



Morven North Offshore Wind Array Project

Environmental Impact Assessment Report

**Volume 3, Annex 11.1: Offshore Ornithology
Baseline Characterisation Report**

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1 Introduction

1.1 Context

- 1.1.1.1 The purpose of this report is to provide a detailed baseline characterisation of birds within and around the Morven North Offshore Wind Array Project (hereafter 'Morven North') as shown in Figure 2.1. This report encompasses those species that may utilise the marine environment below Mean High Water Springs.
- 1.1.1.2 Site specific offshore aerial bird surveys have been conducted to collect data for an ornithological characterisation of Morven North¹ plus a 4km buffer. This characterisation informs the baseline against which potential impacts of the proposed development are assessed. This report includes data from 28 aerial surveys undertaken between June 2021 and September 2023.
- 1.1.1.3 An overview of the baseline, together with the impact assessment, cumulative and transboundary impact assessment are provided in Volume 2, Chapter 11: Offshore Ornithology. Details of the Offshore Ornithology Study Area, legislation and guidance, consultation, data sources, and methodology for data collection are also included within Volume 2, Chapter 11: Offshore Ornithology.
- 1.1.1.4 It is recommended that this Baseline Characterisation Report is read in-conjunction with Volume 2, Chapter 11: Offshore Ornithology.

1.2 Purpose and Scope

- 1.2.1.1 This report presents an outline of the study methodology, together with baseline results from the site specific aerial surveys which were designed to best inform the ornithological baseline characterisation of Morven North. This report therefore:
- collates all ornithological data gathered to date for the Morven North application and provides a baseline description of the ornithological interests within the Morven North Boundary;
 - establishes the ornithological importance of Morven North for breeding, wintering and migratory birds by analysing aerial survey data, and other data sources from the wider area.
- 1.2.1.2 In relation to nature conservation importance, three key potential legislative impact pathways on the seabird assemblage during the construction, operation and maintenance, and decommissioning of Morven North have been identified:
- The potential for the project to adversely affect seabirds of highest conservation concern, listed on Annex I of the EU Birds Directive (2009/147/EC, the codified version - updated to incorporate the original Directive and all amendments of Council Directive (79/409/EEC)), and/or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);
 - The potential for the project to adversely affect qualifying ornithological features of nearby designated sites; Natura 2000 sites (Special Protection Areas (SPAs)), sites of national value (Sites of Special Scientific Interest (SSSIs)), and internationally designated sites (Ramsar) (see Volume 2, Chapter 11: Offshore Ornithology, for more detail);
 - The potential for the project to adversely affect other species in internationally-, nationally- or regionally-important numbers in winter, during migration, or whilst commuting locally between foraging areas (which may include Morven North) and breeding colonies (see Volume 2, Chapter 11: Offshore Ornithology, for more detail on the legislative background associated with these receptors).

¹ This is where Morven North will be located, which will include wind turbines and foundations, offshore substation platforms (OSPs) and foundations, inter-array and interconnector cables, and associated infrastructure (Volume 1, Chapter 3: Project Description).

1.2.1.3 The structure of this report is as follows:

- Section 2 defines the study areas used to characterise the baseline environment at Morven North;
- Section 3 provides an overview of the methodologies used to gather, analyse and present baseline data, as well as the rationale behind, and procedures used, to define population importance and sensitivity for each key species;
- Section 4 presents the results gathered from desk-based studies and aerial surveys to characterise the baseline environment. Information is provided for raw counts of all species recorded at Morven North;
- Section 5 identifies sites of conservation concern with potential connectivity with Morven North during the breeding season, based on the foraging behaviour of those species designated as qualifying features at relevant sites of conservation concern;
- Section 5.1.1.6 contains individual species accounts for species recorded during surveys of Morven North and provides discussion pertaining to trends in spatial, seasonal or inter-annual variation. The relative importance of Morven North to the species' background populations are also considered in a wider spatial context;
- Section 7 then takes all the presented information to summarise which species should be considered for impact assessment, based on the importance of the populations recorded during the baseline period.

2 Study Area

2.1 Study areas

2.1.1.1 In order to characterise the baseline environment, two study areas have been defined:

- the Morven North Offshore Ornithology Baseline Characterisation Study Area;
- the Morven North Offshore Ornithology Regional Study Area.

2.1.1.2 The Morven North Offshore Ornithology Baseline Characterisation Study Area provides a site specific baseline encompassing the Morven North Boundary plus 4km buffer across which aerial surveys were undertaken (947.1km²) (Figure 2.1). The Offshore Ornithology Regional Study Area encompasses a wide area generally coinciding with the northern and southern North Sea as defined by the regional seas identified by JNCC for implementing UK nature conservation strategy (JNCC, 2004). This captures the areas utilised by various seabird populations that may utilise the Morven North Offshore Ornithology Baseline Characterisation Study Area throughout the annual cycle. Consideration of the Offshore Ornithology Regional Study Area provides a wider context incorporating species-specific foraging ranges, migration routes and wintering areas. The spatial extent of the Offshore Ornithology Regional Study Area therefore varies depending on different ecological factors (e.g. age cohort, season, etc.) for individual species. In addition, a number of areas in the North Sea that are considered important for birds are also discussed as part of the wider baseline characterisation (i.e. Wee Bankie and Marr Bank).

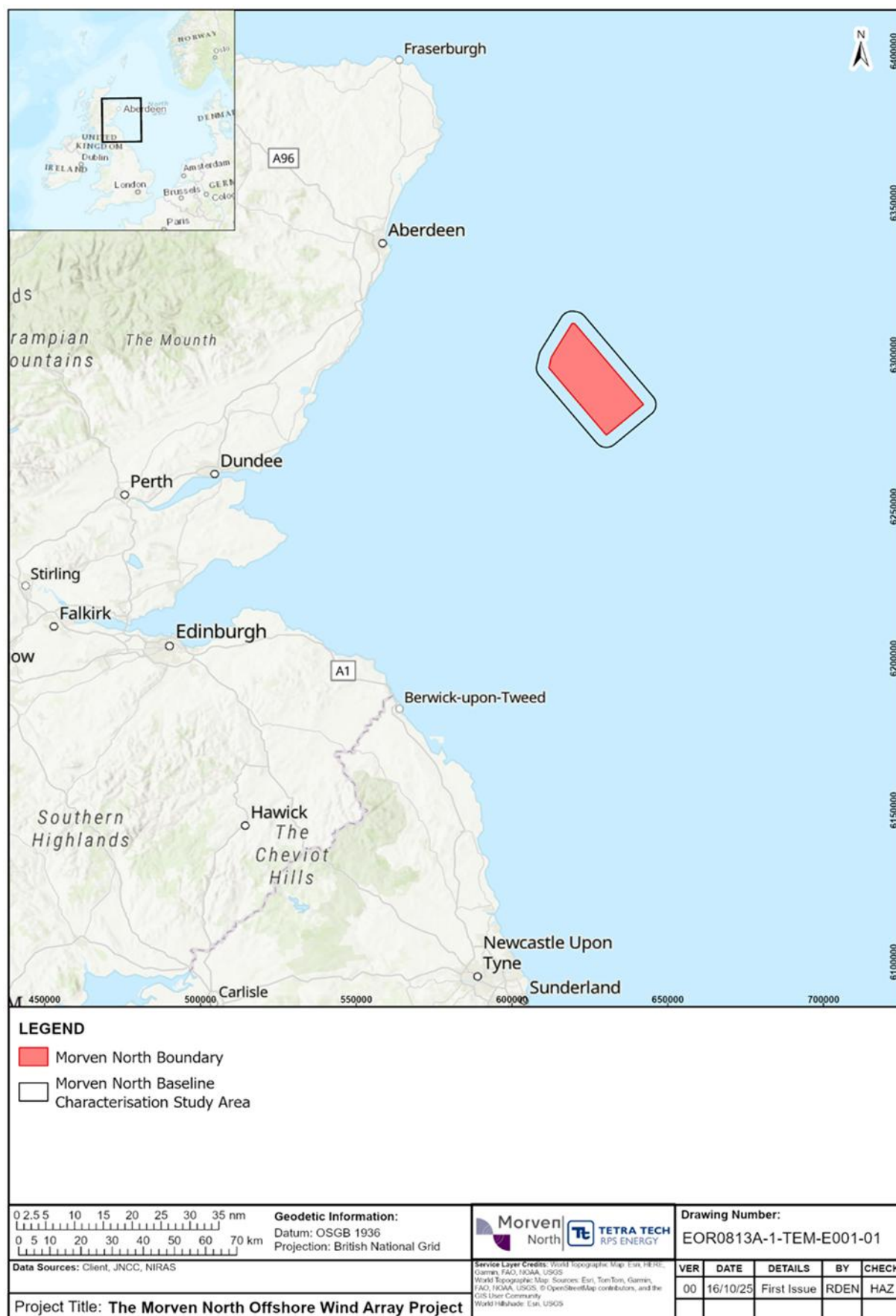


Figure 2.1: The Morven North Offshore Ornithology Baseline Characterisation Study Area used to define the ornithological baseline

3 Methodology

3.1 Desktop study

3.1.1 Desktop review of data sources

- 3.1.1.1 Evidence sources and existing datasets have been reviewed to define the seabird baseline and support the findings of the site specific Digital Aerial Surveys. Both scientific and grey literature were reviewed, and the subsequent data sources relevant to the Morven North site identified. Peer-reviewed scientific literature examining seabird distribution and abundance in UK waters was included, and grey literature was searched for unpublished reports documenting seabird distribution and abundance.
- 3.1.1.2 The data that have been collected and used to inform this baseline characterisation report are summarised in Table 3.1. This includes a description of the data sources, the spatiotemporal coverage of the dataset across the project area, and any key limitations and assumptions of the sources.

Table 3.1: Summary of key desktop datasets and reports

Source/reference	Description	Data source	Date	Site coverage
APEM (2024)	Digital aerial surveys conducted between 2021 and 2023 to provide up-to-date relative abundance, density and distribution data for species in the Morven North Offshore Ornithology Baseline Characterisation Study Area.	Digital aerial data.	January 2021 to September 2023.	Morven North Offshore Ornithology Baseline Characterisation Study Area
HiDef Aerial Surveying Limited (2023)	Digital video aerial surveys of seabirds and marine megafauna at SSE Regional Survey: Annual Report April 2022 to August 2023	Digital aerial data.	April 2022 to August 2023	Southeast Scottish North Sea
Woodward <i>et al.</i> (2019)	Desk-based revision of seabird foraging ranges used for HRA screening.	Data on foraging ranges, literature review.	Includes information up to 2019.	Provides data on foraging range for seabird species in UK waters.
Joint Nature Conservation Committee (JNCC) (2021)	Population trends for UK breeding seabirds.	Census results and Seabird Monitoring Programme (SMP) samples.	1986 to 2019.	Provides information covering all of the UK.

Source/reference	Description	Data source	Date	Site coverage
Furness (2015)	Non-breeding season seabird populations in UK waters.	Population data, literature review.	Uses data up to 2013.	Covers all UK waters. Also provides seasonal extents for multiple species.
Kober <i>et al.</i> (2010)	An analysis of seabird numbers and distributions within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.	Population data, literature review.	1980 to 2004.	Provides seasonal extents and distributions for multiple species, covering UK waters.
NatureScot (2020)	Guidance note – Seasonal Definitions for Birds in the Scottish Marine Environment.	Seasonal abundance and distribution data.	Up-to-date to 2020.	Covers the Scottish Marine Environment.
NatureScot (2023)	Guidance note – Identifying theoretical connectivity with breeding site Special Protection Areas using breeding season foraging ranges	Tracking data, range data	Includes information up to 2019.	UK waters.
Cleasby <i>et al.</i> (2020)	Identifying important at sea areas for seabirds using species distribution models and hotspot mapping for four seabird species: kittiwake, guillemot, razorbill and shag.	Tracking data	May to July, (2010 to 2014)	UK waters
Joint Nature Conservation Committee (JNCC) (2025)	Population and productivity data for breeding seabirds around the UK	Bird counts and productivity data at breeding colonies	1986 to 2024	Count data at breeding colonies that may have connectivity with the Morven North Offshore Ornithology Baseline Characterisation Study Area

Source/reference	Description	Data source	Date	Site coverage
BirdLife International (2024)	Interface to view seabird tracking database	Seabird tracking data	Various dates	UK waters

3.2 Site specific aerial surveys

3.2.1 Overview

- 3.2.1.1 Digital aerial surveys of the whole Morven Option Lease Agreement Site (hereafter 'Morven Site') were undertaken between January 2021 and September 2023. Following pre-application consultation with NatureScot (Volume 1, Chapter 5: Consultation) it was advised that due to the planned application date for the project only data from June 2021 to September 2023 should be used for baseline characterisation to avoid data being older than the five year cut-off at application while ensuring there are full seasons of data available for displacement assessments for all species. This report therefore reports on the methodology and results from surveys undertaken between June 2021 and September 2023.
- 3.2.1.2 A grid-based sampling method was used to aerially survey from October 2021 to September 2023 (APEM, 2024). The survey methodology was designed to provide information suitable to support an Environmental Impact Assessment (EIA) and Habitats Regulations Appraisal (HRA) of the potential effects of a large offshore wind farm, for which an accurate assessment of abundance and distribution of seabirds is required.
- 3.2.1.3 Grid-based aerial surveys involved 22 survey lines spaced approximately 2km apart within Morven North Project Boundary plus a 4km buffer (Morven North Offshore Ornithology Baseline Characterisation Study Area; Figure 3.1. Such a design ensures that each grid line samples a similar range of habitats (primarily relating to water depth) and reduces the difference in bird abundance estimates for each grid line.
- 3.2.1.4 The dates and start and end times for each digital aerial survey are provided in Table 3.2, and the corresponding weather conditions provided in Table 3.3.
- 3.2.1.5 Surveys were undertaken using an aircraft equipped with APEM's camera system with data being collected at a Ground Sample Distance of 1.5cm. Data was collected at a flight altitude of approximately 400m to avoid disturbance to marine wildlife, whilst optimising data collection and image resolution and a flight speed of approximately 120 knots. An altitude of 400m is standard for digital aerial surveys of this type and has been applied across multiple survey campaigns. Analyses were conducted utilising data that represented close to 12% of the sea surface, with this level of coverage deemed to be sufficient for baseline characterisation. The coverage achieved during each month of the aerial surveys is presented in Table 3.4.

Table 3.2: Date and start/end times (Coordinated Universal Time) for each flight for the June 2021 to September 2023 digital aerial surveys

Survey no.	Date	Start time (HH:MM)	End time (HH:MM)
01	11/06/2021	08:31	11:09
		13:58	16:29
02	17/07/2021	09:26	13:58
		10:28	17:55
03	02/08/2021	09:55	14:15
04	14/09/2021	10:41	14:44
05	16/10/2021	08:59	13:01
06	09/11/2021	09:58	13:42
		13:02	13:31
07	07/12/2021	10:15	11:58
		10:28	12:47
08	11/01/2022	10:10	14:14
09	19/02/2022	11:13	15:17
10	06/03/2022	10:42	11:35
	07/03/2022	10:36	14:40
11	11/04/2022	09:59	14:03
12	07/05/2022	11:23	14:45
13	06/06/2022	11:01	15:28
14	04/07/2022	13:27	18:09
15	02/08/2022	10:21	14:40
		17:02	17:42
16	01/09/2022	11:56	14:36
		16:35	18:23
17	13/10/2022	09:08	13:14
18	03/11/2022	11:44	14:03
19	20/12/2022	10:20	12:52
20	15/01/2023	10:15	15:07
21	15/02/2023	09:32	13:52
22	15/03/2023	12:04	14:03
	15/03/2023	12:50	14:58
23	14/04/2023	08:45	11:04
	14/04/2023	13:30	15:16
24	22/05/2023	14:55	17:07
	23/05/2023	08:35	10:46
25	14/06/2023	10:03	12:03

Survey no.	Date	Start time (HH:MM)	End time (HH:MM)
	14/06/2023	14:13	17:05
26	10/07/2023	08:07	11:04
	10/07/2023	13:27	15:27
27	09/08/2023	09:30	11:30
	09/08/2023	13:20	15:16
28	17/09/2023	06:57	10:49

Table 3.3: Weather conditions during all surveys from June 2021 to September 2023

0 = Calm (Glassy); 1 = Calm (Rippled); 2 = Smooth; 3 = Slight; 4 = Moderate

0 = Clear; 1 = Slightly Turbid; 2 = Moderately Turbid; 3 = Highly Turbid

0 = Clear; 1-10 = Few; 11-50 = Scattered; 51-95 = Broken; 96-100 = Overcast

Survey no.	Date	Visibility (km)	Sea state	Glint/glare (%)	Turbidity ²	Cloud (%) ³	Air temp (oC)	Wind speed (knots)/direction
01	11/06/2021	10+	4	0-30	0	0-100	12-13	28-39 / W-SW
02	17/07/2021	20+	3	30-40	1-2	0-20	18-21	20-31 / W-WNW
03	02/08/2021	20+	2	0-5	1	90	9-10	1-11 / SW-NNW
04	14/09/2021	10+	2	0-10	0	50-100	12	8-20 / S
05	16/10/2021	10+	2-3	0	3	5	5-7	12-20/W-WNW
06	09/11/2021	10+	2	0-5	2	50-100	10	20/W
07	07/12/2021	10+	2-3	0	2	5-100	3	22-25/S-SE
08	11/01/2022	15+	0.5-1.5	0-<10	1-1	0-20	4-5	20-30/W
09	19/02/2022	30+	2-3	0-<15	0.5	0	0-1	12-20/WNW-NW
10	06/03/2022	10+	1	0	0	1-50	3	5/N
	07/03/2022	10+	3	0	2	0-100	2-3	21-25/SW
11	11/04/2022	10+	2	0-40	2	5-50	4	17/SE-SSE
12	07/05/2022	7-10+	0-1	0-40	1	30-50	6-7	3-7/NNE-E, S
13	06/06/2022	10+	2	0-10	2	25-100	7-8	22/NNE
14	04/07/2022	15-20	3	0	3	80-95	10-13	10-28/W-WNW
15	02/08/2022	10+	3-4	0-40	1	0-30	17-19	29-40/WSW

Survey no.	Date	Visibility (km)	Sea state	Glint/glare (%)	Turbidity2	Cloud (%)3	Air temp (oC)	Wind speed (knots)/direction
16	01/09/2022	10+	0	0-20	0	0	12-13	10-14/SSE
17	13/10/2022	10+	2	0-20	2	25	8-9	12-16/WSW-W
18	03/11/2022	10+	2-3	0	0	0-5	7	14/W
19	20/12/2022	10	3	10-20	2	15-20	6-8	25-36/SWS-WSW
20	15/01/2023	10+	4+	-	1-2	50-70	2	30-50/NW
21	15/02/2023	10+	2	-	1-2	40-100	7-10	33-40/SW-WSW
22	15/03/2023	10+	1	0-20	1	55	5	15/SSW
	15/03/2023	10+	3	5-15	3	50-80	1	9-10/W-WSW
23	14/04/2023	5-10+	2	30 - 50	1	0	4-6	10-15/SSW
	14/04/2023	10+	2	0 - 10	2	5-10	6-7	12 - 20/SW - S
24	22/05/2023	10+	2	0 - 5	0	0 - 20	10	18-19/N
	23/05/2023	10+	1	20 - 30	0	0	8	9/WNW
25	14/06/2023	25+	1	0 - 50	1	5 - 10	17	16-21/SSE
	14/06/2023	25	1	0	1	5	17	6-11/SSW-NW
26	10/07/2023	25	1-2	0 - 60	2	25 - 60	13-14	11 - 15/SSW
	10/07/2023	25	1	0 - 40	2	40 - 60	14	14 - 24/S-SSW
27	09/08/2023	10+	1	5	1	40	10 - 11	19/NW
	09/08/2023	10+	1	0	1	60 - 95	12	15/W
28	17/09/2023	10+	2-3	5 - 25	0	0 - 50	9 - 11	12/E

Table 3.4: Monthly coverage statistics for the Morven North digital aerial surveys. Percentage captured and percentage analysed statistics are provided

Survey	Percentage captured %	Percentage analysed %
Jun-21	32.99	11.79
Jul-21	33.13	11.84
Aug-21	33.00	11.86
Sep-21	33.04	11.84
Oct-21	33.36	12.07
Nov-21	32.27	11.59
Dec-21	32.65	11.78
Jan-22	33.06	11.92
Feb-22	33.02	11.94
Mar-22	33.02	11.95
Apr-22	32.88	11.76
May-22	33.55	11.73
Jun-22	32.67	11.82
Jul-22	36.27	11.88
Aug-22	33.73	12.02
Sep-22	32.43	11.75
Oct-22	32.36	11.71
Nov-22	33.48	11.93
Dec-22	32.58	11.82
Jan-23	33.22	11.88
Feb-23	32.78	11.86
Mar-23	33.04	11.88
Apr-23	33.01	11.96
May-23	32.87	11.85
Jun-23	32.97	11.87
Jul-23	32.84	11.88
Aug-23	33.09	11.95
Sep-23	32.77	11.84

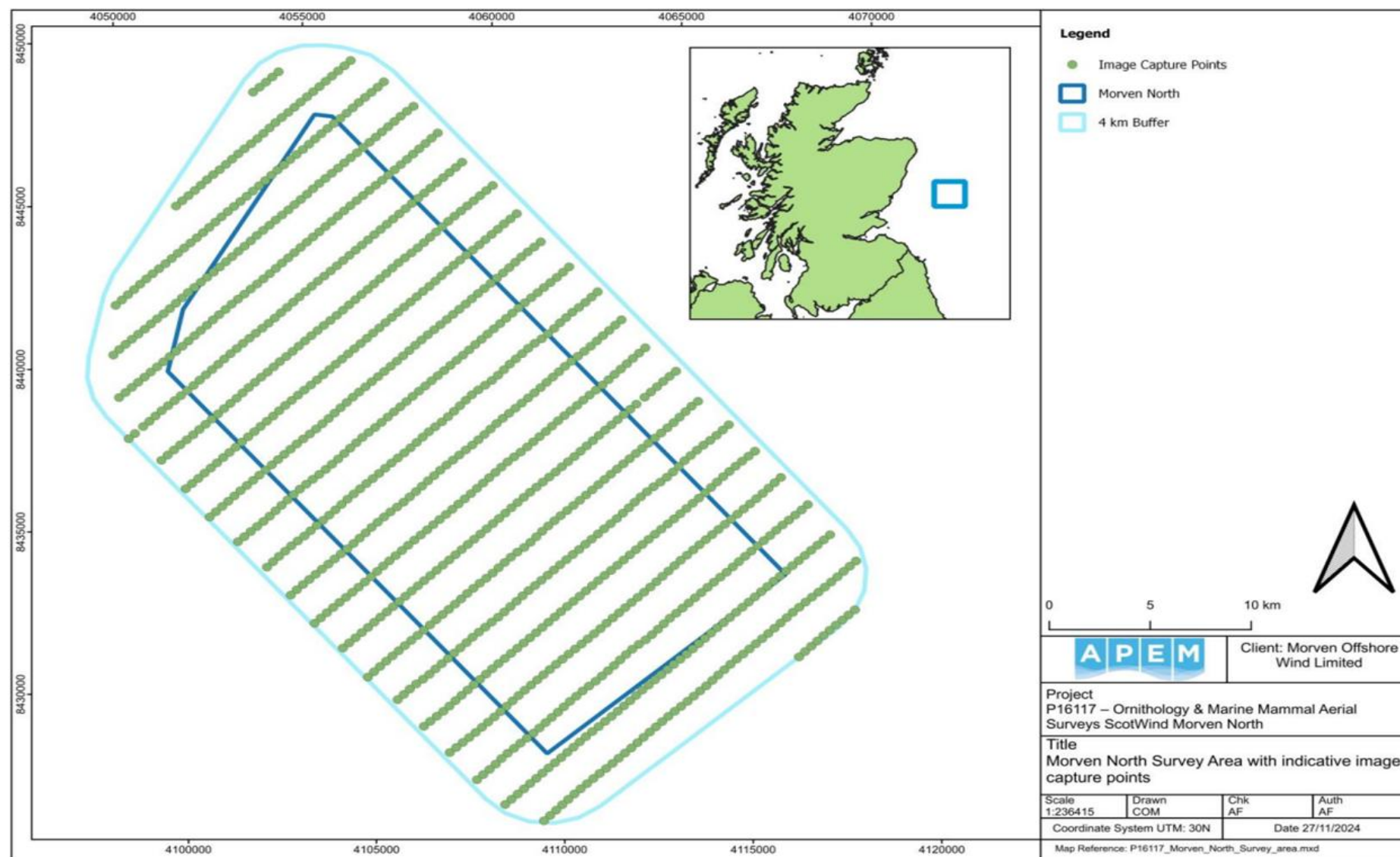


Figure 3.1: Map of the survey lines involved in the aerial surveys for the Morven North Offshore Ornithology Baseline Characterisation Study Area

3.2.2 Data processing

- 3.2.2.1 Data collected during aerial surveys were analysed by trained ornithologists for the presence of seabirds. Every bird recorded on these surveys was viewed by at least two members of APEM staff as part of their comprehensive quality assurance (QA) process. Blank image QA was performed on at least 10% of the imagery to ensure no birds were missed. Finally, all bird identification records were checked by an experienced QA manager.
- 3.2.2.2 Once the image analysis was completed, APEM's BIRD software automatically generated a tabulated database containing information corresponding to each individual sighting including a group/species, geographical position of the individual, timing of the sighting and behaviour (flying, sitting, submerged, etc). The database was exported into Excel format to provide simple raw count-based data.

3.2.3 Survey coverage

- 3.2.3.1 Following refinements to the project boundary and consultation with The Crown Estate Scotland it was identified that the area covered by the digital aerial surveys did not cover the entirety of the Morven North Offshore Ornithology Baseline Characterisation Study Area. The digital aerial survey area was based on a previous version of the Morven Option Lease Agreement Site (this area incorporates both the Morven North and Morven South) which was later refined and used to develop the boundaries for Morven North and Morven South.
- 3.2.3.2 The surveys achieved complete coverage of the areas required for the abundance metrics used in displacement analyses (Morven North plus 2km buffer) and collision risk modelling (Morven North only). However, complete coverage of the area required to identify Valued Ornithological Receptors (VORs) (Morven North plus a 4km buffer), as needed in this report, was not. The area that was not covered by the digital aerial surveys represents a small proportion of the Morven North Offshore Ornithology Baseline Characterisation Study Area (less than 5%). This issue was discussed at a pre-application consultation meeting with NatureScot on 05 March 2025 Volume 1, Chapter 5: Consultation, and the following approach to account for the discrepancy, which ensures the assessments remain precautionary, was proposed.
- 3.2.3.3 Whilst it is considered that the process used to identify VORs, which incorporates expert judgement to ensure species are not erroneously omitted from further consideration within assessments, will be unaffected by this discrepancy between the Morven North Offshore Ornithology Baseline Characterisation Study Area and the area covered by the digital aerial surveys, a precautionary approach has been adopted whereby population importance thresholds have not been applied as definitive thresholds but rather where a species population is approaching an importance threshold, it is assumed that this threshold is exceeded.

3.2.4 Design-based abundance estimates

- 3.2.4.1 For each monthly survey, species-specific abundance and density estimates were produced, with upper and lower confidence limits and precision estimates in the form of a coefficient of variation (CV). The raw counts were divided by the number of images collected to give the mean number of birds per image (i). Population estimates (N) for each survey month were generated by multiplying the mean number of birds per image by the total number of images required to cover the entire study area (A):

$$N = i A$$

- 3.2.4.2 Non-parametric bootstrap methods were used for variance estimation - a variability statistic by re-sampling 1,000 times with replacement from the raw count data. The statistic was evaluated from each of these samples and upper and lower 95% confidence intervals of the 1,000 values taken as the variability of the statistic over the population.

- 3.2.4.3 Measures of precision were calculated using a Poisson estimator, suitable for a pseudo-Poisson over-dispersed distribution. This produces a CV based on the relationship of the standard error to the mean. A CV or target precision of ≤ 0.16 allows the detection of a population change of a factor as small as 2.
- 3.2.4.4 All analysis and data manipulation carried out by APEM was conducted in the R software programming statistical package and non-parametric 95% confidence intervals generated using the 'boot' library of function.

Availability bias

- 3.2.4.5 For auk species such as common guillemot, razorbill and puffin, which make foraging dives underwater, a proportion will not be detectable at the surface during analysis of the survey images. As a result, density and abundance estimates need to be adjusted to allow for this 'availability bias'. A fixed species-specific correction factor was applied to the number of each auk species recorded on the sea surface.
- 3.2.4.6 The correction factor applied to each relevant auk species is based on that recommended by Joint Nature Conservation Committee (JNCC) in a submission during the examination phase of the East Anglia ONE offshore wind farm, referred to by JNCC as Method C (JNCC, 2013). Correction factors are derived from time spent underwater (during the chick-rearing stage) from Thaxter *et al.*, (2010) for guillemot and razorbill and from records from data loggers from Spencer (2012) for puffin. The correction factors applied to the relative abundance estimate of guillemot, razorbill and puffin sitting on the sea surface are 1.311, 1.211 and 1.165, respectively.

Attribution of unidentified birds

- 3.2.4.7 Although the majority of individuals recorded during the site specific digital aerial surveys were identified to species level, a number remained identified to group level only. To account for these unidentified individuals' abundance estimates, where appropriate, include an attribution of unidentified individuals into the monthly abundance estimates and densities. This is based upon an apportionment of the group level individuals between those species within that group proportionally based on the abundance of each species. Apportioning is conducted separately by behaviour, where possible, to allow for the possibility that patterns of occurrence differ depending on behaviour. During this apportionment process, non-parametric bootstrap samples generated as part of abundance estimate calculations are apportioned individually. This allows for variation between bootstrap samples in the number of individuals identified to group level as well as in the species proportions to be considered; and ensures that uncertainty in species level abundances as well as group level abundances is fully accounted for within the final apportioned abundance estimates. The upper and lower 95% confidence intervals are calculated from the apportioned (and corrected where availability bias applies) bootstrap samples. The CV is similarly calculated from the bootstrap samples and is based on the relationship of the standard deviation to the mean. Note that the bootstrap samples are based on mean densities and are multiplied by the specific boundary area as part of apportionment calculations to obtain population estimates in number of individuals. Apportioning is carried out within the R environment (R Core Team, 2024).
- 3.2.4.8 For each bootstrap, the number of unidentified individuals in a group was allocated in proportion to the relative numbers of the specific species contained within that group based on those records with positive species identification in that month's survey. For example, in the case of kittiwake, the count consists of: positively identified kittiwake + proportion of unidentified small gull species estimated to be kittiwakes calculated from positively identified small gull species + proportion of unidentified gull species estimated to be kittiwakes calculated from positively identified gull species + proportion of fulmar/gull species estimated to be kittiwakes calculated from positively identified fulmar/gull species.
- 3.2.4.9 Some high-level groups do not undergo apportionment due to the breadth of taxa they encompass. This includes individuals assigned to 'unidentified bird species', 'raptor species', etc.

3.2.4.10 Instances can occur when there are no positively identified species in months where group level identified individuals have been recorded. A hierarchical approach was used in such cases, only utilising a higher hierarchy level where no data was available to use the lowest level. Note that level 1 of the hierarchy is the standard apportioning level considering each bootstrap separately, whilst subsequent hierarchy levels define species proportions using the mean density estimates across bootstrap samples.

1. same month, same year, same area² (site or buffer only);
2. same month, same year, survey area (site and buffer);
3. same bio-season/season³ (combined sum), same year, same area;
4. same bio-season/season (combined sum) same year, survey area;
5. same bio-season/season (combined sum), same year, wider buffer (if available);
6. same bio-season/season (combined sum), same year, survey area, different behaviour (for marine mammals, for use in sitting/diving birds only);
7. same bio-season/season (combined sum), different year, same area;
8. same bio-season/season (combined sum), different year, survey area;
9. same bio-season/season (combined sum), different year, wider buffer (if available);
10. same bio-season/season (combined sum), different year, survey area (different behaviour).

3.2.5 Marine Renewables Strategic Environmental Assessment

Overview

- 3.2.5.1 NatureScot published online guidance documents in early 2023 (NatureScot, 2023b), detailing the appropriate methodology to follow when carrying out ornithological impact assessments for offshore wind farms.
- 3.2.5.2 Within the guidance notes it is stated that baseline site characterisation should include detailed spatial data for all species present. NatureScot further advise that the spatial modelling package MRSea (Marine Renewables Strategic Environmental Assessment; originally developed by Scott-Hayward *et al.*, 2013) should be used to derive density estimates for species observed in sufficient numbers during site specific digital aerial surveys. MRSea is a statistical package in R (R Core Team, 2024) that has been developed by the Centre for Research into Ecological and Environmental Modelling to model spatial distribution and abundances of animal populations, and the potential impact of human infrastructural developments on these (Scott-Hayward *et al.*, 2013).
- 3.2.5.3 The guidance note also indicates that it is unlikely that MRSea will run successfully when the number of observed birds is less than ten across a surface area over multiple months. Within temporal or spatial Density Surface Models (DSMs), model uncertainty is inevitable, but this is exacerbated in the case of MRSea when species have scattered distributions (Hanspach *et al.*, 2010). Poor predictive power is likely in these cases, along with marked imprecision (Hernandes *et al.*, 2006). Here a threshold of five birds was used to decide whether modelling should be attempted – reasonable models for low counts of models are possible with some effort in the starting conditions for the MRSea model fitting.

² 'Area' refers to the abundance estimates calculated for the specific area being apportioned. This will either be the Site area or Buffer only

³ 'Bio-season' refers to significant periods in the year for the apportioned bird species. The following bio-seasons were used for apportionment: Return Migration, Breeding site Attendance, Migration-free Breeding, Post-breeding Migration, Migration-free Winter, and Extended Non-breeding (NatureScot, 2020). In the cases where no data was available for a species, this was filled in through other sources. Where the NatureScot Breeding Site Attendance overlaps with Post-Breeding Migration, and therefore Post-Breeding Migration was estimated from a different source, the preference was given to use the NatureScot Breeding Site Attendance for that month. 'Season' refers to typical seasons within the year for apportioned marine megafauna species: spring, summer, autumn, winter.

- 3.2.5.4 Modelling was performed in R (R Core Team, 2024) using the MRSea package (Scott-Hayward *et al*, 2014), which uses adaptive regression-spline smoothers to provide estimated mean density surfaces and associated 95% confidence intervals via parametric bootstrapping.

Data and treatment

- 3.2.5.5 The modelling/abundance estimation requires counts of birds at surveyed points over time. This is created by combining two data sources:
- the effort data (a list of images with time, location and coverage);
 - the observations data (the time and location of birds).
- 3.2.5.6 The former shows what parts of the survey region were observed, with the latter showing where birds were seen. Equally important is where birds were not detected, which requires cross-referencing of these data to provide zero counts.
- 3.2.5.7 Bird counts were generated from combining coincident images at a series of sample points (nodes) consisting of three images perpendicular to the flight transect, and therefore relatively clustered together. These survey nodes are themselves approximately at 500m intervals along the flight transects and modelling predictions are ultimately made at 1km² resolution.
- 3.2.5.8 Counts of birds were aggregated at this node level for those unambiguously identified as a member of the species group. Adjustments for ambiguous birds within images are adjusted for post-hoc. Images without birds of the species of interest will contribute a zero. Node effort is from the sum of the individual image coverage.
- 3.2.5.9 Three regions were of interest for abundance estimation:
- windfarm boundary;
 - windfarm boundary with additional 2km buffer;
 - windfarm boundary with additional 4km buffer.
- 3.2.5.10 Predictions were made to a 1km² grid, created to encompass the nominal survey area.
- 3.2.5.11 Thirty-three surveys were conducted. Several surveys contained no birds and many with few birds spread over the region, which a priori suggests modelling would be problematic and likely unnecessary in these cases.

Modelling

- 3.2.5.12 Mean density surfaces were fitted using the MRSea package. The fundamental/initial model was a Generalised Linear Model, with log-link and quasi-Poisson error structure or Poisson as required – the selection being based on estimated mean-variance relationships. Generally, for species surveys where there were low overall bird densities and diffuse distributions, the Poisson was favoured. Where Poisson models were fitted, model selection was via the Akaike Information Criterion (AIC), whereas quasi-Akaike Information Criterion/Quasi Information Criterion was used for quasi-Poisson. An offset was included for the area of the survey cell and the only covariates considered were spatial location – from which spatial smooths were estimated using the *salsa2d* algorithm. No other covariates were presented for the modelling process, nor would offer much utility for the development of the DSMs, given: the principal outputs are temporally-varying distribution maps, not an investigation of functional relationships with the environment; flying birds, and by extension combined surfaces, may a priori not be displaying strong habitat preference due to transiting; many of the species surveys are very sparse and do not support fitting of environmental relationships e.g. several individual birds will not support several marginal spline functions; fine-scale model selection for covariate relationships is not feasible for approximately 600 DSMs; and, the imposition of functional relationships with the environment will typically create deviations between the DSM and design-based abundance estimates, where the latter is typically treated as a quasi-validation of the DSMs.

- 3.2.5.13 Separate surfaces were fitted for each of the surveys where feasible, with survey nodes providing candidate knot locations. These locations were used to create 500 potential knots, over which *salsa2d* performed its search. The initial number of knots was generally 10, with a maximum generally of 50, given that a range of preliminary MRSea fits indicated highly complex surfaces were not required. Some adjustments to these settings were made for surfaces with convergence difficulties, in particular low levels of knots for very sparse surveys – where the initial knot number was generally reduced to achieve fitting. A semi-arbitrary criterion was used prior to DSM fitting – less than five individuals in five separate 1km² grid-cells was considered sufficiently sparse to be modelled with a flat DSM, when the smoother repeatedly failed to converge (which equates to an approximate density of <0.006 birds per km² for the Morven North footprint).
- 3.2.5.14 95% confidence intervals were generated using the MRSea parametric bootstrapping method, which provided confidence intervals for each 1km² grid cell. Estimates to the various regions were calculated by summation over the 1m² grid contained within these. Upper and lower confidence intervals were given by the 2.5 and 97.5 percentiles of the summed bootstrap surfaces.

Adjustments to counts: availability and uncertain identification

- 3.2.5.15 Adjustments were made post-hoc to fitted model estimates for birds that were observed, but not fully identified to species level. This was done at the survey level by proportional allocation to those birds fully identified. Calculation at the survey level accounts for seasonal/temporal effects, with the primary assumption that all species are equally difficult to identify within a species group. For example, assuming there were 100 birds recorded for the Guillemot/Razorbill species group - if the ratio of confirmed guillemots to razorbill was 80:20 for this survey, then this is assumed to hold true for the vaguely defined birds (i.e. an additional 80 guillemot and 20 razorbill are allocated).
- 3.2.5.16 The species groups allocated in this way, to confirmed species' estimates, were:
- guillemot/razorbill (allocated to guillemot and razorbill). 2,209 instances during Morven North aerial surveys;
 - auk/shearwater species (allocated to guillemot, razorbill, puffin after the proportion of shearwater is removed). 134 instances during Morven North aerial surveys;
 - auk species (allocated to guillemot, razorbill, puffin). 320 instances during Morven North aerial surveys;
 - 'commic' tern (allocated to common tern and Arctic tern). 169 instances during Morven North aerial surveys.
- 3.2.5.17 Numbers of other bird species identified only to species group were negligible.
- 3.2.5.18 Corrections were also made for availability of sitting bird counts, whose diving times are of significance. The adjustment was by simple inflation of estimates, in line with figures for the proportion of time estimated to be underwater during surveys. These were based on JNCC *et al.* (2013) for guillemot and razorbill (which refines figures from Thaxter *et al.*, 2010), and Spencer (2012) for puffin, and were:
- guillemot: 23.75%;
 - razorbill: 17.39% ;
 - puffin: 14.16%.

- 3.2.5.19 The values to use to account for availability bias were confirmed with NatureScot (as detailed in Volume 2, Chapter 11: Offshore Ornithology).

3.3 Defining population importance

- 3.3.1.1 The significance of an impact on any particular species can be determined as a combination of the size and importance of the species' population affected, and the sensitivity of the species to that particular impact.

- 3.3.1.2 The importance of species present in Morven North was defined in relation to estimated international, national and regional populations through the use of the 1% threshold criterion. The 1% threshold for each population is obtained by dividing the respective biogeographic population by 100. The qualification of any SPA species found within the survey areas and the conservation status of each species as per the latest Birds of Conservation Concern classification (Stanbury *et al.*, 2021; Stanbury *et al.*, 2024), and any national or international designated status (e.g., Annex I, Schedule 1) are also considered. It is important to note that other criteria (e.g. the conservation importance of a species) are also considered when identifying Valued Ornithological Receptors with these criteria presented in Section 7.
- 3.3.1.3 The 1% criterion, whilst not necessarily of biological relevance, has been previously used as a standard for designating areas of conservation interest (Kuijken, 2006). National population thresholds were derived from Musgrove *et al.* (2013), Burton *et al.* (2012) or Stienen *et al.* (2007). Appropriate numbers for both breeding and wintering populations were determined for each species from the most recent literature, taking into account seasonal patterns of movement (e.g., Furness, 2015).
- 3.3.1.4 Classification of the regional importance of breeding populations observed on site (i.e., if the population exceeded 1% of the regional population) was based on the following:
- estimates of foraging range (e.g. Woodward *et al.*, 2019; Thaxter *et al.*, 2012);
 - data presented from the Seabirds Count census in Burnell *et al.* 2023) and the subsequent JNCC Seabird Monitoring Programme (SMP; JNCC *et al.*, 2024);
 - colony-specific data, where available (e.g. tagging studies as part of the Future of the Atlantic Marine Environment project [www.fameproject.eu]).
- 3.3.1.5 For non-breeding species present in winter or on passage, the relevant regional population was considered to be the North Sea with relevant Biologically Defined Minimum Population Scale (BDMPS) populations taken from Furness (2015). Furness (2015) uses demographic data to incorporate the number of immature birds associated with breeding colonies within the BDMPS populations defined for the non-breeding and passage seasons.

4 Baseline characterisation

4.1 Recent seabird populations trends

- 4.1.1.1 Increasing sea temperatures have had impacts on seabird populations in the UK, mainly through indirect effects via the food chain, on which they rely (JNCC, 2013). Sea surface temperatures in the northeast Atlantic and UK coastal waters have been rising since the 1980s by around 0.2-0.9°C per decade (Holliday *et al.*, 2008).
- 4.1.1.2 Climate-driven changes in the food chain have had acute negative impacts upon seabirds breeding on Britain's North Sea coast. Rising sea temperatures caused a change in the North Sea plankton community in the late 1980s and consequently large reductions in abundance of the zooplankton on which larval fish feed (Beaugrand *et al.*, 2003). Climate impacts on plankton may be responsible for the association between warmer sea surface temperatures and poor sandeel productivity (Arnott and Ruxton, 2002).
- 4.1.1.3 Low breeding success of kittiwake and of other species that rely on sandeels such as common guillemot, has occurred with increasing frequency in recent years. Kittiwakes in eastern Britain have fledged fewer young in recent, warmer years (Frederiksen *et al.*, 2004; Frederiksen *et al.*, 2007), which is thought to be linked to the relationship between temperature and sandeel productivity.
- 4.1.1.4 Observations at colonies have confirmed that seabirds were catching fewer and smaller sandeels than normal during years of poor breeding performance (JNCC, 2017). The calorific content of these sandeels was much lower than usual in 2004, which was one of the least successful breeding seasons for seabirds overall in recent times (Wanless *et al.*, 2005). Long-term declines in numbers of kittiwake are expected to continue unless the recent rises in sea surface temperature are reversed (Frederiksen *et al.*, 2004).
- 4.1.1.5 Winter storms can make it difficult for seabirds to forage at sea and consequently result in reduced survival. At times, this impact can be dramatic and some storms have resulted in large-scale mortality events or 'wrecks', when large numbers of dead or emaciated seabirds have been washed up on the shore (e.g., puffins in spring 2013 (Royal Society for the Protection of Birds (RSPB), 2013)). Frederiksen *et al.* (2008) demonstrated that mortality during storms has had a significant negative effect upon the numbers of shags breeding at a colony in southeast Scotland.
- 4.1.1.6 An increase in frequency of extreme weather events, as predicted by climate-change models, could lead to population declines and an increasing probability of extinction of vulnerable species from exposed areas (Frederiksen *et al.*, 2008). Increased storminess and sea level rise may also reduce available breeding habitat for shoreline-nesting species (e.g., terns *Sternidae*).
- 4.1.1.7 Incursion of highly pathogenic avian influenza (HPAI) into marine birds in 2022 first occurred in eider duck in Shetland from late March (Falchieri *et al.* 2022). The first confirmation of infection then followed from great black-backed gull and great skua in April from Fair Isle (Falchieri *et al.* 2022). An increase in cases of HPAI virus in great skua were followed by the sequential detection of major outbreaks in an increasing number of species and spread generally southwards across the UK and beyond (Cunningham *et al.* 2020, Falchieri *et al.* 2022). By September 2022, HPAI virus had been detected in Scotland amongst 151 breeding seabird species and over 20,500 birds had been reported dead, particularly great skua and gannet (NatureScot, unpublished data as cited by Cunningham *et al.* 2020). This will be a substantial underestimate of total mortality, with fatalities also occurring at sea or remote locations with limited reporting, and chicks dying from starvation as a consequence of one or both parents succumbing to the virus. The outbreak continued into the 2023 breeding season when colonies of black-headed gulls and common tern were heavily impacted early on (Tremlett *et al.* 2024b). There were no significant outbreaks in 2024 with signs of recovery, in terms of population size, at some colonies including Fair Isle and Bass Rock however, the true impact of HPAI especially in terms of any effects on breeding productivity and adult survival are currently unknown.

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- 4.1.1.8 Seabird population trends have been used by UK Government as a 'sustainable development strategy indicator'. Trends are published on an annual basis by JNCC and also following national seabird censuses. The most recent national seabird census (Burnell *et al.* 2023) was published in 2023 and provides the most recent trends for all UK seabirds. The latest trends for species relevant to Morven North are summarised in Table 4.1 (Burnell *et al.*, 2023). In addition, seabird population trends have also been recently summarised in Harris *et al.* (2024). Harris *et al.* (2024) provides trends for both the UK and Scotland using data from the three most recent national seabird censuses. These data, for the UK, are also presented in Table 4.1, data for Scotland from Harris *et al.* (2024) is presented in Table 4.2. Note that red-throated diver is not included in either table as it has not been monitored by Operation Seafarer, Seabird 2000 census or included in the Seabird Colony Register.
- 4.1.1.9 The closest seabird colony to Morven North is the Fowlsheugh SPA, located approximately 59km west of the Morven North Boundary. The five seabird species designated as ornithological features at this SPA are fulmar, herring gull, kittiwake, guillemot and razorbill. The populations of fulmar, herring gull and kittiwake have declined since designation of the SPA, reflecting UK and Scottish trends for these species. The populations for guillemot and razorbill have increased since designation of the SPA, with these changes also reflecting UK trends (both species) and Scottish trends (razorbill only). Population trends for qualifying features at more distant colonies (e.g. the Forth Islands and St Abb's Head to Fast Castle SPA) also generally follow national trends.

Table 4.1: Summary of seabird populations trends in the UK and Scotland (JNCC, 2021; Harris *et al.*, 2024)

Species	Population change						
	UK national trend (Burnell <i>et al.</i> , 2023)			Scottish national trend (Burnell <i>et al.</i> , 2023)			HPAI surveys (Wilson <i>et al.</i> , 2024)
	1969-70 to 1985-88	1985-88 to 1998-2002	1998-2002 to 2015-2021	1969-70 to 1985-88	1985-88 to 1998-2002	1998-2002 to 2015-2021	2015-2021/23
Kittiwake	+24	-26	-43	4	-21	-57	+8
Black-headed gull	+116 ^{4,5}	-13 ⁵	-29	+90	+24	-75	-11
Common gull	+25 ⁴	+217 ⁴	-52	+29	+218	-53	n/a
Great black-backed gull	-7	-3	-52	-4	-4	-63	-20
Herring gull	-48	-26	-44	-42	-28	-44	-7
Lesser black-backed gull	+29	+73	-49	+62	+8	-48	-25
Sandwich tern	+41	-15	+4	-7	-53	-5	-35
Little tern	+58	-26	-25	+21	-14	-29	n/a
Roseate tern	-66	-83	+114	-87	-22	-100	-21
Common tern	+9	+2	-9	+58	-21	-24	-42
Arctic tern	+50	-37	-35	+53	-40	-54	-2
Great skua	+148	+26	+14	+148	+26	+14	-76

⁴ For black-headed gull and common gull, the census surveys in 1969-70 and 1985-88 were mainly coastal and had minimal inland counts, which can affect comparison with the 1998-2002 and 2015-2021 surveys with inland colony coverage.

⁵ Figures for black-headed gull from the 1985-1988 count do not include adjustments that were present in Lloyd *et al.* (1991) to account for unsurveyed sites, following Burnell *et al.*, (2023).

Species	Population change						
	UK national trend (Burnell et al., 2023)			Scottish national trend (Burnell et al., 2023)			HPAI surveys (Wilson et al., 2024)
	1969-70 to 1985-88	1985-88 to 1998-2002	1998-2002 to 2015-2021	1969-70 to 1985-88	1985-88 to 1998-2002	1998-2002 to 2015-2021	2015-2021/23
Arctic skua	+226	-37	-66	+226	-37	-66	-28
Guillemot	+80	+32	-11	+82	+24	-31	-6
Razorbill	+18	+23	+18	+11	+15	-2	n/a
Puffin	+15	+13	-14	+7	+6	-21	n/a
European storm petrel	n/a	n/a	+41	n/a	n/a	+48	n/a
Leach's storm petrel	n/a	n/a	-79	n/a	n/a	-79	n/a
Fulmar	+77	-3	-37	+77	-3	-37	n/a
Manx shearwater	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Gannet	+39	+40	+39	+32	+47	+40	-25
Cormorant	+9	+40	-5	-13	+23	-6	n/a
Shag	+21	-27	-24	+17	-32	-22	n/a

Table 4.2: Summary of seabird populations trends in Scotland (Harris et al., 2024)

Species	Population change (%)	
	Long-term trend (1986-23)	23-year trend UK (2000-23)
Fulmar	-42	-40
Manx shearwater	n/a	n/a
European storm petrel	n/a	n/a
Leach's storm petrel	n/a	n/a
Gannet	n/a	n/a
Cormorant	n/a	n/a
Shag	-14	+9
Arctic skua	-83	-71
Great skua	n/a	n/a
Kittiwake	-53	-40
Black-headed gull	n/a	n/a
Common gull	-19	-38
Lesser black-backed gull	-62	-63
Herring gull	-53	-43
Great black-backed gull	-72	-70
Little tern	-83	-72
Sandwich tern	n/a	n/a
Common tern	-41	-28
Roseate tern	n/a	n/a
Arctic tern	-49	-49
Guillemot	-9	-25
Razorbill	+88	+16
Puffin	n/a	n/a

4.2 Seasonal definitions and population importance

4.2.1.1 Seasonal definitions outline different periods of the annual cycle for a species. There are four seasons that can be applied to different periods within the annual cycle however, these seasons are not applicable for some species, with different combinations used depending on the biology and life history of a species:

- breeding: when birds are attending colonies, nesting and provisioning young;
- post-breeding: when birds are migrating to wintering areas or dispersing from colonies;
- non-breeding: when birds are over-wintering in an area;
- pre-breeding: when birds are migrating to breeding grounds.

4.2.1.2 In this technical report, seasonal definitions are required to determine the importance of populations estimated within the Morven North Offshore Ornithology Baseline Characterisation Study Area. The greatest extent of each season from relevant sources (e.g. NatureScot (2020); Furness (2015)) are

used. Where a season is defined as part of a month (defined as early, mid and late in the aforementioned sources), for the purposes of population importance it is assumed that population estimates on relevant months apply to all defined seasons, in the first instance. Each species account provides consideration of the likely origin of birds (e.g. from a local breeding colony or passage birds) based on the populations recorded when determining the importance in each season. Seasonal definitions for species relevant to Morven North are included in Table 4.4.

