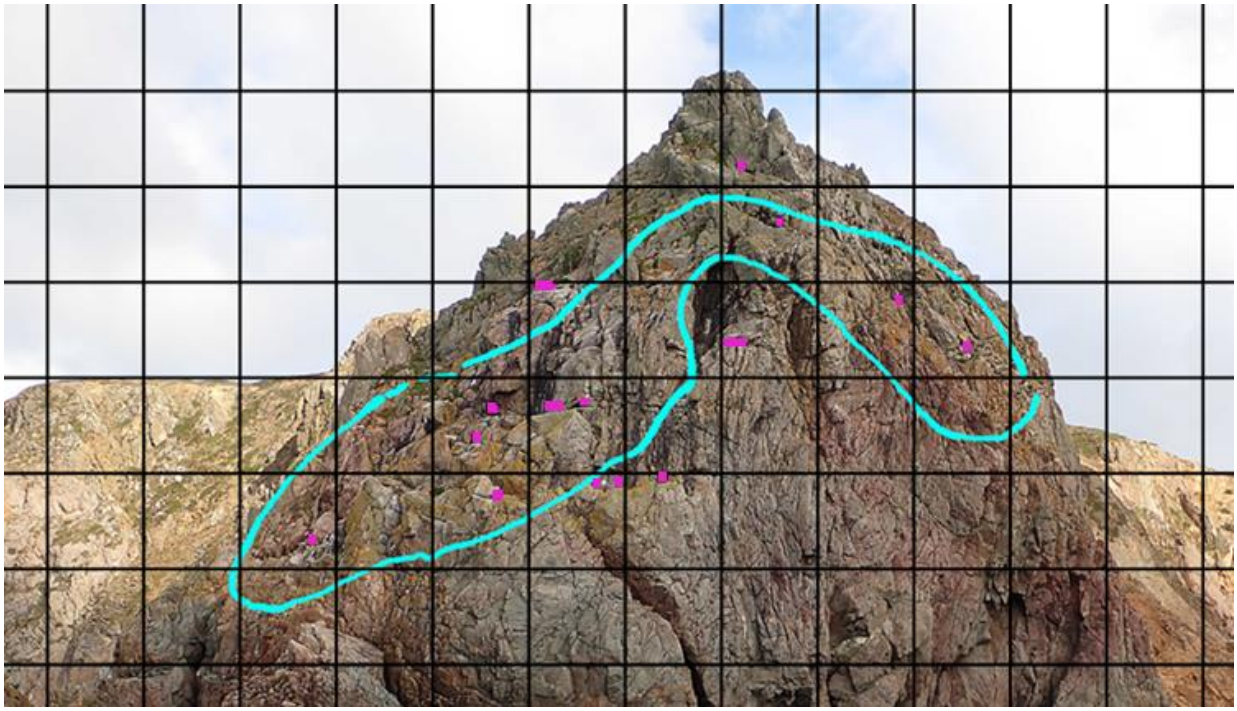
3.1.1.1 Suitable nesting ledges are marked in pink. Razorbill are thought to use the area marked in red (Alderney Wildlife Trust, *pers. comm.,* 2022). The area circled in blue was highlighted by Alderney Wildlife Trust as suitable nesting habitat for guillemot and razorbill (*pers. comm.,* 2022) prior to the detailed habitat analysis.





4 Alderney – La Nache

4.1.1.1 Suitable nesting ledges are marked in pink. The areas circled in blue were highlighted by Alderney Wildlife Trust as suitable nesting habitat for guillemot and razorbill (*pers. comm.,* 2022) prior to the detailed habitat analysis.



5 Grande Fauconniere

5.1.1.1 Suitable nesting ledges and platforms are marked in pink and blue respectively.