- 4.2.1.3 The seasonal definitions presented in Table 4.4 are considered appropriate for the purpose of identifying population importance within this Baseline Characterisation Report. However, it is important to understand that seasonal extents are not fixed and will vary depending on the population under consideration. For example, the extent of the breeding season may vary between a breeding colony located in south England and one located in north Scotland or further north, meaning birds that breed at north colonies may pass through a sea area at the same time as that area is being utilised by birds from a local breeding colony. Further to this, different population age cohorts exhibit different behaviours with increasing proportions of different immature age classes arriving at natal waters as the breeding season progresses and potentially occupying different sea areas. These factors will be fully explored, where necessary in the Volume 2, Chapter 11: Offshore ornithology and the Report to inform the Appropriate Assessment and where necessary differing seasonal extents may be applied for different parts of the assessment (for example see Volume 3, Annex 11.4 Offshore Ornithology Displacement Modelling Report (Matrix Approach)). For some species one or more seasons are not relevant to the assessments required for Morven North (e.g. breeding season for little auk). These are identified using 'N/A' in Table 4.4. Where a season is not relevant to a species the relevant cell in Table 4.4 is greyed out.
- 4.2.1.4 The methodology used to define regional, national and international populations for all species recorded during the baseline surveys undertaken for Morven North is summarised in Table 4.3 with the resulting populations presented in Table 4.5.

Table 4.3: Methodologies applied to derive regional, national and international populations

Biogeographic population scale	Season	BDMPS definition	Population units	Source of population/data used to calculate population
Regional	Breeding	Mean maximum foraging range + 1 standard deviation (SD) (or other available foraging range metric where mean maximum unavailable)	Breeding adults Breeding adults plus immatures	Breeding adult data from database associated with Burnell et al (2023) Immature contribution calculated by multiplying adult population by adult: immature ratio in Furness (2015)
	Post-breeding	BDMPS as defined in Furness (2015)	Breeding adults plus immatures	Furness (2015)
	Non-breeding (except guillemot and herring gull)	BDMPS as defined in Furness (2015)	Breeding adults plus immatures	Furness (2015)
	Non-breeding (herring gull)	Mean maximum foraging range + 1 SD	Breeding adults plus immatures	Breeding adult data from database

Biogeographic population scale	Season	BDMPs definition	Population units	Source of population/data used to calculate population
				associated with Burnell <i>et al.</i> (2023) Immature contribution calculated by multiplying adult population by adult: immature ratio in Furness (2015)
	Non-breeding (guillemot)	Population of colonies identified by tracking data as contributing to the population present at Morven North	Breeding adults plus immatures	Colonies identified using tracking data from Buckingham <i>et al.</i> (2023).
	Pre-breeding	BDMPs as defined in Furness (2015)	Breeding adults plus immatures	Furness (2015)
National	Breeding	Total UK population	Breeding adults Breeding adults plus immatures	Breeding adult data from database associated with Burnell <i>et al.</i> (2023) or Woodward <i>et al.</i> (2020) Immature contribution calculated by multiplying adult population by adult: immature ratio in Furness (2015)
	Post-breeding	Total UK population from Furness (2015)	Breeding adults plus immatures	Furness (2015)
	Post-breeding	Total UK population from Furness (2015)	Breeding adults plus immatures	Furness (2015)
	Non-breeding	Total UK population from Furness (2015)	Breeding adults plus immatures	Furness (2015)
	Pre-breeding	Total UK population from Furness (2015)	Breeding adults plus immatures	Furness (2015)
International	Breeding	-	Breeding adults	Burnell <i>et al.</i> (2023) Wetlands International

Biogeographic population scale	Season	BDMPS definition	Population units	Source of population/data used to calculate population
				(2025) (red-throated diver only)

- 4.2.1.5 Regional populations are defined using the seasonal BDMPS relevant to each species. The BDMPS is defined as the smallest geographical range and population scale that can be supported by evidence relating to the life history of a species including seasonal distribution and migratory movements. Relevant BDMPS populations are calculated for all seasons defined for a species, with those in the breeding season based on the number of birds within foraging range of Morven North and those in the post-breeding, non-breeding and pre-breeding seasons obtained from Furness (2015) or other relevant sources. Foraging ranges are applied from the centre of Morven North to align with the approach for apportioning which was advised by NatureScot for which the underlying data is also used (Volume 1, Chapter 5: Consultation). For guillemot and herring gull, following NatureScot guidance (NatureScot, 2023d; NatureScot, 2021), the BDMPS in the non-breeding season comprises the breeding population found within the mean maximum foraging range plus one standard deviation of Morven North, the same regional population as used in the breeding season.
- 4.2.1.6 For guillemot in the non-breeding season, a different approach has been agreed between the Applicant and NatureScot during pre-application consultation undertaken in October 2025. Due to the increased populations recorded at Morven North in surveys undertaken in July and August it is considered that guillemots from a wider range of colonies than would usually be identified following the approach normally recommended by NatureScot (the application of the mean-maximum foraging range plus one standard deviation) may be contributing to the population present at Morven North. The approach for guillemot therefore utilises tracking data collected by Buckingham *et al.* (2023) to identify the colonies that may contribute birds to the population present at Morven North. These data suggest that guillemot from colonies between the Troup, Pennan and Lion's Heads SPA and the St Abb's Head to Fast Castle SPA may occur at Morven North during the post-breeding and non-breeding seasons. The total population of guillemot at colonies in this area has been totalled to provide the total breeding population. This population has been multiplied by the immature ratio presented in Furness (2015) to calculate the number of immatures associated with this population. These two populations have then been combined to provide the total population from which birds at Morven North may originate.
- 4.2.1.7 For the purposes of the analyses required in this technical report, namely, to identify the population importance of species recorded during site specific baseline characterisation surveys, regional populations for the breeding season are estimated by summing the population counts from Burnell *et al.* (2023) for all breeding colonies in the mean maximum foraging range plus one standard deviation for each species. This provides the breeding adult population which is then multiplied by the immature proportion for each species as provided in Furness (2015) to provide the immature population associated with the total breeding adult population. The breeding adult and immature populations are then summed to provide the regional population for the breeding season. This approach has also been applied to calculate the national breeding population. This approach makes the assumption that all immatures associated with each breeding colony will be present within the foraging range defined for each species. Regional and national breeding populations composed of breeding adults only and the population including immatures are presented in Table 4.5.
- 4.2.1.8 The use of data from Burnell *et al.* (2023) provides biogeographic populations calculated using the most complete dataset available incorporating the vast majority of all breeding sites in the UK and, in most cases, was also collected across the same time period (2015-2021). The data used to calculate regional populations represent, in most cases, a subset of the breeding data for the UK, as presented in Burnell *et al.* (2023), based on the foraging range for each species. This means that data from the Channel Islands and the Isle of Man are not included. European storm petrel is not

included in Furness (2015) and therefore the regional breeding population for this species is composed of breeding adults only.

- 4.2.1.9 The regional, national and international population levels presented in Table 4.5 are divided by 100 in order to provide the 1% thresholds against which population estimates calculated for each species in the Morven North Offshore Ornithology Baseline Characterisation Study Area are assessed. This is used as part of an initial screening exercise to identify those species for which further assessment is required. Originally developed for the Ramsar Convention (Kuijken, 2006), the 1% threshold level signifying importance has been used extensively for site designation (Kuijken, 2006) and in assessing potential impacts of proposed developments (Skov *et al.*, 2007) and its use here is considered appropriate. Where possible, thresholds are taken from temporally appropriate population levels, with particular attention given in this assessment to breeding, post-breeding, non-breeding and pre-breeding populations.
- 4.2.1.10 Although some 1% thresholds are low in terms of actual numbers of individuals, a value of 50 individuals is normally used as a minimum threshold in the British Trust for Ornithology's (BTO) Wetland Bird Survey (WeBS) reports (e.g. Frost *et al.*, 2017), and is considered relevant here.

Table 4.4: Seasonal definitions considered in this report

Species	Source	Seasonal definitions			
		Breeding	Post-breeding	Non-breeding	Pre-breeding
Kittiwake	NatureScot (2020); Furness (2015)	April to August	September to December		January to March
Black-headed gull	NatureScot (2020)	April to August		September to March	
Little gull	NatureScot (2020)	No breeding season defined.		August to April	
Common gull	NatureScot (2020); Kober <i>et al.</i> (2010)	April to August		September to March	
Great black-backed gull	NatureScot (2020); Furness (2015)	April to August		September to March	
Herring gull	NatureScot (2020); Furness (2015)	April to August		September to March	
Lesser black-backed gull	NatureScot (2020); Furness (2015)	mid-March to August	August to October	November to February	March
Sandwich tern	NatureScot (2020); Furness (2015)	mid-April to mid-September	July to September		March to May
Little tern	NatureScot (2020); Furness (2015)	mid-May to August	late July to early September		mid-April to May
Roseate tern	NatureScot (2020); Furness (2015)	mid-May to August	August to September		late April to May
Common tern	NatureScot (2020); Furness (2015)	May to mid-September	late July to early September		April to May
Arctic tern	NatureScot (2020); Furness (2015)	May to August	July to September		April to May
Great skua	NatureScot (2020); Furness (2015)	mid-April to mid-September	August to October	November to February	March to mid-April

Species	Source	Seasonal definitions			
		Breeding	Post-breeding	Non-breeding	Pre-breeding
Arctic skua	NatureScot (2020); Furness (2015)	May to August	August to October		April to May
Little auk	Kober <i>et al.</i> (2015)	N/A	N/A	November to March	N/A
Guillemot	NatureScot (2020); Furness (2015)	April to mid-August		Mid-August to March	
Razorbill	NatureScot (2020); Furness (2015)	April to mid-August	August to October	November to December	January to March
Black guillemot	NatureScot (2020); Furness (2015)	April to August		September to March	
Puffin	NatureScot (2020); Furness (2015)	April to mid-August		mid-August to March	
Red-throated diver	NatureScot (2020); Furness (2015)	March to mid-September	September to November	December to January	February to April
European storm petrel	NatureScot (2020); Kober <i>et al.</i> (2010)	May to October	November to December		January to April
Leach's petrel	NatureScot (2020); Kober <i>et al.</i> (2010)	May to October	November to December ⁶		January to May ⁴
Fulmar	NatureScot (2020); Furness (2015)	April to September	October	November	December to March
Sooty shearwater	Assumed to be the same as Manx shearwater	No breeding season defined	August to October		March to May
Manx shearwater	NatureScot (2020); Furness (2015)	April to mid-October	August to October		March to May

⁶ Data not available; assumed to be the same as European storm petrel

Species	Source	Seasonal definitions			
		Breeding	Post-breeding	Non-breeding	Pre-breeding
Gannet	NatureScot (2020); Furness (2015)	March to September	October to November		December to February
Cormorant	NatureScot (2020); Furness (2015)	mid-February to mid-September		September to February	
Shag	NatureScot (2020); Furness (2015)	March to September		September to January	

Table 4.5: Regional, national and international population importance levels for species included in this report (All population estimates are for individual birds) (The 1% threshold for each population is obtained by dividing the respective population by 100)

Species	Breeding					Post-breeding		Non-breeding		Pre-breeding	
	Regional BDMPS (adults only) (breeding individuals)	Regional BDMPS (adults and immature birds) (individuals)	National (adults only) (breeding individuals)	National (adults and immature birds) (individuals)	International (breeding individuals)	Regional BDMPS (all birds)	National (all birds)	Regional BDMPS (all birds)	National (all birds)	Regional BDMPS (all birds)	National (all birds)
Kittiwake	318,388	598,569	431,826	811,833	7,588,796	829,937	1,741,523			627,816	1,319,342
Common gull	No breeding birds within foraging range		47,080	-	2,452,172-3,693,636			Unavailable	710,000		
Great black-backed gull	38	86	22,530	50,918	304,000-330,000			91,399	143,521		
Herring gull	10,584	22,121	475,146	993,055	1,060,000-1,220,000			22,121	639,810		

Species	Breeding					Post-breeding		Non-breeding		Pre-breeding	
	Regional BDMPS (adults only) (breeding individuals)	Regional BDMPS (adults and immature birds) (individuals)	National (adults only) (breeding individuals)	National (adults and immature birds) (individuals)	International (breeding individuals)	Regional BDMPS (all birds)	National (all birds)	Regional BDMPS (all birds)	National (all birds)	Regional BDMPS (all birds)	National (all birds)
Lesser black-backed gull	16,854	28,315	648,930	1,090,202	940,000-2,070,000	209,007	372,311	39,314	80,473	197,483	360,787
Sandwich tern	No breeding birds within foraging range		25,960	42,315	247,000-504,000	38,051	48,812			38,051	48,812
Arctic tern	No breeding birds within foraging range		60,902	96,225	2,000,000	163,930	235,328			163,930	235,328
Great skua	19,864	48,071	21,874	52,935	32,600-34,400	19,556	35,892	143	1,541	8,485	33,575
Arctic skua	No breeding birds within foraging range		1,454	2,486	400,000-560,000	6,427	11,714			1,227	6,338
Guillemot	143,777	250,171	1,696,290	2,951,545	24,120,000			474,821	2,756,526		
Razorbill	51,187	89,065	335,843	584,367	1,250,746-2,477,612	591,874	1,198,788	218,622	560,044	591,874	1,198,788
Black guillemot	No breeding birds within foraging range		39,524	91,696	410,000-1,484,000			Unavailable	Unavailable		
Puffin	241,480	439,494	949,358	1,936,690	24,000,000-28,000,000			231,957	536,514		
European storm petrel	5,248	-	75,310	N/A	918,000-1,102,000	20,000	200,000			10,000	100,000

Species	Breeding					Post-breeding		Non-breeding		Pre-breeding	
	Regional BDMPS (adults only) (breeding individuals)	Regional BDMPS (adults and immature birds) (individuals)	National (adults only) (breeding individuals)	National (adults and immature birds) (individuals)	International (breeding individuals)	Regional BDMPS (all birds)	National (all birds)	Regional BDMPS (all birds)	National (all birds)	Regional BDMPS (all birds)	National (all birds)
Fulmar	612,524	992,289	639,016	1,035,206	14,000,000	957,502	1,785,696	568,736	1,125,103	957,502	1,785,696
Sooty shearwater	N/A	N/A	N/A	N/A	N/A	Unavailable	Unavailable			Unavailable	Unavailable
Manx shearwater	2	4	1,573,486	2,895,214	1,489,394-2,444,914	8,507	1,589,402			8,507	1,589,402
Gannet	309,372	559,963	675,716	1,223,046	1,171,178	456,298	1,002,252			248,385	910,273

5 Designated sites

- 5.1.1.1 Breeding seabirds are central-place foragers, with the nest or colony forming the central location. Foraging range varies widely between species and is determined by environmental conditions, dietary needs, flight physiology and ability to transport food.
- 5.1.1.2 The foraging range of each species was used to infer potential connectivity between Morven North and important colonies or designated sites with this measured from the edge of the Morven North Boundary consistent with the approach to HRA screening, as detailed within Chapter 1: Morven Option Lease Agreement Site: HRA Stage 1 Screening Report, of the EIA Report. These foraging ranges are shown in Table 5.1. Recent NatureScot guidance (NatureScot, 2023c) advises the use of mean maximum foraging range + 1 standard deviation (SD), reported in Woodward *et al.* (2019), as the metric to screen in connectivity to SPAs. The exceptions to this are three gannet colonies where site specific maximum values are recommended instead, and species with insufficient data to calculate the mean maximum + 1 SD. In the case of these species, it is recommended that, in order of preference, the mean maximum value, maximum value, or mean value for foraging range is used instead. These recommendations, and their exceptions, are followed when determining connectivity and regional populations in this chapter.
- 5.1.1.3 The mean maximum foraging range of a species refers to the average maximum length of the trip taken by individuals to obtain food, based on data obtained from relevant studies of that species (Woodward *et al.* 2019; 2024). A maximum foraging range encompasses the longest distance from home colony recorded for a given species.
- 5.1.1.4 Additional data from site specific tracking studies (e.g. Wakefield *et al.*, 2013; Dean *et al.*, 2013) have also been used to refine the results obtained when applying the more generic foraging ranges presented in Woodward *et al.* (2019; 2024). Some species have very large foraging ranges and therefore for the purposes of this report any SPA designated sites to the west of Cape Wrath, Scotland and the Irish and Celtic Seas have been excluded as it is considered that any birds present at these SPAs are highly unlikely to utilise the area in which Morven North is located to a significant degree.
- 5.1.1.5 The list of SPAs within range of Morven North is shown in Table 5.2 and Figure 5.1.

Table 5.1: Foraging ranges used to identify designated sites and important colonies that may have connectivity with Morven North (NatureScot, 2023c; Woodward *et al.* 2019; 2024)

Species	Mean maximum foraging range + 1 SD (km)
Common scoter	21.5 (Mean maximum foraging range only)
Kittiwake	300.6
Black-headed gull	18.5 (Mean maximum foraging range only)
Common gull	50 (Mean maximum foraging range only)
Great black-backed gull	73 (Mean maximum foraging range only)
Herring gull	85.6
Lesser black-backed gull	236
Sandwich tern	57.5
Little tern	5 (Mean maximum foraging range only)
Roseate tern	23.2
Common tern	26.9

Species	Mean maximum foraging range + 1 SD (km)
Arctic tern	40.5
Great skua	931.2
Arctic skua	2.7 (Mean + SD used as metric)
Guillemot	95.2 (excludes data from Fair Isle)
Razorbill	122.2
Puffin	265.4
Red-throated diver	9 (Mean maximum foraging range only)
European storm petrel	336 (Mean maximum foraging range only)
Leach's petrel	657 (Mean foraging range)
Fulmar	1200.2
Manx shearwater	2365.5
Gannet	509.4 (for colonies without site specific values. For the Forth Islands SPA, the site specific foraging range of 590km is used instead)
Cormorant	33.9
Shag	23.7

Table 5.2: SPA colonies within individual species ranges (mean maximum foraging range + 1 SD) from Morven North

Designated site	Distance to Morven North (km)	Kittiwake	Herring gull	Lesser black-backed gull	Great skua	Common guillemot	Razorbill	Puffin	Storm petrel	Leach's petrel	Fulmar	Gannet
Auskerry SPA	249								✓			
Buchan Ness to Collieston Coast SPA	66	✓	✓			✓					✓	
Calf of Eday SPA	271	✓									✓	
Cape Wrath SPA	287										✓	
Copinsay SPA	235	✓									✓	
Coquet Island SPA	141	✓		✓				✓			✓	
East Caithness Cliffs SPA	197	✓									✓	
Fair Isle SPA	287	✓			✓						✓	✓
Farne Islands SPA	109	✓						✓				
Fetlar SPA	403				✓						✓	
Flamborough & Filey Coast SPA	258	✓						✓			✓	✓

Designated site	Distance to Morven North (km)	Kittiwake	Herring gull	Lesser black-backed gull	Great skua	Common guillemot	Razorbill	Puffin	Storm petrel	Leach's petrel	Fulmar	Gannet
Forth Islands SPA	99	✓		✓			✓	✓				✓
Foula SPA	357				✓					✓	✓	
Fowlsheugh SPA	57	✓	✓			✓	✓				✓	
Hermaness, Saxa Vord and Valla Field SPA	423				✓						✓	✓
Hoy SPA	241	✓			✓			✓			✓	
Marwick Head SPA	275	✓										
North Caithness Cliffs SPA	216	✓						✓			✓	
Noss SPA	355				✓						✓	✓
Ramna Stacks and Gruney SPA	415									✓		
Ronas Hill - North Roe and Tingon SPA and Ramsar	400				✓							
Rousay SPA	272	✓									✓	

Designated site	Distance to Morven North (km)	Kittiwake	Herring gull	Lesser black-backed gull	Great skua	Common guillemot	Razorbill	Puffin	Storm petrel	Leach's petrel	Fulmar	Gannet
St Abb's Head to Fast Castle SPA	102	✓					✓					
Sule Skerry and Sule Stack SPA	305								✓	✓		✓
Sumburgh Head SPA	324										✓	
Troup, Pennan and Lion's Heads SPA	105	✓					✓				✓	
West Westray SPA	283	✓									✓	

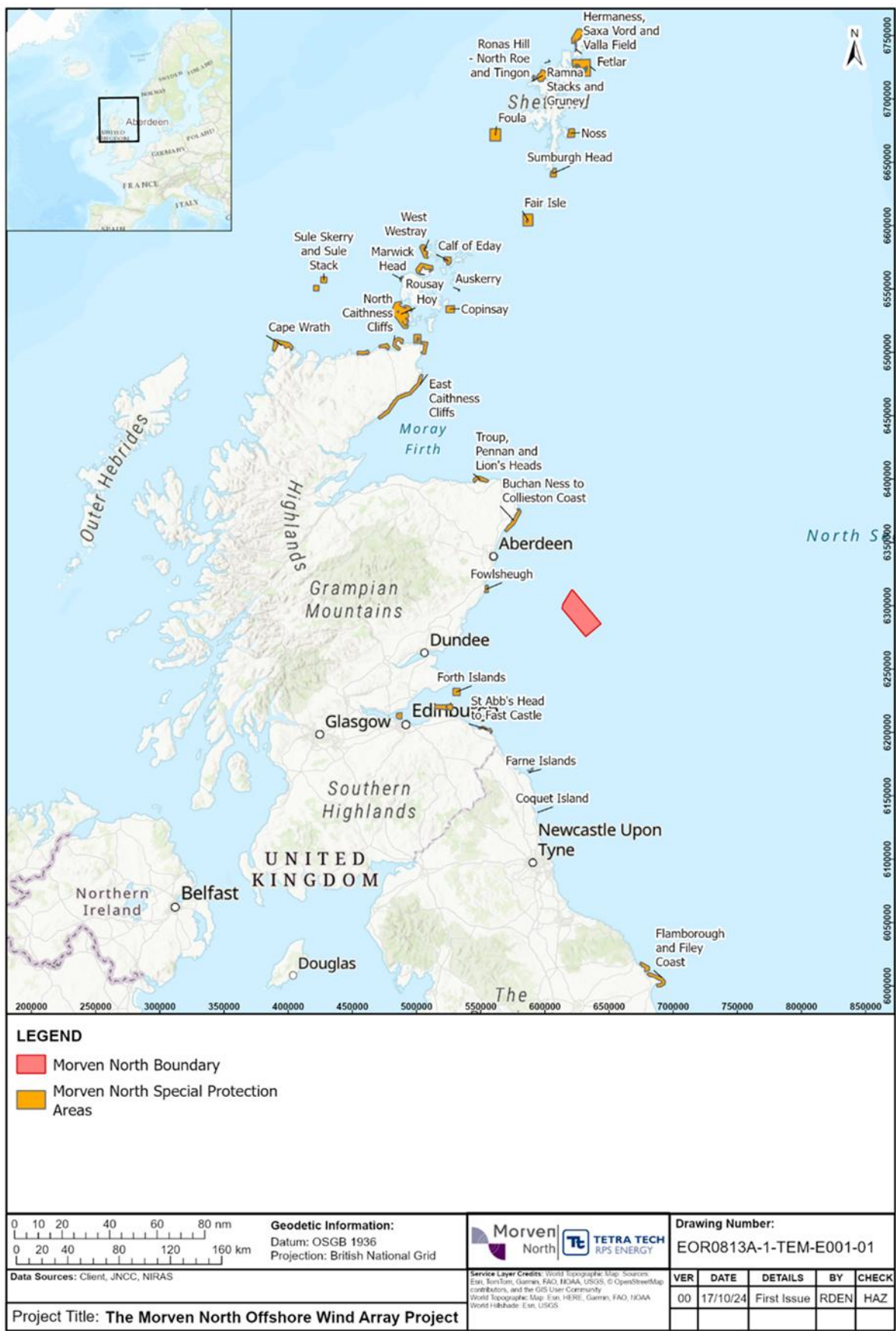


Figure 5.1: Designated sites from which the foraging range of relevant qualifying features has connectivity with Morven North

5.1.1.6 In addition to those SPAs identified in Table 5.2 that have potential connectivity with Morven North and are designated to protect breeding colonies of seabirds (e.g. the Forth Islands SPA), there are additional SPAs that protect sea areas utilised by seabirds either adjacent to or away from breeding colonies that may exhibit connectivity with Morven North (e.g. the Outer Firth of Forth and St Andrew's Bay Complex). These SPAs cover sea areas surrounding those SPAs designated to protect breeding colonies. Identifying connectivity using foraging ranges is not applicable to these SPAs as they already incorporate part of the foraging range within their designation. Connectivity is therefore identified based on the identification of connectivity for associated breeding colony SPAs. This therefore includes the SPAs and qualifying features identified in Table 5.3.

Table 5.3: Additional Special Protection Areas with connectivity to Morven North

SPA	Distance to Morven North (km)	Associated breeding colony SPA(s)	Qualifying features
Northumberland Marine	102	Farne Islands SPA Coquet Island SPA Lindisfarne SPA Northumbria Coast SPA	Fulmar, lesser black-backed gull, kittiwake, puffin
Outer Firth of Forth and St Andrew's Bay Complex	66	Forth Islands SPA Firth of Forth SPA Imperial Dock Lock, Leith SPA	Manx shearwater, gannet, kittiwake, puffin
Seas off Foula	329	Foula SPA	Fulmar, great skua

6 Species accounts

6.1 Overview

- 6.1.1.1 Those species that may occur within the Morven North Boundary have been identified using site specific aerial surveys undertaken between June 2021 and September 2023. Species accounts are therefore presented for all species recorded during these surveys. The species accounts for these species present aerial survey data from the Morven North Offshore Ornithology Baseline Characterisation Study Area. For species included in this section, population estimates for Morven North Offshore Ornithology Baseline Characterisation Study Area are used as a screening tool to identify those species which require further assessment within Volume 2, Chapter 11: Offshore Ornithology. Species identified for further assessment are summarised in Section 7. In addition, information pertaining to other species, the distribution and abundance of which may not be adequately captured by traditional baseline surveys, has been reviewed and is discussed within relevant species accounts below.
- 6.1.1.2 The occurrence of each species in the North Sea has also been considered using relevant data sources. The primary data source is regional survey data covering part of the Scottish North Sea. The methodology for these surveys is provided in HiDef Aerial Surveying Limited (2023). In addition, consideration has been given to the data associated with Waggitt *et al.* (2020) and Bradbury *et al.* (2014). The spatial coverage of both datasets overlapped with the Morven North Offshore Ornithology Baseline Characterisation Study Area. Waggitt *et al.* (2020) produced monthly distribution maps for 12 seabird species at a 10km spatial resolution in the northeast Atlantic. Bradbury *et al.* (2014) analysed offshore boat and aerial observer surveys spanning from 1979 to 2012 to produce predicted bird densities across a grid covering English territorial waters at a resolution of 3x3km.
- 6.1.1.3 Each species account also includes an overview of species' conservation status. This includes consideration of different conservation metrics and the inclusion of a species as a qualifying feature at relevant designated sites.
- 6.1.1.4 Behavioural information recorded during baseline surveys relating to flight direction is also presented within individual species accounts for those species where flight direction was recorded for at least 100 individuals across all surveys. Age class data is also reported for all species where age class was identified for at least 50 individuals across all surveys.
- 6.1.1.5 A VOR was identified where the numbers present at the Morven North Offshore Ornithology Baseline Characterisation Study Area breached the 1% threshold of the regional population (adults and immatures) in any season. It is considered that any impacts on species occurring in numbers of less than 1% of the relevant regional population will not be significant. Following the identification of population importance used as part of the WeBS, where the 1% threshold for any population is below 50 birds, a 50-bird threshold is used as the minimum qualifying threshold for the identification of importance.
- 6.1.1.6 The process outlined above is not, however, applied as a definitive threshold. In addition, expert judgement is used to identify species for which this threshold may not be applicable and therefore ensure that species are not erroneously omitted from further assessment. Each species account section then uses criteria associated with a species' conservation status and the importance of populations estimated within the Morven North Offshore Ornithology Baseline Characterisation Study Area to identify the relevant conservation value for a VOR (Table 6.1). These selection criteria were informed by the Chartered Institute of Ecology and Environmental Management's (CIEEM) (2010) guidance and adapted to relevance for the avifauna present within the Morven North Offshore Ornithology Baseline Characterisation Study Area.
- 6.1.1.7 The following species accounts present abundance data for the Morven North Offshore Ornithology Baseline Characterisation Study Area to determine the population importance of each species at Morven North. Throughout all species accounts, those abundance estimates derived from model-

based approaches are given precedence over those from design-based approaches, where these are available. Raw data from all surveys for the Morven North Offshore Ornithology Baseline Characterisation Study Area are presented in Appendix 1 – Raw count data with densities and population estimates for other project areas presented in Appendices 4 and 5.

Table 6.1: Definition of terms relating to the conservation value of ornithological receptors

Conservation Value	Definition
Negligible	<u>Conservation status</u> All species of lowest conservation status (e.g. Green-listed species listed on the Birds of Conservation Concern 5).
	<u>Importance</u> Not recorded during baseline and regional surveys of the Morven North Offshore Ornithology Baseline Characterisation Study Area
Local	<u>Conservation status</u> Any other species of conservation status (e.g. Amber-listed species listed on the Birds of Conservation Concern 5) not covered in the categories below.
	<u>Importance</u> A species which is present at Morven North in numbers lower than 1% of the regional population.
Regional	<u>Conservation status</u> Species red-listed on the Birds of Conservation Concern 5; and/or Species that are the subject of a specific action plan within the UK or species considered to be of principal importance for biodiversity and conservation in Scotland as listed on the Scottish Biodiversity List (Nature Conservation (Scotland) Act 2004).
	<u>Importance</u> A species which is present at Morven North in numbers of greater than 1% of the regional population.
National	<u>Conservation status</u> Species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) not already covered by International criteria; Species listed on Annex I of the EU Birds Directive; Bird species that form part of an SSSI that may potentially interact with Morven North at some stage of their life cycle; At least 50% of the UK breeding or non-breeding population found in ten or fewer sites; and/or An impact on an ecologically sensitive species (<300 breeding pairs or <900 wintering individuals in the UK).

Conservation Value	Definition
	<u>Importance</u> A species which is present at Morven North in numbers of greater than 1% of the national population.
International	<u>Conservation status</u> Bird species that form part of a cited interest of an SPA or Ramsar site that may potentially interact Morven North at some stage of their life cycle including those listed as assemblage features; and/or At least 20% of the European breeding or non-breeding population is found in the UK.
	<u>Importance</u> A species which is present at Morven North in numbers of greater than 1% of the international biogeographic population.

6.2 Kittiwake (*Rissa tridactyla*)

6.2.1 Status overview

- 6.2.1.1 Kittiwake is currently red-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024). The species is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).
- 6.2.1.2 Whilst kittiwake was previously one of the most common species of seabirds recorded, Britain and Ireland's breeding population in Seabird Count is the lowest ever recorded, with 241,321 AON, a decline of 42% in the population has been reported since the Seabird 2000 (Burnell *et al.*, 2023).
- 6.2.1.3 In Scotland, the kittiwake population is 121,082 AON (Burnell *et al.*, 2023) with breeding colonies located all around the Scottish coast (Balmer *et al.*, 2013). The Scottish population has exhibited declines both in the long-term (a 53% decrease between 1986 and 2023 and in the last 23-years (a 40% decrease between 2000 and 2023) (Harris *et al.*, 2024). This decline is mirrored in UK-wide trends with a decline in the long-term trend of 51% and a 32% decline over the last 23-years (Harris *et al.*, 2024). In the winter kittiwake from UK breeding colonies are distributed across the north Atlantic and North Sea, west to North America and south to Africa (Furness, 2015; Frederiksen *et al.*, 2012).
- 6.2.1.4 Kittiwake is listed as a qualifying feature at 17 SPAs within the species' generic mean maximum foraging range from Morven North (Woodward *et al.*, 2024) (Table 6.2). These SPAs are designated for 295,986 breeding pairs although the current population has fallen to 132,060 breeding pairs representing over 60% of the national breeding population as recorded during the 2015-2021 Seabird Census (Burnell *et al.*, 2023). The closest colony is located at Fowlsheugh, with a population, as of the latest Seabirds Count (2015-2021) of 14,039 breeding pairs (Burnell *et al.*, 2023). In addition, kittiwake is also a qualifying feature of the Northumberland Marine SPA and Outer Firth of Forth and St Andrew's Bay Complex SPA which both protect sea areas used by the species from nearby breeding colony SPAs that have connectivity with Morven North.
- 6.2.1.5 Populations recorded as part of the Seabirds Count are presented in Table 6.2 to provide a more recent contemporaneous dataset. Following the HPAI outbreak amongst breeding seabirds in 2022, kittiwake was identified as a species of the highest priority in terms of understanding the impacts of

HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 91 kittiwake breeding sites and found that on average the number of kittiwake had increased by 8%. However, whereas some colonies had increased by at least 10% (43 sites) a number had decreased by at least a similar amount (36 sites). Further counts have been conducted at a number of sites included in Table 6.2 (JNCC *et al.*, 2024; Zisman and Swann, 2025a; Zisman and Swann, 2025b) and the results reflect those found by Tremlett *et al.* (2024a) with some having decreased and some increased. The decreases noted are in line with national trends calculated by Harris *et al.* (2024) and whilst these declines reflect the long-term decline in kittiwake populations this decline has been exacerbated in some cases by the HPAI outbreak in 2022 and 2023.

Table 6.2: Designated sites at which kittiwake is a qualifying feature with which there is connectivity with Morven North based on generic foraging range data

Designated site	Distance to Morven North (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell <i>et al.</i> (2023) (breeding pairs)
Buchan Ness to Collieston Coast SPA	66	30,452	11,295
Calf of Eday SPA	271	1,717	336
Copinsay SPA	235	9,550	955
Coquet Island SPA	141	426	466
East Caithness Cliffs SPA	197	32,500	24,479
Fair Isle SPA	287	18,160	448
Farne Islands SPA	109	8,241	4,402
Flamborough and Filey Coast SPA	258	44,520	51,535
Forth Islands SPA	99	8,400	4,542
Fowlsheugh SPA	57	36,650	14,039
Hoy SPA	241	3,000	266
Marwick Head SPA	275	7,700	906
North Caithness Cliffs SPA	216	13,100	5,571
Rousay SPA	272	4,900	330
St Abb's Head to Fast Castle SPA	102	21,170	5,150
Troup, Pennan and Lion's Heads SPA	105	31,600	10,616
West Westray SPA	283	23,900	2,755

6.2.2 Seasonal abundance and distribution

Site specific surveys

- 6.2.2.1 Kittiwakes were recorded in all aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. The peak count occurred in July 2023 (Table 6.3; Figure 6.1).
- 6.2.2.2 The species was most abundant towards the end of the breeding season (June and July) in all three years with peak populations of 4,837 birds in June 2021, 2,068 birds in June 2022 and 5,384 birds in July 2023. Outside of the breeding season the abundance of the species was generally lower than that recorded in the breeding season with peak populations of 872 birds in September 2021 and 221 birds in December 2022.
- 6.2.2.3 The populations of kittiwake in all seasons did not surpass the thresholds for regional importance (5,986 birds in the breeding season, 8,299 birds in the post-breeding season and 6,278 birds in the pre-breeding season) in any month.
- 6.2.2.4 The distribution of kittiwake across all surveys is presented in Figure B. 1. The distribution of kittiwake varies across surveys with no obvious trends between years or seasons.

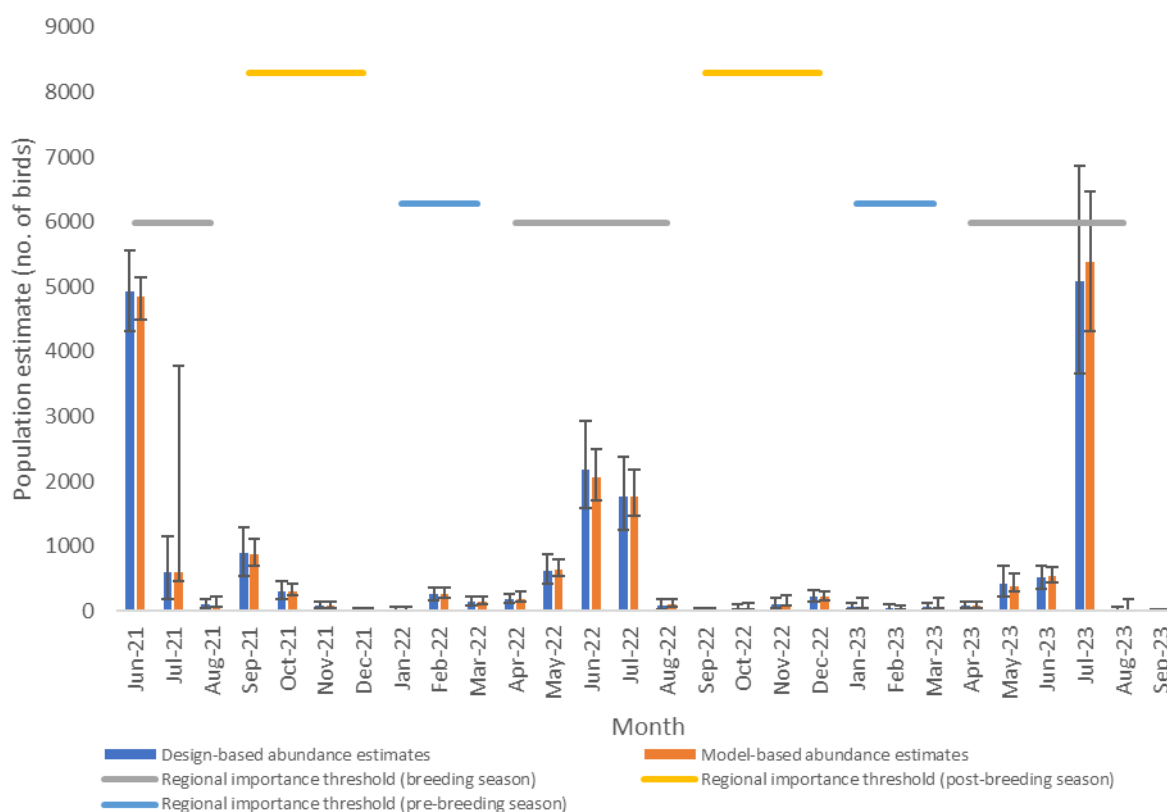


Figure 6.1: Abundance of kittiwake in the Morven North Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals). The regional importance thresholds for all seasons are also shown

Regional distribution

- 6.2.2.5 Kittiwakes were recorded in all the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023) with the highest numbers during the breeding season.
- 6.2.2.6 The distribution of kittiwake in the breeding season was often centred on the western side of the survey area, especially during surveys undertaken in 2022, often overlapping with the Morven North Offshore Ornithology Baseline Characterisation Study Area. In the non-breeding seasons there was no obvious trend in the distribution of kittiwake across the survey area (Figure C. 1, Figure C. 2 and Figure C. 3).

Table 6.3: Design-based and model-based population estimates (all behaviours) with lower and upper (95%) confidence limits for each month surveyed from June 2021 to September 2023 for the Morven North Offshore Ornithology Baseline Characterisation Study Area for kittiwake

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	4,837	4,491	5,143	4,925	4,317	5,552
July 2021	601	463	3,776	596	178	1,149
August 2021	91	66	230	112	51	187
September 2021	872	699	1,121	899	542	1,290
October 2021	306	241	428	305	182	463
November 2021	87	47	136	86	43	146
December 2021	12	5	49	17	2	43
January 2022	26	0	57	25	3	59
February 2022	261	195	363	259	167	359
March 2022	150	101	226	149	83	219
April 2022	192	147	304	185	118	265
May 2022	632	534	788	625	417	869
June 2022	2,068	1,709	2,502	2,182	1,581	2,928
July 2022	1,766	1,459	2,175	1,772	1,255	2,383
August 2022	109	72	179	90	25	182
September 2022	17	0	43	17	2	43
October 2022	53	27	114	50	17	94
November 2022	104	75	246	109	38	199
December 2022	221	160	293	229	152	322

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
January 2023	62	42	194	68	25	118
February 2023	39	20	77	45	8	101
March 2023	65	45	198	68	25	119
April 2023	86	53	143	92	42	150
May 2023	388	300	577	417	219	702
June 2023	540	445	676	519	345	703
July 2023	5,384	4,322	6,462	5,091	3,652	6,868
August 2023	26	12	188	625	3	58
September 2023	11	0	32	2,182	1	25

6.2.3 Tracking data

- 6.2.3.1 There is evidence based on GPS tracking studies that kittiwake use the Morven North Boundary and adjacent waters (BirdLife International, 2024) from nearby breeding colonies. Between 2012 and 2021, 119 individuals have been GPS tagged from colonies within the Buchan Ness to Collieston Coast SPA, Fowlsheugh SPA, Forth Islands SPA and St. Abb's Head to Fast Castle SPA, with tracks from all studies showing overlap with the Morven North Boundary (Wakefield *et al.*, 2017; Bogdanova *et al.*, 2022). Tracking data from Wakefield *et al.* (2017) has been used to identify important areas for seabirds at sea around the UK coastline, further highlighting waters encompassing the Morven North Boundary as an important area for kittiwakes (Cleasby *et al.*, 2020). Further tracking undertaken in 2023 and 2024 showed overlap between the very northern extent of Morven North and the 95% utilisation contour of kittiwake from the Buchan Ness to Collieston Coast SPA (Bennett *et al.*, 2024) (Figure 6.2).

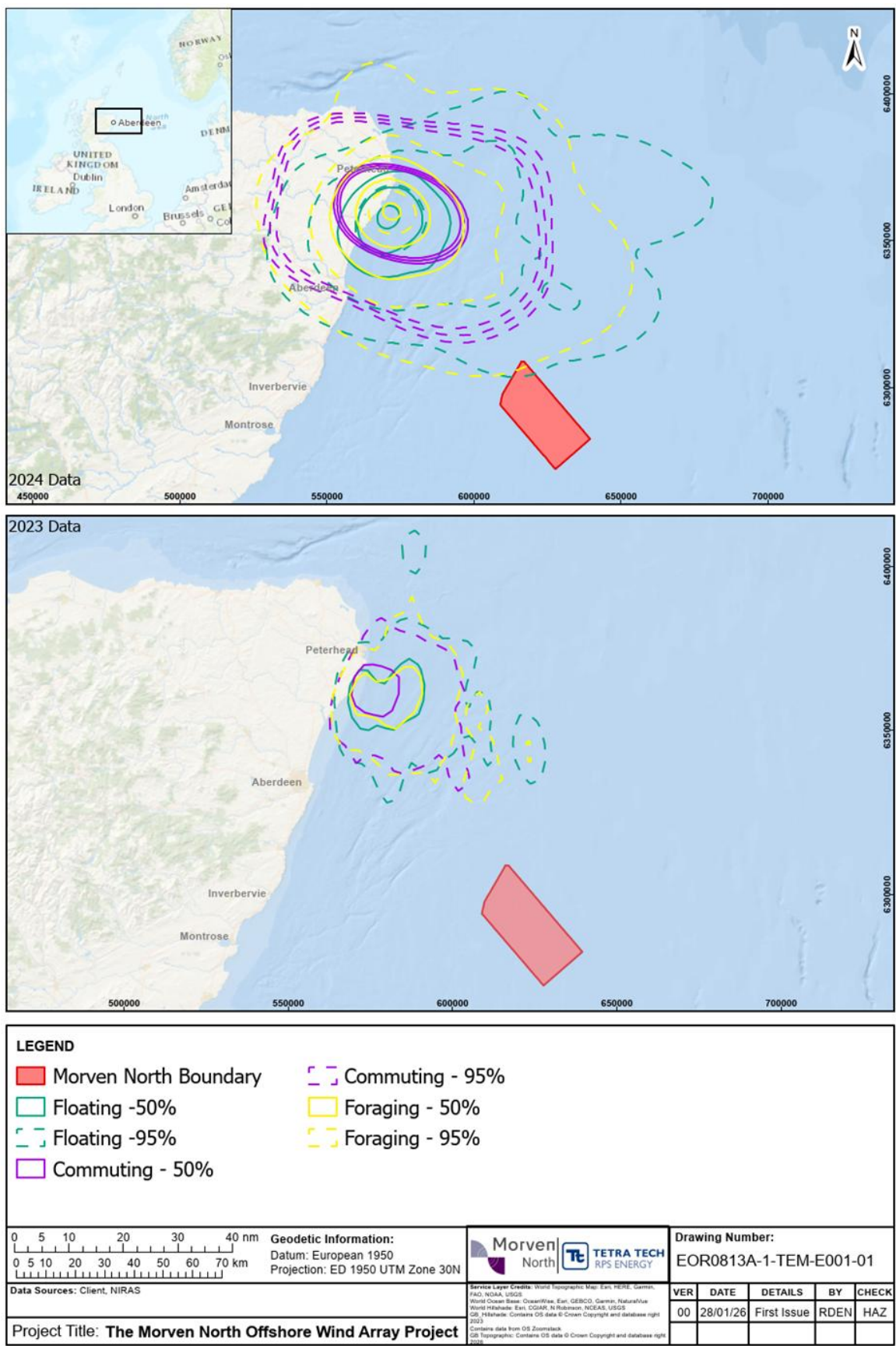


Figure 6.2: The spatial distribution of different behavioural states of kittiwake tracked from the Buchan Ness to Collieston Coast in 2023 and 2024 in relation to Morven North

6.2.4 Behaviour and age class

- 6.2.4.1 During aerial surveys only juvenile and first year kittiwake can be distinguished from adult birds. A total of 1,105 individuals were aged during the site specific aerial surveys. Of these, 1,011 were identified as adults, 58 as immatures and 36 as juveniles (Figure 6.3). Juvenile birds were recorded towards the end of the breeding season or the start of the post-breeding season. Immature birds were recorded in all months except January, February and September.
- 6.2.4.2 Analysis of flight directions across the breeding season showed prevailing flight directions of south, southwest and west. In the post-breeding season, the prevailing flight direction was southwest. In the pre-breeding season, birds were mainly recorded flying northwest, west, southwest and south (Figure 6.4).

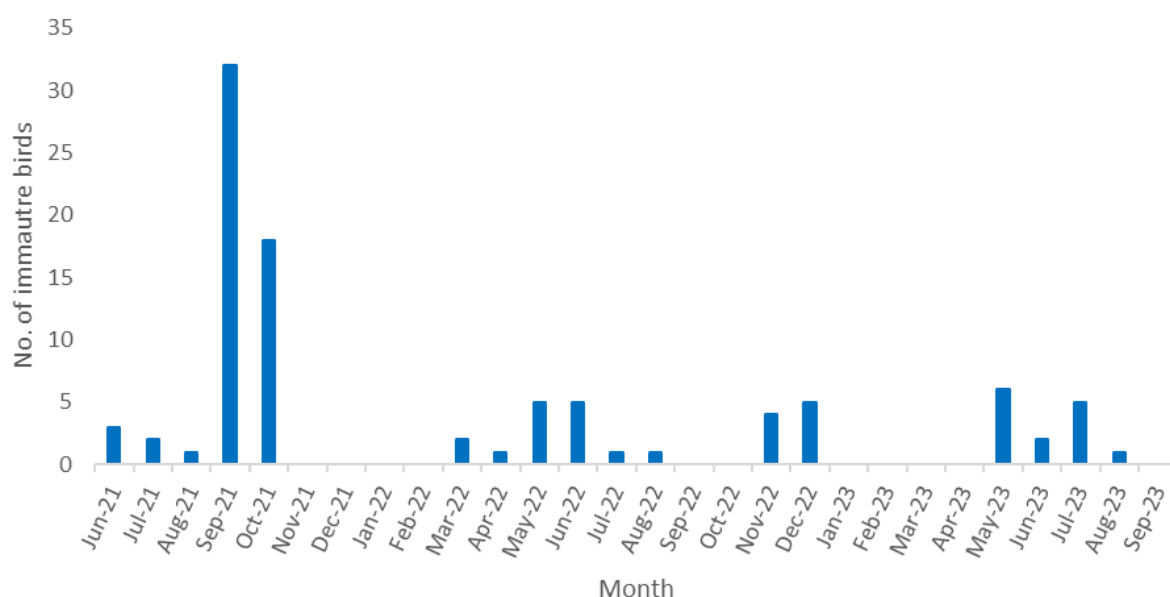


Figure 6.3: Number of immature kittiwakes recorded during each site specific aerial survey

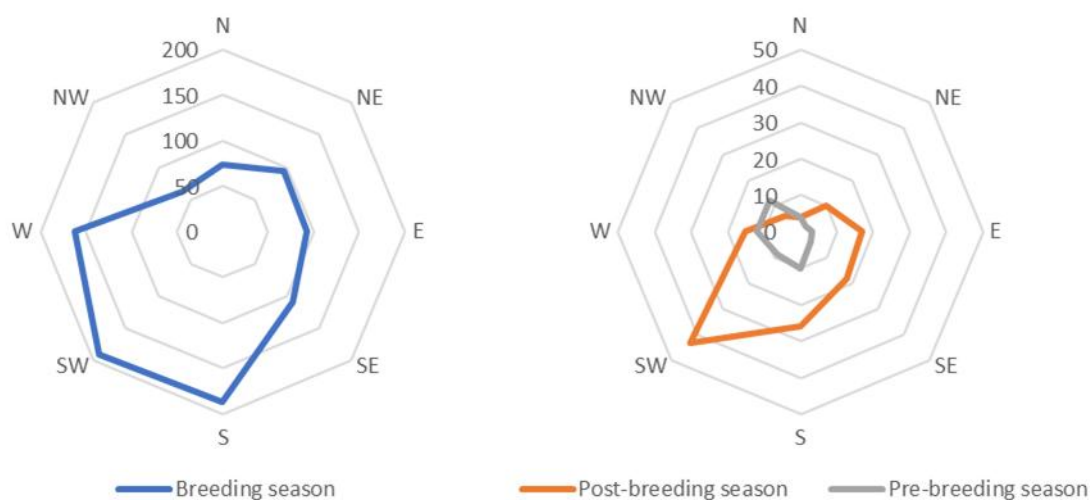


Figure 6.4: Flight directions of kittiwake, as recorded during site specific aerial surveys

6.2.5 Conclusion

- 6.2.5.1 Kittiwake is considered to have an International conservation status with connectivity identified between the Morven North Boundary and multiple SPAs. Population estimates of kittiwake at the Morven North Offshore Ornithology Baseline Characterisation Study Area do not surpass importance thresholds in any season (Figure 6.1). Kittiwake is therefore identified as a VOR and considered for further assessment as a receptor with an International conservation value.

6.3 Black-headed gull (*Chroicocephalus ridibundus*)

6.3.1 Status overview

- 6.3.1.1 Black-headed gull is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is included on the Scottish Biodiversity List. Black-headed gull is amber-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.3.1.2 Black-headed gulls are common and widespread in the UK and occur both inland and on the coast, although they are rarely found far offshore. In summer, birds breed at inland and coastal colonies, with 85,491 pairs recorded in Britain during the 2015-2021 Seabird Count of which 10,785 AON were in Scotland (Burnell *et al.*, 2023). In Scotland, the species is found at both inland and coastal locations but is absent from large areas in western Scotland, especially more mountainous regions (Balmer *et al.*, 2013). The UK wintering population of black-headed gull has been estimated at nearly 2,200,000 individuals (Burton *et al.*, 2012). In the UK, SMP long-term trends (1986-2023) data indicates a 5% decrease in black-headed gull and a 23% decline over the 23-year trend (Harris *et al.*, 2024). Not enough data was collected in Scotland to establish trends (Harris *et al.*, 2024). In the winter, UK birds mainly remain in the UK with a small proportion moving south into France and Iberia (Wernham *et al.*, 2002).
- 6.3.1.3 Morven North is not within the generic foraging range of any SPA at which black-headed gull is a feature (Woodward *et al.*, 2024).
- 6.3.1.4 Following the HPAI outbreak amongst breeding seabirds in 2022, black-headed gull was identified as a species of medium priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 72 black-headed gull breeding sites and found that on average the number of black-headed gull had decreased by 11% although due to the timing of counts at some sites, the impact of HPAI is not considered to be well accounted for in the counts presented.

6.3.2 Seasonal abundance and distribution

Site specific surveys

- 6.3.2.1 Black-headed gulls were not recorded in the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

- 6.3.2.2 Black-headed gulls were recorded in one of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023) with four birds recorded during the July 2023 survey. These birds were recorded in the northern part of the survey area outside of the Morven North Offshore Ornithology Baseline Characterisation Study Area.

6.3.3 Conclusion

- 6.3.3.1 Black-headed gull is considered to have a regional conservation status due to the species being included on the Scottish Biodiversity List. Black-headed gulls were not recorded during aerial surveys of the Morven North Offshore Ornithology Baseline Characterisation Study Area and regional surveys suggest limited, if any, birds will be present. The species is therefore considered to have negligible population importance and therefore it is considered unlikely that impacts associated with Morven North will occur on black-headed gull.
- 6.3.3.2 Black-headed gull is therefore not considered for further assessment in relation to impacts associated with Morven North.

6.4 Little gull (*Hydrocoloeus minutus*)**6.4.1 Status overview**

- 6.4.1.1 Little gull is listed on Annex I of the EU Birds Directive and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). It is currently green-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2021).
- 6.4.1.2 Little gull occur in Britain and Ireland year round, typically in low numbers and during peak migration periods (Burnell *et al.*, 2023). Individuals occasionally summer in suitable breeding habitats but breeding is recorded only rarely and has been confirmed on just six occasions, only one of which was in Scotland at Loch of Strathbeg in 2016 (Burnell *et al.*, 2023). The species is more common during winter and passage periods including, in Scotland, the Firths of Forth and Tay (Balmer *et al.*, 2013) where the species is included as a qualifying feature of the Outer Firth of Forth and St Andrew's Bay Complex SPA. The estimated UK wintering population ranges from 400 to 800, with a 200 to 700 individuals estimated to pass through during the spring (SNH, 2019; Burnell *et al.*, 2023).
- 6.4.1.3 Morven North is not within the generic foraging range of any SPA at which little gull is a feature (Woodward *et al.*, 2019).

6.4.2 Seasonal abundance and distribution**Site specific surveys**

- 6.4.2.1 Little gulls were not recorded in the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

- 6.4.2.2 Little gulls were not recorded in the surveys conducted as part of the regional surveys in the Scottish North Sea (HiDef Aerial Surveying Limited, 2023).

6.4.3 Conclusion

- 6.4.3.1 Little gull is considered to have a national conservation status due to the species inclusion on Annex I of the Birds Directive. Little gulls were not recorded during aerial surveys of the Morven North Offshore Ornithology Baseline Characterisation Study Area. However, traditional survey methods are unlikely to capture the movements of migratory birds due to the ephemeral nature of these movements. As this species could have been under-recorded, extra consideration should be given to potential impacts on this species during migratory periods. Little gull is therefore identified as a VOR with a National conservation value.

6.5 Common gull (*Larus canus*)

6.5.1 Status overview

- 6.5.1.1 Common gull is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is currently red-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.5.1.2 Common gulls are common and widespread in the UK in lowland, urban and coastal areas in winter, and at breeding colonies in coastal and inland locations in summer, almost exclusively in Scotland. The Seabird census of 2015-2021 recorded 22,784 pairs of common gulls breeding in Britain, the Isle of Man and the Channel Islands (Burnell *et al.*, 2023) with 22,755 AON in Scotland predominantly north of the Firth of Forth (Balmer *et al.*, 2013). Common gulls typically feed on farmland, playing fields, estuaries and in coastal waters, and are comparatively uncommon offshore (Forrester *et al.*, 2007; Stone *et al.*, 1995). The UK wintering population of common gull has been estimated at over 700,000 individuals, with an estimated 200,296 in Scotland (Burton *et al.*, 2012). The SMP Scottish long-term trend (1986-2023) indicates a 19% decline in common gull population and a 38% decline over the 23-year trend (2000-2023) (Harris *et al.*, 2024). No trends were determined for the UK-wide data (Harris *et al.*, 2024).
- 6.5.1.3 Common gull is listed as a qualifying interest species in the breeding season for one SPA in the UK, the Tips of Corsemaul and Tom Mor SPA. The distance between this SPA and Morven North is beyond the maximum known foraging range for this species (50km) (Woodward *et al.*, 2024). Common gull is also a qualifying feature for the Outer Firth of Forth and St Andrews Bay Complex SPA (14,647 individuals) during the non-breeding season.

6.5.2 Seasonal abundance and distribution

Site specific surveys

- 6.5.2.1 Common gulls were recorded in three of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. Of these, two were during the breeding season and one in the non-breeding season. The peak population of 49 birds occurred in August 2022 with a population of nine birds in November 2022 and 33 birds in July 2023.
- 6.5.2.2 Due to the small number of birds recorded there were no obvious trends in the distribution of birds across the Morven North Baseline Characterisation survey area.
- 6.5.2.3 The peak population in the non-breeding season (September to March) occurred in November 2022 (9 birds). No estimate of the regional population relevant to the regional BDMPS in which Morven North is located is available and therefore, in the non-breeding season, this species is assessed for national importance only. The estimated population did not surpass the threshold for national importance (7,100 birds). In the breeding season (April to August), the peak population was recorded in August 2022 (49 birds). There are no breeding populations of common gull within the foraging range of Morven North.

Regional distribution

- 6.5.2.4 Common gulls were recorded in nine of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). Less than ten birds were recorded in each survey with a peak of seven birds in June 2023. Common gulls were recorded in the Morven North Baseline Characterisation survey area in the July 2022, June and July 2023.

6.5.3 Conclusion

- 6.5.3.1 Common gull is considered to have a regional conservation status due to the species being red-listed on the Birds of Conservation Concern (Stanbury *et al.*, 2024). Common gulls were recorded in three of the surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area however, the estimated populations did not surpass the thresholds of importance for any population level.
- 6.5.3.2 Common gull is therefore not considered for further assessment in relation to impacts associated with Morven North.

6.6 Great black-backed gull (*Larus marinus*)

6.6.1 Status overview

- 6.6.1.1 Great black-backed gull is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is currently red-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.6.1.2 Great black-backed gull is a resident species in the UK, occurring in coastal areas. The Seabirds Count recorded 11,265 breeding pairs in the UK, with largest numbers on western coasts with 5,404 pairs in Scotland (Burnell *et al.*, 2023). Breeding sites are located along all Scottish coasts but more widespread on western and northern coasts (Balmer *et al.*, 2013). Great black-backed gulls are omnivorous, foraging at sea, on estuaries and beaches, and less commonly at rubbish dumps (Forrester *et al.*, 2007).
- 6.6.1.3 During the pre-breeding and breeding season their distribution tends to be limited to coastal areas. During the winter they are a much more widely dispersed species. The UK wintering population of great black-backed gull has been estimated at over 76,000 individuals (Burton *et al.*, 2012). The flyway population in the North Sea is estimated at 480,000 birds with 5.2% of the biogeographic population flying over the southernmost part of this area (Stienen *et al.*, 2007). In the UK, SMP long-term trends (1986-2023) indicate a 42% decrease in great black-backed gull population and the 23-year trend a 45% decrease (Harris *et al.*, 2024). In Scotland, SMP trends indicate a 72% decline long-term (1986-2023) and 70% decline between 2000 and 2023 (Harris *et al.*, 2024).
- 6.6.1.4 Great black-backed gull is listed as a qualifying interest species in the breeding season for six SPAs on the east coast of the UK. However, Morven North is not located within the generic foraging range of the species from any of these SPAs (Woodward *et al.*, 2024).
- 6.6.1.5 Following the HPAI outbreak amongst breeding seabirds in 2022, great black-backed gull was identified as a species of medium priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 164 great black-backed gull breeding sites and found that on average the number of great black-backed gull had decreased by 20% with this trend consistent across SPAs surveys but not across all sites in the UK as a whole.

6.6.2 Seasonal abundance and distribution

Site specific surveys

- 6.6.2.1 Great black-backed gulls were recorded within the Morven North Offshore Ornithology Baseline Characterisation Study Area in 11 of the baseline aerial surveys (Figure 6.5; Table 6.4). Peak numbers occurred in November 2021 (52 birds).
- 6.6.2.2 The majority of birds were recorded in the non-breeding season defined for the species (September to March). In the breeding season birds were recorded in July 2021 and June 2022 (Figure 6.5). The populations of birds recorded during the non-breeding season were generally higher than those recorded in the breeding season.
- 6.6.2.3 The peak population in the non-breeding season (September to March) occurred in November 2021 (52 birds). This population did not surpass the 1% threshold for regional importance (914 birds). In the breeding season (April to August), the threshold for regional importance (50 birds) was also not surpassed.
- 6.6.2.4 Due to the small number of birds recorded there were no obvious trends in the distribution of great black-backed gull across the Morven North Baseline Characterisation survey area.

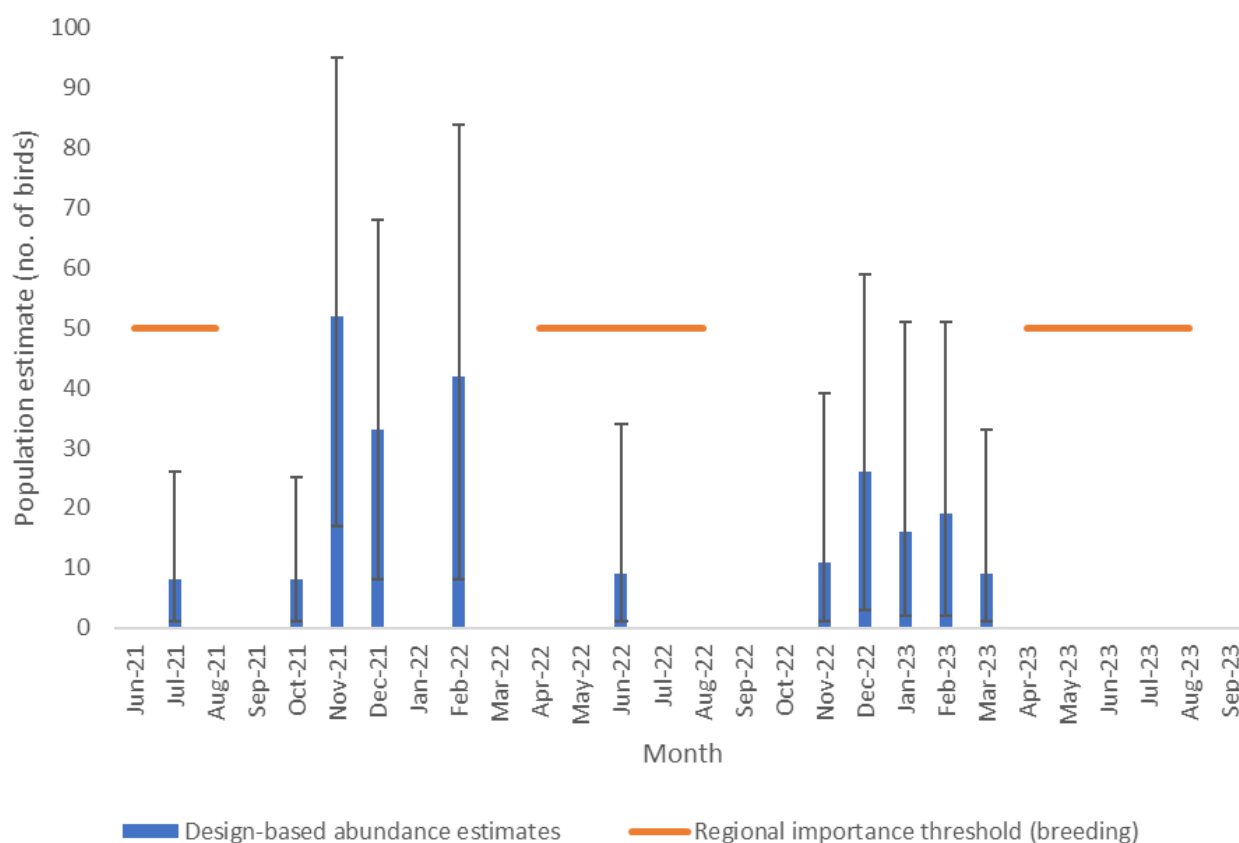


Figure 6.5: Abundance of great black-backed gull in the Morven North Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals). The regional importance threshold for the breeding season is also shown.

Regional distribution

- 6.6.2.5 Great black-backed gulls were recorded in eight of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). The number of birds was below 20 birds in all surveys except January (60 birds) and February (41 birds) 2023. Birds were only recorded in the Morven North Offshore Ornithology Baseline Characterisation Study Area in the June 2022 survey.

6.6.3 Age class

- 6.6.3.1 A total of 24 individuals were aged during the site specific aerial surveys. Of these, 18 were identified as adults and six as immature (five four winter birds and two third winter birds). No juveniles were recorded.

6.6.4 Conclusion

- 6.6.4.1 Great black-backed gull is currently red-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024) meaning the species has a regional conservation status in the context of Morven North. Great black-backed gulls were recorded in ten of the surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. The estimated populations did not surpass the thresholds of importance for any population level, the species was recorded in multiple surveys. Great black-backed gull is therefore identified as a VOR as a receptor with a Regional conservation value.

Table 6.4: Design-based population estimates (all behaviours) with lower and upper (95%) confidence limits for each month surveyed from October 2021 to September 2023 for The Morven North Offshore Ornithology Baseline Characterisation Study Area for great black-backed gull

Month	Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit
June 2021	0	0	0
July 2021	8	1	26
August 2021	0	0	0
September 2021	0	0	0
October 2021	8	1	25
November 2021	52	17	95
December 2021	33	8	68
January 2022	0	0	0
February 2022	42	8	84
March 2022	0	0	0
April 2022	0	0	0
May 2022	0	0	0
June 2022	9	1	34
July 2022	0	0	0
August 2022	0	0	0
September 2022	0	0	0
October 2022	0	0	0
November 2022	11	1	39
December 2022	26	3	59
January 2023	16	2	51

Month	Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit
February 2023	19	2	51
March 2023	9	1	33
April 2023	0	0	0
May 2023	0	0	0
June 2023	0	0	0
July 2023	0	0	0
August 2023	0	0	0
September 2023	0	0	0

6.7 Herring gull (*Larus argentatus*)

6.7.1 Status overview

- 6.7.1.1 Herring gull is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is included on the Scottish Biodiversity List. The species is currently red-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.7.1.2 Herring gulls are resident, common and widespread, breeding in colonies in coastal and inland locations. The Seabirds Count recorded 237,573 breeding pairs in the UK with 100,161 breeding pairs in Scotland (Burnell *et al.*, 2023). The species is predominantly found breeding coastally in Scotland with the main exceptions inland around towns and cities including Glasgow and Edinburgh (Balmer *et al.*, 2013). There is a general movement southwards in winter months (Forrester *et al.*, 2007) with the UK wintering population estimated at over 740,000 individuals (Burton *et al.*, 2012). Herring gulls exploit a wide range of food sources, including scraps and offal from trawlers, as well as on land at refuse dumps and farm land (Forrester *et al.*, 2007).
- 6.7.1.3 In Scotland, the SMP data indicates a 53% decline in the species population between 1986 and 2023 and 43% decline between 2000 and 2023 (Harris *et al.*, 2024). In the UK-wide SMP data, herring gull has been decreasing by 50% between 1986 and 2023 and 46% between 2000 and 2023 (Harris *et al.*, 2024).
- 6.7.1.4 Herring gull is listed as a qualifying species in the breeding season for two SPAs within the species mean maximum foraging range (+ 1SD) of the Morven North Offshore Ornithology Baseline Characterisation Study Area (Woodward *et al.*, 2024). The total designated population at these SPAs is 7,482 breeding pairs however, the populations recorded as part of the Seabirds Count national census (Burnell *et al.*, 2023) show that the population at both SPAs has declined to a total population of 3,112 breeding pairs (Table 6.5). Further counts have been conducted at a number of sites included in Table 6.2 with most showing declines mirroring those calculated in Harris *et al.* (2024) (JNCC *et al.*, 2024; Zisman and Swann, 2025a; Zisman and Swann, 2025b). Whilst these declines reflect the long-term decline in kittiwake populations this decline has been exacerbated in some cases by the recent HPAI outbreak in 2022 and 2023.
- 6.7.1.5 Populations recorded as part of the Seabirds Count are presented in Table 6.5 to provide a more recent contemporaneous dataset. Following the HPAI outbreak amongst breeding seabirds in 2022, herring gull was identified as a species of the highest priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 191 natural herring gull breeding sites and found that on average the number of herring gull had decreased by 7%, although across the UK the trend was not consistent. For those SPAs included in Table 6.5, a count of the Buchan Ness to Collieston Coast SPA was conducted in 2023 and found little change in the population of herring gull (JNCC, 2024).

Table 6.5: Designated sites at which herring gull is a qualifying feature with which there is connectivity with Morven North based on generic foraging range data

Designated site	Distance to Morven North (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell <i>et al.</i> (2023) (breeding pairs)
Buchan Ness to Collieston Coast SPA	66	4,292	2,077
Fowlsheugh SPA	57	3,190	1,035

6.7.2 Seasonal abundance and distribution

Site specific surveys

- 6.7.2.1 Herring gulls were recorded within the Morven North Offshore Ornithology Baseline Characterisation Study Area in 11 of the baseline aerial surveys. The highest populations were estimated in the breeding season defined for the species, with the peak population of 368 birds occurring July 2021. Small numbers (less than 20 birds) were recorded in non-breeding season months (Table 6.6; Figure 6.6). There was no obvious trend in the distribution of herring gull across the Morven North Offshore Ornithology Baseline Characterisation Study Area.
- 6.7.2.2 A peak population of nine birds was recorded in three non-breeding season months, November 2021, October 2022 and December 2022. These populations do not surpass the 1% threshold for regional importance (221 birds). In the breeding season (April to August), the peak population was recorded in July 2021 (368 birds). This population surpassed the 1% threshold of regional importance (221 birds).
- 6.7.2.3 In the July 2021 survey, the highest densities of herring gulls was found in the northern part of the Morven North Offshore Ornithology Baseline Characterisation Study Area. In the June 2023 survey, the highest density of herring gulls was recorded just to the south of the northern limit of the Morven North Offshore Ornithology Baseline Characterisation Study Area. In all other months, the number of birds recorded was too low to detect any trends in the distribution of the species in the Morven North Offshore Ornithology Baseline Characterisation Study Area.

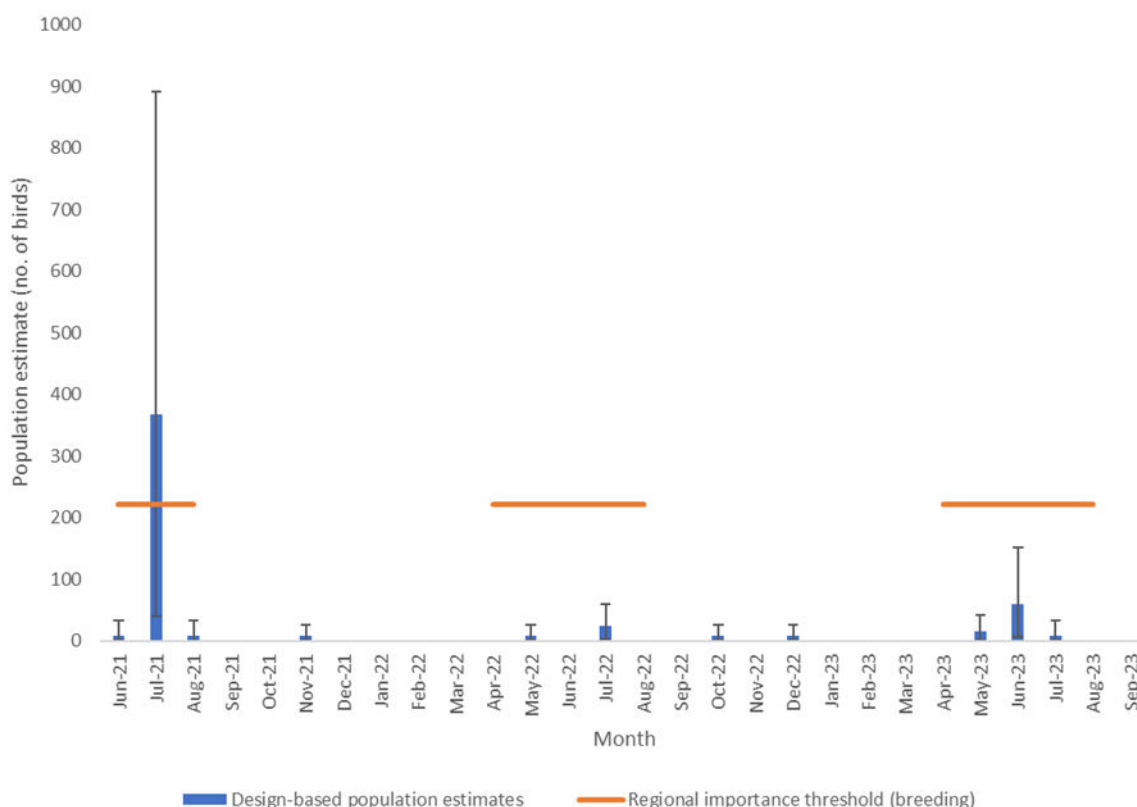


Figure 6.6: Abundance of herring gull in the Morven North Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals). The regional importance threshold for the breeding season is also shown.

Regional distribution

- 6.7.2.4 Herring gulls were recorded in 12 of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). Less than 20 birds were recorded in all surveys except June and July 2022 (43 birds in both surveys), November 2022 (24 birds) and June 2023 (119 birds).
- 6.7.2.5 Birds occurred in the Morven North Offshore Ornithology Baseline Characterisation Study Area in the breeding season, although there was no trend in the distribution of this species. The species was not recorded during a number of non-breeding months and did not occur in the Morven North Offshore Ornithology Baseline Characterisation Study Area (Figure C. 4, Figure C. 5 and Figure C. 6).

6.7.3 Age class

- 6.7.3.1 A total of 38 individuals were aged during the site specific aerial surveys. Of these, 35 were identified as adults and three as immature (one second winter bird and two third summer birds). No juveniles were recorded.

6.7.4 Conclusion

- 6.7.4.1 Herring gull is considered to have an international conservation status due to Morven North being within the foraging range of herring gull from the Buchan Ness to Collieston Coast and Fowlsheugh SPAs at which the species is designated as a breeding feature. The estimated population in June 2021 surpassed the threshold of importance for the regional population with the species also recorded in multiple other surveys. Herring gull is therefore identified as a VOR and is considered for further assessment as a receptor with an International conservation value.

Table 6.6: Design-based population estimates (all behaviours) with lower and upper (95%) confidence limits for each month surveyed from October 2021 to September 2023 for The Morven North Offshore Ornithology Baseline Characterisation Study Area for herring gull

Month	Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit
June 2021	9	1	34
July 2021	368	41	892
August 2021	9	0	34
September 2021	0	0	0
October 2021	0	0	0
November 2021	9	1	26
December 2021	0	0	0
January 2022	0	0	0
February 2022	0	0	0
March 2022	0	0	0
April 2022	0	0	0
May 2022	8	1	26
June 2022	0	0	0
July 2022	25	3	59
August 2022	0	0	0
September 2022	0	0	0
October 2022	9	1	26
November 2022	0	0	0
December 2022	9	1	26
January 2023	0	0	0

Month	Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit
February 2023	0	0	0
March 2023	0	0	0
April 2023	0	0	0
May 2023	16	2	42
June 2023	60	7	152
July 2023	8	1	33
August 2023	0	0	0
September 2023	0	0	0

6.8 Lesser black-backed gull (*Larus fuscus*)

6.8.1 Status overview

- 6.8.1.1 Lesser black-backed gull is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is currently amber-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.8.1.2 Lesser black-backed gulls are common and widespread in the UK in summer, and breed in colonies in coastal and inland locations. The Seabirds Count recorded 324,465 breeding pairs in the UK with 49,662 breeding pairs in Scotland (Burnell *et al.*, 2023). The species is widespread in Scotland in the breeding season with the majority of breeding sites on the western and northern coasts and in and around Glasgow and Edinburgh (Balmer *et al.*, 2013). In winter, many birds leave northern areas between November and March, although some remain all year, particularly in the southwest (Forrester *et al.*, 2007). The UK wintering population of lesser black-backed gull has been estimated at over 125,000 individuals (Burton *et al.*, 2012). Lesser black-backed gulls take a wide variety of prey and scavenged food, both at sea, and on farmland and refuse sites (Forrester *et al.*, 2007). In Scotland, SMP data indicates that lesser black-backed gull has experienced a 62% decrease between 1986 and 2023 and a 63% decrease between 2000 and 2023 (Harris *et al.*, 2024). In the UK-wide data, trends show a 65% decrease between 1986 and 2023 and a 78% decrease between 2000 and 2023 (Harris *et al.*, 2024). In the UK-wide data, lesser black-backed gull had a 65% decrease between 1986 and 2023 and a 78% decrease between 2000 and 2023 (Harris *et al.*, 2024).
- 6.8.1.3 Lesser black-backed gull is listed as a qualifying interest species in the breeding season for two SPAs within the generic mean maximum foraging range of this species from Morven North (Woodward *et al.*, 2024). These SPAs are designated for 1,526 breeding pairs with the most recent count suggesting the total population has increased to 2,481 breeding pairs (Table 6.7). In addition, lesser black-backed gull is also a qualifying feature of the Northumberland Marine SPA which protects sea areas used by the species from nearby breeding colony SPAs that have connectivity with Morven North.
- 6.8.1.4 Populations recorded as part of the Seabirds Count are presented in Table 6.7 to provide a more recent contemporaneous dataset. Following the HPAI outbreak amongst breeding seabirds in 2022, lesser black-backed gull was identified as a species of low priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 80 natural lesser black-backed gull breeding sites and found that on average the number of lesser black-backed gull had decreased by 25%, although across the UK the trend was not consistent. For those SPAs included in Table 6.7, more recent counts undertaken in 2024 recorded 12 breeding pairs at the Coquet Island SPA and 1,485 breeding pairs recorded at the Forth Islands SPA reflecting the decreasing trends observed for these species in recent years potentially exacerbated by the HPAI outbreak in 2022 and 2023.

Table 6.7: Designated sites at which lesser black-backed gull is a qualifying feature with which there is connectivity with Morven North based on generic foraging range data

Designated site	Distance to Morven North (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell <i>et al.</i> (2023) (breeding pairs)
Coquet Island SPA	141	52 individuals	20
Forth Islands SPA	99	1,500	2,015

6.8.2 Seasonal abundance and distribution

Site specific surveys

- 6.8.2.1 Lesser black-backed gulls were recorded in one of the baseline aerial surveys conducted across the Morven North Offshore Ornithology Baseline Characterisation Study Area. A single bird was recorded in the June 2023 survey translating to a population estimate of eight birds.
- 6.8.2.2 June represents the breeding season for lesser black-backed gull with the population recorded during the June 2023 survey not surpassing the importance threshold for the regional population (283 birds).

Regional distribution

- 6.8.2.3 Lesser black-backed gulls were recorded in five of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). Less than ten birds were recorded in each survey with a peak of five birds in June 2023. Lesser black-backed gulls were only recorded in the Morven North Offshore Ornithology Baseline Characterisation Study Area in the July 2023 survey.

6.8.3 Conclusion

- 6.8.3.1 Lesser black-backed gull is considered to have an international conservation status due to Morven North being within the foraging range of the species from multiple SPAs at which the species is designated as a breeding feature. The species was recorded in only one of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. The estimated population did not surpass the threshold for regional importance.
- 6.8.3.2 As lesser black-backed gulls were recorded in only one month, the species is not identified as a VOR and not considered for further assessment.

6.9 Sandwich tern (*Thalasseus sandvicensis*)

6.9.1 Status overview

- 6.9.1.1 Sandwich tern is listed on Annex I of the Birds Directive (2009/147/EEC), and the species is currently amber-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024). The species is also included on the Scottish Biodiversity List.
- 6.9.1.2 Sandwich terns are summer visitors to Britain, breeding in coastal colonies. The 2015 to 2021 Seabird census recorded 11,076 pairs of breeding Sandwich tern across Britain, the Isle of Man and the Channel Islands (Burnell *et al.*, 2023) with this representing more than 20% of the European population of the species. Of this population 1,014 breeding pairs are found in Scotland. The largest breeding colonies are found on the east coast where there are three SPAs for the species, with further breeding colonies on Orkney and southwest Scotland. After the breeding season, Sandwich terns migrate south to the west coast of Africa, returning the following spring (Wernham *et al.*, 2002). Sandwich terns feed on a variety of small, surface feeding fish including sandeels but also cephalopods and crustaceans that they catch by plunge-diving (Brown and Grice, 2005). According to the UK-wide SMP data, Sandwich tern has decreased by 14% between 1986 and 2023 and by 8% between 2000 and 2023 (Harris *et al.*, 2024). No trends are available for the Sandwich tern population in Scotland (Harris *et al.*, 2024).
- 6.9.1.3 The nearest SPAs designated for breeding Sandwich tern are Forth Island SPA and Ythan Estuary, Sands of Forvie and Meikle Loch SPA. No SPAs designated for Sandwich tern are located within the species generic mean maximum foraging range from Morven North (Woodward *et al.*, 2024).

- 6.9.1.4 Following the HPAI outbreak amongst breeding seabirds in 2022, Sandwich tern was identified as a species of the highest priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 14 Sandwich tern breeding sites and found that on average the number of Sandwich tern had decreased by 36% with this decrease consistent across sites.

6.9.2 Seasonal abundance and distribution

Site specific surveys

- 6.9.2.1 Sandwich tern were recorded in one of the aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. A single bird was recorded in the August 2022 survey translating to a population estimate of eight birds.
- 6.9.2.2 August falls within the seasonal definitions for both the breeding and post-breeding season for Sandwich tern (Table 4.4) however, as Morven North is not within the foraging range of the species from any breeding colonies this bird is likely to be a bird on migration. The population recorded during the August 2022 survey did not surpass the importance threshold for either the breeding or post-breeding seasons (423 and 488 birds, respectively).

Regional distribution

- 6.9.2.3 Sandwich terns were not recorded in the surveys conducted as part of the regional surveys in the Scottish North Sea (HiDef Aerial Surveying Limited, 2023).

Tracking data

- 6.9.2.4 Tracking of Sandwich terns from the Ythan Estuary, Sands of Forvie and Meikle Loch SPA has shown no connectivity with the Morven North Boundary (Wilson *et al.*, 2014).

6.9.3 Conclusion

- 6.9.3.1 Sandwich tern is considered to have a national conservation status due to the species inclusion on Annex I of the Birds Directive. The species was recorded in only one of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. The estimated population did not surpass the threshold for regional importance in relevant seasons. However, traditional survey methods are unlikely to capture the movements of migratory birds due to the ephemeral nature of these movements and therefore consideration will be given to potential impacts on this species during migratory periods. Sandwich tern is therefore identified as a VOR with a National conservation value.

6.10 Little tern (*Sternula albifrons*)

6.10.1 Status overview

- 6.10.1.1 Little tern is listed on both Annex I of the Birds Directive (2009/147/EEC) and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is also amber-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024) and included on the Scottish Biodiversity List.
- 6.10.1.2 Little terns are summer visitors to Britain, breeding in coastal colonies. The 2015-2021 seabird census recorded 1,403 breeding pairs in the UK with 227 breeding pairs in Scotland (Burnell *et al.*, 2023). Breeding colonies are found on all Scottish coasts (Balmer *et al.*, 2013). At least 50% of this population breed at ten or fewer sites. In Scotland, little tern population trends between 1986 and 2023 indicate an 83% decline in the population and 72% decline between 2000 and 2023 (Harris *et al.*, 2024). The UK-wide trends indicate a 26% decrease between 1986 and 2023 and a 14% decrease between 2000 and 2023 (Harris *et al.*, 2024). Little terns depart breeding colonies rapidly with ring

recoveries from southern Europe in August (Wernham *et al.*, 2002). Birds are also recovered in the Netherlands and Denmark with Scottish birds mainly recorded at the latter (Wernham *et al.*, 2002).

- 6.10.1.3 No SPAs designated for little tern or other known colonies are located within a 5km radius of Morven North, the species' known average foraging range (Woodward *et al.*, 2024).

6.10.2 Seasonal abundance and distribution

Site specific surveys

- 6.10.2.1 Little terns were not recorded in the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

- 6.10.2.2 Little terns were not recorded in the surveys conducted as part of the regional surveys in the Scottish North Sea (HiDef Aerial Surveying Limited, 2023).

Tracking data

- 6.10.2.3 Tracking of little terns at Ythan Estuary, Sands of Forvie and Meikle Loch SPA show that birds tend to forage offshore to approximately 2km and along the shore to 3km away from the colony (Parsons *et al.*, 2015). This would suggest no connectivity between this breeding colony and the Morven North study area plus 4km buffer.

6.10.3 Conclusion

- 6.10.3.1 Little tern is considered to have a national conservation status due to the species inclusion on Annex I of the Birds Directive and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Little terns were not recorded during baseline aerial surveys of the Morven North Offshore Ornithology Baseline Characterisation Study Area. However, traditional survey methods are unlikely to capture the movements of migratory birds due to the ephemeral nature of these movements. As this species could have been under-recorded, extra consideration should be given to potential impacts on this species during migratory periods. Little tern is therefore identified as a VOR with a National conservation value.

6.11 Roseate tern (*Sterna dougallii*)

6.11.1 Status overview

- 6.11.1.1 Roseate tern is listed on both Annex I of the Birds Directive (2009/147/EEC) and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and the Scottish Biodiversity List. The species is also red-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024). The species is also considered to be ecologically sensitive having fewer than 300 breeding pairs in the UK and over 50% of the population found in 10 or fewer sites. In the SMP UK-wide trends, roseate tern populations have decreased by 63% between 1986 and 2023 but increased by 116% between 2000 and 2023 (Harris *et al.*, 2023) No data is available for trends in Scotland specifically (Harris *et al.*, 2024).
- 6.11.1.2 Roseate terns are summer visitors to Britain, breeding on offshore islands. The 2015 to 2021 seabird census recorded 119 breeding pairs of roseate tern in Britain, the Isle of Man and the Channel Islands although none of these were in Scotland with the species not recorded at Long Craig, Dunfermline where the species has been present in previous censuses (Burnell *et al.*, 2023). At least 50% of this population breed at ten or fewer sites. No colonies are located within the generic mean maximum foraging range of the species (Woodward *et al.*, 2024). Following the breeding season, birds congregate in areas with suitable food with birds then migrating to wintering areas off west Africa (Wernham *et al.*, 2002).

- 6.11.1.3 Following the HPAI outbreak amongst breeding seabirds in 2022, roseate tern was identified as a species of the highest priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed the roseate tern breeding colony on Coquet Island and found a 21% decline in breeding numbers.

6.11.2 Seasonal abundance and distribution

Site specific surveys

- 6.11.2.1 Roseate terns were not recorded in the baseline aerial surveys undertaken across the Morven North Baseline Characterisation Study Area.

Regional distribution

- 6.11.2.2 Roseate terns were not recorded in the surveys conducted as part of the regional surveys in the Scottish North Sea (HiDef Aerial Surveying Limited, 2023).

6.11.3 Conclusion

- 6.11.3.1 Roseate tern is considered to have a national conservation status due to the species inclusion on Annex I of the Birds Directive and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Roseate terns were not recorded during baseline aerial surveys of the Morven North Baseline Characterisation Study Area. However, traditional survey methods are unlikely to capture the movements of migratory birds due to the ephemeral nature of these movements. As this species could have been under-recorded, extra consideration should be given to potential impacts on this species during migratory periods. Roseate tern is therefore identified as a VOR with a National conservation value.

6.12 Common tern (*Sterna hirundo*)

6.12.1 Status overview

- 6.12.1.1 Common tern is listed on Annex I of the Birds Directive, and the species is currently amber-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024). The species is also included on the Scottish Biodiversity List.
- 6.12.1.2 Common terns are summer visitors to Britain, breeding in colonies at coastal sites and also inland. The 2015 to 2021 seabird census recorded 10,541 pairs of breeding common terns across Britain, the Isle of Man and the Channel Islands (Burnell *et al.*, 2023). Of this population 4,071 breeding pairs were found in Scotland with breeding colonies located mainly on the coast, although less common on the east coast away from the Moray Firth (Balmer *et al.*, 2013). SMP trends indicate a 41% decline in the common tern population in Scotland between 1986 and 2023 and a 28% decrease between 2000 and 2023 (Harris *et al.*, 2024). The UK-wide trends indicate a 45% decline between 1986 and 2023 and a 40% decline between 2000 and 2023 (Harris *et al.*, 2024). Following the breeding season, common tern disperse from breeding colonies with such movements occurring in both southern and northern directions with some birds also crossing the North Sea. Wintering areas are located off western Africa (Wernham *et al.*, 2002).
- 6.12.1.3 Morven North is not in the foraging range of any SPA at which common tern is a feature (Woodward *et al.*, 2024).
- 6.12.1.4 Following the HPAI outbreak amongst breeding seabirds in 2022, common tern was identified as a species of the highest priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 55 common tern breeding sites and found that on average the number of common tern had decreased by 42% with this decrease consistent across sites, with decreases at all SPA sites monitored except four.

6.12.2 Seasonal abundance and distribution

Site specific surveys

- 6.12.2.1 Common tern were not recorded in the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. Whilst a number of 'commic' terns were recorded, representing birds that could not be identified confidently to either common or Arctic tern, as no common terns were recorded, all birds in the 'commic' tern group were allocated to Arctic tern, following the methodology described in Sections 3.2.4 and 3.2.5.

Regional distribution

- 6.12.2.2 Common terns were recorded in five of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). Birds were recorded in May, July, August and September with less than 20 birds recorded in each survey. Common terns were recorded in the Morven North Offshore Ornithology Baseline Characterisation Study Area during the July 2022 and August 2022 surveys.

Tracking data

- 6.12.2.3 Tracking of common terns from the Isle of May colony within the Forth Islands SPA and colonies within the Imperial Dock Lock SPA suggest no connectivity with the Morven North Boundary (Wilson *et al.*, 2014).

6.12.3 Conclusion

- 6.12.3.1 Common tern is considered to have a national conservation status due to the species inclusion on Annex I of the Birds Directive. Common terns were not recorded during baseline aerial surveys of the Morven North Offshore Ornithology Baseline Characterisation Study Area. However, traditional survey methods are unlikely to capture the movements of migratory birds due to the ephemeral nature of these movements. As this species could have been under-recorded, extra consideration should be given to potential impacts on this species during migratory periods. Common tern is therefore identified as a VOR with a National conservation value.

6.13 Arctic tern (*Sterna paradisaea*)

6.13.1 Status overview

- 6.13.1.1 Arctic tern is listed on Annex I of the EU Birds Directive, and the species is currently red-listed on the UK Birds of Conservation Concern list (Stanbury *et al.*, 2024). The species is also included on the Scottish Biodiversity List.
- 6.13.1.2 Arctic terns are summer visitors to Britain, breeding in coastal colonies, predominantly in the north. The 2015-2021 seabird census recorded 29,707 pairs in Britain, the Isle of Man and the Channel Islands with 19,555 breeding pairs in Scotland (Burnell *et al.*, 2023). Scottish breeding colonies are predominantly found on the western and northern coasts including the Northern Isles (Balmer *et al.*, 2013). In autumn, Arctic terns migrate down the west coast of Europe and Africa to the Antarctic seas for the winter, returning the following spring (Wernham *et al.*, 2002). The closest large colonies to Morven North are the Farne Islands, Coquet Island and Long Nanny, (all Northumberland). Sandeels are the major prey species (Mitchell *et al.*, 2004). In Scotland, the SMP trends indicate a 49% decline between both 1986-2023 and 2000-2023 (Harris *et al.*, 2024). The UK-wide data indicates a 12% decrease between 1986 and 2023 and a 17% decrease between 2000-2023 (Harris *et al.*, 2024).
- 6.13.1.3 Arctic tern is listed as a qualifying interest species in the breeding season for 14 SPAs across the Shetlands, Orkney, Scotland east coast and the northeast of England. Morven North lies beyond the maximum known foraging range of Arctic terns from these SPAs (Woodward *et al.*, 2024).

6.13.1.4 Following the HPAI outbreak amongst breeding seabirds in 2022, Arctic tern was identified as a species of the highest priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 53 Arctic tern breeding sites and found that on average the number of Arctic tern had decreased by 2% although the magnitude of change was variable across sites.

6.13.2 Seasonal abundance and distribution

Site specific surveys

6.13.2.1 Arctic terns were recorded in five of the aerial surveys undertaken across Morven North Offshore Ornithology Baseline Characterisation Study Area. Throughout the survey programme birds were only recorded in July and August. These months span the breeding and post-breeding seasons defined for the species in Table 4.4. Morven North is however, beyond the foraging range of Arctic tern from any breeding colonies and therefore these birds are considered to be birds migrating from breeding grounds. The populations recorded in the Morven North Offshore Ornithology Baseline Characterisation Study Area are therefore compared to the relevant importance thresholds in the post-breeding season. The population estimated in August 2022 (3,690 birds) surpassed the threshold for national importance (2,353 birds).

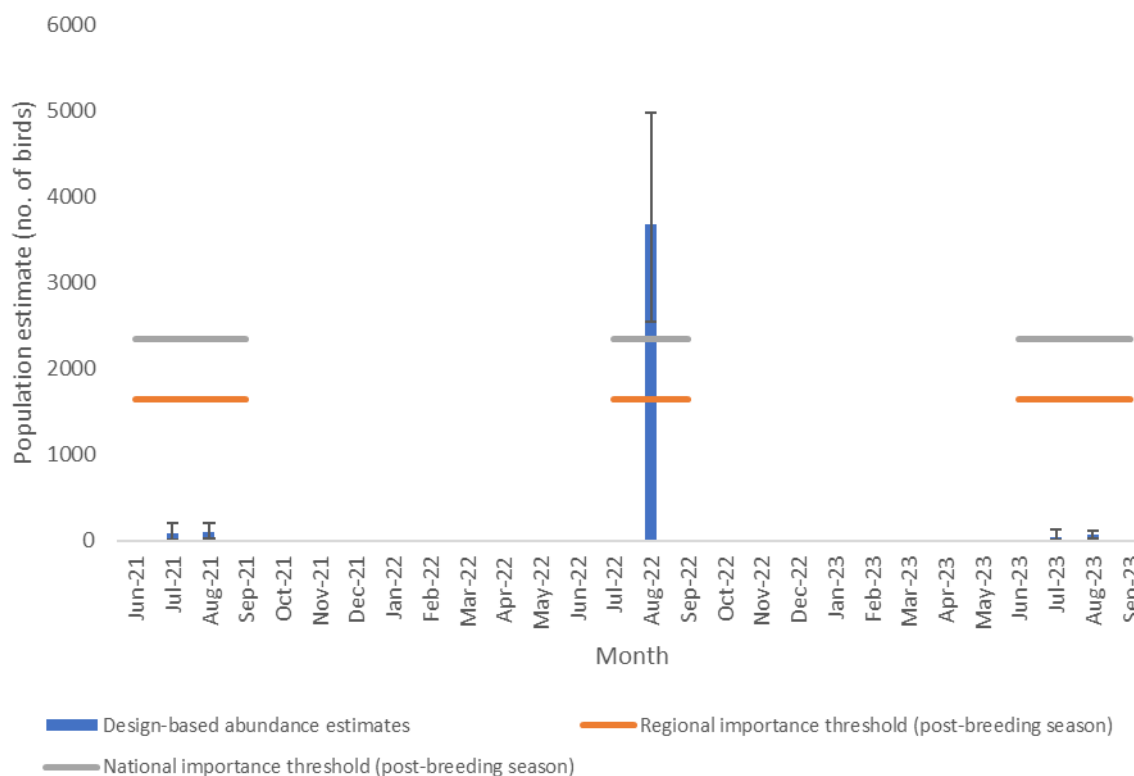


Figure 6.7: Abundance of Arctic tern in the Morven North Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals). The regional and national importance thresholds for the breeding season are also shown.

Regional distribution

6.13.2.2 Arctic terns were recorded in five of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). Birds were recorded in May, July, August and September with less than five birds in all surveys except July 2022 when 45 birds were recorded. Arctic terns were recorded in the Morven North Offshore Ornithology Baseline Characterisation Study Area during the July 2022, August 2022, September 2022 and July 2023.

Tracking data

6.13.2.3 Tracking of Arctic terns from the Isle of May colony within the Forth Islands SPA suggests no connectivity with the Morven North Boundary (Wilson *et al.*, 2014).

6.13.3 Behaviour

6.13.3.1 Analysis of flight directions across all surveys showed prevailing flight directions of south and southwest (Figure 6.8).

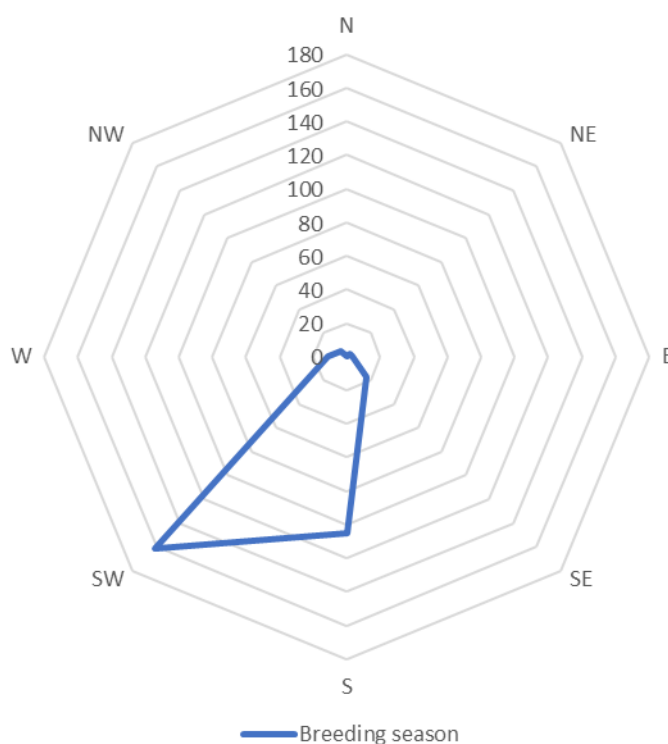


Figure 6.8: Flight directions of Arctic terns, as recorded during site specific aerial surveys

6.13.4 Conclusion

6.13.4.1 Arctic tern is listed on Annex I of the EU Birds Directive and therefore the species is considered to have a national conservation status. The species was recorded in three of the aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. The estimated population in the August 2022 survey surpassed the threshold for National importance. The birds recorded in this month are likely to be individuals on migration. Arctic tern is therefore identified as a VOR with a National conservation value.

6.14 Great skua (*Stercorarius skua*)

6.14.1 Status overview

- 6.14.1.1 Great skua is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Great skua is currently red-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.14.1.2 The species regularly occurs in the North Sea on spring and autumn passage, with some birds remaining for the winter months (Stone *et al.*, 1995). Great skuas breed on Shetland, Orkney and the Western Isles (Balmer *et al.*, 2013), with an estimated population of 10,935 pairs during the 2015-2021 seabird census (Burnell *et al.*, 2023). This represents more than 20% of the European population of the species. At least 50% of the UK population breed at ten or fewer sites. Given the remote nature and large area covered by many of the Great skua colonies, annual sample sizes are insufficient to determine the overall population trends between censuses (JNCC, 2021). Great skuas breed close to other seabird colonies, in order to scavenge and parasitise food from other seabirds, as well as predating other birds and nests.
- 6.14.1.3 Great skua is listed as a qualifying interest species in the breeding season for seven SPAs on the UK east coast (Table 6.8). These SPAs are designated for 6,126 Apparently Occupied Territories (AOT). The most recent count for each SPA suggests the population associated with these SPAs has increased to 6,231 breeding pairs representing approximately 57% of the breeding population as recorded in Britain, the Isle of Man, and the Channel Islands during the 2015 to 2021 seabird census (Burnell *et al.*, 2023). All nine of these SPA colonies lie within the generic mean maximum foraging range of this species (Woodward *et al.*, 2024) from Morven North. In addition, great skua is also a qualifying feature of the Seas off Foula SPA which protects sea areas used by the species from nearby breeding colony SPAs that have connectivity with Morven North.
- 6.14.1.4 Populations recorded as part of the Seabirds Count are presented in Table 6.8 to provide a more recent contemporaneous dataset. Following the HPAI outbreak amongst breeding seabirds in 2022, great skua was identified as a species of the highest priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 356 great skua breeding sites and found that on average the number of great skua had decreased by 76%, with this decline consistent across all sites. For those SPAs included in Table 6.8, further counts conducted in 2023 and 2024 show that there have been significant declines at all of the SPAs due to the recent HPAI outbreak in 2022 and 2023.

Table 6.8: Designated sites at which great skua is a qualifying feature with which there is connectivity with Morven North based on generic foraging range data

Designated site	Distance to Morven North (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell et al. (2023) (breeding pairs)
Fair Isle SPA	287	110	430
Fetlar SPA	403	508	854
Foula SPA	357	2,270	1,846
Hermaness, Saxa Vord and Valla Field SPA	423	788	1,030
Hoy SPA	241	1,900	1,405
Noss SPA	355	420	476
Ronas Hill - North Roe and Tingon SPA and Ramsar	400	130	190

6.14.2 Seasonal abundance and distribution

Site specific surveys

- 6.14.2.1 Great skuas were recorded in five of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. These records occurred during the July, August, September and October 2021 and September 2023 surveys with a single bird recorded in each survey translating to a population estimate of eight or nine birds in each month. The populations estimated in these months do not surpass the threshold for regional importance in the post-breeding season (196 birds).
- 6.14.2.2 Due to the small number of birds recorded there were no obvious trends in the distribution of great skua across the Morven North Baseline Characterisation survey area.

Regional distribution

- 6.14.2.3 Great skuas were recorded in three of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). Birds were recorded in June (three birds), July (five birds) and August (one bird) 2022. No great skuas were recorded in the Morven North Offshore Ornithology Baseline Characterisation Study Area.

6.14.3 Conclusion

- 6.14.3.1 Great skua is considered to have an international conservation status as Morven North is within the foraging range of the species from multiple UK SPAs. Great skuas were recorded in two of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area with associated population estimates not surpassing thresholds for regional importance. However, traditional survey methods are unlikely to capture the movements of migratory birds due to the ephemeral nature of these movements and therefore consideration will be given to potential impacts on this species during migratory periods. Great skua is therefore identified as a VOR with an International conservation value.

6.15 Arctic skua (*Stercorarius parasiticus*)

6.15.1 Status overview

- 6.15.1.1 Arctic skua is currently red-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024) due to its significant recent decline with the UK breeding population showing declines of 37% between 1985/88 and 1998/2002 and 64% between 1998/2002 and 2015 (JNCC, 2016). The species is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is included on the Scottish Biodiversity List. The SMP data for both Scotland and the entirety of the UK indicate an 83% decrease in the species population between 1986 and 2023 and a 71% decrease between 2000 and 2023 (Harris *et al.*, 2024).
- 6.15.1.2 Arctic skua is a passage migrant in spring and autumn in the North Sea, and a scarce UK breeding species, restricted to Shetland, Orkney, north Scotland and the Western Isles (Forrester *et al.*, 2007; Burnell *et al.*, 2023). The 2015-2021 seabird census estimated the breeding population in Britain, the Isle of Man and the Channel Islands at 727 pairs, which were virtually all part of the nine Scottish SPAs designated for this species (Burnell *et al.*, 2023). Morven North is not in the foraging range from any SPA at which Arctic skua is a qualifying feature.
- 6.15.1.3 Following the HPAI outbreak amongst breeding seabirds in 2022, Arctic skua was identified as a species of low priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 228 Arctic tern breeding sites and found that on average the number of Sandwich tern had decreased by 28% although this trend was not consistent across sites with some showing increases.

6.15.2 Seasonal abundance and distribution

Site specific surveys

- 6.15.2.1 Arctic skuas were recorded in one of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. This record occurred during the September 2021 survey which forms part of the post-breeding season. The population estimated for this survey (26 birds) does not surpass the threshold for regional importance in the post-breeding season (64 birds).
- 6.15.2.2 Due to the small number of birds recorded there were no obvious trends in the distribution of great skua across the Morven North Offshore Ornithology Baseline Characterisation Survey Area.

Regional distribution

- 6.15.2.3 Arctic skuas were recorded in only two of the months surveyed as part of the regional surveys (HiDef Aerial Surveying Limited, 2023), with two birds in July 2022 and one bird in August 2023. One of the birds in July 2022 was recorded in the Morven North Offshore Ornithology Baseline Characterisation Study Area. No Arctic skuas were recorded in the Morven North Offshore Ornithology Baseline Characterisation Study Area.

6.15.3 Conclusion

- 6.15.3.1 Arctic skua is considered to have a regional conservation status due to the species being red-listed on the Birds of Conservation Concern (Stanbury *et al.*, 2024). Arctic skuas were not recorded in baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. However, traditional survey methods are unlikely to capture the movements of migratory birds due to the ephemeral nature of these movements and therefore consideration will be given to potential impacts on this species during migratory. Arctic skua is therefore identified as a VOR with a Regional conservation value.

6.16 Little auk (*Alle alle*)

6.16.1 Status overview

- 6.16.1.1 Little auk is not listed under Annex I of the Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is currently green-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2021).
- 6.16.1.2 There is no British population estimate for this species. Little auks are scarce but regular autumn passage migrants and winter visitors in the UK, where most records are from the North Sea coast. There are no SPAs for little auk in the UK.

6.16.2 Seasonal abundance and distribution

Site specific surveys

- 6.16.2.1 Little auks were not recorded in the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

- 6.16.2.2 Little auks were recorded in three of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). One bird was recorded in November 2022, January 2023 and February 2023. The little auk recorded in January 2023 was within the Morven North Offshore Ornithology Baseline Characterisation Study Area.

6.16.3 Conclusion

- 6.16.3.1 Little auk is considered to have a negligible conservation status due to the species being green-listed on the Birds of Conservation Concern (Stanbury *et al.*, 2021). Little auks were recorded in only one of the surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area.
- 6.16.3.2 Little auk is therefore not considered for further assessment in relation to impacts associated with Morven North.

6.17 Common guillemot (*Uria aalge*)

6.17.1 Status overview

- 6.17.1.1 Guillemot is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is currently amber-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.17.1.2 Guillemot is one of the most abundant seabird species in Britain, breeding in large colonies on suitable coastal cliff habitat. The 2015 to 2021 seabird census recorded 1,115,609 breeding individuals across Britain, the Isle of Man and the Channel Islands (Burnell *et al.*, 2023). This represents more than 20% of the European population of the species. Of this population 810,645 breeding individuals are found in Scotland (Burnell *et al.*, 2023), located along all coasts (Balmer *et al.*, 2013). Guillemots mostly prey on small fish species such as lesser sandeel, sprat and gadoid fish (Mitchell *et al.*, 2004). In Scotland, the SMP data indicates a 9% decrease in guillemot population between 1986 and 2023 and a 25% decrease between 2000 and 2023 (Harris *et al.*, 2024). In the UK-wide data, guillemot have increased by 23% between 1986 and 2023 and by 2% between 2000 and 2023 (Harris *et al.*, 2024). Guillemot are found close to colonies throughout the winter often occupying ledges, with the exception of the moult period between August and September (Furness, 2015).

- 6.17.1.3 Guillemot is listed as a qualifying interest species in the breeding season for two SPAs within the species' mean maximum foraging range from Morven North (Woodward *et al.*, 2019) (Table 6.9). These SPAs are designated for 46,642 breeding pairs. The most recent count for each SPA suggests the population associated with these SPAs has increased to 66,055 breeding pairs representing approximately 8% of the breeding population as recorded in Britain, the Isle of Man, and the Channel Islands during the 2015 to 2021 seabird census (Burnell *et al.*, 2023).
- 6.17.1.4 Populations recorded as part of the Seabirds Count are presented in Table 6.9 to provide a more recent contemporaneous dataset. Following the HPAI outbreak amongst breeding seabirds in 2022, guillemot was identified as a species of the highest priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 99 guillemot breeding sites and found that on average the number of guillemot had declined by 6%. However, the decline was not consistent across sites. Further counts have been conducted at both SPAs included in Table 6.9 (JNCC *et al.*, 2024) with increases at both sites (20,381 breeding pairs at the Buchan Ness to Collieston Coast SPA in 2023 and 54,306 breeding pairs at the Fowlsheugh SPA in 2023).

Table 6.9: Designated sites at which common guillemot is a qualifying feature with which there is connectivity with Morven North based on generic foraging range data

Designated site	Distance to Morven North (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell <i>et al.</i> (2023) (breeding pairs)
Buchan Ness to Collieston Coast SPA	66	8,640	19,720
Fowlsheugh SPA	57	37,822	46,785

6.17.2 Seasonal abundance and distribution

Site specific surveys

- 6.17.2.1 Guillemot were recorded in all of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. The species was most abundant in the breeding season (May to August) in all three years with the peak population recorded in July 2021 (49,452 birds) (Table 6.11; Figure 6.9). Outside of this period the abundance of the species was considerably lower.
- 6.17.2.2 The populations estimated in the breeding season (April to mid-August) in the June and July surveys of all three years and August 2022 surpassed the threshold for regional importance (2,502 birds), as did the populations estimated in May 2022 and May 2023. The threshold for national importance (29,515 birds) was also surpassed in the July 2021 and July 2023 surveys. During the breeding season, densities were generally higher in the northern sector of the Morven North Offshore Ornithology Baseline Characterisation Study Area, especially between May and July (Figure B. 2).
- 6.17.2.3 In the non-breeding season (mid-August to March) the threshold for regional importance (4,748 birds) was surpassed in the September 2021 and, August 2022 surveys. There is no obvious trend in the distribution of common guillemot in the non-breeding season (Figure B. 2).
- 6.17.2.4 The populations recorded during July and August surveys are significantly higher than the populations recorded in other breeding and non-breeding season months, particularly in 2022 and 2023. These months mark the beginning of the fledging period when flightless guillemot chicks leave breeding colonies and swim offshore accompanied by their father. To understand if the populations recorded at Morven North are influenced by this movement of young birds and their parent offshore, fledging dates from local colonies have been obtained and are presented in Table 6.10. Data were

only available for the Forth Islands SPA which although beyond the generic foraging range of guillemot in the breeding season is located to the southwest of Morven North and may either contribute birds to the populations recorded in July and August or will be indicative of the likely fledge dates at other colonies on the east coast of Scotland.

6.17.2.5 Fledging in 2022 and 2023 started in mid-June with the last fledging date recorded as the 6th August in 2023 (an equivalent date is not available for 2022). It is therefore highly likely that significant numbers of juvenile birds and their parents from colonies on the east coast of Scotland will be present in offshore waters during July and August and therefore contributing to the populations recorded at Morven North. This is further supported by the presence of juvenile birds in site specific surveys undertaken in July (see Section 6.17.3). This will be considered in the analyses and assessments required for Chapter 2, Volume 11: Offshore Ornithology and Chapter 2.2: Report to Inform Appropriate Assessment: SPA and Ramsar Site Assessments, of the HRA Report.

Table 6.10: Fledging dates for guillemot from the Forth Islands Special Protection Area (Steel and Greetham, 2023; Steel and Skinner, 2024)

Year	First fledge date	Last fledge date
2022	18 June	N/A
2023	19 June	6 August

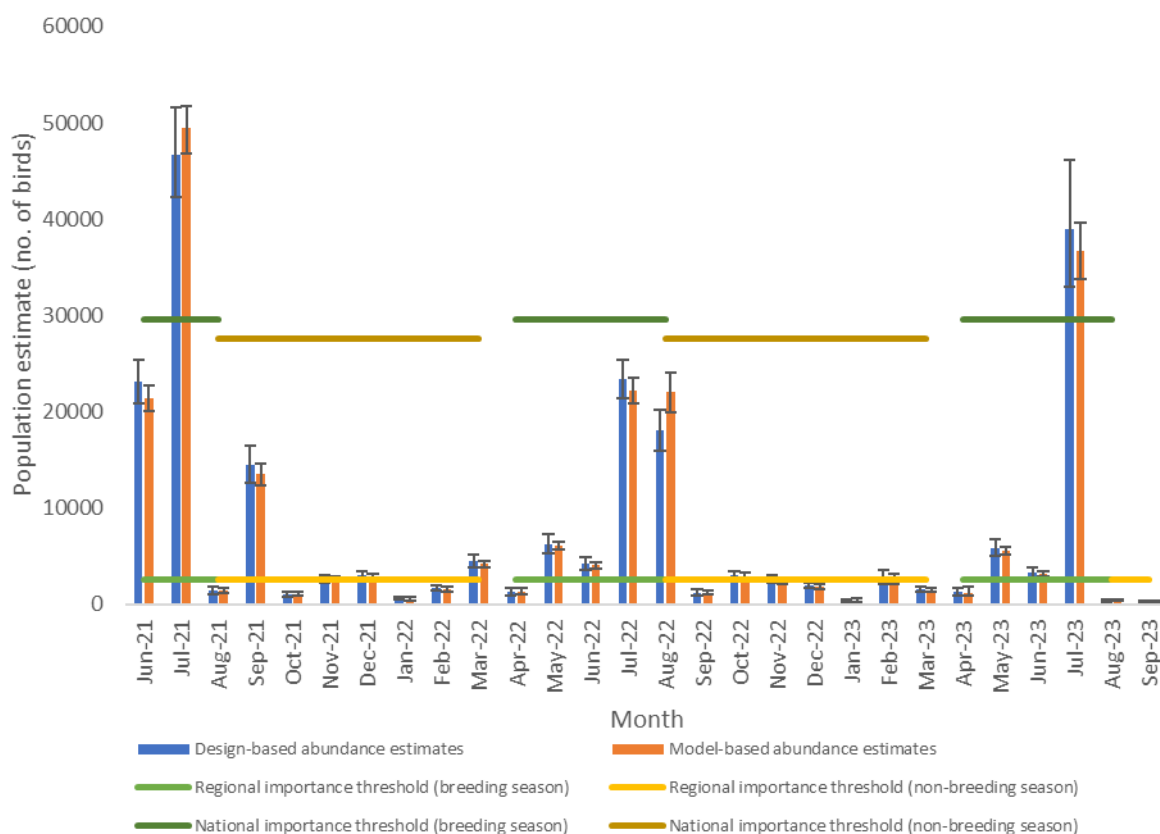


Figure 6.9: Abundance of common guillemot in the Morven North Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals). The regional and national importance thresholds for both seasons are also shown.

Table 6.11: Design-based and model-based population estimates (all behaviours) with lower and upper (95%) confidence limits for each month surveyed from October 2021 to September 2023 for The Morven North Offshore Ornithology Baseline Characterisation Study Area for common guillemot

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	21,359	20,037	22,684	23,051	20,911	25,388
July 2021	49,452	46,758	51,776	46,679	42,341	51,584
August 2021	1,381	1,178	1,633	1,424	1,060	1,839
September 2021	13,472	12,339	14,576	14,419	12,543	16,459
October 2021	1,062	865	1,260	1,018	816	1,248
November 2021	2,597	2,323	2,892	2,580	2,175	2,982
December 2021	2,721	2,380	3,169	2,957	2,427	3,449
January 2022	535	417	706	622	456	796
February 2022	1,544	1,330	1,806	1,663	1,388	1,955
March 2022	4,185	3,825	4,520	4,453	3,851	5,136
April 2022	1,301	1,026	1,704	1,300	922	1,751
May 2022	6,085	5,660	6,493	6,264	5,336	7,227
June 2022	4,034	3,697	4,369	4,248	3,571	4,921
July 2022	22,201	20,901	23,492	23,355	21,397	25,394
August 2022	21,997	19,872	24,025	18,019	15,944	20,166
September 2022	1,140	970	1,385	1,206	865	1,595
October 2022	2,929	2,639	3,231	3,002	2,573	3,405
November 2022	2,307	2,025	2,612	2,616	2,222	3,028
December 2022	1,809	1,560	2,099	1,963	1,675	2,267

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
January 2023	385	286	594	375	219	548
February 2023	2,556	2,091	3,205	2,791	2,140	3,524
March 2023	1,488	1,271	1,719	1,542	1,260	1,826
April 2023	1,217	882	1,768	1,263	869	1,737
May 2023	5,566	5,180	5,967	5,824	4,975	6,787
June 2023	3,137	2,823	3,462	3,226	2,759	3,763
July 2023	36,744	33,736	39,569	38,992	33,002	46,201
August 2023	408	323	539	396	253	559
September 2023	211	160	348	236	132	352

Regional distribution

- 6.17.2.6 Common guillemots were recorded in all of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023) with the highest numbers during the breeding season, although numbers were lower in the second year of surveys. A peak count of 28,036 birds was recorded in the July 2022 survey.
- 6.17.2.7 In the breeding season guillemots were abundant throughout the survey area including the Morven North Baseline Characterisation Survey Area. There was a westerly bias in the distribution in May 2022 with this occurring more regularly in the second breeding season. In the August 2022 and 2023 surveys there was a northerly bias in the distribution of guillemot with birds tending to exhibit a more offshore distribution in the non-breeding season (Figure C. 7, Figure C. 8 and Figure C. 9).

Tracking data

- 6.17.2.8 GPS tracking of 105 individuals between 2011 and 2013 from the Isle of May within the Forth Islands SPA showed connectivity with the Morven North Boundary. In this study, birds made use of both nearshore and offshore waters during all periods of the annual cycle, with further offshore waters encompassing the Morven North Boundary being particularly favoured during the winter moult period (Harris *et al.*, 2015). A separate tracking study of 80 individuals from the Isle of May colony within the Forth Islands SPA between 2010 and 2014 revealed that tracked birds made use of nearshore waters during foraging trips, but there was no overlap of tracks with the Morven North Boundary (Cook *et al.*, 2023). However, tracking data presented in Wakefield *et al.* (2017) based on GPS tagging of nine guillemots from colonies within Fowlsheugh SPA and 15 guillemots from the Isle of May within the Forth Islands SPA during the breeding season between 2010 and 2014 revealed some tracks overlapped with the Morven North Boundary during foraging trips. Furthermore, one study of three guillemots GPS tagged within Fair Isle SPA during the breeding season between 2011 and 2012 showed connectivity with the Morven North Boundary (Wakefield *et al.*, 2017).
- 6.17.2.9 Deployment of six tags on guillemot at the Fowlsheugh SPA in 2024 showed no connectivity with the Morven North Boundary (O'Donovan *et al.*, 2025).

6.17.3 Behaviour and age class

- 6.17.3.1 During aerial surveys, guillemots can only be aged in the weeks following fledging when juvenile birds are accompanied into offshore areas by their father. As a result, data on age class was only available from those surveys conducted in July. In July 2021, 486 birds were aged with 337 juveniles and 149 adults. In July 2022, 211 birds were aged with 114 juveniles and 97 adults. In July 2023, 91 birds were aged with 54 juveniles and 37 adults.
- 6.17.3.2 Analysis of flight directions across the seasonal extents for the breeding season showed the prevailing flight direction was strongly northwest, with only small numbers of birds flying in other directions. In the non-breeding season, the prevailing flight direction was reversed, with southeast being the prevailing direction (Figure 6.10).

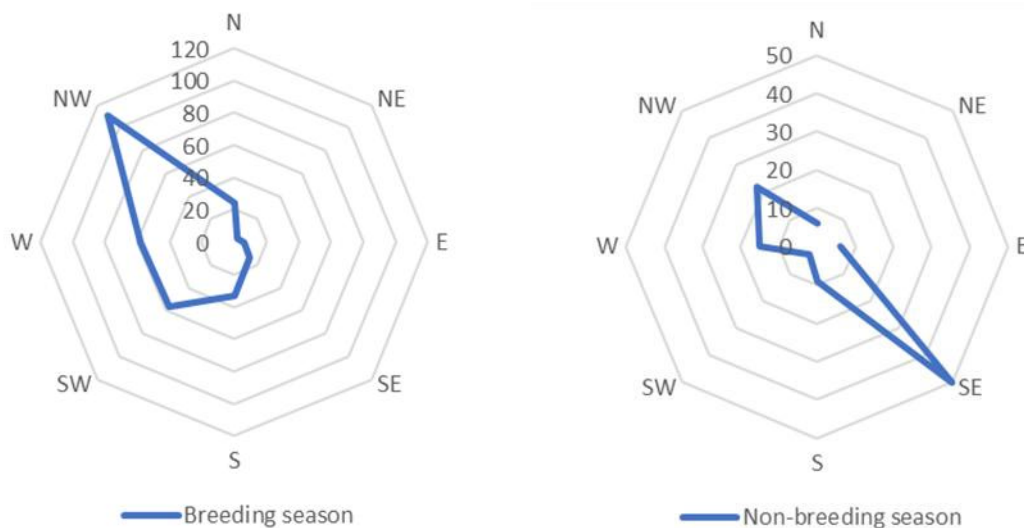


Figure 6.10: Flight directions of guillemots as recorded during site specific aerial surveys

6.17.4 Conclusion

- 6.17.4.1 Guillemot is considered to have an international conservation status due to connectivity between Morven North and two SPAs. Population estimates of guillemot within the Morven North Offshore Ornithology Baseline Characterisation Study Area during the breeding season exceeded the 1% importance threshold of the national population. Guillemot is therefore identified as a VOR and is considered for further assessment as a receptor with an International conservation value.

6.18 Razorbill (*Alca torda*)

6.18.1 Status overview

- 6.18.1.1 Razorbill is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is currently amber-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.18.1.2 Razorbill is one of the most common seabirds in Britain, breeding in large colonies with other seabirds on suitable coastal cliffs. The 2015 to 2021 Seabird Census recorded 200,285 individuals at breeding colonies around Britain (Burnell *et al.*, 2023). This represents more than 20% of the European population of the species. Of this population, 138,828 breeding individuals are found in Scotland distributed along all coasts (Burnell *et al.*, 2023; Balmer *et al.*, 2013). In Scotland, the data collected between 1986 and 2023 indicate a 88% increase in the species' population and a 16% increase between 2000 and 2023 (Harris *et al.*, 2024). UK-wide trends similarly show an increase of 121% between 1986 and 2023 and of 57% between 2000 and 2023 (Harris *et al.*, 2024). Following the breeding season, birds complete their moult and then move predominantly southwards with birds found in the southern North Sea, Celtic Sea, English Channel and the Bay of Biscay (Wernham *et al.*, 2002).
- 6.18.1.3 Razorbill is listed as a qualifying interest species in the breeding season for four SPAs within the species' mean maximum foraging range from Morven North (Woodward *et al.*, 2019) (Table 6.12). These SPAs are designated for 14,870 breeding individuals. The most recent count for each SPA suggests the population associated with these SPAs has increased to 18,229 breeding pairs representing approximately 12% of the breeding population as recorded in Britain, the Isle of Man, and the Channel Islands during the 2015 to 2021 seabird census (Burnell *et al.*, 2023).

6.18.1.4 Populations recorded as part of the Seabirds Count are presented in Table 6.12 to provide a more recent contemporaneous dataset. Further counts have been conducted at all of the SPAs included in Table 6.12 with increases at the Forth Islands SPA and the Troup, Pennan and Lion's Heads SPA and decreases at the Fowlsheugh SPA and St Abb's Head to Fast Castle SPA.

Table 6.12: Designated sites at which razorbill is a qualifying feature with which there is connectivity with Morven North based on generic foraging range data

Designated site	Distance to Morven North (km)	Population at designation (breeding individuals) (JNCC, 2022)	Population estimate from Burnell et al. (2023) (breeding pairs)
Forth Islands SPA	99	2,090	4,250
Fowlsheugh SPA	57	5,800	10,495
St Abb's Head to Fast Castle SPA	102	2,180	2,187
Troup, Pennan and Lion's Heads SPA	105	4,800	3,372

6.18.2 Seasonal abundance and distribution

Site specific surveys

- 6.18.2.1 Razorbills were recorded in all but one of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. The species was most abundant towards the end of the breeding season and the start of the post-breeding season (July and August) in all three years with the peak population recorded in July 2021. Outside of this period the abundance of the species was considerably lower.
- 6.18.2.2 The peak population estimated in the breeding season (April to mid-August) occurred in July 2021 (13,289 birds). The populations estimated in the breeding season in June 2021 (1,305 birds), July 2021 (1,963 birds) and August 2022 (5,071 birds) and July 2023 (7,445 birds) surpass the threshold for regional importance (891 birds). The threshold for national importance (5,844 birds) was surpassed in July 2021 and July 2023.
- 6.18.2.3 The peak population estimated in the post-breeding season (mid-August to October) occurred in August 2022 (5,071 birds). The threshold for regional importance (5,919 birds) was not surpassed in any month.
- 6.18.2.4 The peak population estimated in the non-breeding season (November to December) occurred in November 2022 (830 birds) with the peak population estimated in the pre-breeding season (January to March) estimated in January 2023 (147 birds). The thresholds associated with regional importance in the non-breeding (2,186 birds) and pre-breeding (5,919 birds) seasons were not surpassed in any month. There is no obvious trend in the distribution of razorbill on a seasonal or annual basis (Figure B. 3).
- 6.18.2.5 The populations recorded during the July 2021, 2022 and 2023 and August 2022 surveys are significantly higher than the populations recorded in other breeding and non-breeding season months. These months mark the beginning of the fledging period when flightless razorbill chicks leave breeding colonies and swim offshore accompanied by their father. To understand if the populations recorded at Morven North are influenced by this movement of young birds and their parent offshore, fledging dates from local colonies have been obtained and are presented in Table

6.13. Data were only available for the Forth Islands SPA which is located to the southwest of Morven North and may therefore contribute birds to the populations recorded in July and August and will also be indicative of the likely fledge dates at other colonies on the east coast of Scotland.

6.18.2.6 Fledging in 2022 and 2023 started in mid-June with the last fledging date recorded as early August in 2022 and 4th August in 2023. It is therefore highly likely that significant numbers of juvenile birds and their parents from colonies on the east coast of Scotland will be present in offshore waters during July and August and therefore contributing to the populations recorded at Morven North. This is further supported by the presence of juvenile birds in site specific surveys undertaken in July (see Section 6.17.3). This will be considered in the analyses and assessments required for Chapter 2, Volume 11: Offshore Ornithology and Chapter 2.2: Report to Inform Appropriate Assessment Part 3: SPA and Ramsar Site Assessments.

Table 6.13: Fledging dates for guillemot from the Forth Islands SPA (Steel and Greetham, 2023; Steel and Skinner, 2024)

Year	First fledge date	Last fledge date
2022	18 June	Early August
2023	20 June	4 August

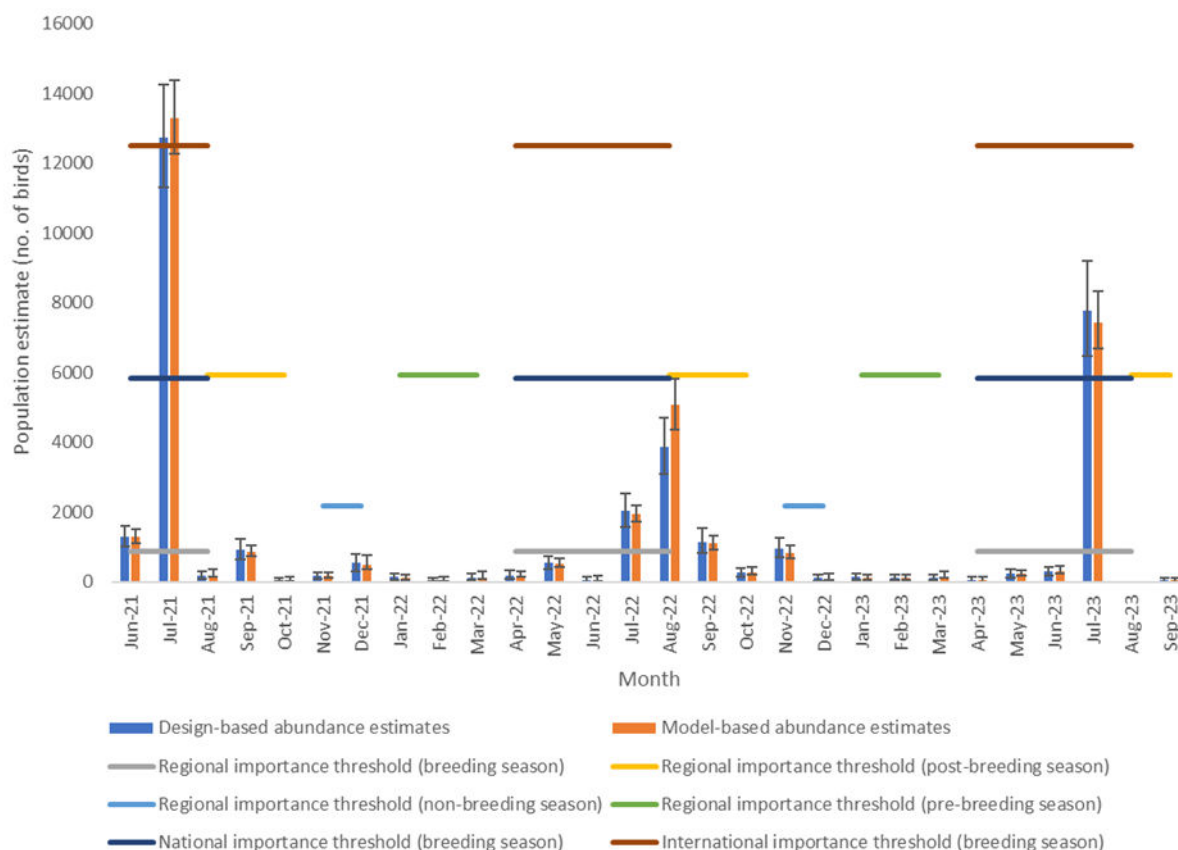


Figure 6.11: Abundance of razorbill in the Morven North Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals). The regional importance threshold for all seasons are also shown. The national importance threshold for the breeding season is also shown.

Table 6.14: Design-based and model-based population estimates (all behaviours) with lower and upper (95%) confidence limits for each month surveyed from October 2021 to September 2023 for the Morven North Offshore Ornithology Baseline Characterisation Study Area for razorbill. Monthly population estimates and densities of razorbill at Morven North plus a 4km buffer.

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	1,305	1,122	1,513	1,298	1,024	1,598
July 2021	13,289	12,273	14,371	12,743	11,313	14,246
August 2021	191	144	380	179	75	310
September 2021	849	741	1,050	928	661	1,236
October 2021	63	31	140	64	13	119
November 2021	182	108	275	180	94	275
December 2021	485	380	769	540	301	805
January 2022	113	63	203	141	58	237
February 2022	61	29	135	60	14	124
March 2022	124	94	306	129	45	238
April 2022	189	142	319	187	81	325
May 2022	527	426	684	541	369	736
June 2022	62	32	172	63	10	138
July 2022	1,963	1,725	2,196	2,037	1,565	2,545
August 2022	5,071	4,372	5,836	3,879	3,098	4,702
September 2022	1,109	932	1,330	1,155	826	1,529
October 2022	285	204	424	271	161	392
November 2022	830	677	1,041	957	717	1,266

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
December 2022	91	59	244	114	30	210
January 2023	124	70	217	147	65	256
February 2023	123	70	207	127	51	223
March 2023	162	119	307	121	42	221
April 2023	47	0	139	52	6	144
May 2023	230	168	348	237	129	368
June 2023	299	238	448	304	182	442
July 2023	7,445	6,678	8,315	7,764	6,476	9,200
August 2023	0	0	0	0	0	0
September 2023	49	0	127	50	4	121

Regional distribution

- 6.18.2.7 Razorbills were recorded in all of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023) with the highest numbers during the breeding season, although numbers were lower in the second year of surveys. A peak count of 3,095 birds was recorded in the July 2022 survey.
- 6.18.2.8 The species was widespread throughout the survey area during the July 2022 survey whereas there was a westerly bias in the distribution of razorbill during the July 2023 survey. In the remaining surveys undertaken in the breeding season there was no obvious trend in the distribution of the species, with far fewer birds present, when compared to the July surveys, with birds not always recorded in the Morven North Baseline Characterisation survey area. There was also no obvious trend in the distribution of the species in the non-breeding season with birds also not recorded in the Morven North Baseline Characterisation survey area in all months (Figure C. 10, Figure C. 11 and Figure C. 12).

Tracking data

- 6.18.2.9 Razorbills have been tracked on the Isle of May within the Forth Islands SPA since 2008. In one study, 40 birds were GPS tagged between 2010 and 2015, with tracks from this study showing no overlap with the Morven North Boundary (Cook *et al.*, 2008). However, a study of GPS tagged birds from Whinnyfold within the Buchan Ness to Collieston Coast SPA investigating the wintering movements of razorbill between 2017 and 2018 did show connectivity with the Morven North Boundary (Buckingham *et al.*, 2021). Furthermore, data presented in the Seabird Tracking Database shows some tracks to overlap with the Morven North Boundary from birds GPS tagged as far as Fair Isle SPA during the breeding season (BirdLife International, 2024), with a mean foraging distance of 152km and a maximum foraging distance of 313km reported (Woodward *et al.*, 2019).
- 6.18.2.10 Deployment of six tags on razorbill at the Fowlsheugh SPA in 2024 showed no connectivity with the Morven North Boundary (O'Donovan *et al.*, 2025).

6.18.3 Age class

- 6.18.3.1 During aerial surveys, razorbills can only be aged in the weeks following fledging when juvenile birds are accompanied into offshore areas by their father. As a result data on age class was only available from those surveys conducted in July. In July 2021, 214 birds were aged with 156 juveniles and 58 adults. In July 2022, 29 birds were aged with 17 juveniles and 12 adults. In July 2023, 30 birds were aged with 23 juveniles and seven adults.

6.18.4 Conclusion

- 6.18.4.1 Razorbill is considered to have an international conservation status due connectivity between the Morven North Boundary and four SPAs. Population estimates of razorbill within the Morven North Offshore Ornithology Baseline Characterisation Study Area during the breeding season exceeded the threshold for national importance. Razorbill is therefore identified as a VOR and is considered for further assessment as a receptor with an International conservation value.

6.19 Black guillemot (*Cepphus grylle*)

6.19.1 Status overview

- 6.19.1.1 Black guillemot is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is currently green-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).

- 6.19.1.2 Black guillemot is a circumpolar species. Approximately half of the UK's population breeds around the Northern Isles, with the remainder confined mainly to the coasts and Islands of north and west Scotland (Burnell *et al.*, 2023). The species is a scarce breeding species on the east coast of Scotland with breeding records restricted to the Caithness, Moray, Banff and Buchan, City of Aberdeen and Kincardine and Deesside coasts (Burnell *et al.*, 2023). According to Burnell *et al.* (2023), the number of black guillemot AONs reported across Britain, Ireland, the Isle of Man and Channel Islands has dropped from 43,535 in Seabird 2000 to 39,523 in the Seabirds Count conducted between 2015 and 2021. This drop was also reflected in the counts for Scotland only.
- 6.19.1.3 Butterfish are the dominant species in black guillemot diets throughout Britain and Ireland (Ewins 1990; Leonard and Wosley 2014; Shoji *et al.*, 2015) and so any environmental changes affecting this fish's habitat will probably have a detrimental impact on black guillemot foraging (Johnston *et al.*, 2021; Burnell *et al.*, 2023).
- 6.19.1.4 No sites designated for black guillemot are within the species mean maximum foraging range of Morven North (Woodward *et al.*, 2024).

6.19.2 Seasonal abundance and distribution

Site specific surveys

- 6.19.2.1 Black guillemot were not recorded in the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

- 6.19.2.2 Black guillemots were not recorded in the surveys conducted as part of the regional surveys in the Scottish North Sea (HiDef Aerial Surveying Limited, 2023).

6.19.3 Conclusion

- 6.19.3.1 Black guillemot is currently green-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2021) meaning the species has a negligible conservation status in the context of Morven North. Black guillemots were not recorded in the surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area and regional surveys suggest limited, if any, birds will be present. The species is therefore considered to have negligible population importance. Black guillemot is therefore not identified as a VOR and not considered for further assessment.

6.20 Atlantic puffin (*Fratercula arctica*)

6.20.1 Status overview

- 6.20.1.1 Puffin is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is currently red-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.20.1.2 Puffins are one of the most abundant seabird species in Britain, breeding in coastal colonies. The Seabird Count recorded 474,679 breeding pairs in the UK of which 369,279 breeding pairs are found in Scotland (Burnell *et al.*, 2023). During the breeding season puffin are aggregated around their colonies along the east coast of the UK including in Scotland with breeding colonies also found on western coasts and widespread throughout the Northern Isles (Balmer *et al.*, 2013). During post-breeding, birds disperse towards the northwestern North Sea before spreading out more widely into open sea with ring recoveries throughout the north Atlantic (Furness, 2015). Lesser sandeel is the commonest prey item for puffins, but they also eat sprat, herring and a wide range of young gadoid fish (Harris, 1984).

- 6.20.1.3 Puffin is listed as a qualifying interest species in the breeding season for six SPAs within the species foraging range of Morven North (Woodward *et al.*, 2019) (
- 6.20.1.4 Table 6.15). These SPAs are designated for 89,665 breeding pairs. The most recent count for each SPA suggests the population associated with these SPAs has increased to 115,173 breeding individuals (excluding Flamborough and Filey Coast SPA due to the census method being different to that undertaken to support the designation) representing approximately 24% of the breeding population as recorded in Britain, the Isle of Man, and the Channel Islands during the 2015 to 2021 seabird census (Burnell *et al.*, 2023). In addition, puffin is also a qualifying feature of the Northumberland Marine SPA and Outer Firth of Forth and St Andrew's Bay Complex SPA which both protect sea areas used by the species from nearby breeding colony SPAs that have connectivity with Morven North.
- 6.20.1.5 Populations recorded as part of the Seabirds Count are presented in Table 6.15 to provide a more recent contemporaneous dataset. Further counts have been conducted at all of the SPAs included in Table 6.15 with increases at the Farne Islands SPA and the Forth Islands SPA. Populations had declined at the remaining SPAs, except the Hoy SPA for which a more recent count is not available (JNCC *et al.* 2024).

Table 6.15: Designated sites at which puffin is a qualifying feature with which there is connectivity with Morven North based on generic foraging range data

Designated site	Distance to Morven North (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell <i>et al.</i> (2023) (breeding pairs)
Coquet Island SPA	141	31,686	25,029
Farne Islands SPA	109	38,399	43,752
Flamborough and Filey Coast SPA	258	980	4,279 (at sea count)
Forth Islands SPA	99	14,000	42,923
Hoy SPA	241	3,500	430
North Caithness Cliffs SPA	216	2,080	3,039

6.20.2 Seasonal abundance and distribution

Site specific surveys

- 6.20.2.1 Puffins were recorded in 26 of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. In 2021 and 2022, the species was most abundant during the breeding season and the start of the non-breeding season (mid-August and September). In 2023, the highest populations occurred in February (544 birds), May (601 birds) and June (469 birds) (Table 6.16; Figure 6.12). Outside of these periods, population estimates were considerably lower with the species not recorded in January 2022 or August 2023.
- 6.20.2.2 The peak population in the breeding season (April to mid-August) occurred in August 2022 (1,006 birds). The threshold for regional importance (4,395 birds) was not surpassed in any month.
- 6.20.2.3 The peak population in the non-breeding season (mid-August to March) occurred in September 2021 (2,696 birds) with this population surpassing the threshold for regional importance (2,320 birds). The threshold for national importance was not surpassed in any month.

6.20.2.4 There is no obvious trend in the distribution of puffin on a seasonal or annual basis (Figure B. 4).

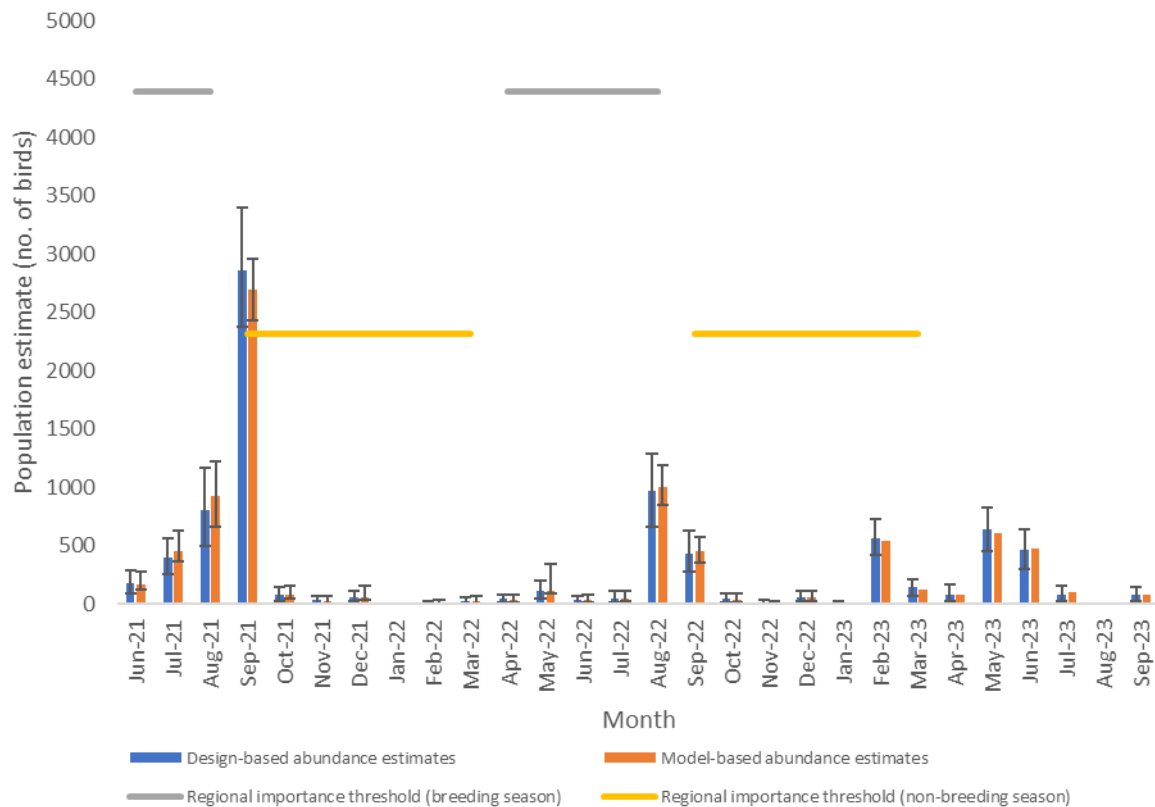


Figure 6.12: Abundance of puffin in the Morven North Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals). The regional importance threshold for the non-breeding season is also shown.

Table 6.16: Design-based and model-based population estimates (all behaviours) with lower and upper (95%) confidence limits for each month surveyed from October 2021 to September 2023 for the Morven North Offshore Ornithology Baseline Characterisation Study Area for puffin

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	172	125	279	181	90	289
July 2021	456	368	624	401	255	566
August 2021	928	666	1,221	809	492	1,167
September 2021	2,696	2,432	2,954	2,857	2,376	3,396
October 2021	76	42	160	77	29	144
November 2021	27	0	64	31	3	71
December 2021	61	35	159	60	20	110
January 2022	0	0	0	0	0	0
February 2022	12	0	36	10	1	29
March 2022	21	0	66	20	2	60
April 2022	40	9	80	41	10	84
May 2022	116	90	338	112	41	195
June 2022	31	14	77	30	3	69
July 2022	47	21	115	50	10	109
August 2022	1,006	851	1,191	969	665	1,292
September 2022	452	350	575	436	278	624
October 2022	36	14	91	42	10	86
November 2022	10	0	29	10	1	30
December 2022	54	29	113	60	20	114

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
January 2023	10	0	30	10	1	29
February 2023	544	444	699	566	419	731
March 2023	127	97	247	140	70	216
April 2023	82	45	140	84	20	163
May 2023	601	506	782	635	450	831
June 2023	469	389	642	460	300	635
July 2023	96	60	241	80	20	157
August 2023	0	0	0	0	0	0
September 2023	75	48	210	76	22	141

Regional distribution

- 6.20.2.5 Puffins were recorded in all of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023) with the highest numbers during the breeding season, although numbers were lower in the second year of surveys. A peak count of 1,023 birds was recorded in the July 2022 survey.
- 6.20.2.6 In the July 2022 survey, there was a southerly bias in the distribution of the species whereas in the August 2022 survey there was a northerly bias in the distribution of the species. In other breeding season months there was no obvious trend in the distribution of the species. Very few puffins were recorded in the November 2022 and January 2023 surveys with no obvious trend in the distribution of puffin in all surveys conducted in the non-breeding season (Figure C. 13, Figure C. 14 and Figure C. 15).

Tracking data

- 6.20.2.7 Tracking data for seven puffins GPS tagged on the Isle of May within the Forth Islands SPA during the breeding season between 2007 and 2010 shows no connectivity between the birds from the colony and the Morven North Boundary (Harris *et al.*, 2012). However, outside of the breeding season, puffins are known to range extensively throughout eastern UK waters, including the Morven North Boundary, out into the North Sea and to the western coasts of Scandinavia (St. John Glew *et al.*, 2019).

6.20.3 Conclusion

- 6.20.3.1 Puffin is considered to have an international conservation status due connectivity between Morven North and six SPAs. Population estimates of puffin within the Morven North Offshore Ornithology Baseline Characterisation Study Area during the non-breeding season exceeded the threshold for regional importance. Puffin is therefore identified as a VOR and is considered for further assessment as a receptor with an International conservation value.

6.21 Red-throated diver (*Gavia stellata*)

6.21.1 Status overview

- 6.21.1.1 Red-throated diver is listed on Annex I of the EU Birds Directive (2009/147/EEC) and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is also included on the Scottish Biodiversity List. The species is currently green-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2021).
- 6.21.1.2 An estimated 1,300 pairs of red-throated diver breed in Britain, with the majority of pairs found in the north and west of Scotland (Musgrove *et al.*, 2013; Balmer *et al.*, 2013). The wintering population around Britain has been estimated at 17,000 individuals (O'Brien *et al.*, 2008) and the 1% threshold for national importance is 170 birds (Musgrove *et al.*, 2011). Wintering red-throated divers show a preference for sheltered shallow waters and sandy bays along North Sea coasts, and several important areas off the east coast of England have recently been identified; in particular the Outer Firth of Forth, Outer Thames Estuary and the Greater Wash (O'Brien *et al.*, 2008). Numbers may however fluctuate widely in response to weather and other factors affecting the supply of prey species such as sandeels, crustaceans and small fish (Lack, 1986).
- 6.21.1.3 Available evidence from ringing studies suggests that red-throated divers may move considerable distances from their breeding grounds in the non-breeding season, with recoveries from Shetland-ringed birds in Kent, Ireland, France and the Netherlands. Birds ringed in Greenland and Scandinavia have also been recovered in the UK, indicating that not all birds recorded in the Morven North area may breed in the UK (Wernham *et al.*, 2002).

- 6.21.1.4 No sites designated for red-throated diver are within the species mean maximum foraging range of Morven North (Woodward *et al.*, 2024). There is also no connectivity between Morven North and any SPAs at which red-throated diver is designated as a wintering feature.

6.21.2 Seasonal abundance and distribution

Site specific surveys

- 6.21.2.1 Red-throated divers were not recorded in the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

- 6.21.2.2 Red-throated divers were recorded in six of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). Birds were recorded in April, July, September and October 2022 and May and June 2023 with one birds in all surveys except April and September 2022 when two birds were recorded. Red-throated divers were recorded in the Morven North Offshore Ornithology Baseline Characterisation Study Area during the September 2022.

6.21.3 Conclusion

- 6.21.3.1 Due to the species inclusion on Annex I of the Birds Directive and Schedule 1 of the Wildlife and Countryside Act 1981, red-throated diver is considered to have a national conservation status. Red-throated divers were not recorded in baseline aerial surveys conducted across the Morven North Offshore Ornithology Baseline Characterisation Study Area.
- 6.21.3.2 Red-throated diver is therefore not considered for further assessment in relation to impacts associated with Morven North.

6.22 European storm petrel (*Hydrobates pelagicus*)

6.22.1 Status overview

- 6.22.1.1 Storm petrel is listed on Annex I of the Birds Directive, and the species is currently amber-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024). The species is also included on the Scottish Biodiversity List.
- 6.22.1.2 Storm petrels breed at a small number of colonies around the UK, primarily on Shetland, Orkney, the Western Isles and the west coast of Scotland, as well as on islands off the Welsh coast, Isles of Scilly and the Channel Islands. Burnell *et al.* (2023) estimated the UK breeding population to be 37,655 breeding pairs of which 33,358 breeding pairs are found in Scotland including the recent colonisation of the Isle of May where there are now an estimated 14 AOS (JNCC *et al.*, 2024). After the breeding season, birds migrate south and spend the winter off the coast of southern Africa (Wernham *et al.*, 2002).
- 6.22.1.3 The Morven North Offshore Ornithology Baseline Characterisation Study Area is within the foraging range of European storm petrel of two SPAs at which the species is a qualifying feature (Table 6.17). These SPAs are designated for 8,600 breeding pairs. The most recent count for each SPA suggests the total population associated with these SPAs has decreased to 869 breeding pairs.

Table 6.17: Designated sites at which European storm petrel is a qualifying feature with which there is connectivity with Morven North based on generic foraging range data

Designated site	Distance to Morven North (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell <i>et al.</i> (2023) (breeding pairs)
Auskerry SPA	249	3,600	692
Sule Skerry and Sule Stack SPA	305	5,000	177

6.22.2 Seasonal abundance and distribution

Site specific surveys

- 6.22.2.1 European storm petrels were recorded in one of the baseline aerial surveys conducted across the Morven North Offshore Ornithology Baseline Characterisation Study Area with a population of 109 birds occurring in the August 2023 survey.
- 6.22.2.2 August represents the breeding season for European storm petrel with the population recorded during the August 2023 survey (109 birds) surpassing the importance threshold for the regional importance (52 birds). The birds recorded during the August 2023 survey were recorded in the north of the Morven North Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

- 6.22.2.3 European storm petrels were recorded in three of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). One bird was recorded in both the July 2022 and May 2023 surveys with 27 birds recorded in August 2023. European storm petrels were not recorded within the Morven North Offshore Ornithology Baseline Characterisation Study Area in any survey.

Tracking data

- 6.22.2.4 GPS tracking of 58 individuals tagged within the Mousa SPA between 2014 and 2017 during the breeding season showed no connectivity with the Morven North Offshore Ornithology Baseline Characterisation Study Area (Bolton, 2021).

6.22.3 Conclusion

- 6.22.3.1 European storm petrel is considered to have an international conservation status due connectivity between Morven North and two SPAs. This species was recorded during one of the baseline aerial surveys conducted across the Morven North Offshore Ornithology Baseline Characterisation Study Area. However, as traditional survey methods are unlikely to capture the movement of migratory birds due to the ephemeral nature of these movements and therefore consideration will be given to potential impacts on this species during migratory periods.
- 6.22.3.2 European storm petrel is therefore identified as a VOR with an International conservation value.

6.23 Leach's petrel (*Oceanodroma leucorhoa*)

6.23.1 Status overview

- 6.23.1.1 Leach's storm petrel is listed on Annex I of the Birds Directive and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), and the species is currently red-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024). The species is also included on the Scottish Biodiversity List.
- 6.23.1.2 Leach's petrels breed at a small number of colonies around the UK, primarily on Shetland, Orkney and the Western Isles. The Seabirds Count estimated the UK breeding population to be 10,765 breeding pairs of which 9,903 breeding pairs are found in Scotland (Burnell *et al.*, 2023). This represents more than 20% of the European population of the species. At least 50% of the UK population breed at ten or fewer sites. After the breeding season, birds migrate south and spend the winter off the coast of west Africa.
- 6.23.1.3 Morven North is within the generic foraging range of Leach's petrel from three SPAs designated for this species (Table 6.18). These SPAs are designated for 75 breeding pairs. The most recent count for each SPA suggests the total population associated with these SPAs has decreased to five breeding pairs with no birds present at the Foula SPA and Sule Skerry and Sule Stack SPA.

Table 6.18: Designated sites at which Leach's petrel is a qualifying feature with which there is connectivity with Morven North based on generic foraging range data

Designated site	Distance to Morven North (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell <i>et al.</i> (2023) (breeding pairs)
Foula SPA	357	50	0
Ramna Stacks and Gruney SPA	415	20	5
Sule Skerry and Sule Stack SPA	305	5	0

6.23.2 Seasonal abundance and distribution

Site specific surveys

- 6.23.2.1 Leach's petrels were not recorded in the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

- 6.23.2.2 Leach's petrels were recorded in one of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). One bird was recorded in the July 2022 survey. Leach's petrels were not recorded within the Morven North Offshore Ornithology Baseline Characterisation Study Area in any survey.

6.23.3 Conclusion

- 6.23.3.1 Leach's petrel is considered to have an international conservation status due connectivity between Morven North and three SPAs. The species was not recorded during baseline aerial surveys of the Morven North Offshore Ornithology Baseline Characterisation Study Area. However, as traditional

survey methods are unlikely to capture the movement of migratory birds due to the ephemeral nature of these movements and therefore consideration will be given to potential impacts on this species during migratory periods.

6.23.3.2 Leach's petrel is therefore identified as a VOR with an International conservation value.

6.24 Northern fulmar (*Fulmarus glacialis*)

6.24.1 Status overview

- 6.24.1.1 Fulmar is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Fulmar is however currently amber-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.24.1.2 Fulmar numbers and distribution around the UK have increased considerably since the mid-19th century (Pennington *et al.*, 2004). The species is one of the most common seabirds in Britain, with an estimated breeding population of 319,508 breeding pairs of which 309,545 breeding pairs are found in Scotland (Burnell *et al.*, 2023). The largest breeding colonies are located off the north and west coasts of Scotland with birds often present at these colonies outside of the breeding season. In the winter birds range over large areas occasionally visiting breeding areas (Furness, 2015).
- 6.24.1.3 Fulmars forage at sea over a wide area in search of small fish (sandeels), crustaceans and squid. They also scavenge extensively around fishing vessels, with offal and fish discards from trawlers now forming a major part of their diet (Phillips *et al.*, 2009). In Scotland, SMP data indicates a 42% decline in the population between 1986 and 2023 and a 40% decline between 2000 and 2023 (Harris *et al.*, 2024). In the UK-wide data, fulmar decreased by 39% between 1986 and 2023 and 38% between 2000 and 2023 (Harris *et al.*, 2023).
- 6.24.1.4 Morven North is within the generic mean maximum foraging range of fulmar (Woodward *et al.*, 2024) from 19 SPAs (Table 6.19). These SPAs are designated for 201,996 breeding pairs. The most recent count for each SPA suggests the total population associated with these SPAs has decreased to 139,529 breeding pairs representing approximately 44% of the UK population. In addition, fulmar is also a qualifying feature of the Northumberland Marine SPA and Seas off Foula SPA which both protect sea areas used by the species from nearby breeding colony SPAs that have connectivity with Morven North.
- 6.24.1.5 Populations recorded as part of the Seabirds Count are presented in Table 6.19 to provide a more recent contemporaneous dataset. Further counts have been conducted at four of the SPAs included in Table 6.19 with increases at the Buchan Ness to Collieston Coast SPA and Copinsay SPA and decreases at the Coquet Island SPA and North Caithness Cliffs SPA (JNCC *et al.*, 2024).

Table 6.19: Designated sites at which fulmar is a qualifying feature with which there is connectivity with Morven North based on generic foraging range data

Designated site	Distance to Morven North (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell et al. (2023) (breeding pairs)
Buchan Ness to Collieston Coast SPA	66	1,765	826
Calf of Eday SPA	271	1,955	2,324
Cape Wrath SPA	287	2,300	1,477
Copinsay SPA	235	1,615	1,618
Coquet Island SPA	141	63	53
East Caithness Cliffs SPA	197	15,000	13,964
Fair Isle SPA	287	35,210	32,491
Fetlar SPA	403	9,500	9,177
Flamborough and Filey Coast SPA	258	1,447	1,257
Foula SPA	357	46,800	10,253
Fowlsheugh SPA	57	1,170	525
Hermaness, Saxa Vord and Valla Field SPA	423	19,539	13,208
Hoy SPA	241	35,000	20,541
North Caithness Cliffs SPA	216	14,700	15,370
Noss SPA	355	6,350	5,092
Rousay SPA	272	1,240	2,192
Sumburgh Head SPA	324	2,542	5,950
Troup, Pennan and Lion's Heads SPA	105	4,400	1,894
West Westray SPA	283	1,400	1,214

6.24.2 Seasonal abundance and distribution

Site specific surveys

- 6.24.2.1 Fulmars were recorded in 27 of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. The species was most abundant from the middle of the breeding season (April to September) through the post-breeding (October) and non-breeding season (November) to the start of the pre-breeding season (December to March).
- 6.24.2.2 The peak population estimated in the breeding season (April to September) occurred in June 2022 (7,314 birds). The threshold for regional importance (9,923 birds) was not surpassed during any month in the breeding season.

6.24.2.3 The peak population estimated in the post-breeding season (October) occurred in October 2022 (613 birds) with the peak population in the non-breeding season (November) in November 2022 (1,177 birds). The peak population in the pre-breeding season (December to March) occurred in December 2022 (621 birds). The threshold for regional importance (9,575, 5,687 and 9,575 birds, respectively) was not surpassed during surveys undertaken in any of these seasons.

6.24.2.4 There is no obvious trend in the distribution of fulmar on a seasonal or annual basis (Figure B. 5).

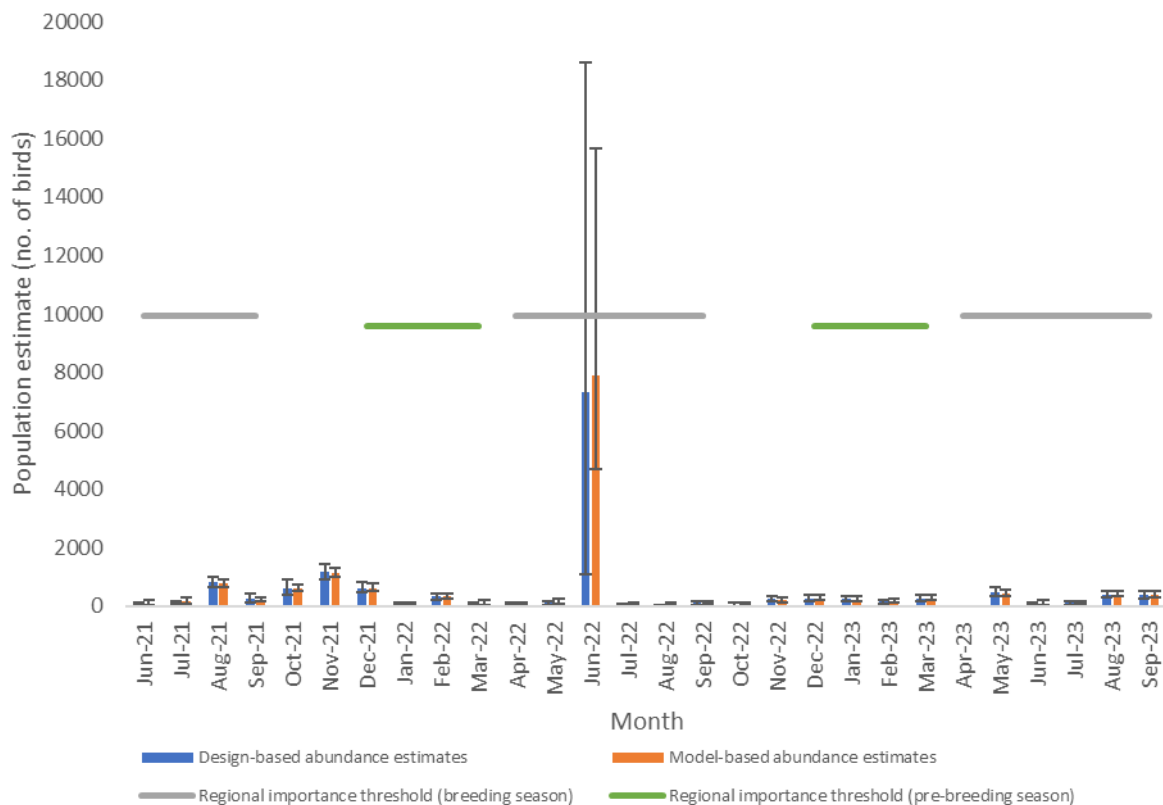


Figure 6.13: Abundance of fulmar in the Morven North Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals). The regional importance threshold for the breeding and non-breeding seasons are also shown.

Table 6.20: Design-based and model-based population estimates (all behaviours) with lower and upper (95%) confidence limits for each month surveyed from October 2021 to September 2023 for Morven North plus a 4km buffer for fulmar. Monthly population estimates and densities of fulmar at Morven North plus a 4km buffer.

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	68	51	197	69	26	128
July 2021	162	89	293	109	59	170
August 2021	787	646	907	810	639	1,000
September 2021	221	168	301	249	110	440
October 2021	609	505	746	613	363	929
November 2021	1,137	983	1,296	1,177	929	1437
December 2021	617	524	768	621	458	814
January 2022	69	40	121	68	17	117
February 2022	323	241	416	335	227	444
March 2022	83	49	185	76	33	126
April 2022	70	41	131	69	25	119
May 2022	116	91	233	110	51	179
June 2022	7,875	4,701	15,659	7,314	1,094	18,612
July 2022	41	22	100	43	8	84
August 2022	31	16	113	25	3	50
September 2022	99	65	178	101	51	154
October 2022	42	26	132	44	5	111
November 2022	186	141	298	241	143	360
December 2022	264	198	367	255	161	363

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
January 2023	211	163	326	235	152	324
February 2023	141	105	242	148	79	223
March 2023	261	204	368	259	169	362
April 2023	0	0	0	0	0	0
May 2023	440	359	563	467	319	632
June 2023	69	51	219	68	25	118
July 2023	105	61	179	102	50	167
August 2023	403	326	530	394	277	519
September 2023	389	310	501	377	255	522

Regional distribution

- 6.24.2.5 Fulmars were recorded in all of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). Over 100 birds were recorded in all surveys except the April 2023 survey, with a peak of 1,306 birds in September 2022.
- 6.24.2.6 There was no obvious trend in the distribution of fulmars in the majority of surveys. In the September and November 2022 and August 2023 surveys there was a northerly bias in the distribution of fulmars (Figure C. 16, Figure C. 17 and Figure C. 18).

Tracking data

- 6.24.2.7 GPS tracking data from five individuals tagged within the Buchan Ness to Collieston Coast SPA during the breeding season in 2012 show some connectivity to the Morven North Boundary (Darby *et al.*, 2021). Furthermore, tracking data obtained during the 2011 and 2012 breeding season from birds nesting on Eynhallow within the Rousay SPA also showed connectivity to the Morven North Boundary, with tracking data from this study suggesting a maximum foraging range of 2980km from the colony, far exceeding the previously assumed 580km foraging range for breeding fulmars reported in Thaxter *et al.* (2012) and Edwards *et al.* (2016).

6.24.3 Behaviour

- 6.24.3.1 Analysis of flight directions recorded during the breeding season revealed northerly compass directions (north, northeast and northwest) as the prevailing flight directions. In the pre-breeding season, there was a predominant western and southerly component to the prevailing flight directions. Flight directions were analysed for a comparatively smaller number of birds in the post-breeding and non-breeding seasons with south the prevailing flight direction in both seasons (Figure 6.14).

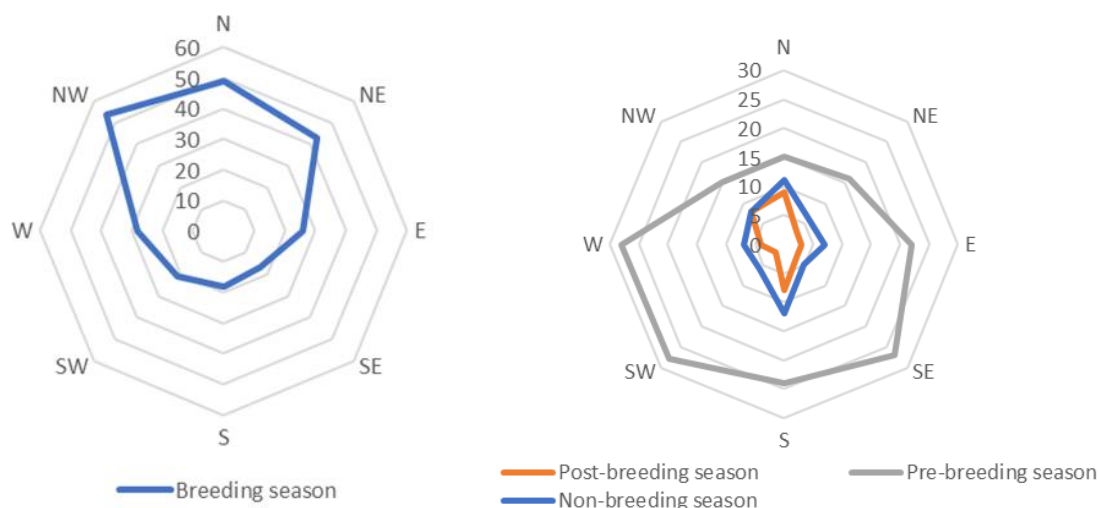


Figure 6.14: Flight directions of fulmars, as recorded during site specific aerial surveys

6.24.4 Conclusion

- 6.24.4.1 Fulmar is considered to have an international conservation status due to Morven North being within the foraging range of fulmar from multiple SPAs. Fulmars were recorded in all but one of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation

Study Area although the estimated populations did not surpass the thresholds of population importance. Based on potential SPA connectivity and the occurrence of the species in all baseline aerial surveys, albeit in numbers of less than regional importance fulmar is identified as a VOR and considered for further assessment as a species with an International conservation value.

6.25 Sooty shearwater (*Ardenna grisea*)

6.25.1 Status overview

- 6.25.1.1 Sooty shearwater is listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Sooty shearwater is not included on Annex I of the EU Birds Directive (2009/147/EEC). The species is not listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2021).

6.25.2 Seasonal abundance and distribution

Site specific surveys

- 6.25.2.1 Sooty shearwaters were recorded in one of the baseline aerial surveys conducted across the Morven North Offshore Ornithology Baseline Characterisation Study Area. Two birds were recorded in the September 2021 survey translating to a population estimate of 17 birds. Sooty shearwater does not breed in the UK and these birds represent birds migrating to breeding areas in the southern hemisphere. Both birds were flying in a south-west or west-south-west direction.

Regional distribution

- 6.25.2.2 Sooty shearwaters were not recorded in the surveys conducted as part of the regional surveys in the Scottish North Sea (HiDef Aerial Surveying Limited, 2023).

6.25.3 Conclusion

- 6.25.3.1 Sooty shearwater is not included on the conservation value metrics included in Table 6.1 and is therefore considered to have a negligible conservation status. The species was only recorded in small numbers in one of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area.
- 6.25.3.2 This population is not considered to be of importance in relation to the international population of the species. Sooty shearwater is therefore not considered for further assessment in relation to impacts associated with Morven North.

6.26 Manx shearwater (*Puffinus puffinus*)

6.26.1 Status overview

- 6.26.1.1 Manx shearwater is not listed under Annex I of the Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is included on the Scottish Biodiversity List. Manx shearwater is currently amber-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.26.1.2 Manx shearwaters spend most of their lives at sea, only coming ashore to breed. They typically eat small squid, fish, including sandeels and free-swimming crustaceans, which they catch by shallow plunge-diving or surface feeding (Forrester *et al.*, 2007).
- 6.26.1.3 Manx shearwater is a summer visitor to UK waters, occurring at breeding colonies between March and September. The UK breeding population is estimated at 786,743 breeding pairs, with large colonies on the west coast of Scotland and off southwest Wales (e.g., Rum, Skomer and Skokholm) (Burnell *et al.*, 2023). At least 50% of the UK population breed at ten or fewer sites. Following the

breeding season, birds migrate southwards to southern Europe and Africa and then cross the Atlantic Ocean spending the winter off the coast of South America (Furness, 2015).

- 6.26.1.4 Manx shearwater has a large generic mean maximum foraging range (Woodward *et al.*, 2024) which means that there is theoretical connectivity between Morven North and all UK SPAs. These SPAs are located on the west coast of the UK and it is considered unlikely that birds from these SPAs will forage in the North Sea to any great extent as illustrated by tracking studies (e.g. Dean *et al.*, 2012). The species is also a qualifying feature of the Outer Firth of Forth and St Andrew's Complex SPA which is designated to protect foraging areas used by the species.

6.26.2 Seasonal abundance and distribution

Site specific surveys

- 6.26.2.1 Manx shearwaters were recorded in six of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. Birds were recorded in June (18 birds) and July (310 birds) 2021, and May (9 birds), July (58 birds), August (25 birds) and September 2023 (9 birds) (Figure 6.15; Table 6.21).
- 6.26.2.2 The peak population estimated within the Morven North Offshore Ornithology Baseline Characterisation Study Area occurred in July 2021 (310 birds). The breeding population that may have connectivity with Morven North is one breeding pair and therefore any birds recorded during surveys conducted in the breeding season are more likely to be either non-breeding birds, failed breeding birds or birds on passage to breeding colonies. As such, all populations recorded during surveys are compared against the 1% regional threshold of the pre- and post-breeding population (85 birds). The population recorded in July 2021 (310 birds) surpasses the threshold for regional importance.

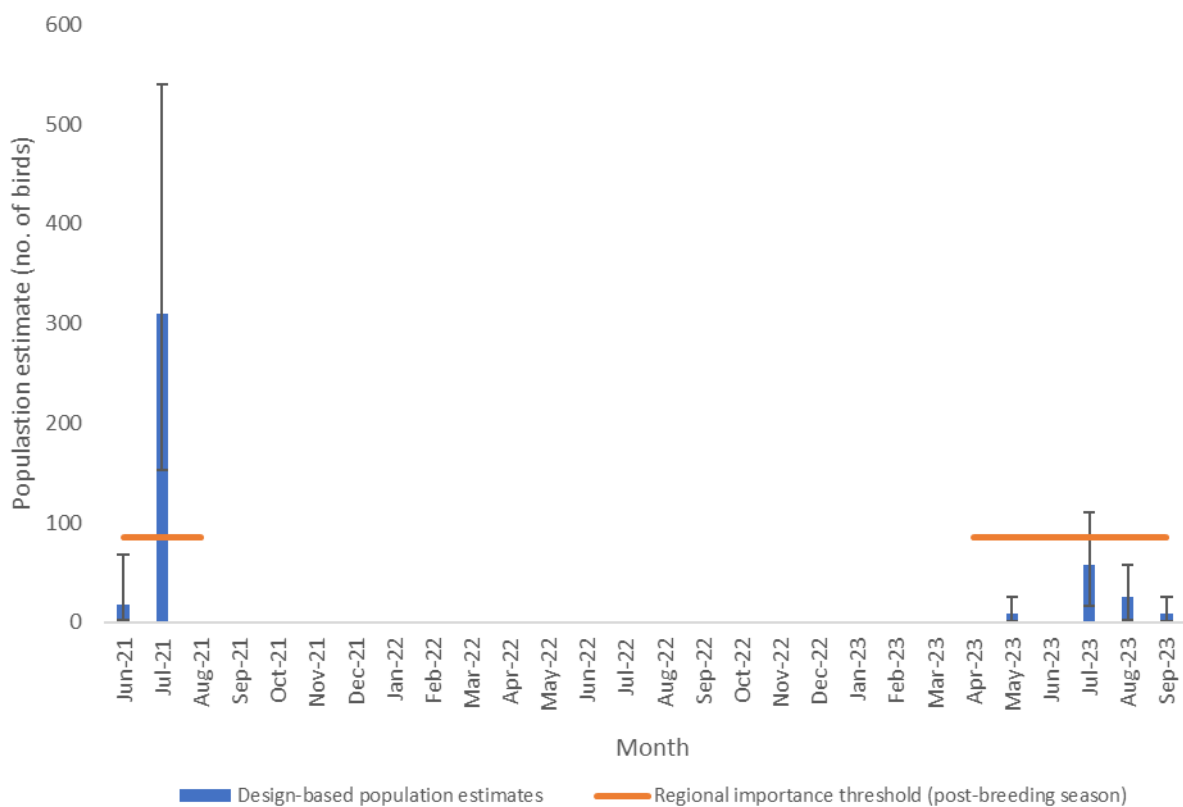


Figure 6.15: Abundance of Manx shearwater in the Morven North Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals). The regional importance threshold for the post-breeding season is also shown.

Table 6.21: Design-based population estimates (all behaviours) with lower and upper (95%) confidence limits for each month surveyed from October 2021 to September 2023 for The Morven North Offshore Ornithology Baseline Characterisation Study Area for Manx shearwater

Month	Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit
June 2021	18	2	68
July 2021	310	153	540
August 2021	0	0	0
September 2021	0	0	0
October 2021	0	0	0
November 2021	0	0	0
December 2021	0	0	0
January 2022	0	0	0
February 2022	0	0	0
March 2022	0	0	0
April 2022	0	0	0
May 2022	0	0	0
June 2022	0	0	0
July 2022	0	0	0
August 2022	0	0	0
September 2022	0	0	0
October 2022	0	0	0
November 2022	0	0	0
December 2022	0	0	0
January 2023	0	0	0

Month	Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit
February 2023	0	0	0
March 2023	0	0	0
April 2023	0	0	0
May 2023	9	1	25
June 2023	0	0	0
July 2023	58	17	110
August 2023	25	2	58
September 2023	9	1	25

Regional distribution

- 6.26.2.3 Manx shearwaters were recorded in three of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023). Eight birds were recorded in the July 2022 survey, one bird in June 2023 and three in July 2023.
- 6.26.2.4 The density layers for Manx shearwater associated with Waggitt *et al.* (2020) show that the Morven study area supports relatively low to negligible densities throughout the year. Higher densities occur much further North, around the Shetlands, and West, corresponding to the locations of St Kilda SPA, the Copeland Islands SPA, and the Welsh SPAs further West in the Irish Sea (Bucknell *et al.*, 2023).

Tracking data

- 6.26.2.5 When applying generic foraging ranges for the species presented in Woodward *et al.* (2020), the Morven North Boundary is within the foraging range of Manx shearwater from several breeding colonies on the west coast of the UK. However, tracking data from colonies on Bardsey Island, Skomer and Lundy Island (BirdLife International, 2024; Dean *et al.*, 2010; Dean *et al.*, 2012) shows no connectivity to the Morven North Boundary from these breeding colonies.

6.26.3 Conclusion

- 6.26.3.1 Manx shearwater is considered to have a regional conservation status due to the species being included on the Scottish Biodiversity List. There is considered to be no connectivity between Morven North and SPAs at which this species is a qualifying feature based on tracking data (Dean *et al.*, 2013). Manx shearwaters were recorded in four of the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. The populations estimated in the July 2021 survey surpassed the threshold for regional importance. Manx shearwater is therefore identified as a VOR with a Regional conservation value.

6.27 Northern gannet (*Morus bassanus*)

6.27.1 Status overview

- 6.27.1.1 Gannet is not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Gannet is currently amber-listed on the UK Birds of Conservation Concern (Stanbury *et al.*, 2024).
- 6.27.1.2 Gannet is a widely dispersed species throughout the southern North Sea outside of the breeding season with an estimated flyway population of 892,000 individuals (Stienen *et al.*, 2007).
- 6.27.1.3 The UK breeding population of gannet has been estimated at 346,398 pairs of which there are an estimated 280,058 breeding pairs in Scotland (Burnell *et al.*, 2023). The species breeds at 22 large colonies around the UK, the nearest to Morven North being at Bass Rock (Forth Islands SPA). The gannet colony at Bass Rock is one of the largest in the UK, with an estimated breeding population of 75,259 pairs in 2014, with a projected population of 81,000 pairs in 2021 (Burnell *et al.*, 2023), although this projection was estimated before the HPAI outbreak in 2022 and 2023 (see below). This represents more than 20% of the European population of the species. At least 50% of the UK population breed at ten or fewer sites. Following the breeding season gannets move southwards with birds wintering across a large area spanning the North Sea to west Africa (Furness, 2015).
- 6.27.1.4 Gannet is listed as a qualifying feature at six SPAs within the species' generic mean maximum foraging range from Morven North (Woodward *et al.*, 2024) (Table 6.22). These SPAs are designated for 60,395 breeding pairs. The most recent count for each SPA suggests the population associated with these SPAs has increased to 146,014 breeding pairs representing approximately 48% of the UK breeding population. In addition, gannet is also a qualifying feature of the Outer Firth of Forth and St

Andrew's Bay Complex SPA which protects sea areas used by the species from nearby breeding colony SPAs that have connectivity with Morven North.

- 6.27.1.5 Populations recorded as part of the Seabirds Count are presented in Table 6.22 to provide a more recent contemporaneous dataset. Following the HPAI outbreak amongst breeding seabirds in 2022, gannet was identified as a species of the highest priority in terms of understanding the impacts of HPAI on the species (NatureScot, 2023). Tremlett *et al.* (2024a) surveyed 13 gannet breeding sites and found that on average the number of gannet had decreased by 25%, although this trend was not consistent across the eight SPAs included in the study. Further counts have been conducted at four if the SPAs included in Table 6.22 (JNCC *et al.*, 2024) and the results reflect those found by Tremlett *et al.* (2024a) with some having decreased (Hermaness, Saxa Vord and Valla Field SPA and Noss SPA) and some increased (Fair Isle SPA and Flamborough and Filey Coast SPA).

Table 6.22: Designated sites at which gannet is a qualifying feature with which there is connectivity with Morven North based on generic foraging range data

Designated site	Distance to Morven North (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell <i>et al.</i> (2023) (breeding pairs)
Fair Isle SPA	291	1,166	4,971
Flamborough and Filey Coast SPA	258	8,469	13,392
Forth Islands SPA	99	21,600	75,259
Hermaness, Saxa Vord and Valla Field SPA	423	16,400	29,562
Noss SPA	355	6,860	13,765
Sule Skerry and Sule Stack SPA	305	5,900	9,065

6.27.2 Seasonal abundance and distribution

Site specific surveys

- 6.27.2.1 Gannets were recorded in all but two of the baseline aerial surveys conducted across the Morven North Offshore Ornithology Baseline Characterisation Study Area. The abundance of the species was generally higher in the breeding season increasing from May to a peak in either June or July and then declining into the post-breeding season. The abundance of the species was considerably lower between December and February.
- 6.27.2.2 The peak population estimated in the breeding season (March to September) occurred in July 2021 (1,651 birds), with the peak population in 2022 occurring in June (1,318 birds) and the peak population in 2023 occurring in July (617 birds). These populations did not surpass the threshold for regional importance (5,600 birds).
- 6.27.2.3 The peak population in the post-breeding season (October to November) occurred in October 2021 (742 birds) with the peak population in the pre-breeding season (December to February) occurring in February 2022 (32 birds). The populations in these seasons did not surpass the respective thresholds for regional importance (4,563 and 2,484 birds respectively).
- 6.27.2.4 There is no obvious trend in the distribution of gannet on a seasonal or annual basis (Figure B. 6).

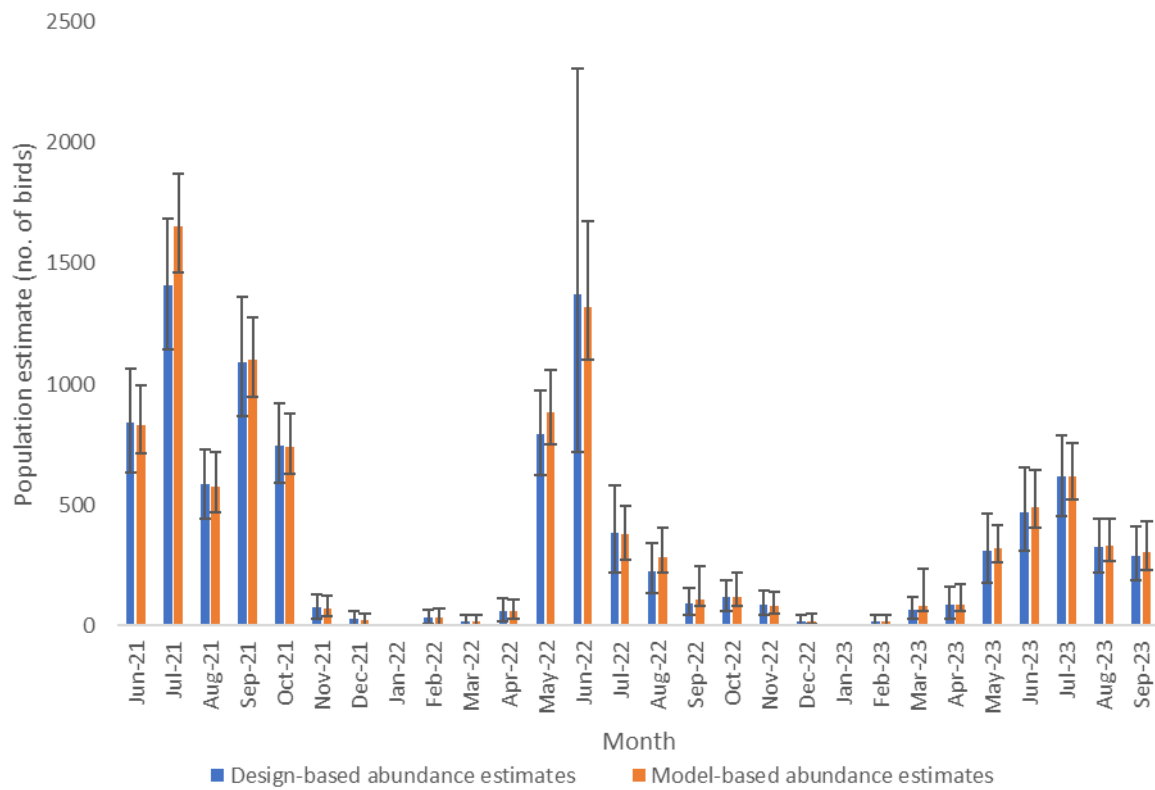


Figure 6.16: Abundance of gannet in the Morven North Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals)

Table 6.23: Design-based and model-based population estimates (all behaviours) with lower and upper (95%) confidence limits for each month surveyed from October 2021 to September 2023 for Morven North plus a 4km buffer for gannet. Monthly population estimates and densities of gannet at Morven North plus a 4km buffer.

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	830	711	995	838	634	1,062
July 2021	1,651	1,464	1,869	1,411	1,142	1,686
August 2021	574	469	721	584	442	728
September 2021	1,099	947	1,275	1,092	869	1,361
October 2021	742	629	880	745	589	919
November 2021	71	40	124	78	26	130
December 2021	24	0	51	26	3	59
January 2022	0	0	0	0	0	0
February 2022	33	0	72	32	8	67
March 2022	17	0	42	16	2	42
April 2022	61	29	109	61	17	111
May 2022	885	748	1,058	792	623	976
June 2022	1,318	1,098	1,674	1,373	720	2,306
July 2022	377	270	493	386	220	580
August 2022	285	221	403	224	133	341
September 2022	110	80	243	93	42	153
October 2022	118	81	219	120	60	189
November 2022	83	49	140	85	42	142
December 2022	19	7	48	18	2	42

Month	Model-based population estimates (Morven North plus 4km buffer) (no. of birds)			Design-based population estimates (Morven North plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
January 2023	0	0	0	0	0	0
February 2023	17	0	43	17	2	42
March 2023	79	61	232	67	25	117
April 2023	86	60	170	85	25	159
May 2023	319	260	413	309	177	464
June 2023	488	403	645	470	311	657
July 2023	617	523	754	616	454	787
August 2023	331	265	442	324	217	443
September 2023	306	228	429	287	185	412

Regional distribution

6.27.2.5 Gannets were recorded in all of the surveys undertaken as part of the regional surveys covering part of the Scottish North Sea (HiDef Aerial Surveying Limited, 2023) with the highest numbers in the breeding season, although fewer birds in the second year of surveys. A peak count of 884 birds was recorded in May 2022. There was no obvious trend in the distribution of gannet in any survey (Figure C. 19, Figure C. 20 and Figure C. 21).

Tracking data

6.27.2.6 There is a long-term tracking study (2010 to date) of gannet at the Bass Rock colony whilst short-term studies have been carried out at other colonies in the North Sea and the east coast of England (e.g. Bempton Cliffs (Langston *et al.*, 2013)). According to Wakefield *et al.* (2013), gannet tracked from colonies around the British Isles forage in largely mutually exclusive areas. In the North Sea, Wakefield *et al.* (2013) and Lane *et al.* (2020) showed that individuals from the Bass Rock colony within the Forth Islands SPA were the most likely to be connected to the Morven North Boundary.

6.27.3 Behaviour and age class

6.27.3.1 A total of 1,001 individuals were aged during the site specific aerial surveys. Of these, 965 were identified as adults, two as juveniles and 34 as immatures of one or more calendar years old. The majority of immature birds were recorded between May and September (Figure C. 20).

6.27.3.2 Analysis of flight directions across the seasonal extents for the breeding season showed prevailing flight directions of southwest and northeast, with west and east as the next most common compass directions. The limited number of birds recorded for flight direction in the pre-breeding season means no clear pattern in flight direction emerges. In the post-breeding season, north and northeast are the prevailing flight directions (Figure C. 20).

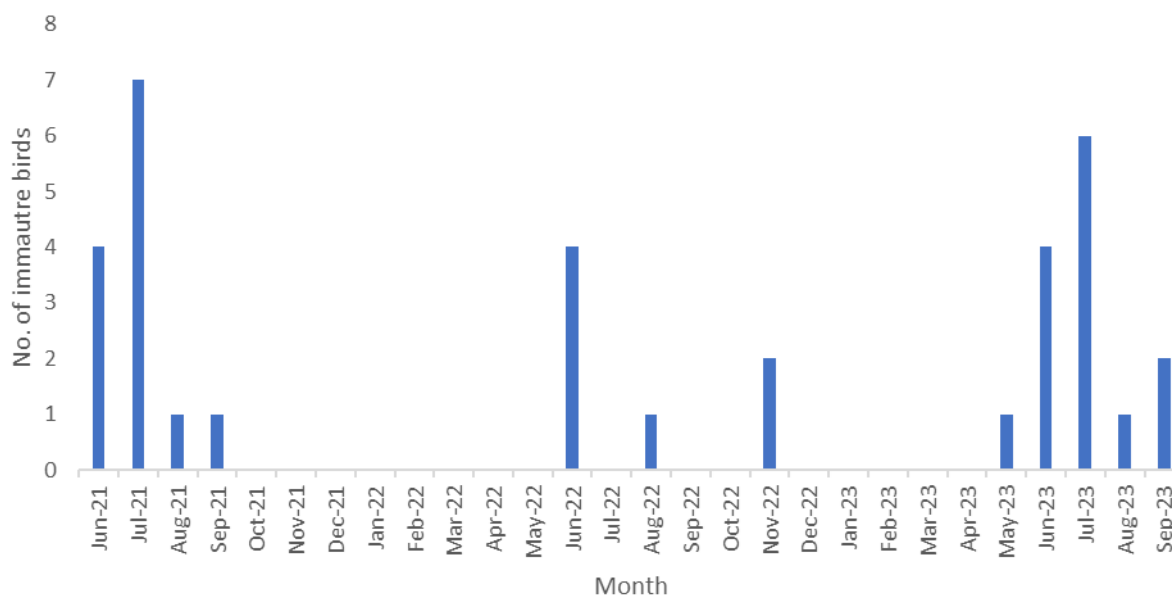


Figure 6.17: Number of immature gannets (one or more calendar years old) recorded during each site specific aerial survey

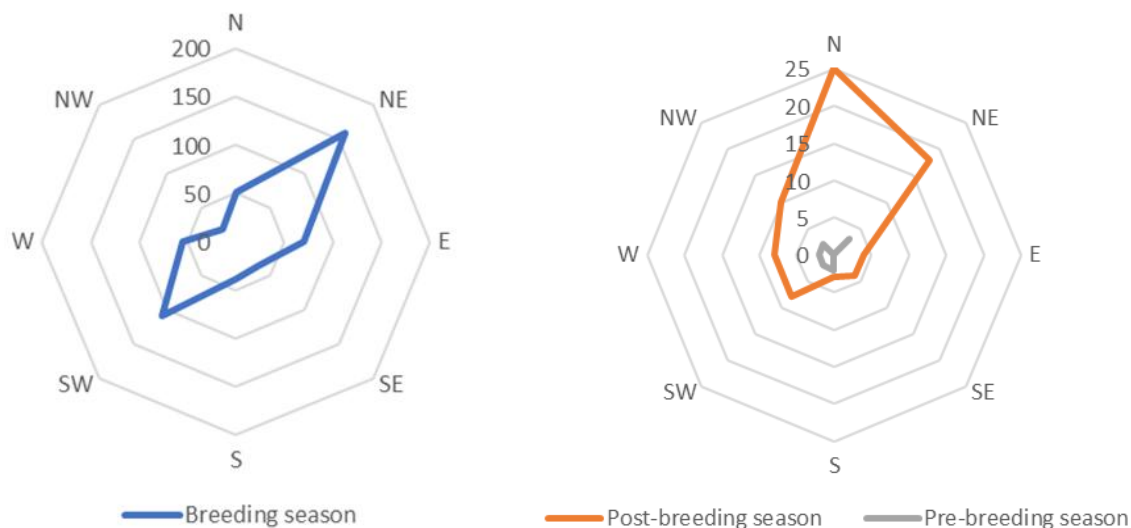


Figure 6.18: Flight directions of gannet as recorded during site specific aerial surveys

6.27.4 Conclusion

6.27.4.1 Gannet is considered to have an international conservation status due to connectivity between Morven North and a number of SPA colonies. Gannets were recorded in almost all the baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area. The populations estimated in these surveys did not surpass the relevant thresholds for regional importance in any season. However, due to the International conservation value of the species, gannet is identified as a VOR and considered for further assessment in relation to impacts associated with Morven North as a receptor with an International conservation value.

6.28 Cormorant (*Phalacrocorax carbo*)

6.28.1 Status overview

6.28.1.1 Cormorant is not listed under Annex I of the Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is currently green-listed on the UK Birds of Conservation Concern list (Stanbury *et al.*, 2024).

6.28.1.2 The UK population of cormorant is estimated 8,900 pairs with breeding locations found around the coasts of the UK, composed of the *carbo* subspecies and at inland locations, composed of the *sinensis* subspecies (Woodward *et al.*, 2020; Balmer *et al.*, 2013). In Scotland the predicted breeding population is 3,458 breeding pairs (Burnell *et al.*, 2023) found along all coasts (Balmer *et al.*, 2013). The population of the species increases to 64,500 individuals in the non-breeding season when it is supplemented by birds from continental Europe of the *sinensis* subspecies (Woodward *et al.*, 2020; Furness, 2015). The UK-wide SMP trends indicate an increase of 5% between 1986 and 2023 but a 5% decrease between 2000 and 2023 (Harris *et al.*, 2024). There are no trends for Scotland alone (Harris *et al.*, 2024).

6.28.1.3 Morven North is not within the foraging range from any SPA at which cormorant is a qualifying feature (Woodward *et al.*, 2024).

6.28.2 Seasonal abundance and distribution

Site specific surveys

- 6.28.2.1 Cormorants were not recorded in baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

- 6.28.2.2 Cormorants were not recorded in the surveys conducted as part of the regional surveys in the Scottish North Sea (HiDef Aerial Surveying Limited, 2023).

6.28.3 Conclusion

- 6.28.3.1 Cormorant is considered to have a negligible conservation status due to the species being green-listed on the Birds of Conservation Concern (Stanbury *et al.*, 2021). Cormorant was not recorded during aerial surveys of the Morven North Offshore Ornithology Baseline Characterisation Study Area or during the regional surveys. The species is therefore considered to have a negligible population importance and therefore it is considered highly unlikely that impacts associated with Morven North project will affect the species. Cormorants are therefore not considered for further assessment in relation to impacts associated with Morven North.

6.29 Shag (*Gulosus aristotelis*)

6.29.1 Status overview

- 6.29.1.1 Shag is listed on Annex I of the Birds Directive (2009/147/EEC) and the species is currently amber-listed on the UK Birds of Conservation Concern list (Stanbury *et al.*, 2024).
- 6.29.1.2 The UK breeding population of shag is estimated at 20,209 breeding pairs with breeding locations found predominantly around the coasts of Scotland, Northern Ireland, Wales and the southwest of England (Burnell *et al.*, 2023). In Scotland, the breeding population is 16,788 breeding pairs distributed along all coasts although more common on western and northern coastlines (Burnell *et al.*, 2023; Balmer *et al.*, 2013). This represents more than 20% of the European population of the species. In the non-breeding season, it is estimated that there are 110,000 individuals in UK waters with birds remaining close to their breeding colonies (Woodward *et al.*, 2020; Furness, 2015). In Scotland, SMP indicates a 14% decrease in the shag population between 1986 and 2023 and 9% increase between 2000 and 2023 (Harris *et al.*, 2024). In the UK-wide data, shag decreased by 27% between 1986 and 2023 and by 14% between 2000 and 2023 (Harris *et al.*, 2024). Shags disperse from breeding colonies and spend the winter in sheltered areas with those from breeding colonies in northeast England and southeast Scotland moving the furthest (Furness, 2015).
- 6.29.1.3 Morven North is not within the foraging range from any SPA at which shag is a qualifying feature (Woodward *et al.*, 2024).

6.29.2 Seasonal abundance and distribution

Site specific surveys

- 6.29.2.1 Shags were not recorded in baseline aerial surveys undertaken across the Morven North Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

- 6.29.2.2 Shags were not recorded in the surveys conducted as part of the regional surveys in the Scottish North Sea (HiDef Aerial Surveying Limited, 2023).

Tracking data

6.29.2.3 Tracking data from 32 individuals GPS tagged on the Isle of May during the breeding seasons in 2012 and 2013 show no connectivity to the Morven North Boundary (Wakefield *et al.*, 2017).

6.29.3 Conclusion

6.29.3.1 Shag is considered to have a national conservation status due to the species inclusion on Annex I of the Birds Directive. Shag was not recorded during aerial surveys of the Morven North Offshore Ornithology Baseline Characterisation Study Area or the regional surveys. The species is therefore considered to have a negligible population importance and therefore it is considered highly unlikely that impacts associated with Morven North will affect the species. Shag is therefore not considered for further assessment in relation to impacts associated with Morven North.

6.30 Other species

6.30.1.1 A number of other species were recorded during surveys of the Morven North Offshore Ornithology Baseline Characterisation Study Area. These are identified in Table 6.24.

Table 6.24: Raw counts of other species recorded during baseline aerial surveys of the Morven North Offshore Ornithology Baseline Characterisation Study Area

Species	Survey	Raw count (no. of birds)
Osprey <i>Pandion haliaetus</i>	June 2021	1
Snipe <i>Gallinago gallinago</i>	September 2022	4
Grey heron <i>Ardea cinerea</i>	September 2023	1

7 Identification of Valued Ornithological Receptors

7.1.1.1 Table 7.1 outlines the criteria used to determine the conservation value of all species relevant to Morven North. Based on the results presented in each species account in 5.1.1.6, a group of key species (VORs) has been identified for Impact Assessment in Volume 2, Chapter 11: Offshore Ornithology, for Morven North:

- kittiwake;
- little gull;
- great black-backed gull;
- herring gull;
- sandwich tern;
- little tern;
- roseate tern;
- common tern;
- Arctic tern;
- great skua;
- Arctic skua;
- common guillemot;
- razorbill;
- puffin;
- European storm petrel;
- Leach's petrel;
- fulmar;
- Manx shearwater;
- gannet;

7.1.1.2 Therefore, of the species considered in this report, black-headed gull, common gull, lesser black-backed gull, little auk, black guillemot, red-throated diver, cormorant and shag are not considered for further assessment in relation to impacts associated with Morven North.

7.1.1.3 Section 3.2.2 discusses differences between the area covered by the digital aerial surveys and the Morven North Offshore Ornithology Baseline Characterisation Study Area. The difference is considered to be insignificant in relation to the large area covered by the site specific surveys. However, a precautionary approach has been adopted whereby population importance thresholds have not been applied as definitive thresholds but rather where a species population is approaching an importance threshold, it is assumed that this threshold is exceeded. However, based on the information presented in the previous sections it is not considered that this disparity leads to any species having been omitted from the list of VORs provided above.

Table 7.1: Summary of the conservation and population importance of all seabird species identified for consideration as part of Morven North assessment in relation to relevant thresholds

Species	Conservation status	SPA connectivity	Population importance in the breeding season	Population importance in the post-breeding/pre-breeding season	Population importance in the non-breeding season	Conservation value	Taken forward for impact assessment
Kittiwake	International (SPA connectivity)	Yes	Local	Local	N/A	International	Yes - SPA connectivity. Peak populations surpass importance thresholds
Black-headed gull	Regional (Scottish Biodiversity List)	No	Negligible	N/A	Negligible	Regional	No - species not recorded during baseline aerial surveys
Little gull	National (Annex I)	No	Negligible	N/A	Negligible	National	Yes – migratory species
Common gull	Regional (Birds of Conservation Concern (BoCC) Red-list)	No	Local	N/A	Local	Regional	No - peak estimates did not surpass population importance thresholds
Great black-backed gull	Regional (BoCC Red-list)	No	Local	N/A	Local	Regional	Yes – Species recorded in multiple baseline surveys
Herring gull	International (SPA connectivity)	Yes	Regional	N/A	Local	International	Yes - SPA connectivity. Peak populations surpass

Species	Conservation status	SPA connectivity	Population importance in the breeding season	Population importance in the post-breeding/pre-breeding season	Population importance in the non-breeding season	Conservation value	Taken forward for impact assessment
							importance thresholds
Lesser black-backed gull	International (SPA connectivity)	Yes	Local	Negligible	Negligible	International	No – species only recorded in one survey.
Sandwich tern	National (Annex I)	No	Negligible	Local	N/A	National	Yes – migratory species
Little tern	National (Annex I; Schedule 1)	No	Negligible	Negligible	N/A	National	Yes – migratory species
Roseate tern	National (Annex I; Schedule 1)	No	Negligible	Negligible	N/A	National	Yes – migratory species
Common tern	National (Annex I)	No	Negligible	Negligible	N/A	National	Yes – migratory species
Arctic tern	National (Annex I)	No	Negligible	National	N/A	National	Yes – migratory species
Great skua	International (SPA connectivity)	Yes	Negligible	Local	N/A	International	Yes – migratory species
Arctic skua	Regional (BoCC Red-list)	No	Negligible	Local	N/A	Regional	Yes – migratory species
Little auk	Negligible	No	N/A	N/A	Negligible	Negligible	No – species not recorded during baseline aerial surveys
Common guillemot	International (SPA connectivity)	Yes	National	N/A	Regional	International	Yes – SPA connectivity, species recorded

Species	Conservation status	SPA connectivity	Population importance in the breeding season	Population importance in the post-breeding/pre-breeding season	Population importance in the non-breeding season	Conservation value	Taken forward for impact assessment
							in the majority of baseline surveys, peak populations surpass importance thresholds
Razorbill	International (SPA connectivity)	Yes	National	Local	Local	International	Yes – SPA connectivity, species recorded in the majority of baseline surveys, peak populations surpass importance thresholds
Black guillemot	Negligible (BoCC Green-list)	No	Negligible	N/A	Negligible	Negligible	No – species not recorded during baseline aerial surveys
Puffin	International (SPA connectivity)	Yes	Local	N/A	Regional	International	Yes – SPA connectivity, species recorded in the majority of baseline surveys, peak population of regional importance
Red-throated diver	National (Annex I; Schedule 1)	No	Negligible	Negligible	Negligible	National	No – species not recorded during

Species	Conservation status	SPA connectivity	Population importance in the breeding season	Population importance in the post-breeding/pre-breeding season	Population importance in the non-breeding season	Conservation value	Taken forward for impact assessment
							baseline aerial surveys
European storm petrel	International (SPA connectivity)	Yes	Regional	Negligible	N/A	International	Yes – migratory species
Leach's petrel	International (SPA connectivity)	Yes	Negligible	Negligible	N/A	International	Yes – migratory species
Fulmar	International (SPA connectivity)	Yes	Local	Local	Local	International	Yes – SPA connectivity, species recorded in the majority of baseline surveys
Sooty shearwater	National (Schedule 1)	No	N/A	Local	Negligible	National	No - species only recorded in one survey.
Manx shearwater	Regional (Scottish Biodiversity List)	No	Negligible	Regional	N/A	Regional	Yes - Peak population exceeds regional population importance threshold
Gannet	International (SPA connectivity)	Yes	Local	Local	N/A	International	Yes – SPA connectivity, species recorded in the majority of baseline surveys
Cormorant	Negligible (BoCC Green-list)	No	Negligible	N/A	Negligible	Negligible	No – species not recorded during

Species	Conservation status	SPA connectivity	Population importance in the breeding season	Population importance in the post-breeding/pre-breeding season	Population importance in the non-breeding season	Conservation value	Taken forward for impact assessment
							baseline surveys aerial
Shag	National (Annex I)	No	Negligible	N/A	Negligible	National	No – species not recorded during baseline surveys aerial

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Appendix A Raw count data

Table A. 1: Raw count data for the Morven North Offshore Ornithology Baseline Characterisation Study Area between June 2021 and September 2022 (No. birds)

Species	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22
Arctic Skua				2												
Arctic Tern		4													293	
Arctic/Long-tailed Skua				1												
Auk species	11	90	15	19		3	2			8	4	10		29	17	17
Auk/Shearwater species	1	94										4		1		
Commic Tern		3	12												149	
Common Gull															6	
Diver species																
European Storm Petrel																
Fulmar	8	13	95	29	75	136	73	8	40	9	8	13	845	5	3	12
Fulmar/Gull species																
Gannet	98	167	68	130	90	9	3		4	2	7	93	163	46	27	11
Great Black-backed Gull		1			1	6	4		5				1			
Great Skua			1	1	1											
Grey Heron																
Guillemot	1,991	3,724	104	1,173	74	200	118	38	99	372	126	517	372	2,019	1,535	84

Species	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22
Guillemot/Razorbill	53	430	17	124	22	28	175	24	55	32	10	34	11	76	135	35
Gull species	5		1													
Herring Gull	1	41				1						1		3		
Kittiwake	570	69	10	104	37	10	2	3	31	18	22	73	256	211	11	2
Large Gull species		2	1													
Lesser Black-backed Gull																
Little Auk																
Manx Shearwater	2	36														
Osprey	1															
Puffin	18	39	76	286	8	3	6		1	2	4	11	3	5	100	41
Razorbill	122	1,100	14	81	5	15	23	9	4	12	17	48	6	192	359	88
Red-throated Diver																
Sandwich Tern															1	
Skua species		1											1			
Small Gull species			2	1												
Small Shearwater species																
Snipe																4
Sooty Shearwater				2												
Storm Petrel species	1		1		2											
Tern species		3														

Species	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22
Thrush species						6										
Unidentified Bird species		1		1				2	2		1	5	3	4	1	1
Wader species														1		

Table A. 2: Raw count data for the Morven North Offshore Ornithology Baseline Characterisation Study Area between October 2022 and September 2023 (No. birds)

Species	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
	Number of Animals											
Arctic Skua	0	0	0	0	0	0	0	0	0	0	0	0
Arctic Tern	0	0	0	0	0	0	0	0	0	5	3	0
Arctic/Long-tailed Skua	0	0	0	0	0	0	0	0	0	0	0	0
Auk species	9	4	3	0	3	1	1	7	10	3	0	3
Auk/Shearwater species	0	0	0	0	0	4	0	7	2	20	1	0
Commic Tern	0	0	0	0	0	0	0	0	0	0	5	0
Common Gull	0	1	0	0	0	0	0	0	0	4	0	0
Diver species	0	0	0	0	0	0	0	0	0	0	0	0
European Storm Petrel	0	0	0	0	0	0	0	0	0	0	13	0
Fulmar	5	24	30	27	17	31	0	55	8	12	47	45
Fulmar/Gull species	0	6	0	1	1	0	0	0	0	2	0	0

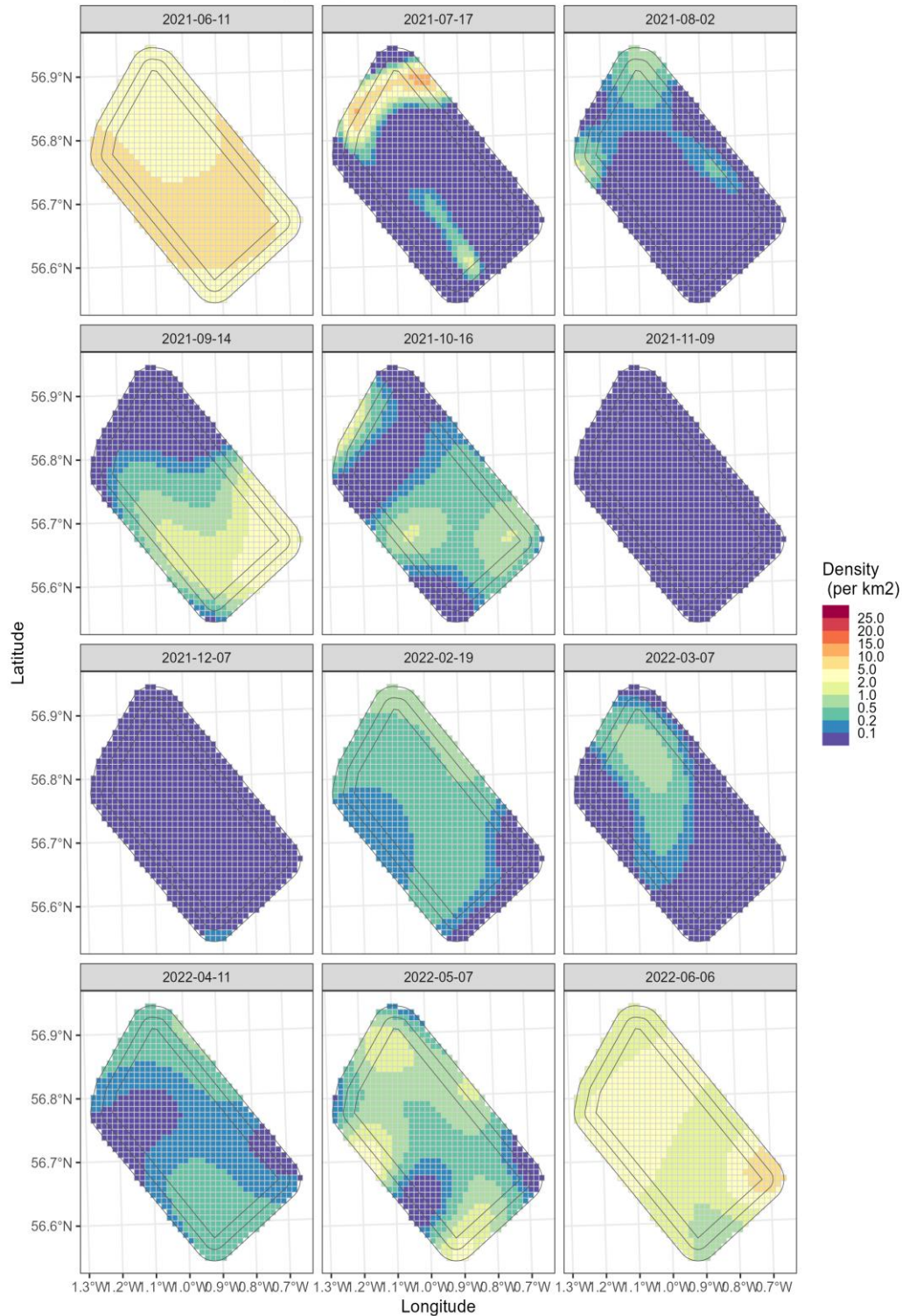
Species	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
	Number of Animals											
Gannet	14	10	2	0	2	8	10	37	56	73	39	34
Great Black-backed Gull	0	1	3	2	2	1	0	0	0	0	0	0
Great Skua	0	0	0	0	0	0	0	0	0	0	0	1
Grey Heron	0	0	0	0	0	0	0	0	0	0	0	1
Guillemot	225	160	128	22	219	126	135	505	274	3,273	35	17
Guillemot/Razorbill	40	107	50	18	50	11	2	16	11	341	1	3
Gull species	0	0	0	0	0	0	0	0	0	0	0	0
Herring Gull	1	0	1	0	0	0	0	2	7	1	0	0
Kittiwake	6	12	27	7	5	8	11	50	62	606	3	1
Large Gull species	0	0	0	0	0	0	0	0	0	0	0	0
Lesser Black-backed Gull	0	0	0	0	0	0	0	0	1	0	0	0
Little Auk	0	0	0	0	0	0	0	0	0	0	0	0
Manx Shearwater	0	0	0	0	0	0	0	1	0	6	2	1
Osprey	0	0	0	0	0	0	0	0	0	0	0	0
Puffin	4	1	6	1	57	14	9	63	45	8	0	7
Razorbill	22	63	8	9	11	12	6	22	28	702	0	4
Red-throated Diver	0	0	0	0	0	0	0	0	0	0	0	0
Sandwich Tern	0	0	0	0	0	0	0	0	0	0	0	0
Skua species	0	0	0	0	0	0	0	0	0	0	0	0
Small Gull species	0	0	0	1	0	0	0	0	0	0	0	0

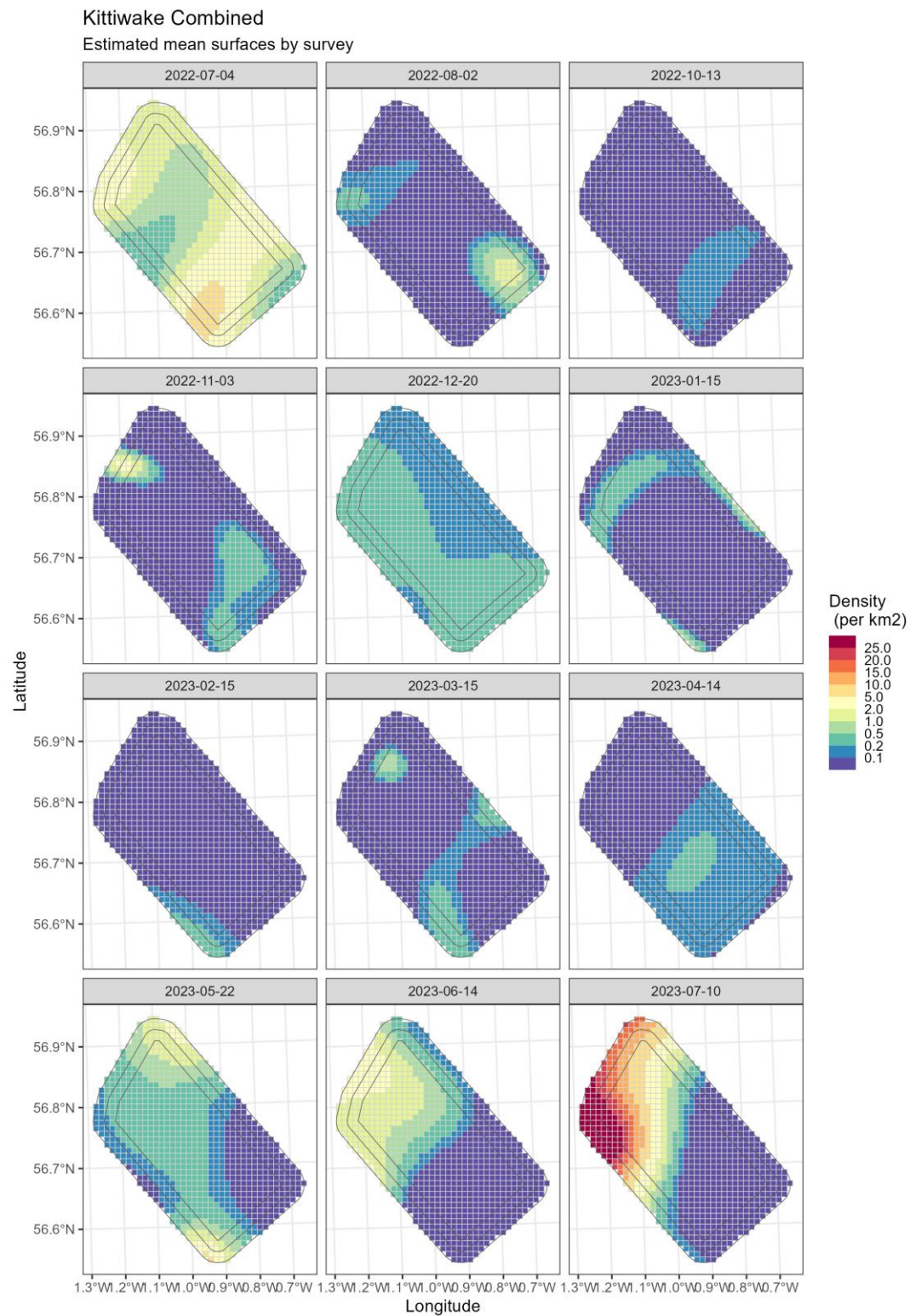
Species	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
	Number of Animals											
Small Shearwater species	0	0	0	0	0	0	0	0	0	1	0	0
Snipe	0	0	0	0	0	0	0	0	0	0	0	0
Storm Petrel species	0	0	0	0	0	0	0	0	0	0	0	0
Tern species	0	0	0	0	0	0	0	0	0	0	0	0
Thrush species	0	0	0	0	0	0	0	0	0	0	0	0
Unidentified Bird species	0	2	1	2	0	0	0	1	3	0	0	1
Wader species	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B Distribution of birds from site specific aerial surveys

B.1 Kittiwake

Kittiwake Combined
Estimated mean surfaces by survey





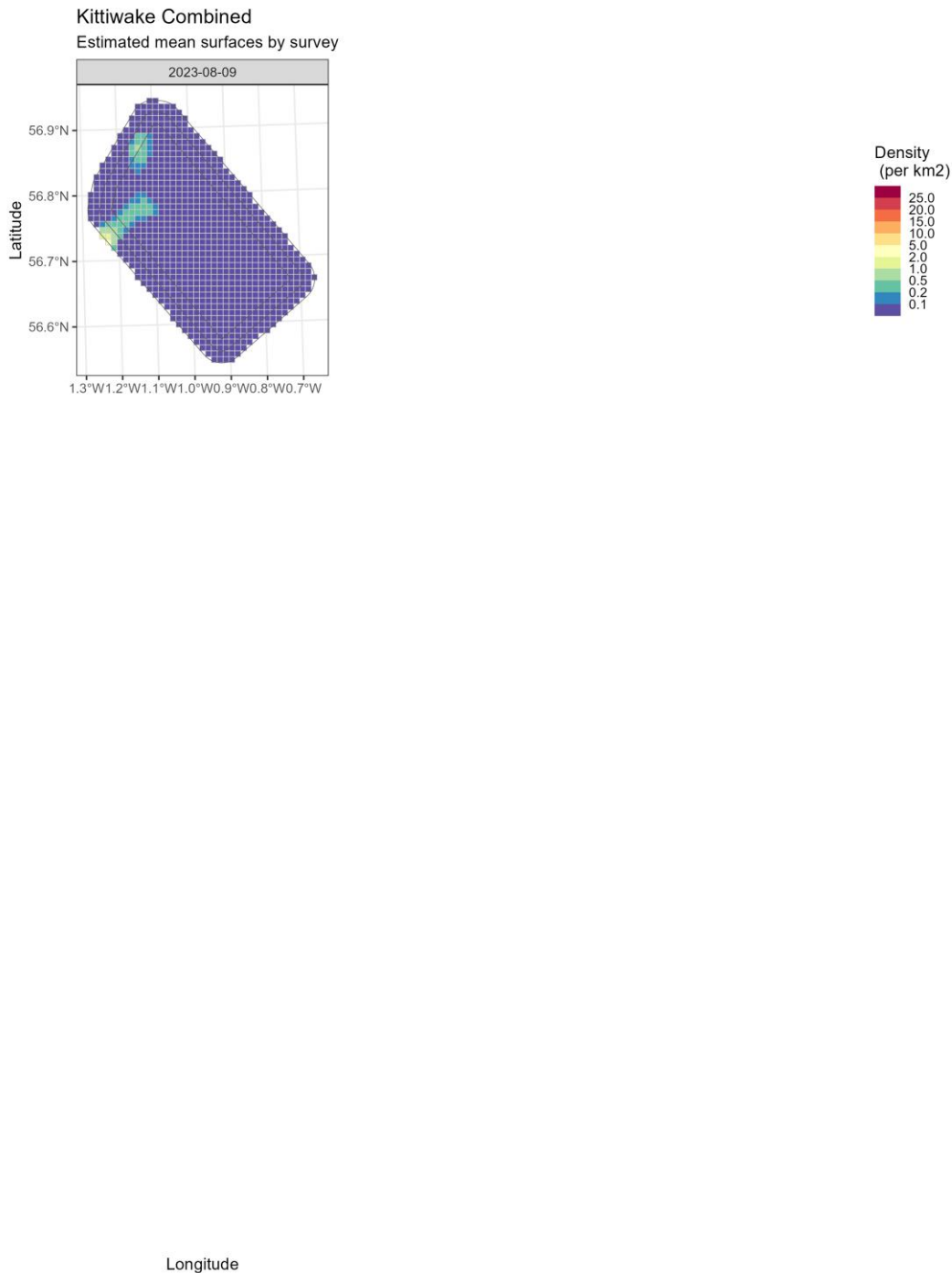
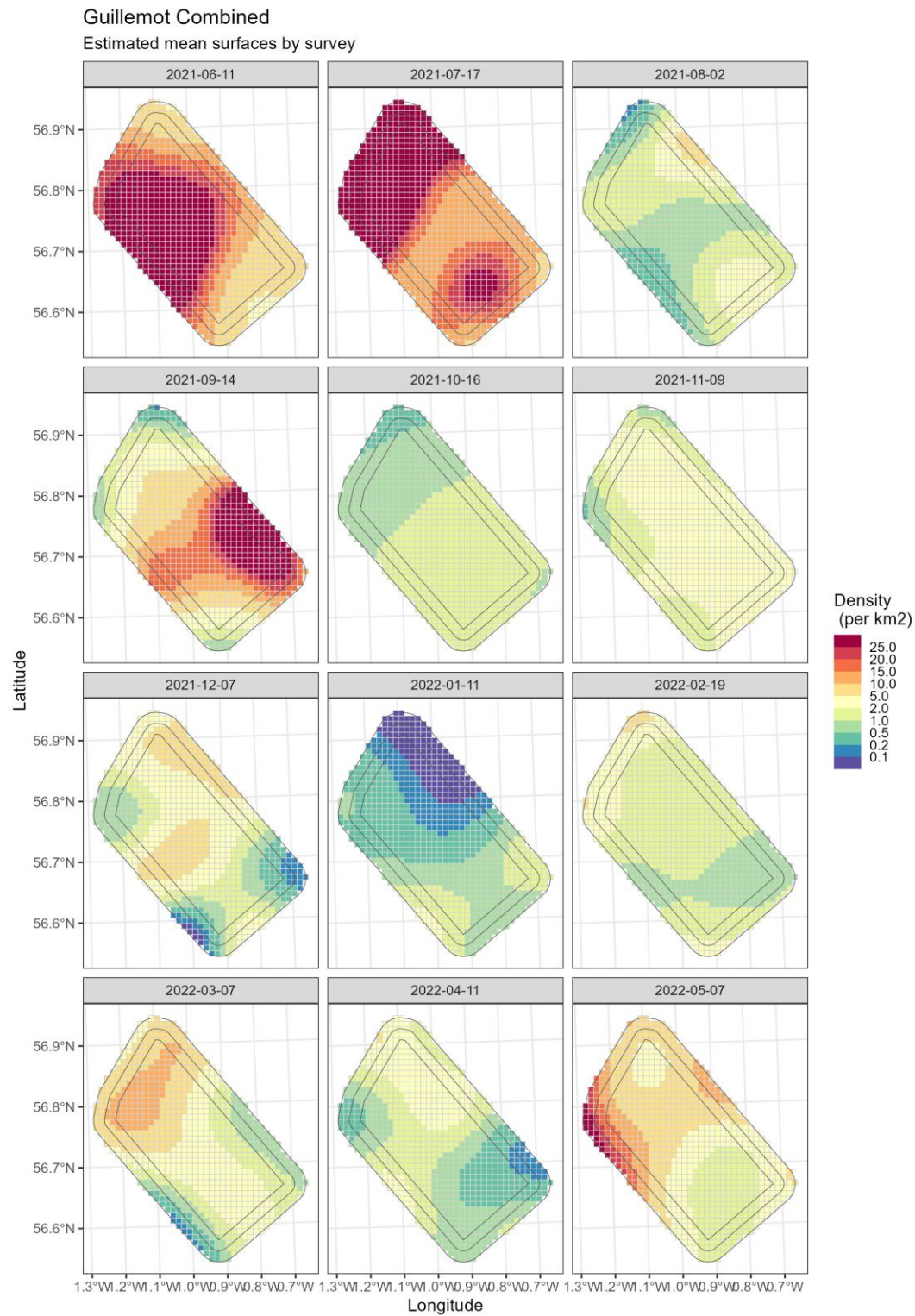
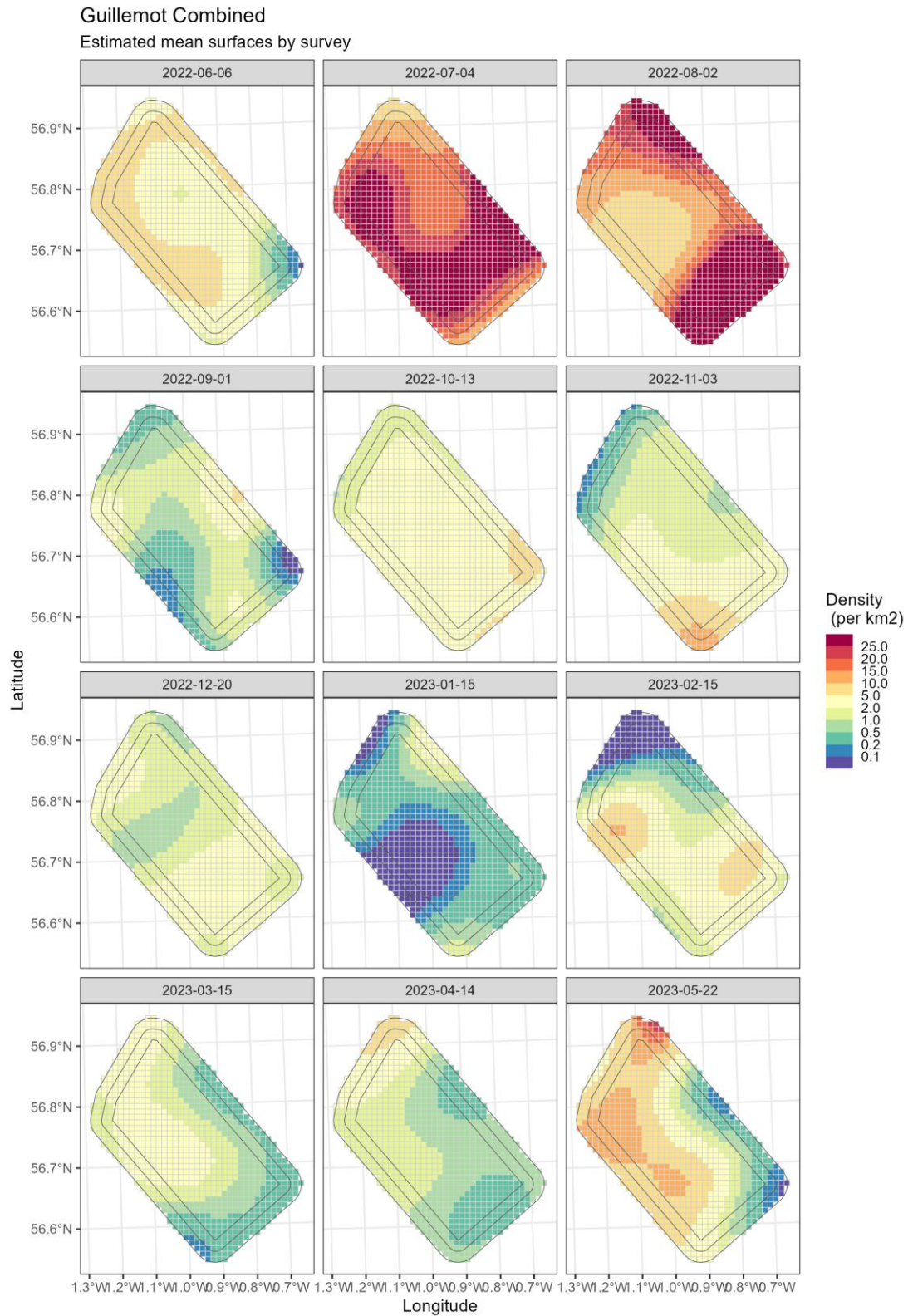


Figure B. 1: Monthly estimated density surfaces for kittiwake across the Morven North Offshore Ornithology Baseline Characterisation Study Area

B.2 Common guillemot





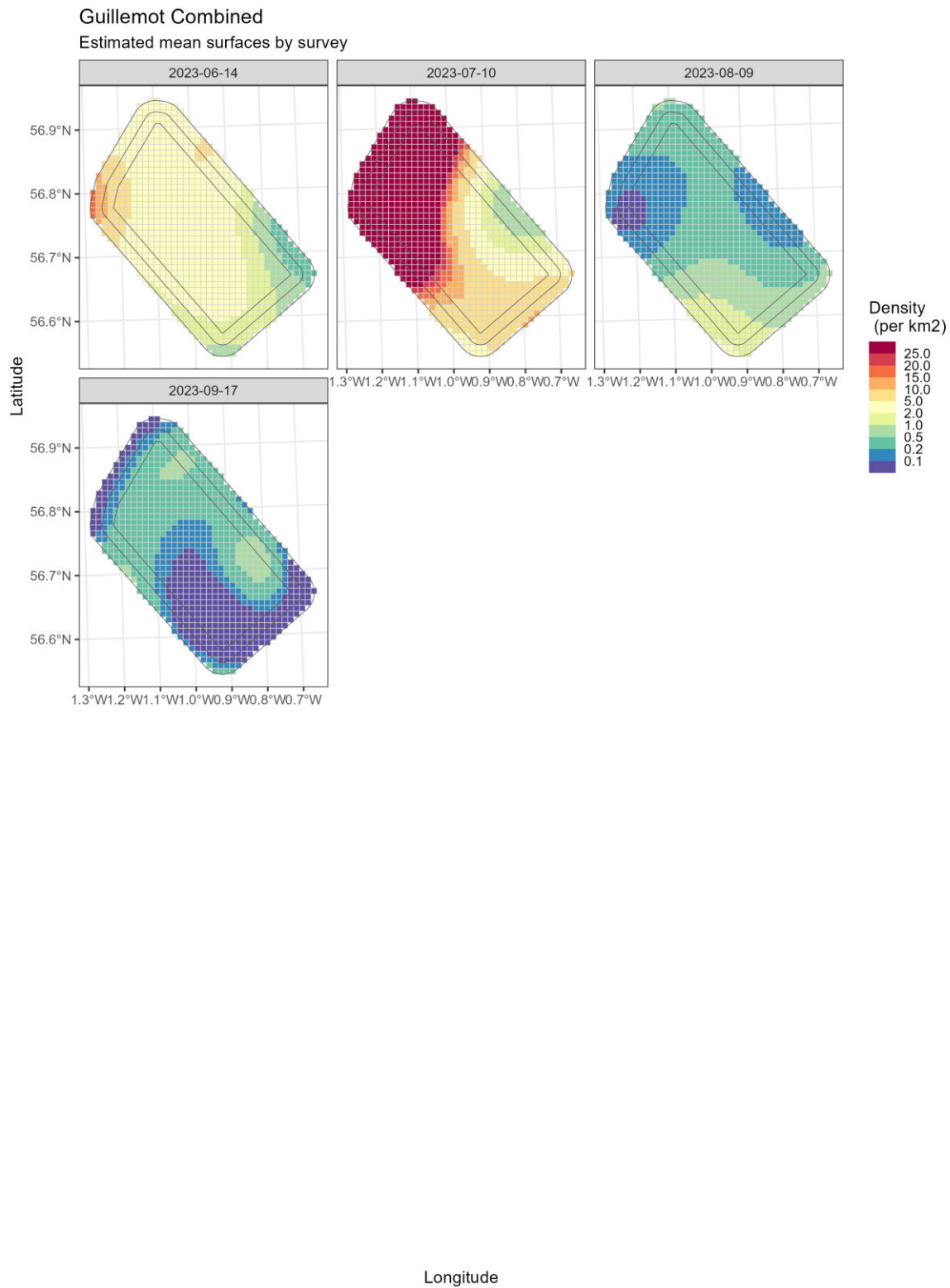
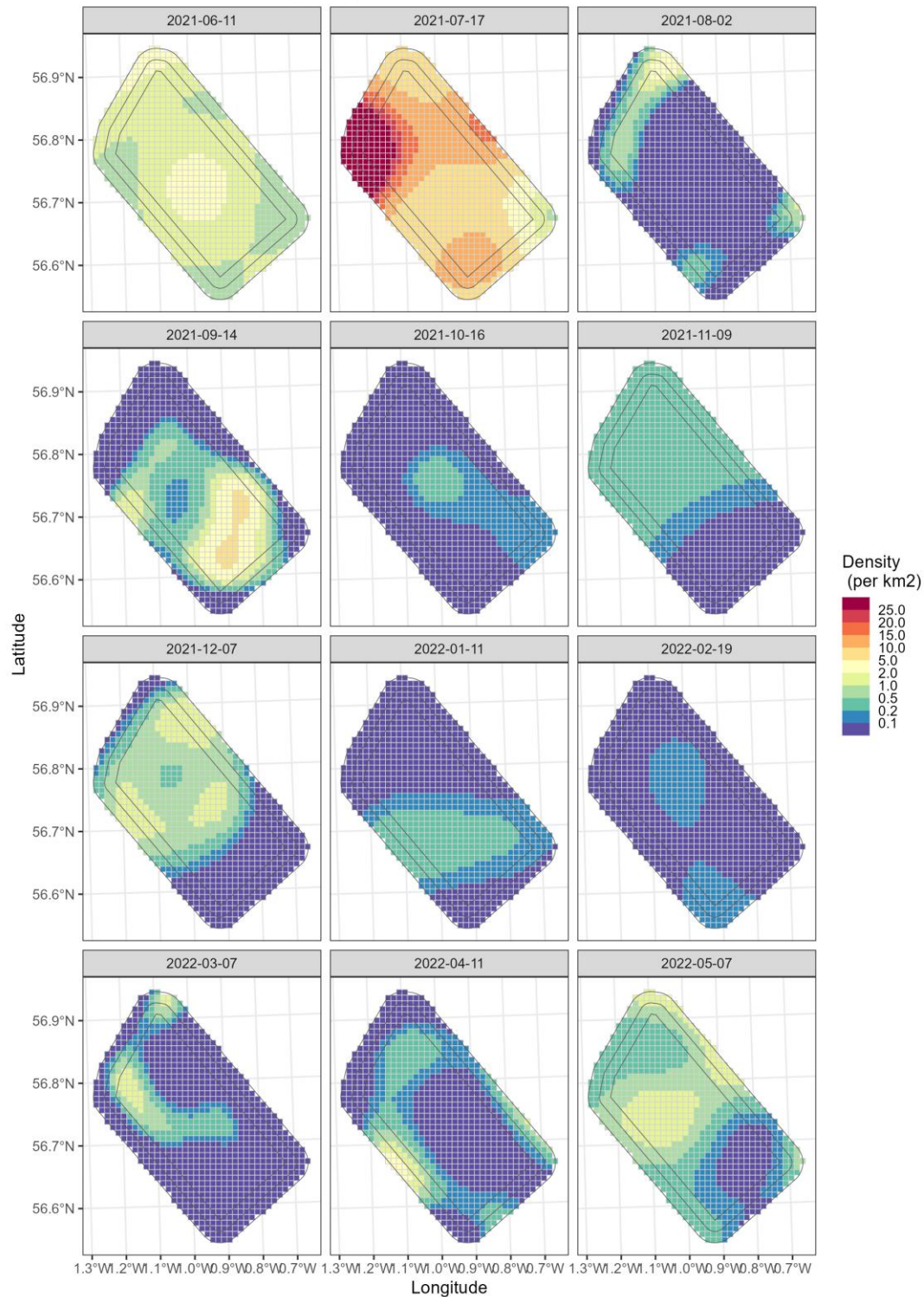
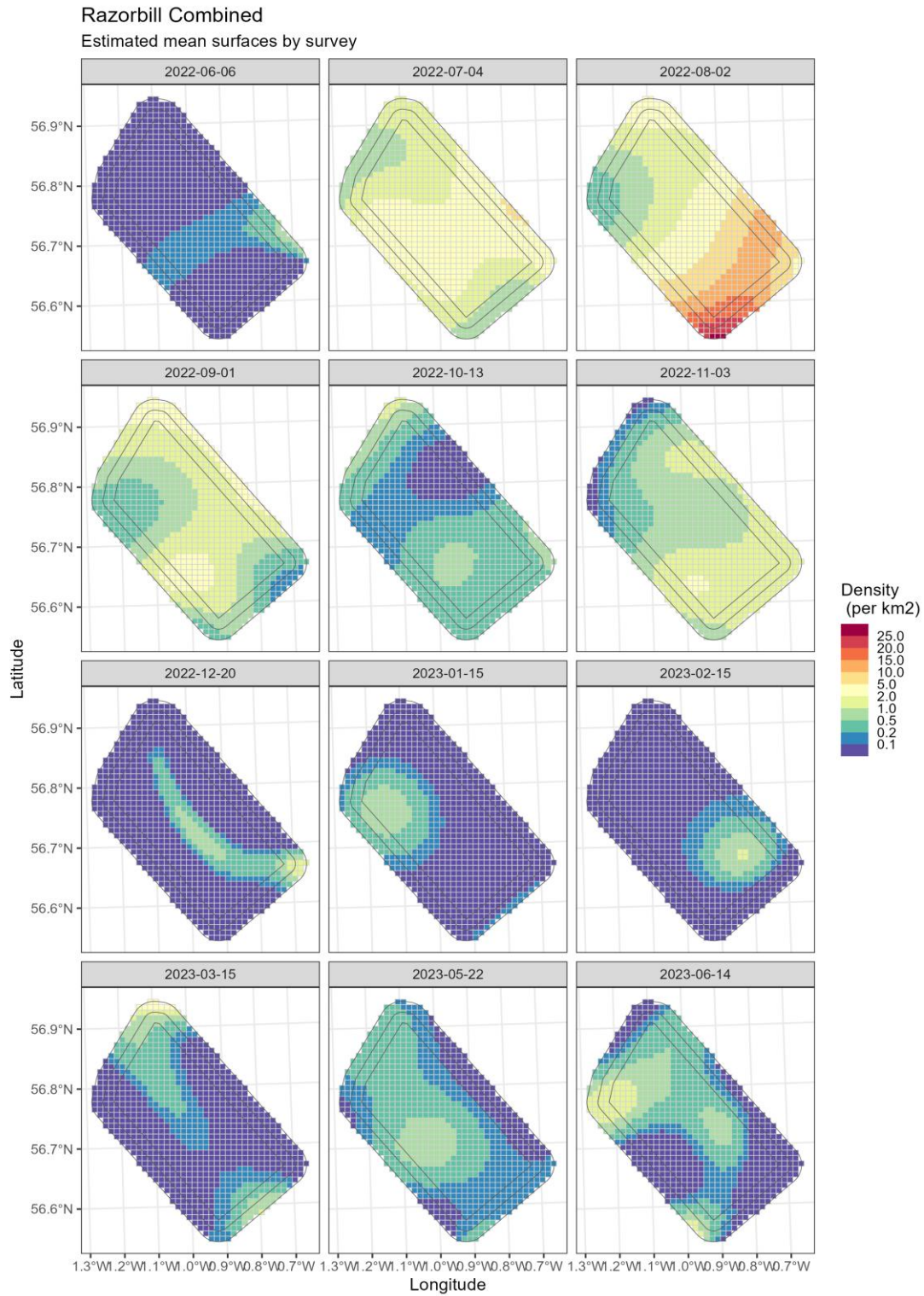


Figure B. 2: Monthly estimated density surfaces for common guillemot across the Morven North Offshore Ornithology Baseline Characterisation Study Area

B.3 Razorbill

Razorbill Combined
Estimated mean surfaces by survey





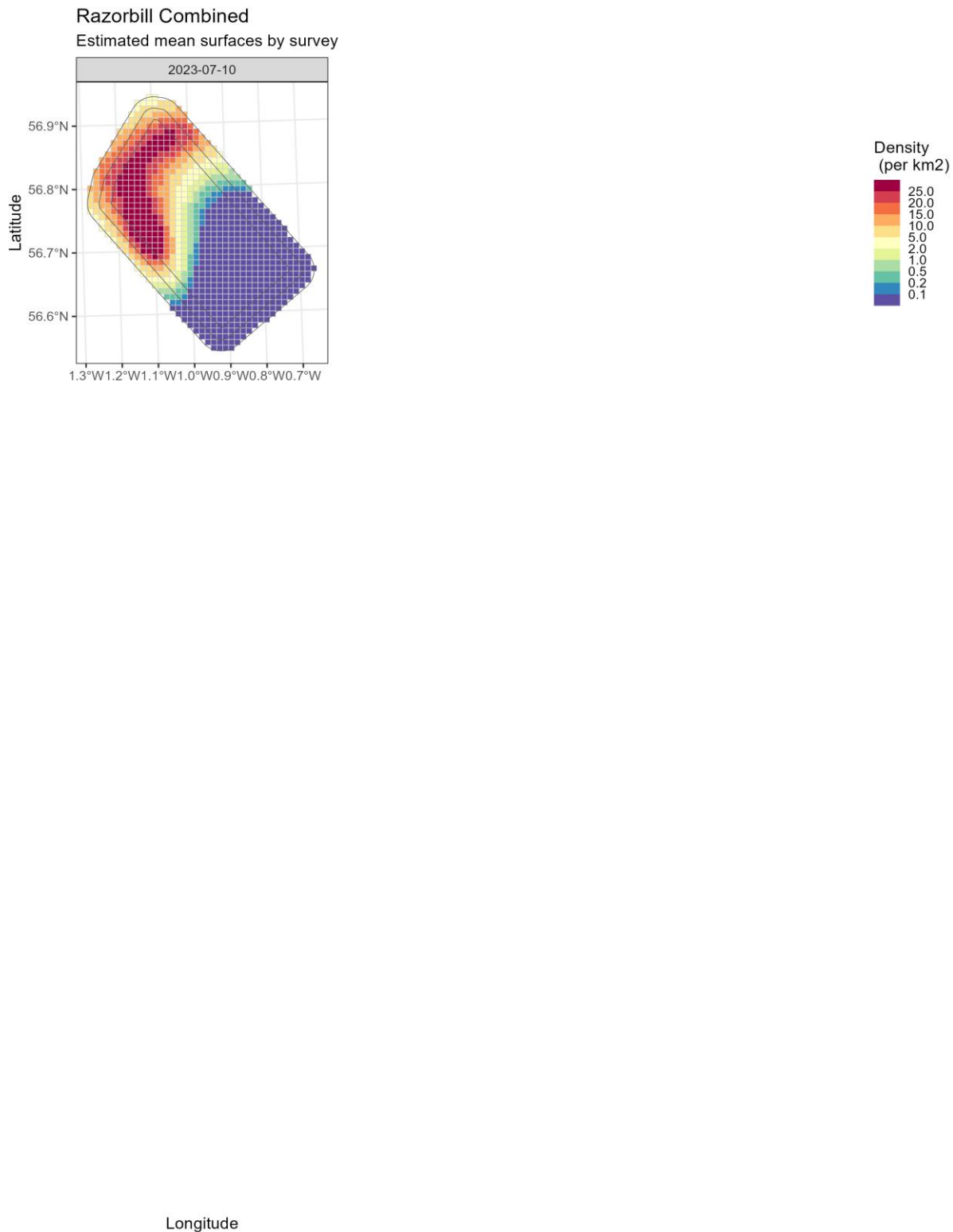
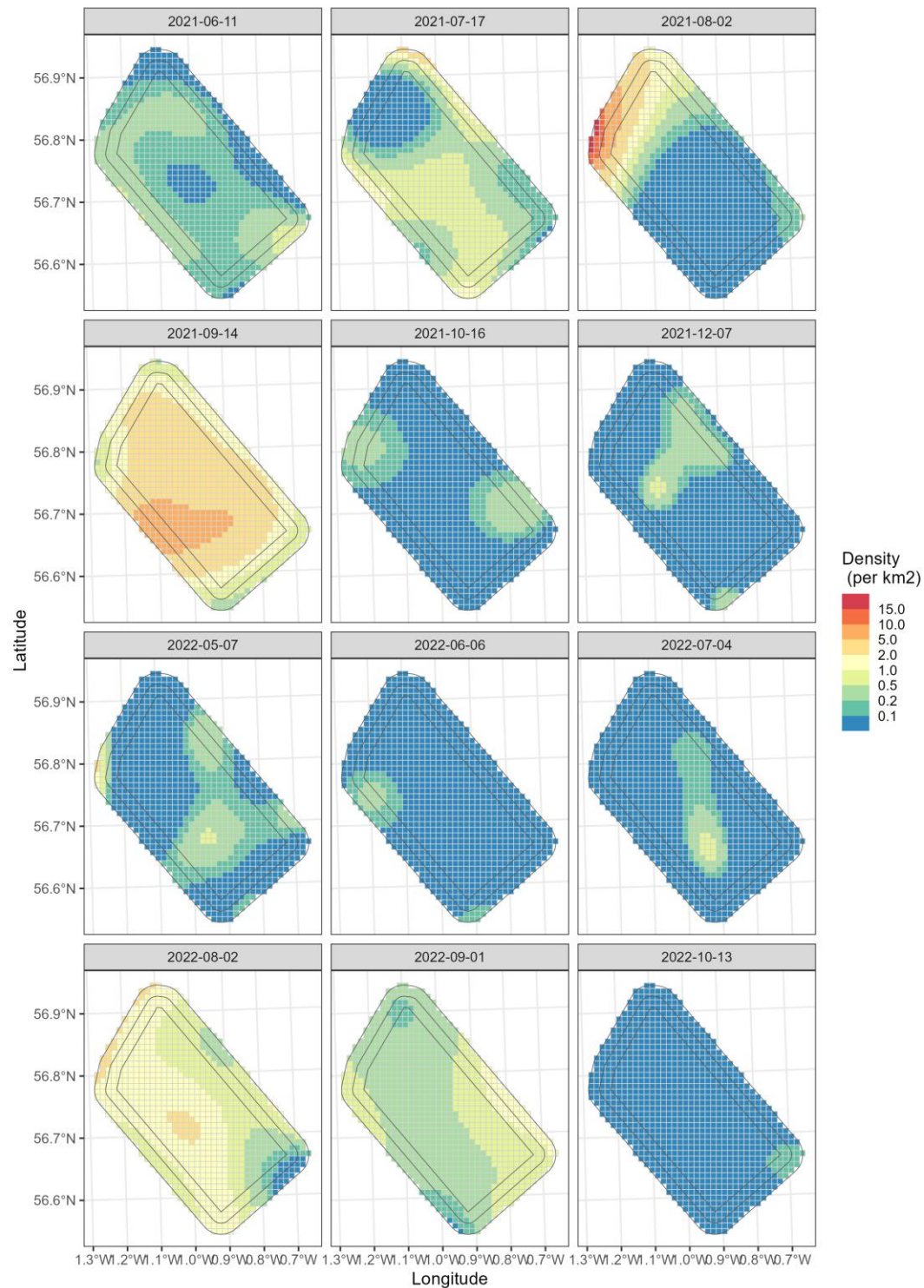


Figure B. 3: Monthly estimated density surfaces for razorbill across the Morven North Offshore Ornithology Baseline Characterisation Study Area

B.4 Puffin

Puffin Combined

Estimated mean surfaces by survey



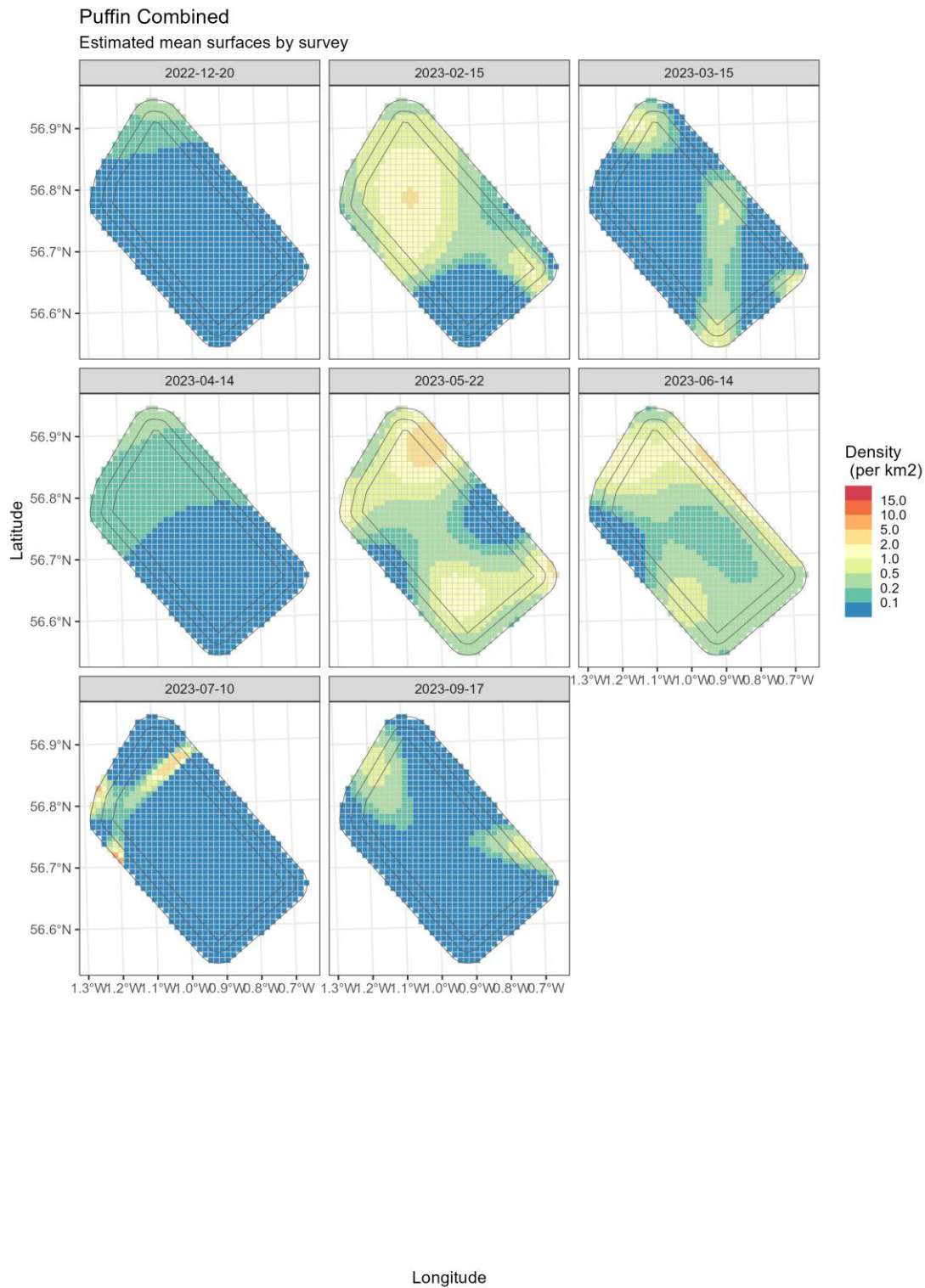
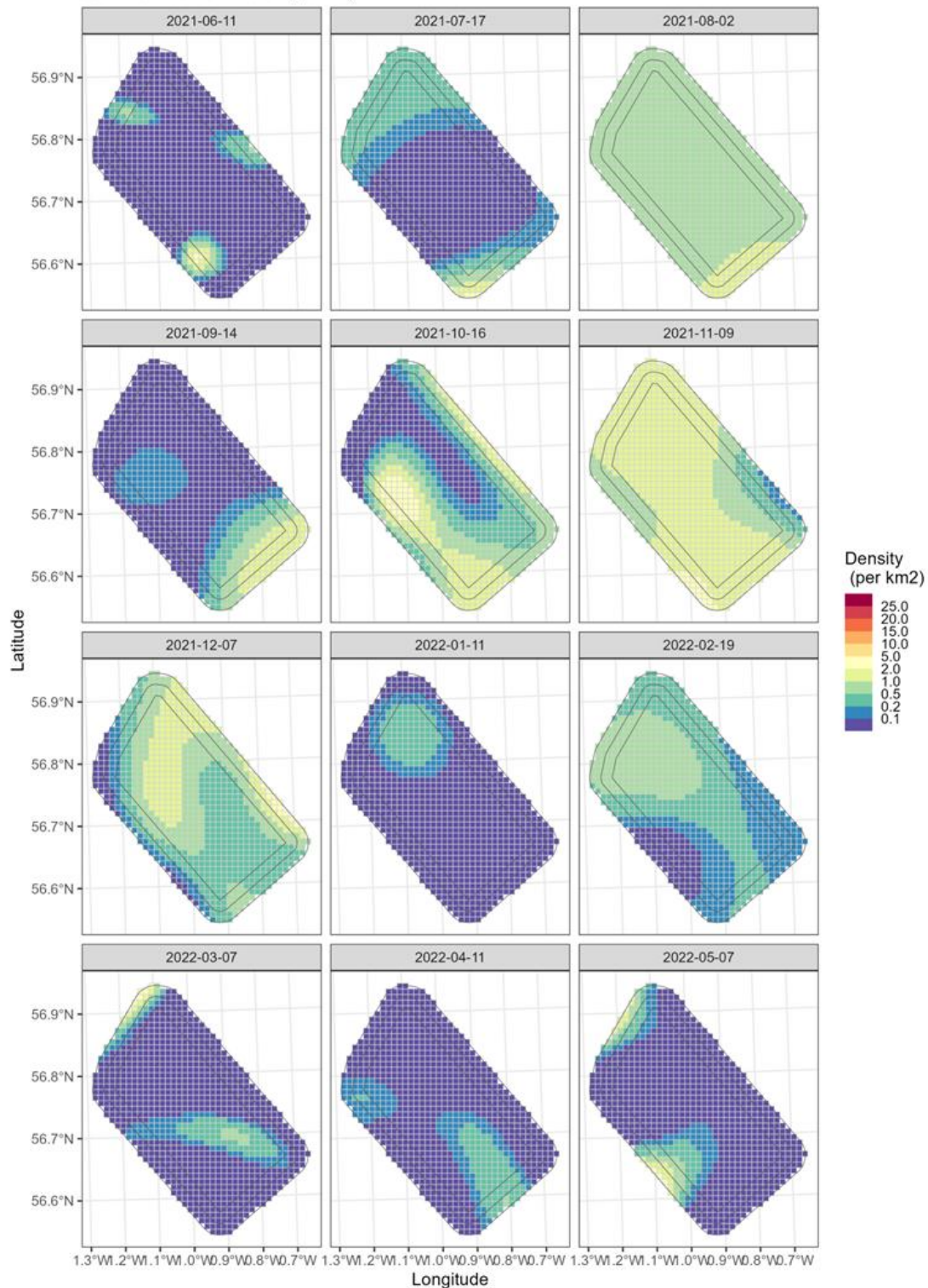
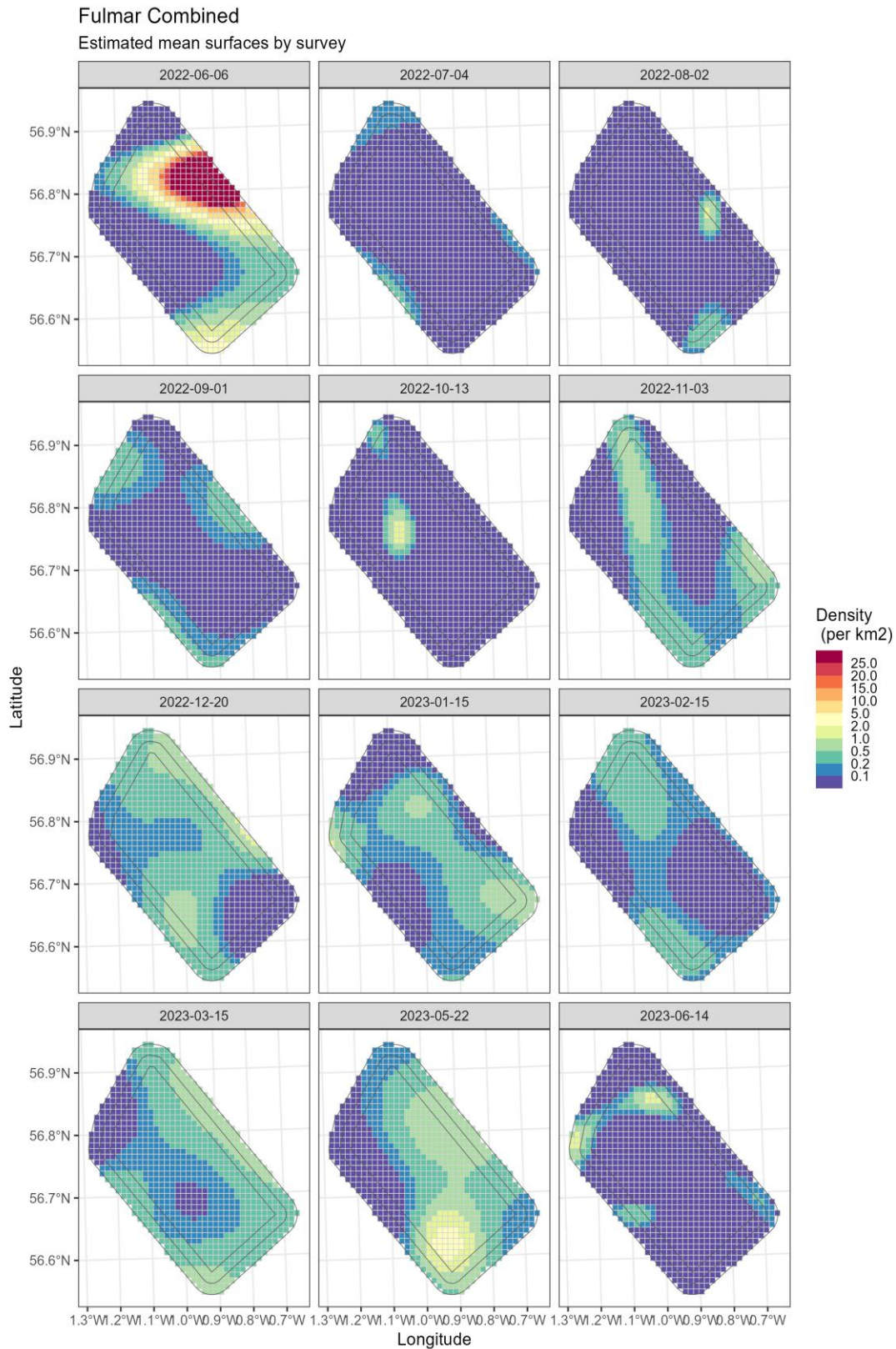


Figure B. 4: Monthly estimated density surfaces for puffin across the Morven North Offshore Ornithology Baseline Characterisation Study Area

B.5 Fulmar

Fulmar Combined
Estimated mean surfaces by survey





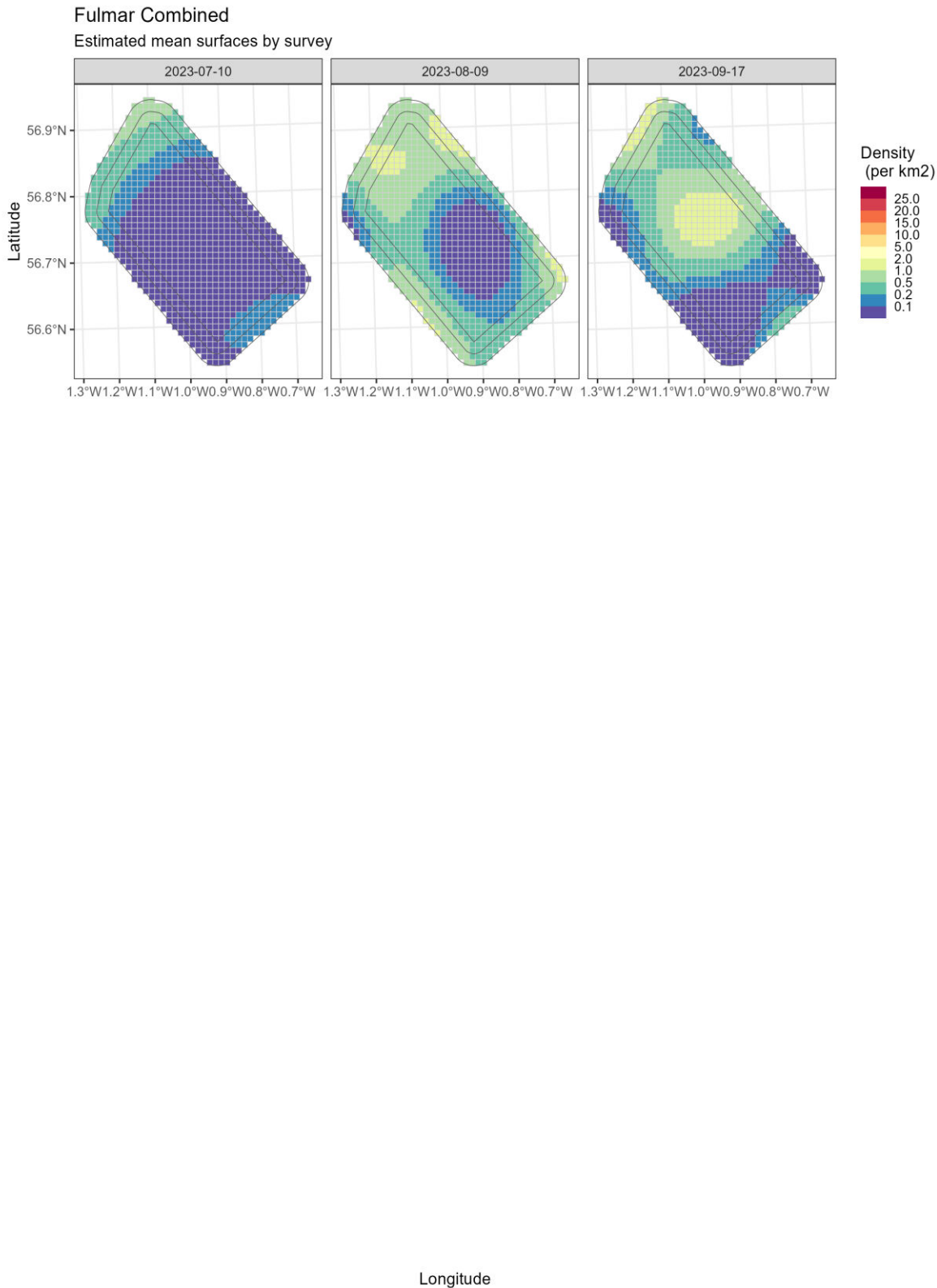
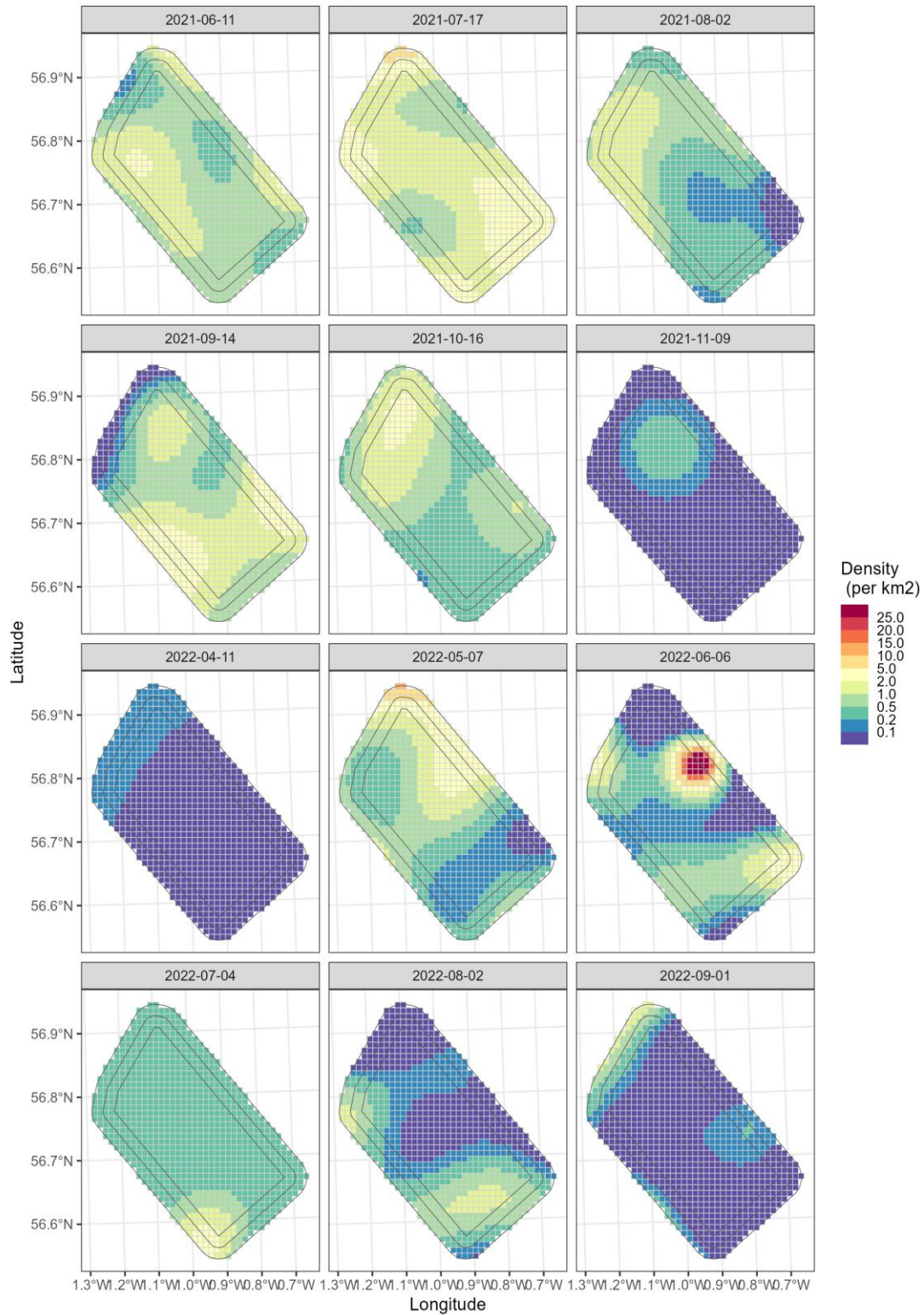


Figure B. 5: Monthly estimated density surfaces for fulmar across the Morven North Offshore Ornithology Baseline Characterisation Study Area

B.6 Gannet

Gannet Combined

Estimated mean surfaces by survey



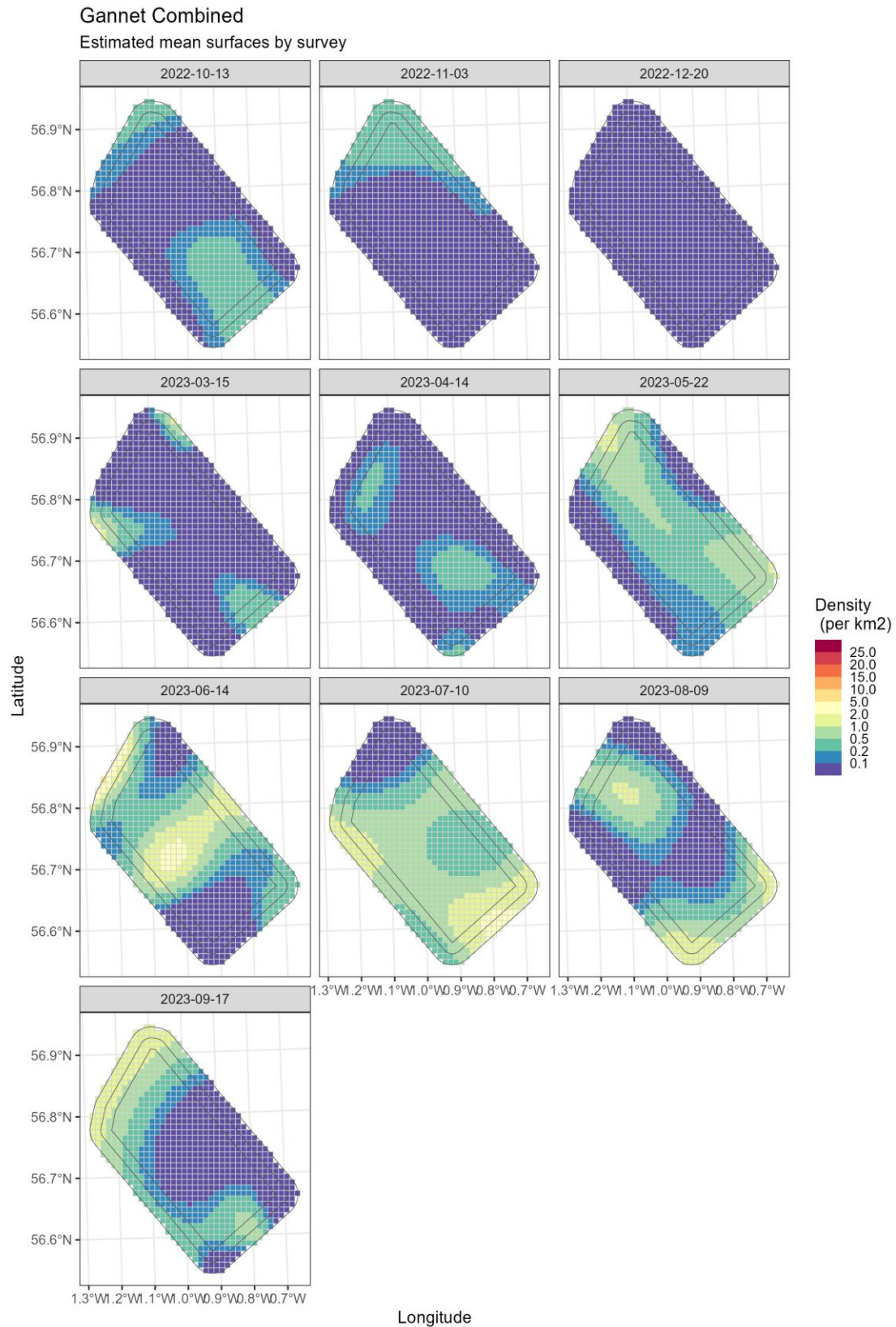


Figure B. 6: Monthly estimated density surfaces for gannet across the Morven North Offshore Ornithology Baseline Characterisation Study Area

Appendix C Distribution of birds in regional surveys (HiDef Aerial Surveying Limited, 2023)

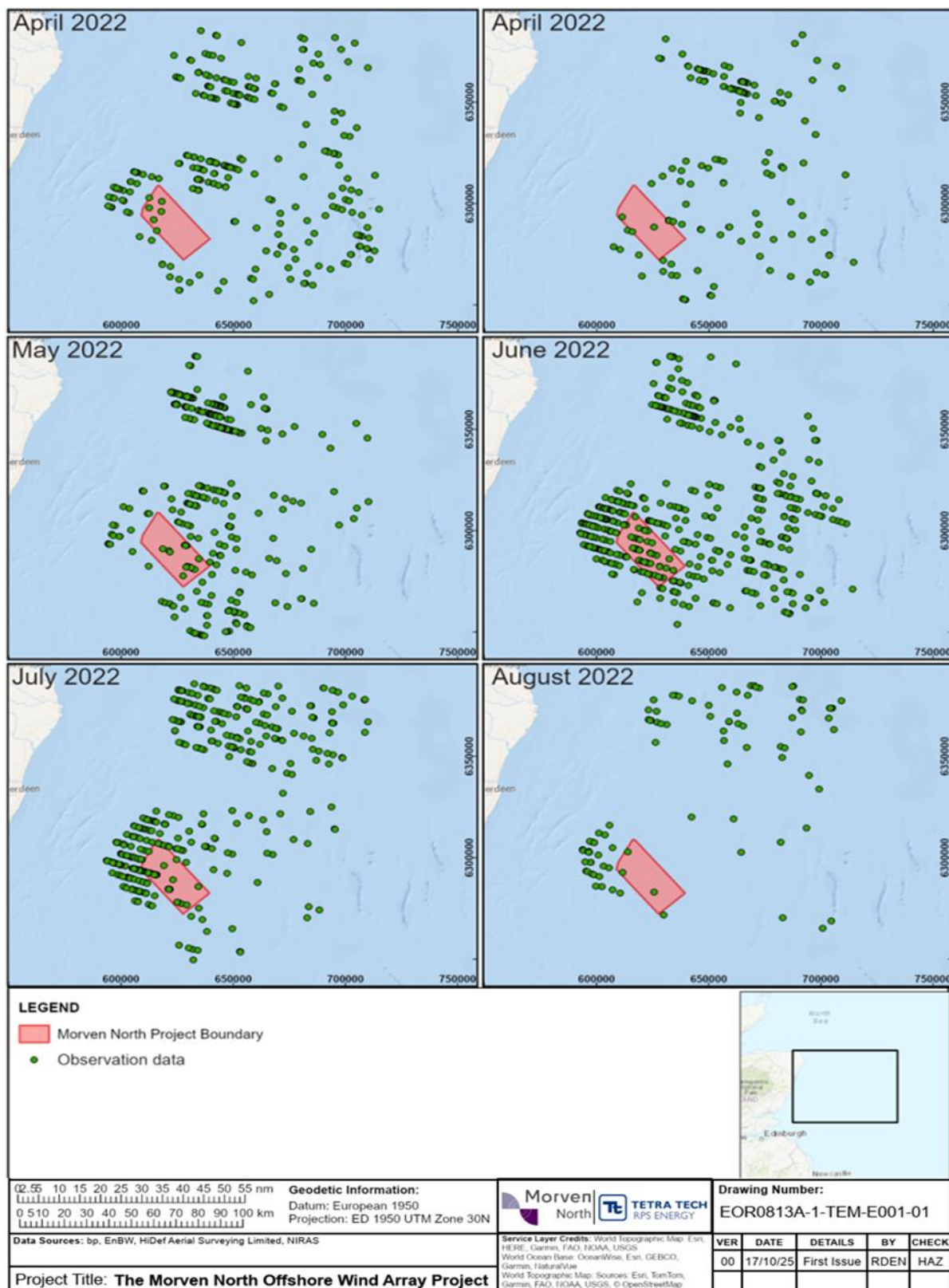


Figure C. 1: Regional distribution of kittiwake (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

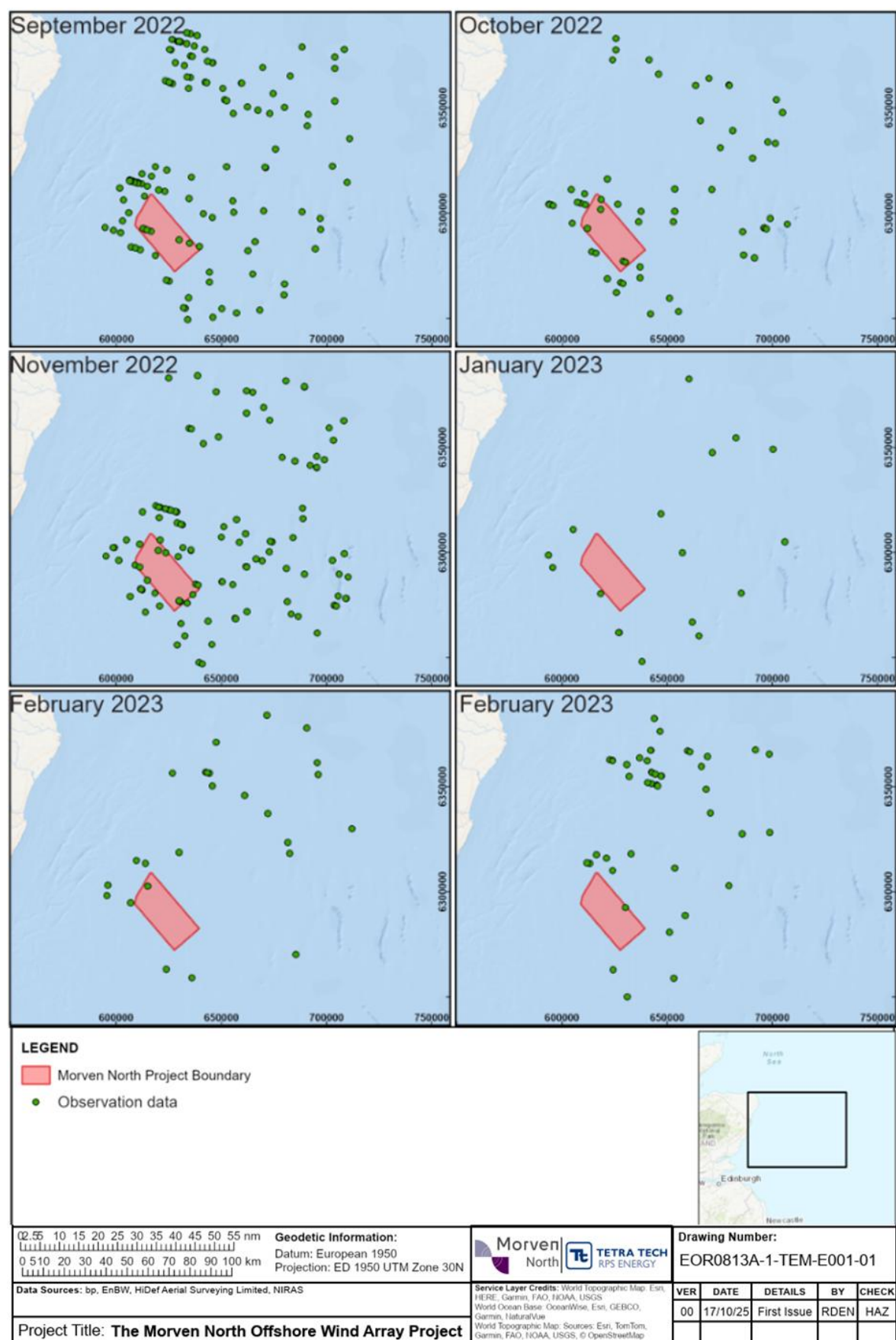


Figure C. 2: Regional distribution of kittiwake (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

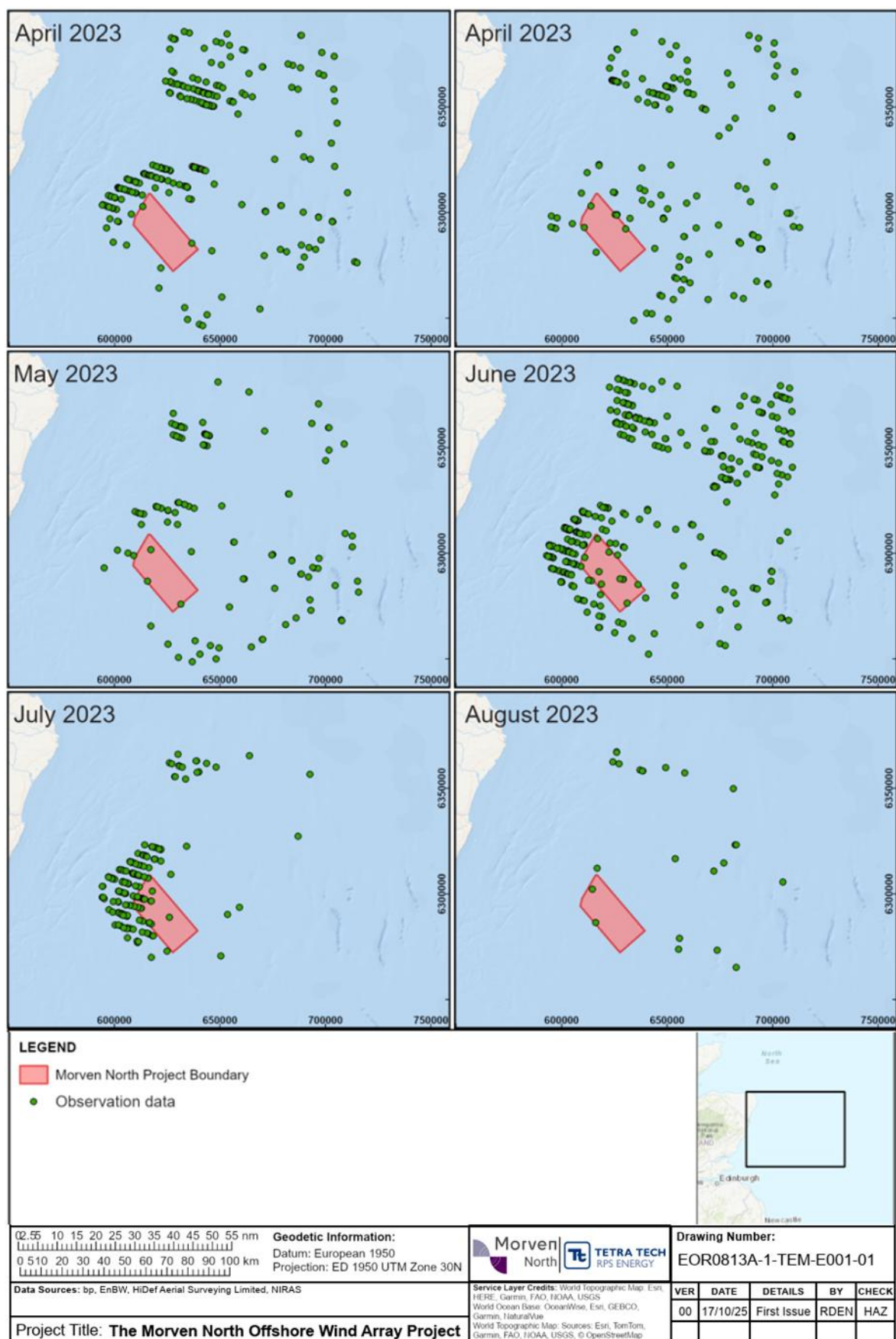


Figure C. 3: Regional distribution of kittiwake (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

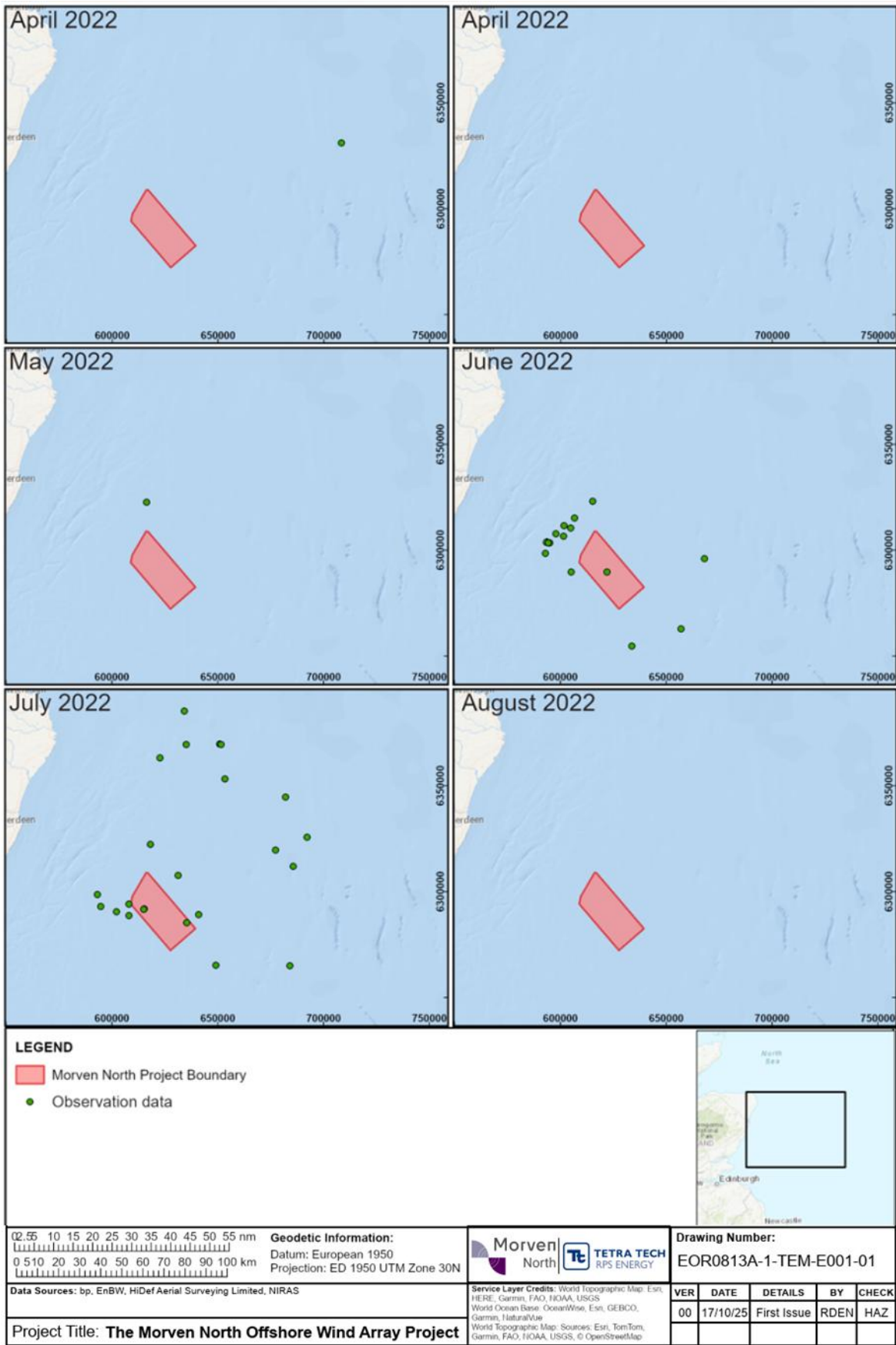


Figure C. 4: Regional distribution of herring gull (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

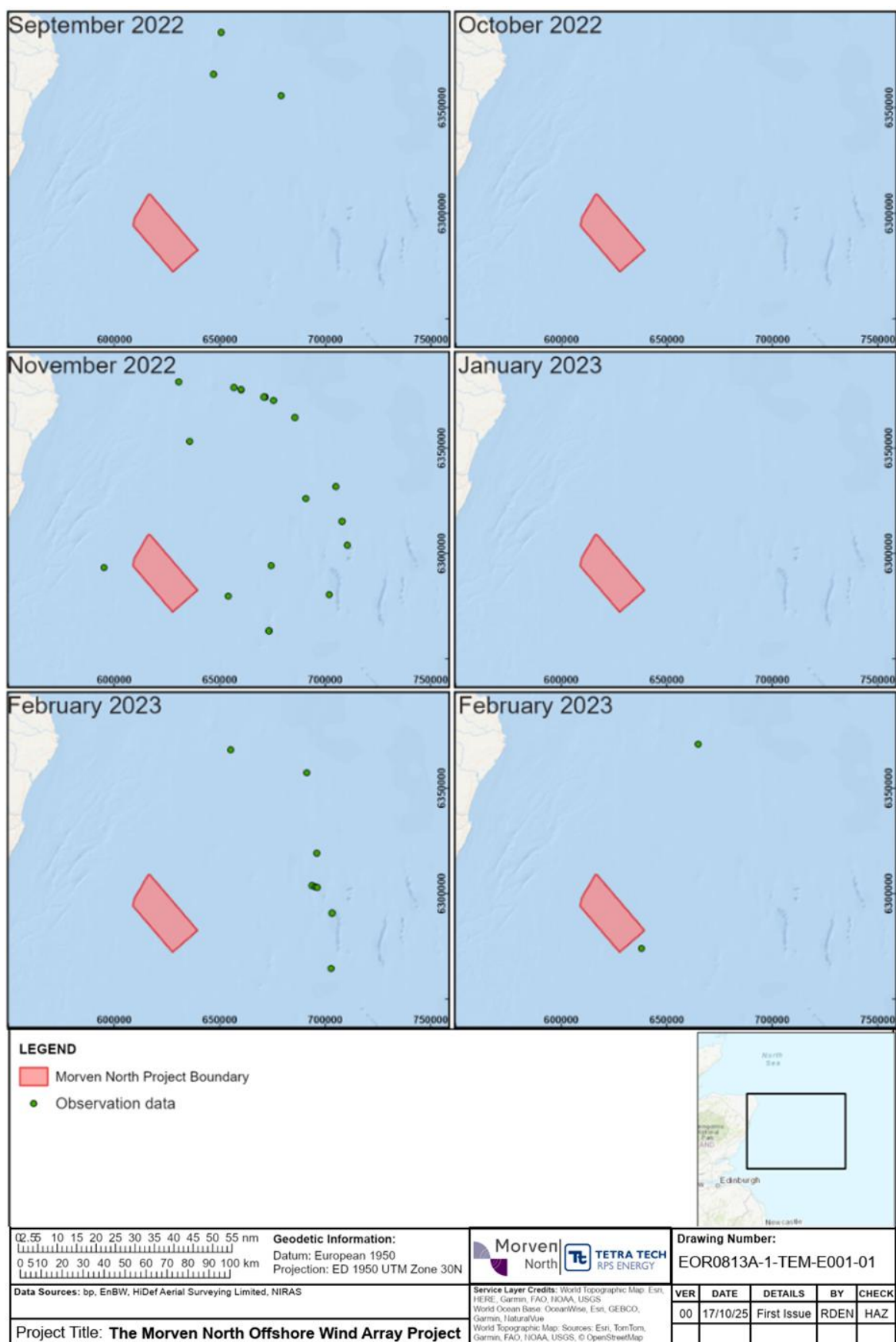


Figure C. 5: Regional distribution of herring gull (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

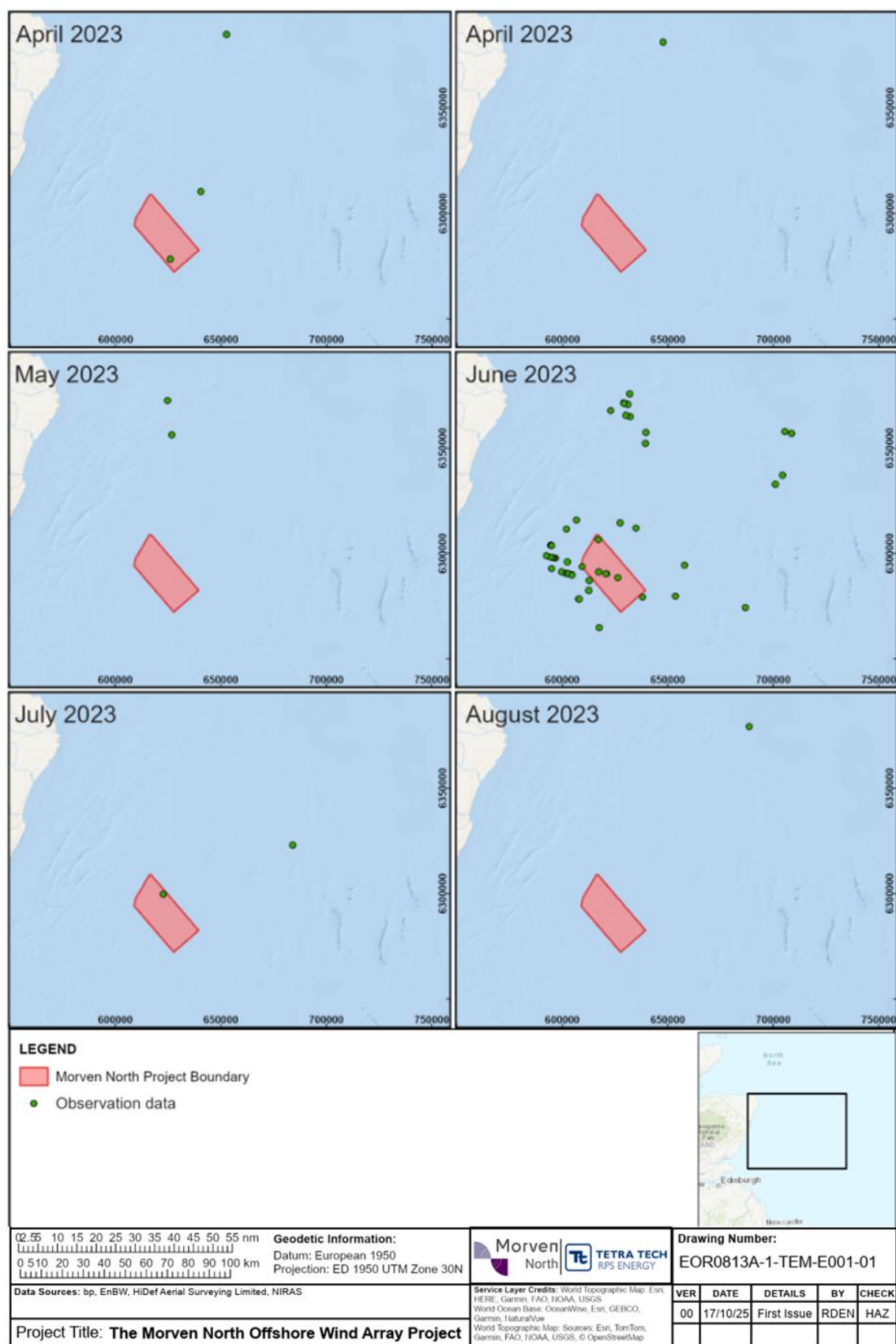


Figure C. 6: Regional distribution of herring gull (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

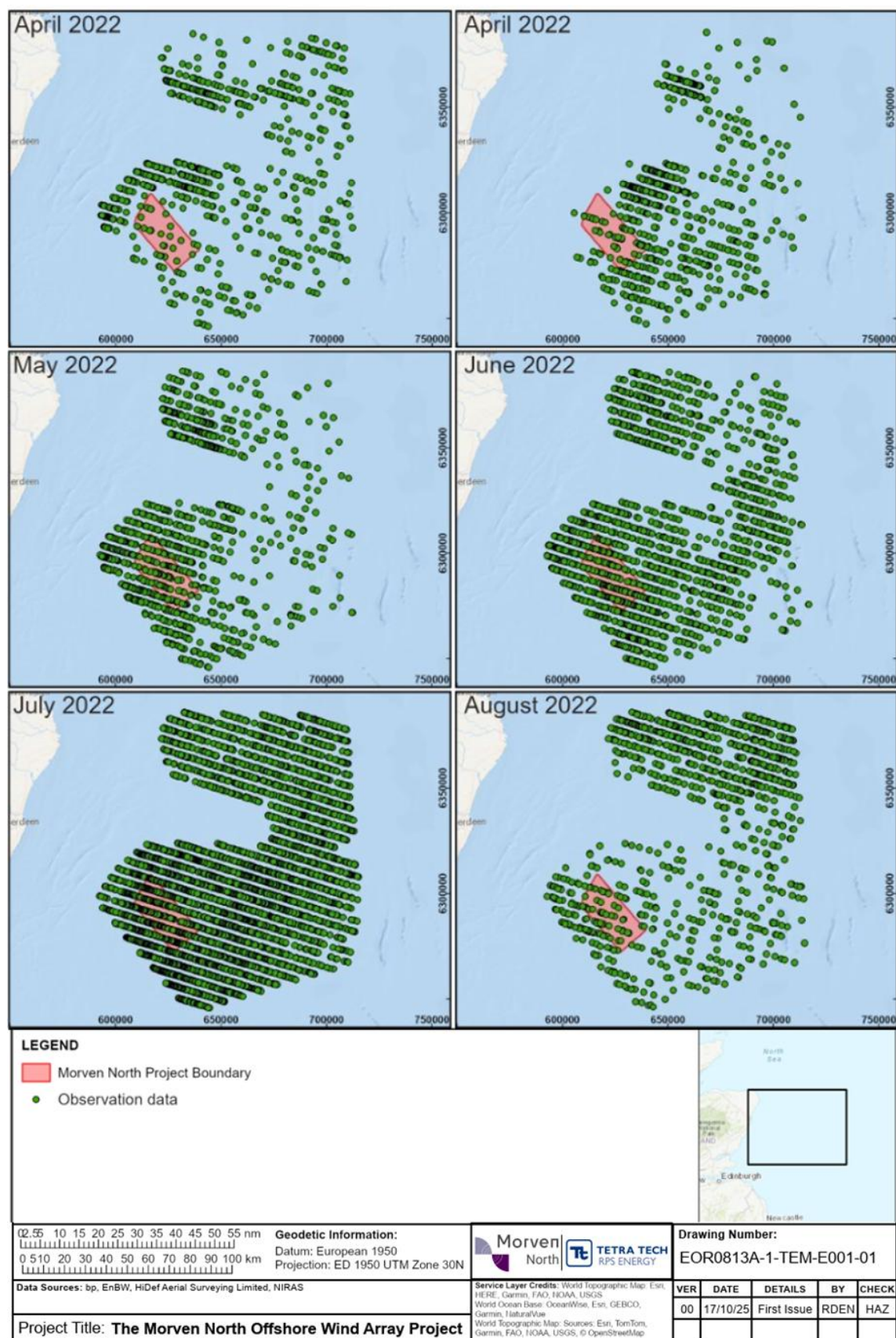


Figure C. 7: Regional distribution of guillemot (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

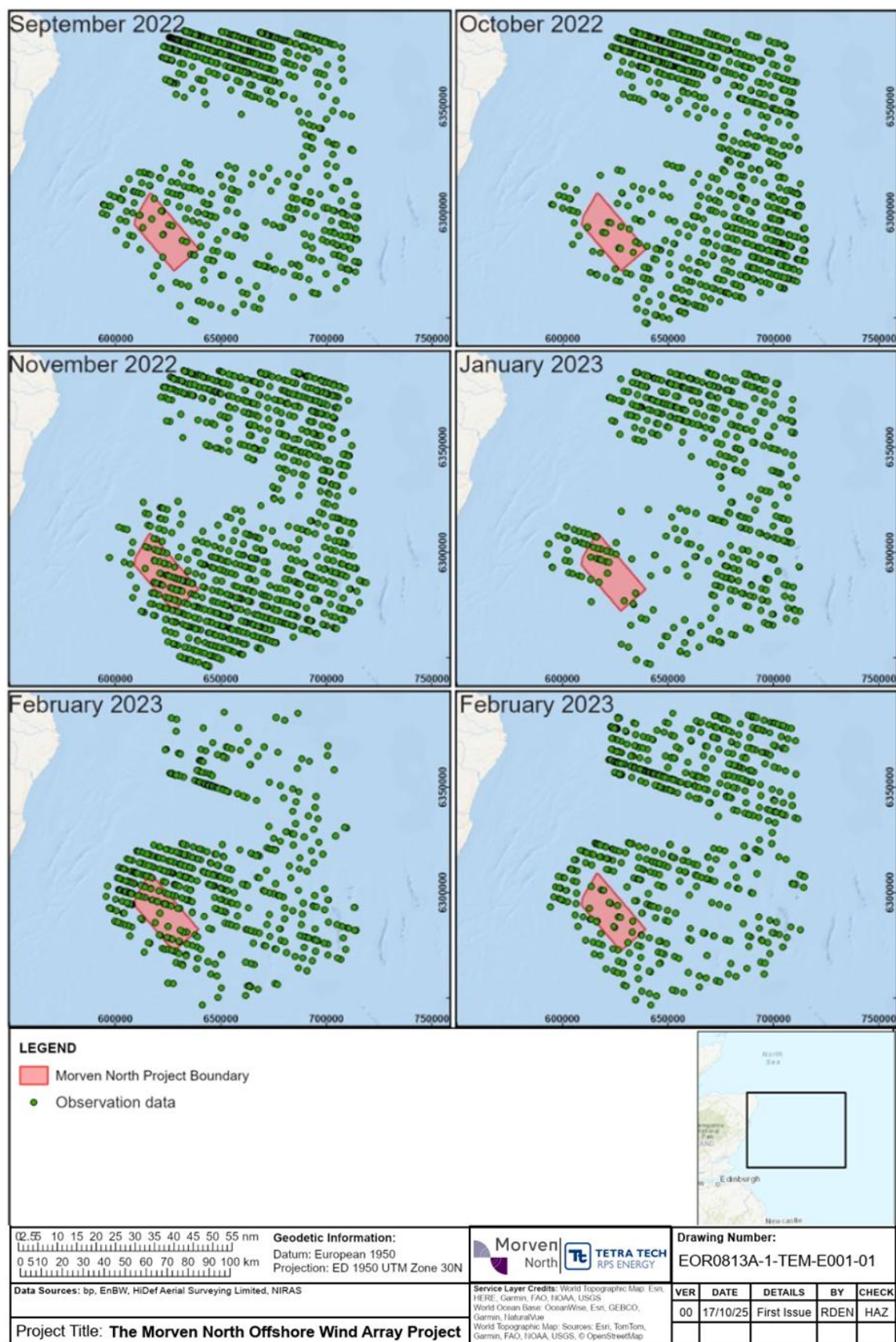


Figure C. 8: Regional distribution of guillemot (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

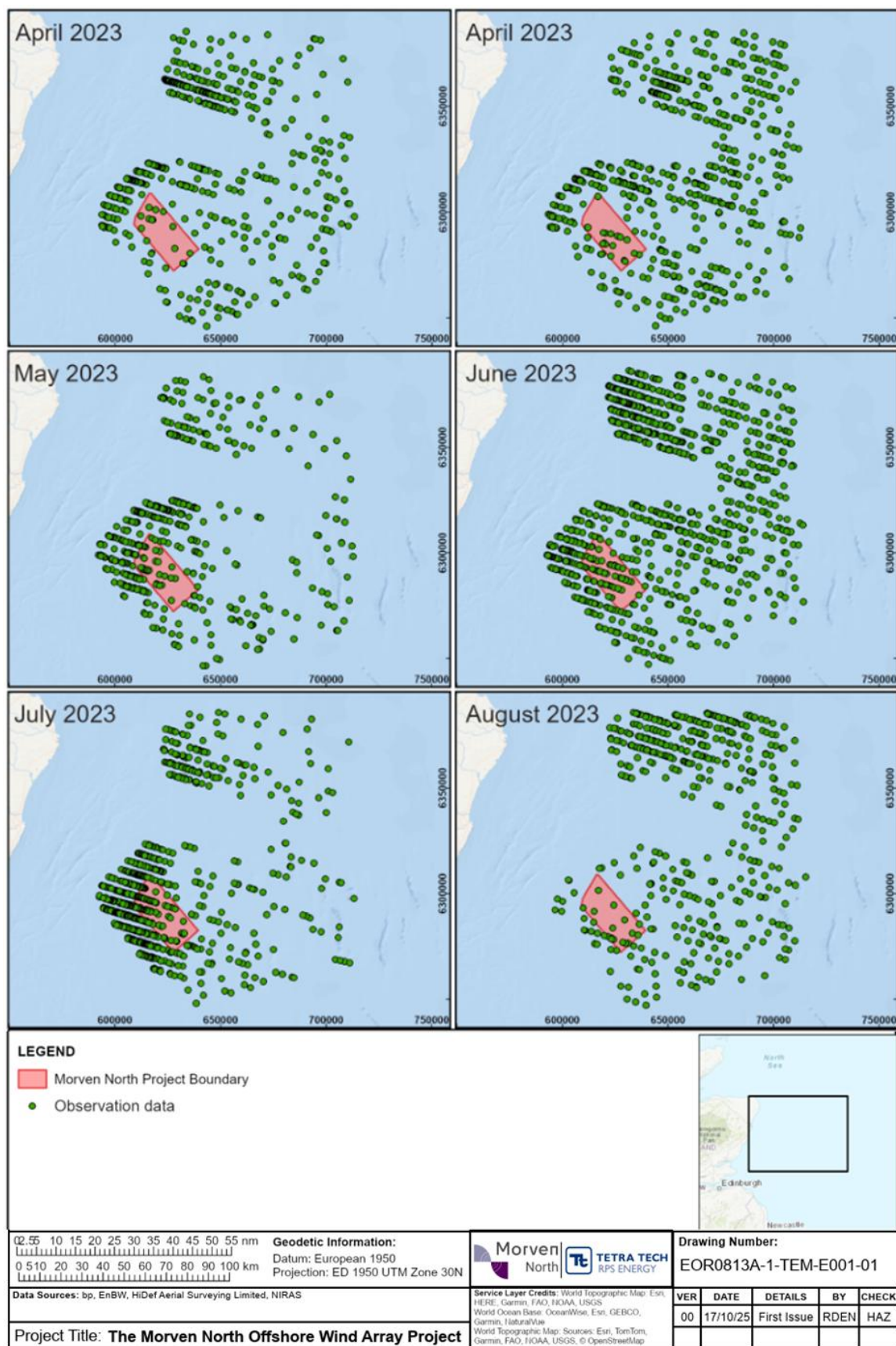


Figure C. 9: Regional distribution of guillemot (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

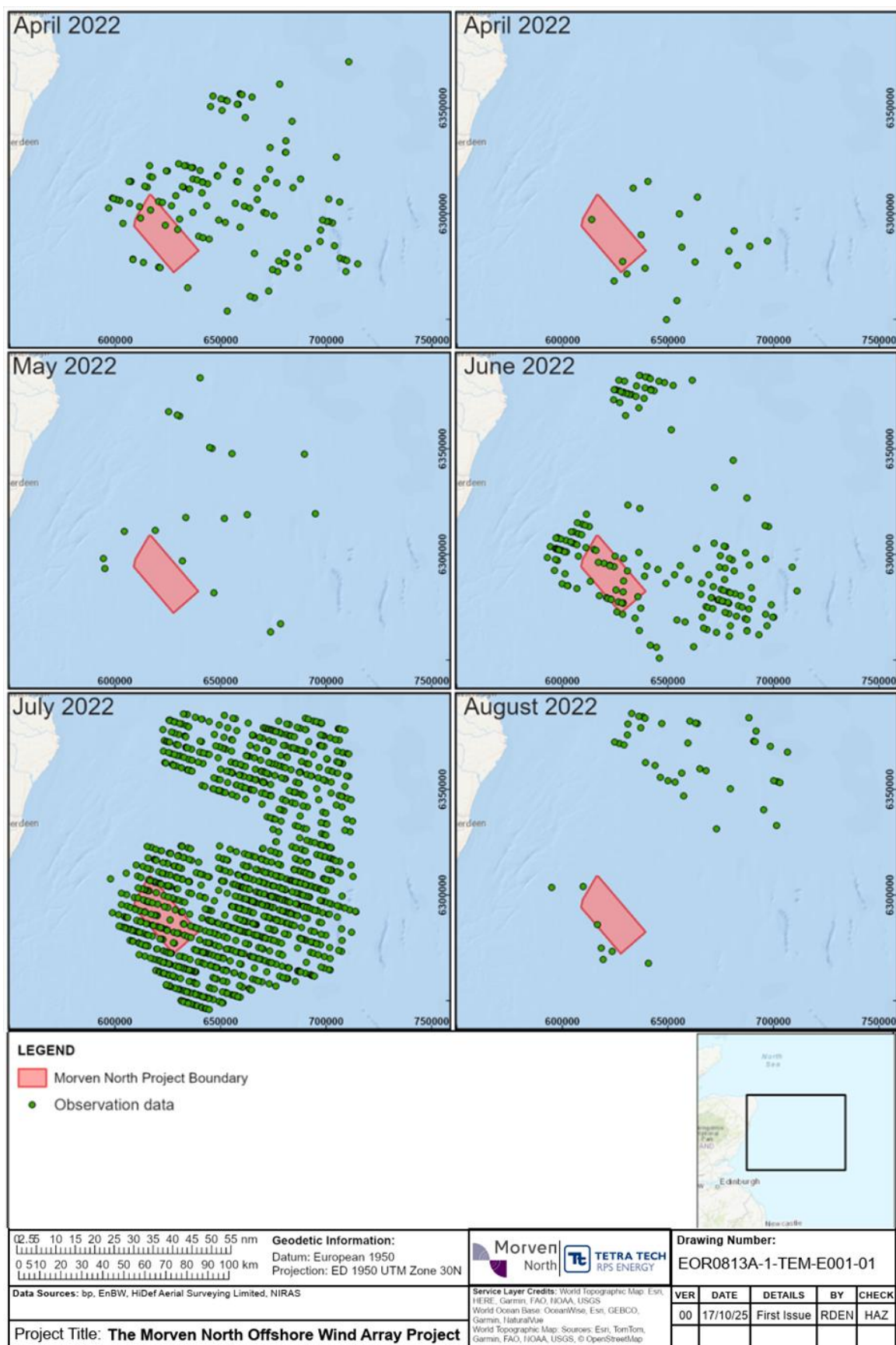


Figure C. 10: Regional distribution of razorbill (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

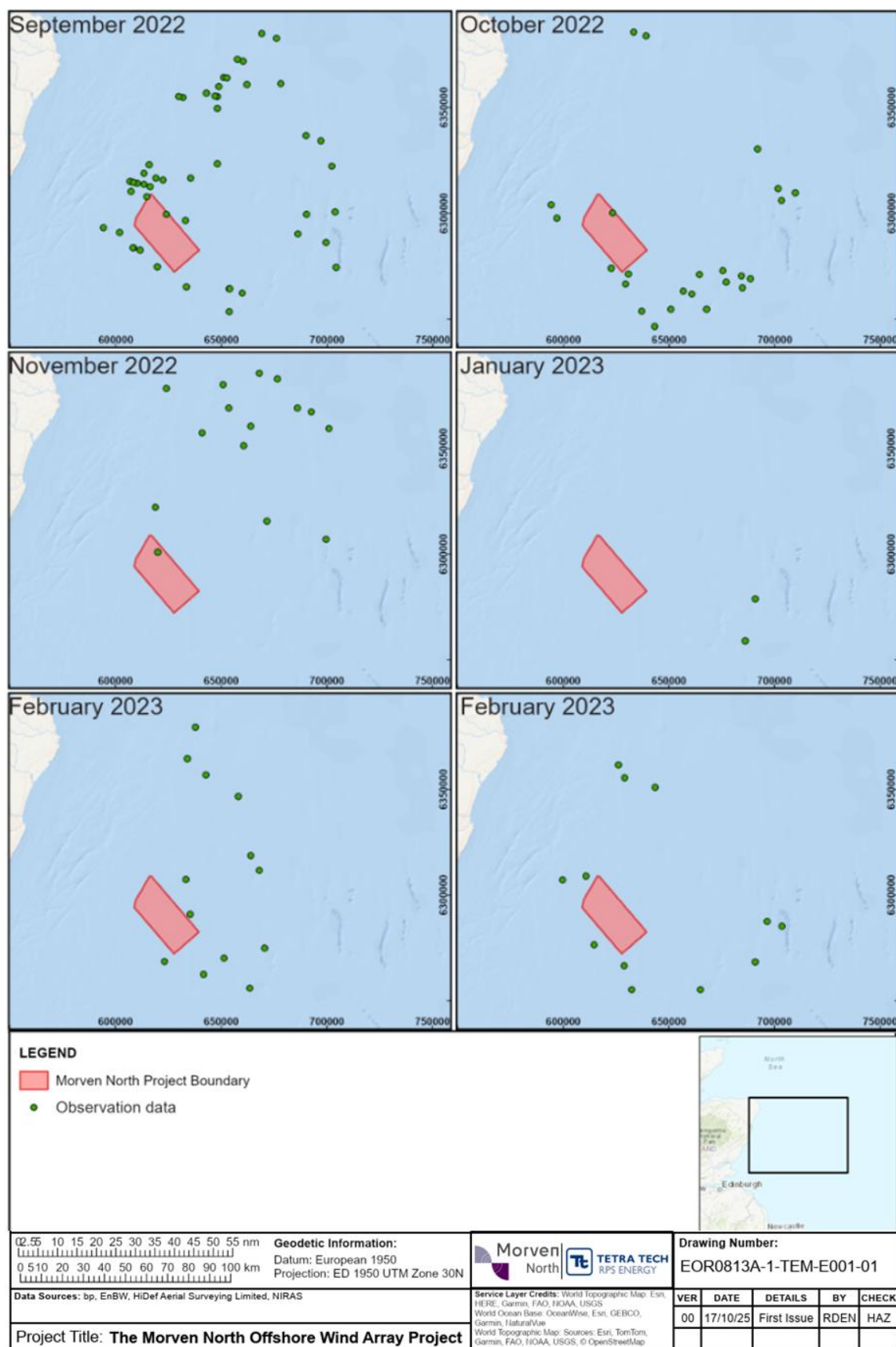


Figure C. 11: Regional distribution of razorbill (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

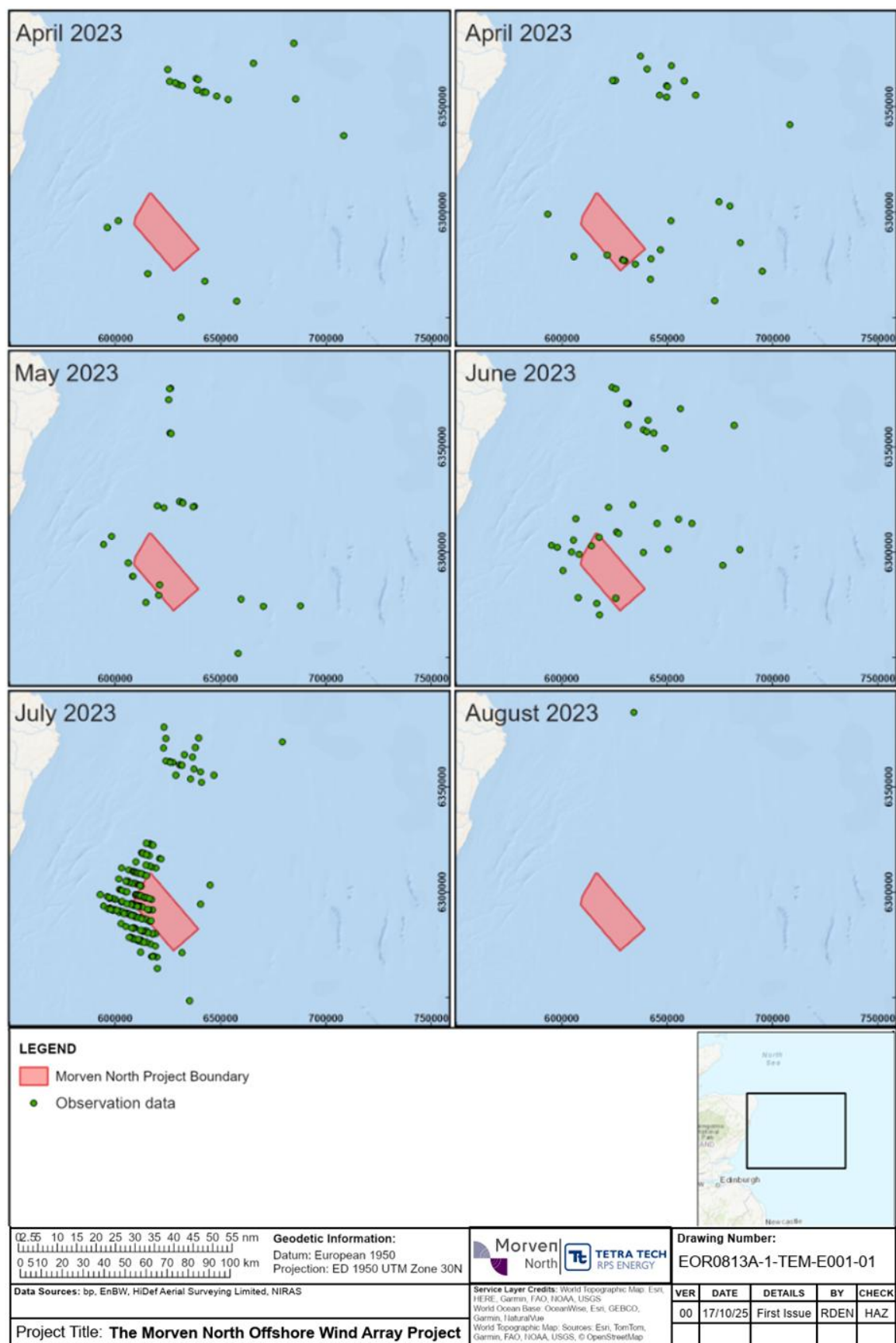


Figure C. 12: Regional distribution of razorbill (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

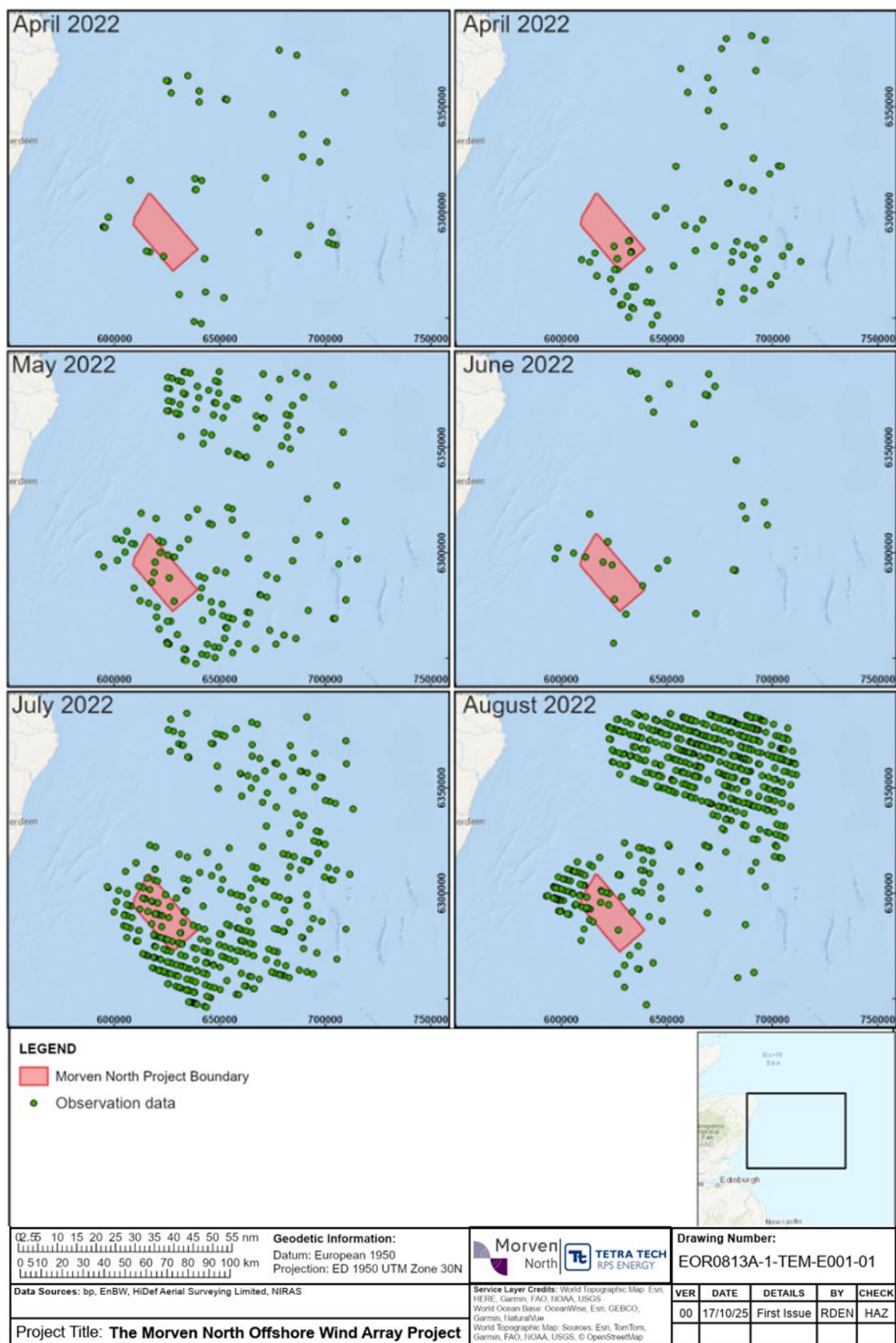


Figure C. 13: Regional distribution of puffin (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

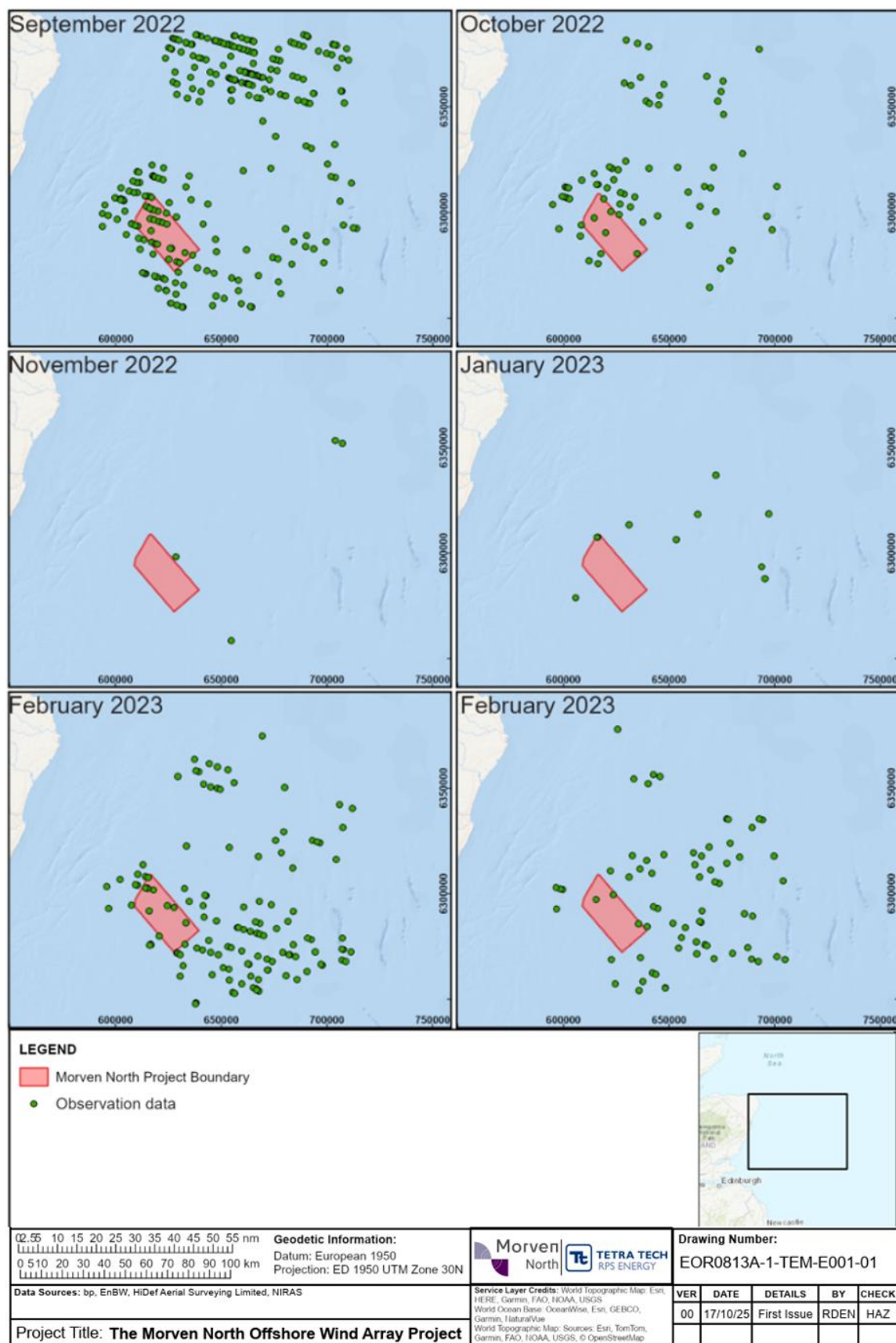


Figure C. 14: Regional distribution of puffin (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

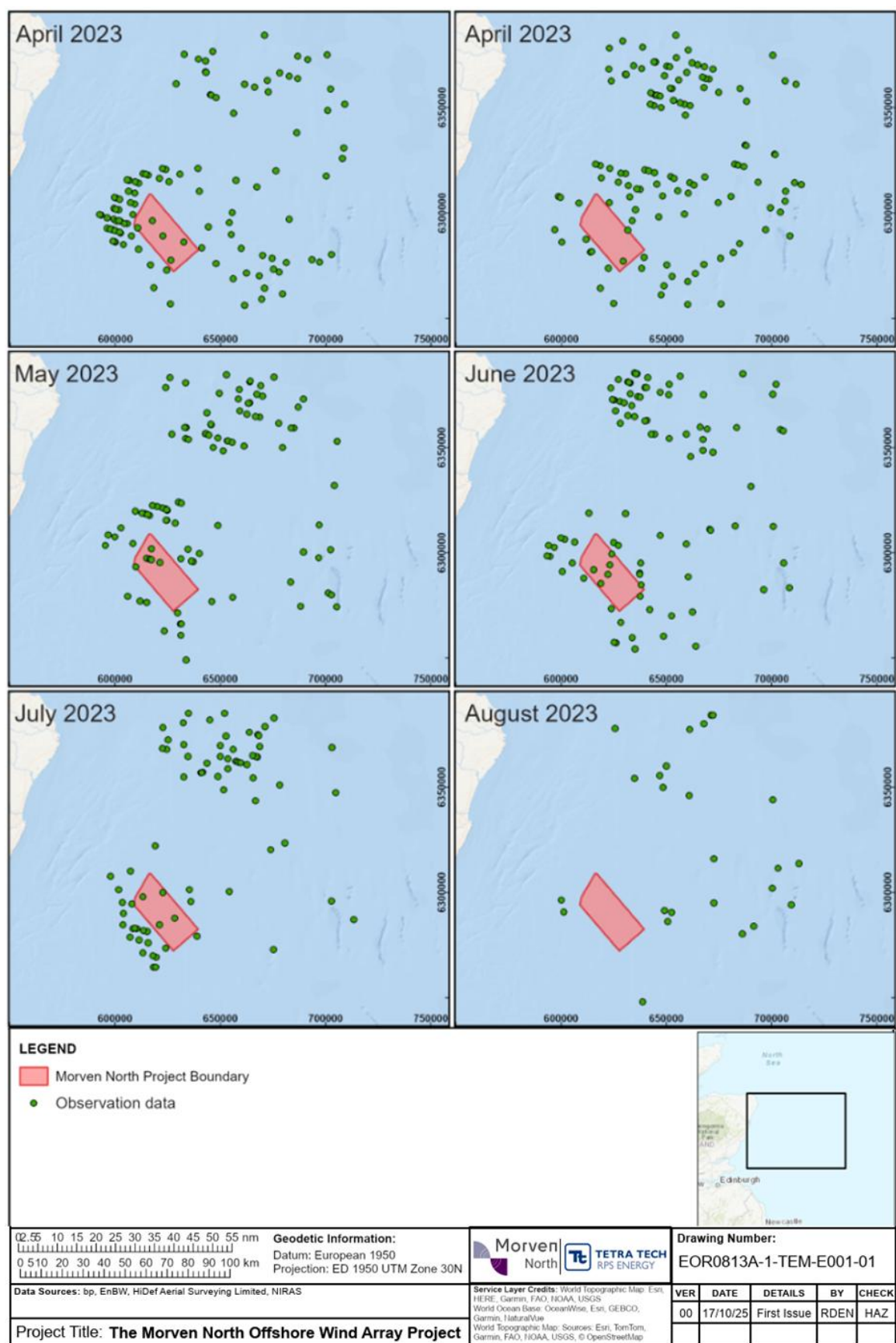


Figure C. 15: Regional distribution of puffin (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

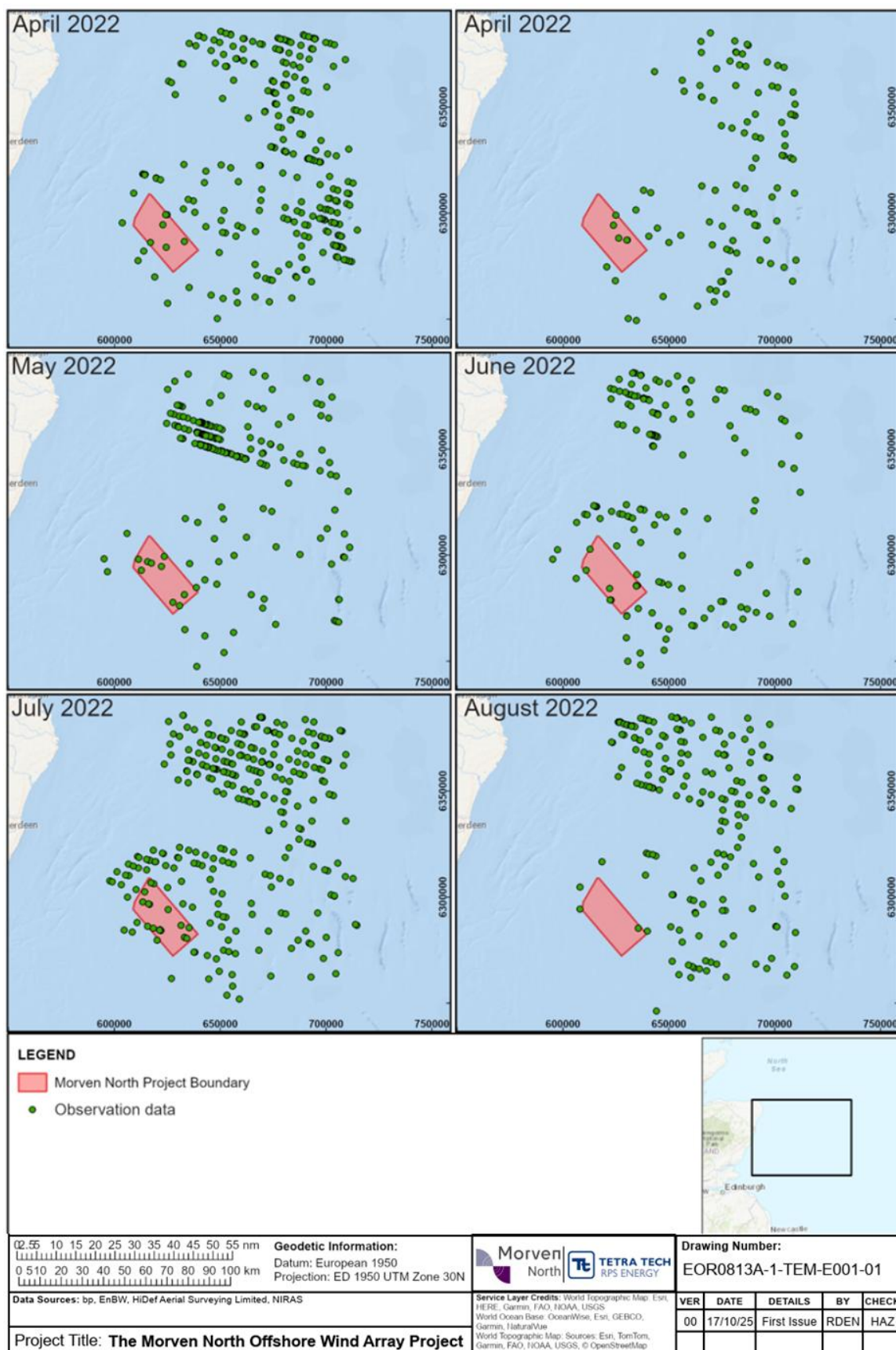


Figure C. 16: Regional distribution of fulmar (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

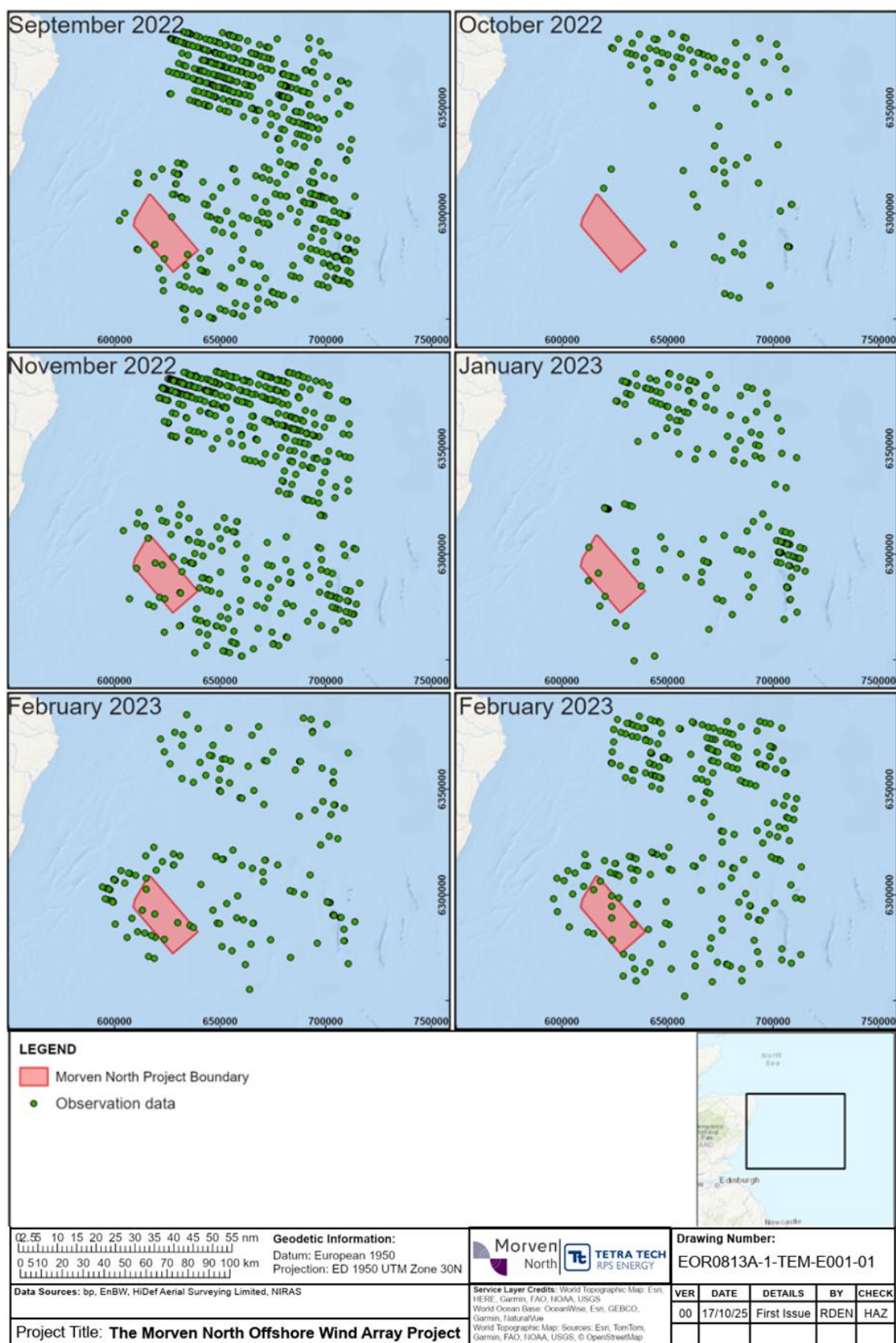


Figure C. 17: Regional distribution of fulmar (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

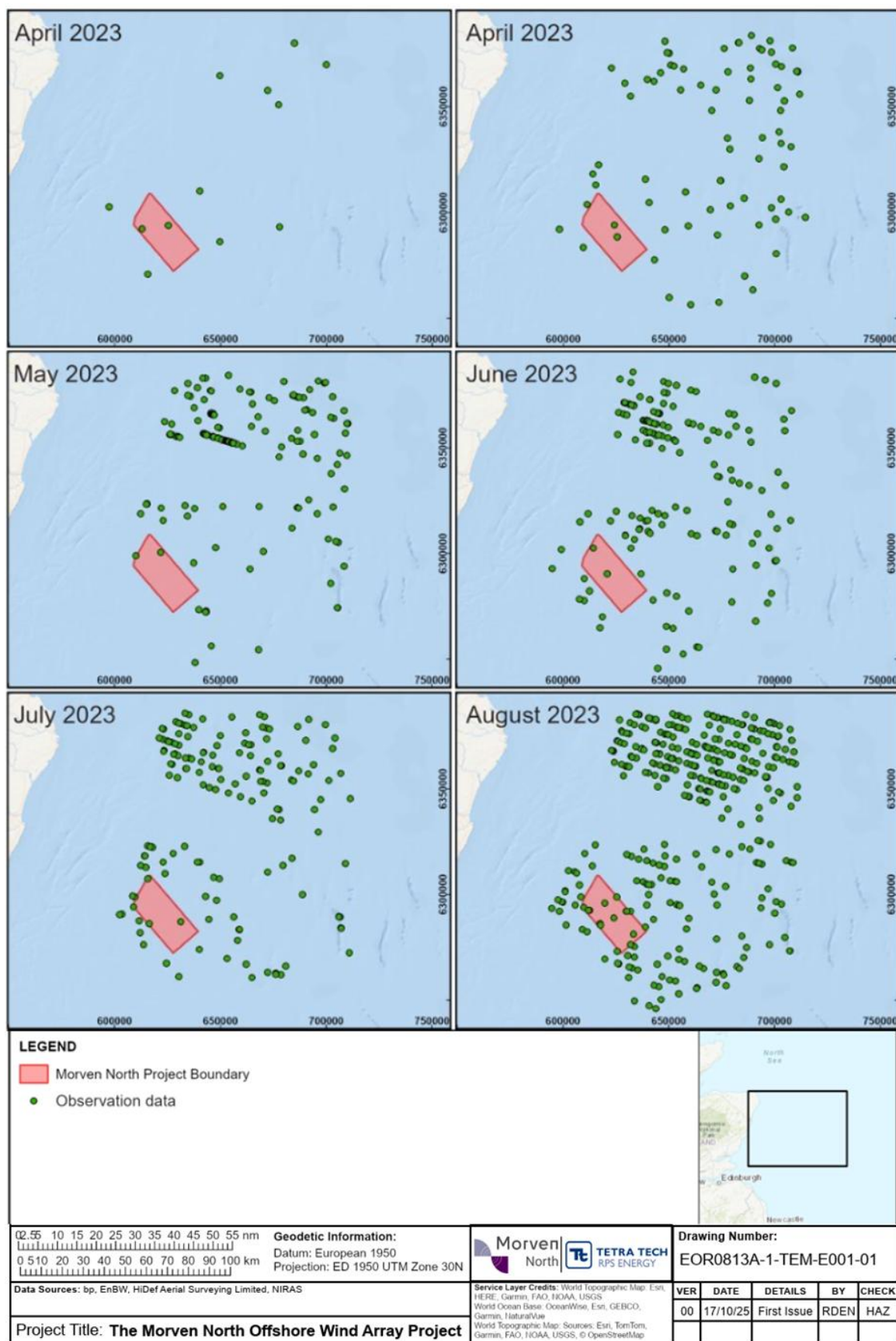


Figure C. 18: Regional distribution of fulmar (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

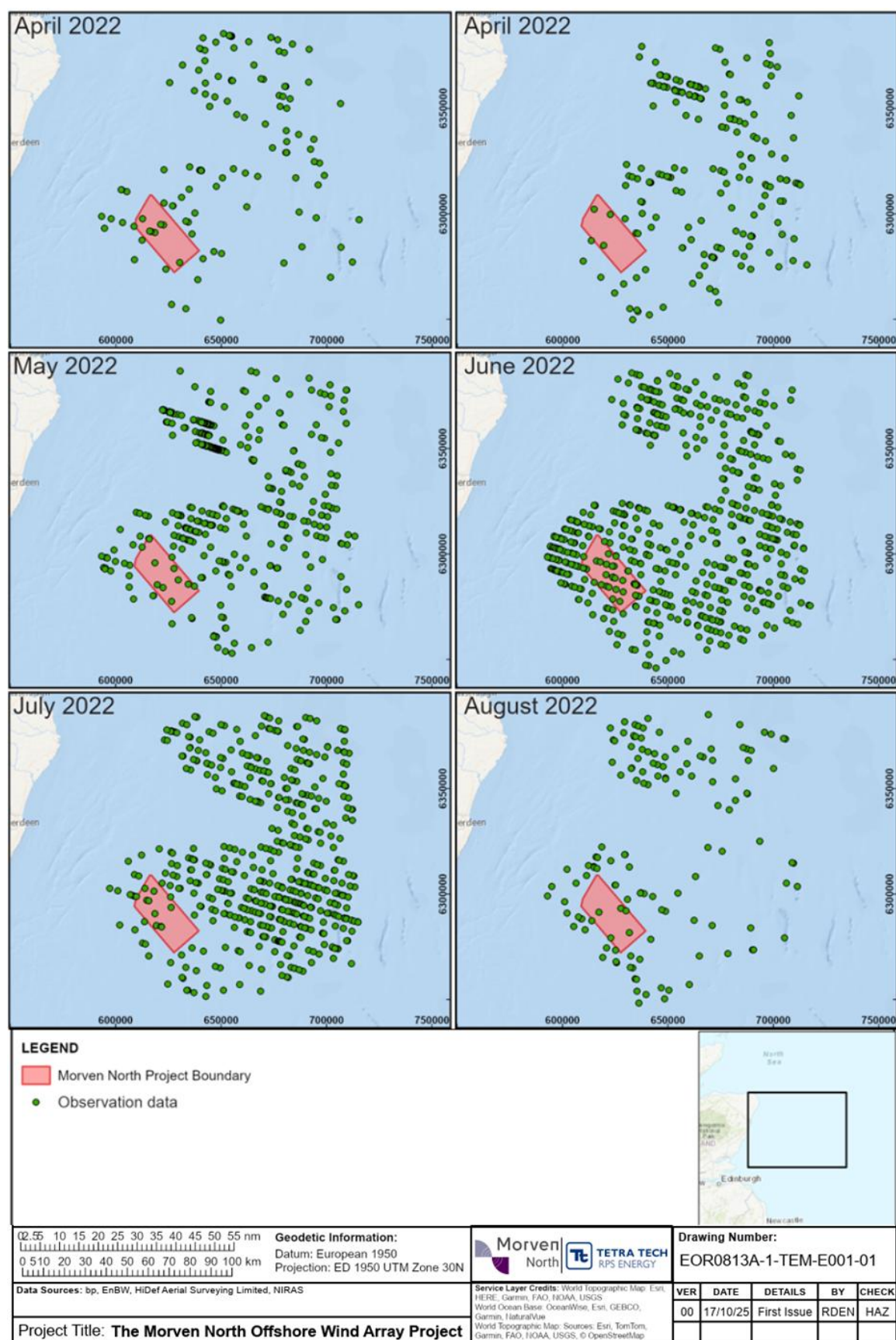


Figure C. 19: Regional distribution of gannet (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

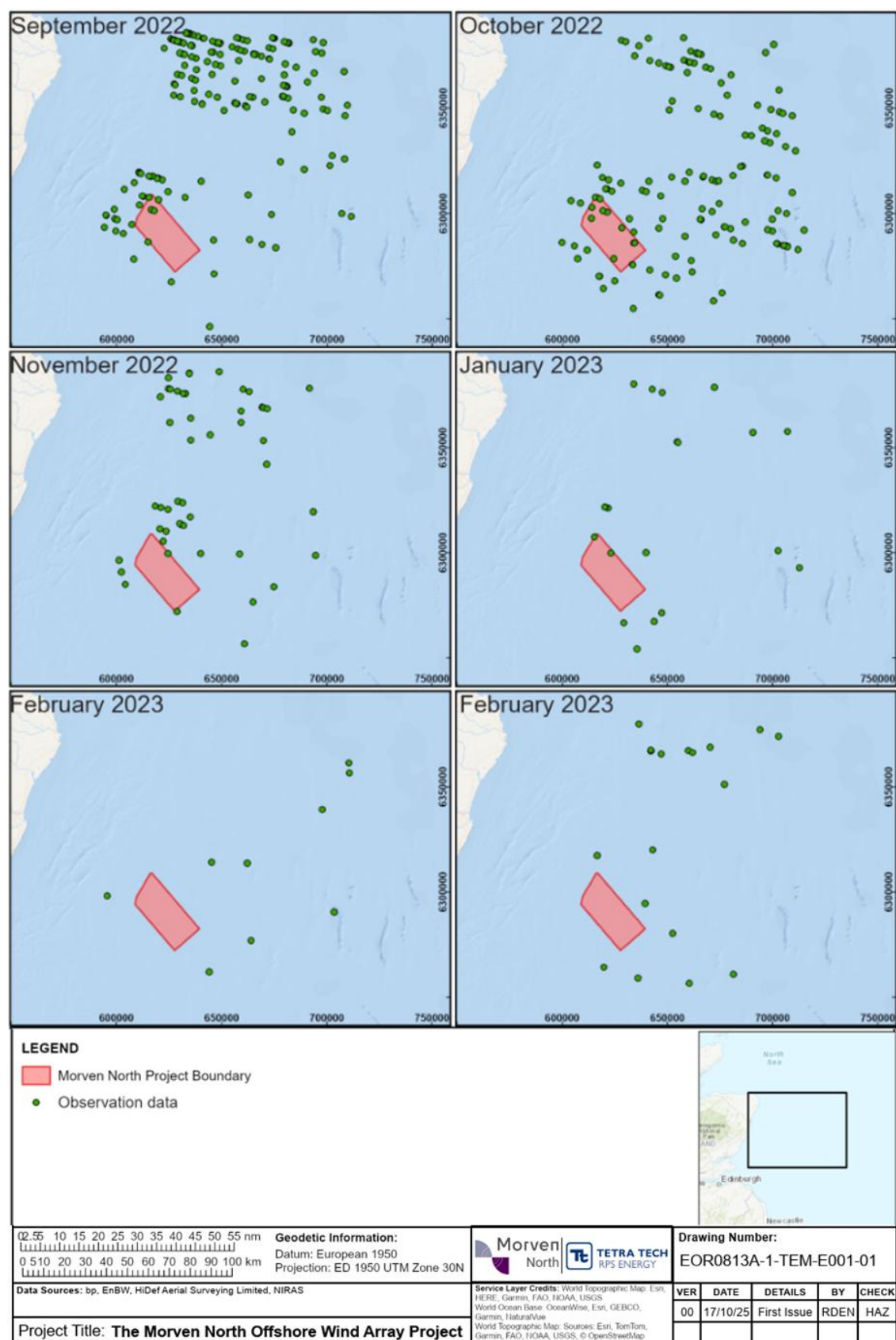


Figure C. 20: Regional distribution of gannet (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

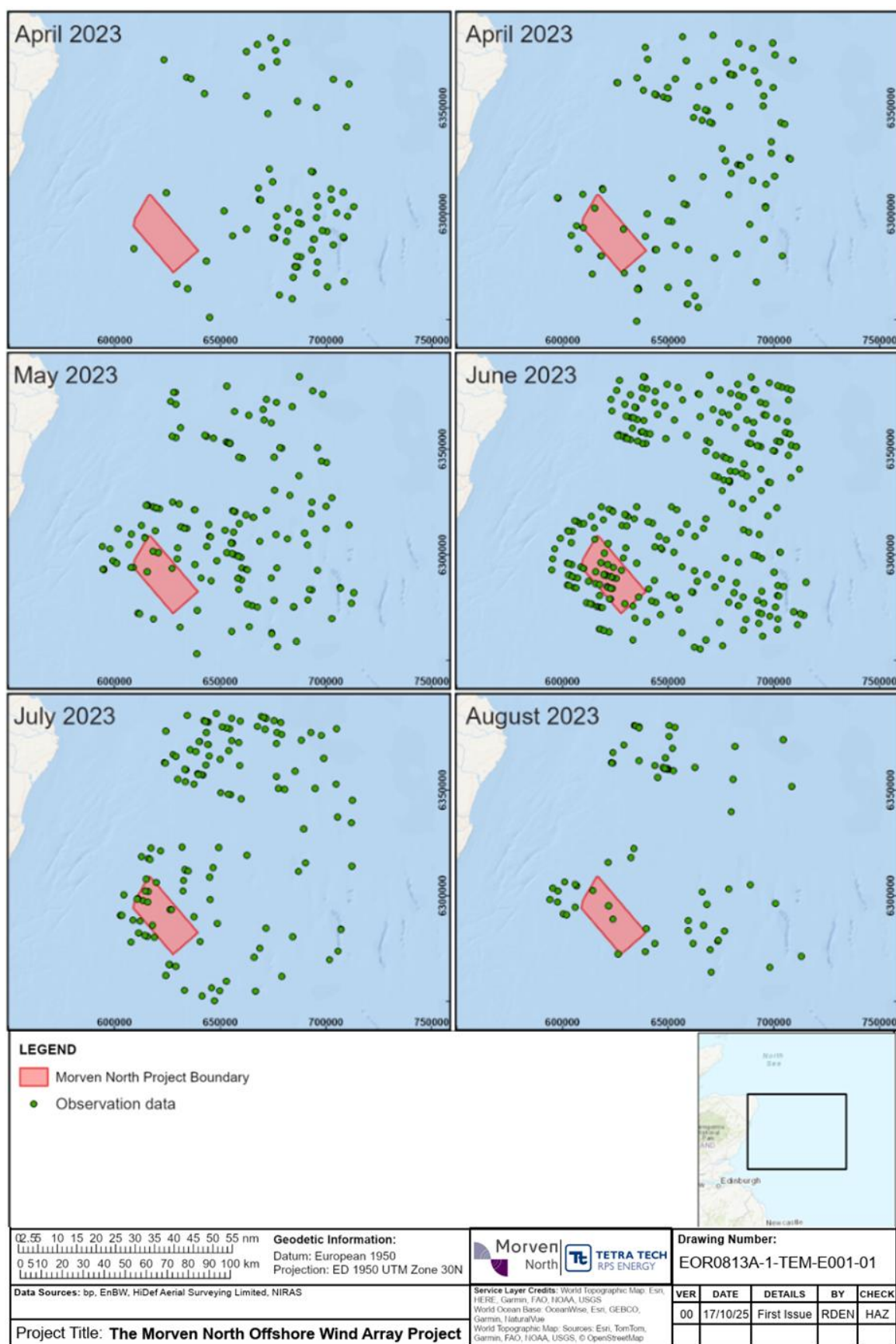


Figure C. 21: Regional distribution of gannet (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

Appendix D Model-based abundance estimates for the Morven North Offshore Ornithology Baseline Characterisation Study Area

D.1 Kittiwake

Table D. 1: Kittiwake MRSea estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	lower confidence level (LCL)	upper confidence level (UCL)	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	4,837	4,491	5,143	2,254	2,036	2,486	2,601	2,361	2,831
2021	Jul	601	463	3,776	562	383	799	63	33	208
2021	Aug	91	66	230	38	18	81	58	27	123
2021	Sep	872	699	1,121	390	297	598	483	391	622
2021	Oct	306	241	428	0	0	0	306	241	428
2021	Nov	87	47	136	26	0	57	78	43	183
2021	Dec	12	5	49	0	0	0	11	3	58
2022	Jan	26	0	57	0	0	0	25	0	55
2022	Feb	261	195	363	38	17	87	220	158	328
2022	Mar	150	101	226	24	9	61	124	86	215
2022	Apr	192	147	304	11	0	31	179	133	266

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	lower confidence level (LCL)	upper confidence level (UCL)	Pop	LCL	UCL	Pop	LCL	UCL
2022	May	632	534	788	137	113	297	504	420	651
2022	Jun	2,068	1,709	2,502	446	364	575	1,622	1,342	2,019
2022	Jul	1,766	1,459	2,175	931	759	1,284	828	708	990
2022	Aug	109	72	179	26	0	55	83	70	140
2022	Sep	17	0	43	8	0	25	11	0	38
2022	Oct	53	27	114	0	0	0	53	27	114
2022	Nov	104	75	246	33	0	96	72	48	200
2022	Dec	221	160	293	42	19	89	176	128	282
2023	Jan	62	42	194	26	0	52	43	23	99
2023	Feb	39	20	77	17	0	51	23	0	47
2023	Mar	65	45	198	18	0	44	49	35	281
2023	Apr	86	53	143	0	0	0	84	51	141
2023	May	388	300	577	8	0	24	377	258	539
2023	Jun	540	445	676	249	203	444	296	238	415
2023	Jul	5,384	4,322	6,462	3,693	3,133	4,475	1,432	1,094	1,848
2023	Aug	26	12	188	0	0	0	26	12	188

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	lower confidence level (LCL)	upper confidence level (UCL)	Pop	LCL	UCL	Pop	LCL	UCL
2023	Sep	11	0	32	10	0	31	0	0	0

Table D. 2: Kittiwake MRSea estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	3,734	3,451	3,969	1,761	1,576	1,948	1,999	1,806	2,179
2021	Jul	403	302	2,292	361	254	509	43	24	181
2021	Aug	59	37	155	31	14	63	30	13	61
2021	Sep	654	497	854	333	240	510	317	249	410
2021	Oct	229	179	315	0	0	0	229	179	315
2021	Nov	66	36	103	25	0	55	34	19	68
2021	Dec	7	2	34	0	0	0	9	2	50
2022	Jan	26	0	57	0	0	0	24	0	56
2022	Feb	199	149	274	25	10	55	172	127	253
2022	Mar	137	92	207	24	9	60	115	80	189
2022	Apr	136	99	208	10	0	29	126	91	185

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	May	460	375	570	67	50	167	356	286	457
2022	Jun	1,570	1,265	1,906	329	260	421	1,184	935	1,477
2022	Jul	1,328	1,084	1,642	724	563	972	616	511	733
2022	Aug	92	61	152	18	0	44	83	70	134
2022	Sep	17	0	43	8	0	26	10	0	35
2022	Oct	44	22	92	0	0	0	44	22	92
2022	Nov	83	60	180	30	0	78	52	35	139
2022	Dec	166	120	220	32	14	65	133	95	211
2023	Jan	37	21	98	14	0	36	23	11	52
2023	Feb	24	12	49	0	0	0	23	7	47
2023	Mar	52	34	142	18	0	41	32	21	197
2023	Apr	70	42	121	0	0	0	73	42	127
2023	May	243	180	365	8	0	24	239	163	346
2023	Jun	385	306	489	152	115	286	224	175	311
2023	Jul	3391	2714	4037	2922	2459	3492	1118	846	1443
2023	Aug	16	7	134	0	0	0	16	7	134
2023	Sep	0	0	0	0	0	0	0	0	0

Table D. 3: Kittiwake MRSea estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	2,708	2,467	2,900	1,272	1,123	1,418	1,455	1,291	1,601
2021	Jul	162	101	1,434	164	106	248	27	15	146
2021	Aug	34	18	99	23	11	46	13	5	31
2021	Sep	428	309	585	246	166	396	177	131	241
2021	Oct	164	121	232	0	0	0	164	121	232
2021	Nov	47	25	74	18	0	45	17	9	36
2021	Dec	4	1	22	0	0	0	7	1	40
2022	Jan	16	0	38	0	0	0	16	0	40
2022	Feb	145	104	199	15	6	37	133	96	196
2022	Mar	116	77	176	23	8	56	95	63	156
2022	Apr	90	58	143	9	0	30	83	56	124
2022	May	301	235	385	31	19	98	239	182	316
2022	Jun	1,095	858	1,342	231	175	304	792	608	1,010
2022	Jul	929	726	1,177	543	401	741	420	336	511
2022	Aug	67	43	113	18	0	42	52	38	85
2022	Sep	18	0	45	8	0	25	9	0	30

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	34	17	69	0	0	0	34	17	69
2022	Nov	56	35	126	25	0	75	27	15	88
2022	Dec	118	84	155	22	9	46	98	65	157
2023	Jan	25	12	66	16	0	38	12	6	29
2023	Feb	14	6	33	0	0	0	7	0	23
2023	Mar	37	23	98	9	0	29	20	12	133
2023	Apr	53	30	98	0	0	0	59	34	105
2023	May	152	104	239	8	0	25	144	96	210
2023	Jun	266	198	345	117	83	225	154	109	222
2023	Jul	1,972	1,563	2,420	1,699	1,345	2,108	758	541	1,016
2023	Aug	11	4	101	0	0	0	11	4	101
2023	Sep	0	0	0	0	0	0	0	0	0

D.2 Guillemot

Table D. 4: Guillemot MRSea estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	21,359	20,037	22,684	21,332	19,889	22,622	30	17	152
2021	Jul	49,452	46,758	51,776	49,217	46,528	51,544	267	180	425
2021	Aug	1,381	1,178	1,633	1,381	1,178	1,633	0	0	0
2021	Sep	13,472	12,339	14,576	13,458	12,325	14,560	14	0	50
2021	Oct	1,062	865	1,260	1,033	836	1,236	27	0	59
2021	Nov	2,597	2,323	2,892	2,581	2,299	2,846	8	0	26
2021	Dec	2,721	2,380	3,169	2,721	2,380	3,169	0	0	0
2022	Jan	535	417	706	523	409	725	16	0	39
2022	Feb	1,544	1,330	1,806	1,559	1,312	1,862	30	0	63
2022	Mar	4,185	3,825	4,520	4,075	3,745	4,435	144	109	318
2022	Apr	1,301	1,026	1,704	528	416	712	755	595	1,075
2022	May	6,085	5,660	6,493	6,077	5,599	6,488	19	0	62
2022	Jun	4,034	3,697	4,369	4,041	3,695	4,381	5	3	8
2022	Jul	22,201	20,901	23,492	22,190	20,890	23,480	12	0	39
2022	Aug	21,997	19,872	24,025	21,982	19,856	24,010	21	0	66

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	1,140	970	1,385	1,140	970	1,385	0	0	0
2022	Oct	2,929	2,639	3,231	2,916	2,625	3,198	40	9	74
2022	Nov	2,307	2,025	2,612	2,222	1,955	2,503	176	0	458
2022	Dec	1,809	1,560	2,099	1,805	1,553	2,075	26	0	59
2023	Jan	385	286	594	385	286	594	0	0	0
2023	Feb	2,556	2,091	3,205	2,029	1,767	2,308	585	426	1,067
2023	Mar	1,488	1,271	1,719	1,431	1,240	1,664	44	10	88
2023	Apr	1,217	882	1,768	410	319	545	787	470	1,236
2023	May	5,566	5,180	5,967	5,404	5,010	5,808	156	120	286
2023	Jun	3,137	2,823	3,462	3,108	2,802	3,412	17	5	55
2023	Jul	36,744	33,736	39,569	36,120	33,402	38,558	554	414	918
2023	Aug	408	323	539	408	323	539	0	0	0
2023	Sep	211	160	348	211	159	358	0	0	0

Table D. 5: Guillemot MRSea estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	17,504	16,279	18,594	17,518	16,253	18,580	15	7	67
2021	Jul	31,248	29,585	32,706	31,027	29,367	32,477	223	144	349
2021	Aug	1,021	842	1,210	1,021	842	1,210	0	0	0
2021	Sep	10,676	9,758	11,518	10,669	9,751	11,510	0	0	0
2021	Oct	829	672	983	828	664	988	26	0	58
2021	Nov	2,115	1,879	2,375	2,092	1,860	2,312	0	0	0
2021	Dec	2,146	1,869	2,519	2,146	1,869	2,519	0	0	0
2022	Jan	374	287	496	380	287	523	7	0	23
2022	Feb	1,034	879	1,217	983	796	1,184	19	0	44
2022	Mar	3,438	3,128	3,710	3,367	3,066	3,655	86	56	195
2022	Apr	980	759	1,284	348	263	471	589	455	844
2022	May	3,897	3,590	4,192	3,896	3,593	4,174	0	0	0
2022	Jun	3,025	2,754	3,281	3,044	2,741	3,315	0	0	0
2022	Jul	17,152	15,987	18,165	17,145	15,980	18,159	12	0	37
2022	Aug	15,971	14,292	17,478	15,963	14,284	17,470	0	0	0
2022	Sep	852	725	1,033	852	725	1,033	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	2,218	1,956	2,482	2,165	1,923	2,387	28	0	62
2022	Nov	1,676	1,439	1,920	1,600	1,382	1,817	153	0	413
2022	Dec	1,351	1,143	1,575	1,365	1,155	1,571	16	0	39
2023	Jan	239	173	369	239	173	369	0	0	0
2023	Feb	2,120	1,705	2,653	1,582	1,370	1,798	546	387	988
2023	Mar	1,215	1,016	1,408	1,210	1,036	1,405	41	10	78
2023	Apr	823	588	1,198	337	261	450	555	328	866
2023	May	4,354	4,020	4,674	4,269	3,935	4,597	111	82	194
2023	Jun	2,369	2,134	2,610	2,366	2,128	2,592	15	4	49
2023	Jul	29,008	26,616	31,197	29,353	26,974	31,563	448	318	760
2023	Aug	282	214	378	282	214	378	0	0	0
2023	Sep	170	124	279	174	127	281	0	0	0

Table D. 6: Guillemot MRSea estimates for the Morven North Boundary only. (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	13,540	12,428	14,397	13,552	12,493	14,481	8	3	37
2021	Jul	19,042	17,694	20,078	18,882	17,539	19,917	161	97	252
2021	Aug	710	564	858	710	564	858	0	0	0
2021	Sep	7,589	6,827	8,251	7,586	6,824	8,247	0	0	0
2021	Oct	609	491	726	624	495	751	27	0	56
2021	Nov	1,585	1,389	1,787	1,552	1,361	1,733	0	0	0
2021	Dec	1,614	1,367	1,919	1,614	1,367	1,919	0	0	0
2022	Jan	243	175	327	254	187	358	0	0	0
2022	Feb	693	569	829	674	523	821	10	0	29
2022	Mar	2,603	2,331	2,843	2,553	2,288	2,800	43	20	110
2022	Apr	694	521	923	222	156	311	433	315	634
2022	May	2,485	2,225	2,716	2,464	2,218	2,675	0	0	0
2022	Jun	2,092	1,890	2,272	2,130	1,889	2,349	0	0	0
2022	Jul	12,345	11,373	13,182	12,342	11,370	13,178	0	0	0
2022	Aug	10,456	9,286	11,568	10,454	9,283	11,566	0	0	0
2022	Sep	586	484	719	586	484	719	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	1,560	1,325	1,766	1,495	1,305	1,666	20	0	51
2022	Nov	1,127	942	1,318	1,073	909	1,231	0	0	0
2022	Dec	960	787	1,128	977	796	1,146	7	0	22
2023	Jan	137	87	224	137	87	224	0	0	0
2023	Feb	1,593	1,240	2,052	1,127	958	1,291	472	325	808
2023	Mar	941	771	1,095	938	778	1,100	43	10	80
2023	Apr	531	369	794	254	186	347	370	214	576
2023	May	3,199	2,899	3,474	3,136	2,824	3,412	69	45	131
2023	Jun	1,741	1529	1943	1740	1554	1920	12	3	39
2023	Jul	20,464	18,511	22,187	20,430	18,466	22,216	325	211	574
2023	Aug	188	132	260	188	132	260	0	0	0
2023	Sep	124	82	208	132	90	213	0	0	0

D.3 Razorbill

Table D. 7: Razorbill MRSea estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	1,305	1,122	1,513	1,269	1,091	1,465	0	61	18
2021	Jul	13,289	12,273	14,371	13,162	11,960	14,232	85	210	109
2021	Aug	191	144	380	191	144	380	0	0	0
2021	Sep	849	741	1,050	849	741	1,050	0	0	0
2021	Oct	63	31	140	63	31	140	0	0	0
2021	Nov	182	108	275	182	108	275	0	0	0
2021	Dec	485	380	769	485	380	769	0	0	0
2022	Jan	113	63	203	113	63	203	0	0	0
2022	Feb	61	29	135	61	29	135	0	0	0
2022	Mar	124	94	306	105	81	311	14	0	48
2022	Apr	189	142	319	130	76	219	69	46	168
2022	May	527	426	684	527	426	684	0	0	0
2022	Jun	62	32	172	62	32	172	0	0	0
2022	Jul	1,963	1,725	2,196	1,963	1,725	2,196	0	0	0
2022	Aug	5,071	4,372	5,836	5,071	4,372	5,836	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	1,109	932	1,330	1,109	932	1,330	0	0	0
2022	Oct	285	204	424	285	204	424	0	0	0
2022	Nov	830	677	1,041	830	677	1,041	0	0	0
2022	Dec	91	59	244	91	59	244	0	0	0
2023	Jan	124	70	217	124	70	217	0	0	0
2023	Feb	123	70	207	88	48	208	30	0	83
2023	Mar	162	119	307	92	70	300	98	44	357
2023	Apr	47	0	139	0	0	0	48	0	137
2023	May	230	168	348	230	168	348	0	0	0
2023	Jun	299	238	448	299	238	448	0	0	0
2023	Jul	7,445	6,678	8,315	7,392	6,691	8,152	50	25	110
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	49	0	127	48	0	124	0	0	0

Table D. 8: Razorbill MRSea estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	1,019	875	1,174	1,019	857	1,175	0	0	0
2021	Jul	9,490	8,664	10,267	9,384	8,513	10,155	102	78	192
2021	Aug	123	88	228	123	88	228	0	0	0
2021	Sep	812	693	997	812	693	997	0	0	0
2021	Oct	56	27	127	56	27	127	0	0	0
2021	Nov	138	81	208	138	81	208	0	0	0
2021	Dec	405	312	625	405	312	625	0	0	0
2022	Jan	95	52	169	95	52	169	0	0	0
2022	Feb	51	24	114	51	24	114	0	0	0
2022	Mar	111	82	260	101	79	286	0	0	0
2022	Apr	109	72	189	74	41	130	62	41	147
2022	May	389	314	499	389	314	499	0	0	0
2022	Jun	45	21	116	45	21	116	0	0	0
2022	Jul	1,497	1,299	1,685	1,497	1,299	1,685	0	0	0
2022	Aug	3,578	3,032	4,129	3,578	3,032	4,129	0	0	0
2022	Sep	823	686	983	823	686	983	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	199	135	302	199	135	302	0	0	0
2022	Nov	654	525	820	654	525	820	0	0	0
2022	Dec	74	42	205	74	42	205	0	0	0
2023	Jan	105	59	186	105	59	186	0	0	0
2023	Feb	108	62	180	68	37	152	30	0	91
2023	Mar	99	67	200	45	28	168	58	21	233
2023	Apr	36	0	116	0	0	0	36	0	115
2023	May	194	141	284	194	141	284	0	0	0
2023	Jun	243	186	357	243	186	357	0	0	0
2023	Jul	6,277	5,604	7,014	6,242	5,625	6,892	46	22	101
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	46	0	114	49	0	118	0	0	0

Table D. 9: Razorbill MRSea estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	778	654	900	786	649	909	0	0	0
2021	Jul	6,401	5,739	7,023	6,324	5,641	6,912	84	58	154
2021	Aug	62	38	127	62	38	127	0	0	0
2021	Sep	718	596	882	718	596	882	0	0	0
2021	Oct	47	21	106	47	21	106	0	0	0
2021	Nov	99	58	149	99	58	149	0	0	0
2021	Dec	304	218	475	304	218	475	0	0	0
2022	Jan	74	40	132	74	40	132	0	0	0
2022	Feb	41	19	90	41	19	90	0	0	0
2022	Mar	89	62	215	88	62	233	0	0	0
2022	Apr	61	35	116	43	23	79	47	27	109
2022	May	292	228	383	292	228	383	0	0	0
2022	Jun	32	15	80	32	15	80	0	0	0
2022	Jul	1,076	907	1,218	1,076	907	1,218	0	0	0
2022	Aug	2,337	1,922	2,744	2,337	1,922	2,744	0	0	0
2022	Sep	579	467	702	579	467	702	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	139	92	216	139	92	216	0	0	0
2022	Nov	474	367	607	474	367	607	0	0	0
2022	Dec	62	33	179	62	33	179	0	0	0
2023	Jan	81	45	142	81	45	142	0	0	0
2023	Feb	90	52	147	49	25	107	23	0	74
2023	Mar	66	42	141	36	19	132	26	7	148
2023	Apr	41	0	116	0	0	0	36	0	116
2023	May	154	110	232	154	110	232	0	0	0
2023	Jun	184	137	275	184	137	275	0	0	0
2023	Jul	4,550	3,940	5,167	4,530	3,975	5,069	38	19	84
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	35	0	92	33	0	87	0	0	0

D.4 Puffin

Table D. 10: Puffin MRSea estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	172	125	279	172	125	279	0	0	0
2021	Jul	456	368	624	427	340	607	38	19	95
2021	Aug	928	666	1,221	928	666	1,221	0	0	0
2021	Sep	2,696	2,432	2,954	2,696	2,432	2,954	0	0	0
2021	Oct	76	42	160	76	42	160	0	0	0
2021	Nov	27	0	64	29	0	62	0	0	0
2021	Dec	61	35	159	61	35	159	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	12	0	36	11	0	35	0	0	0
2022	Mar	21	0	66	21	0	66	0	0	0
2022	Apr	40	9	80	42	10	79	0	0	0
2022	May	116	90	338	116	90	338	0	0	0
2022	Jun	31	14	77	31	14	77	0	0	0
2022	Jul	47	21	115	47	25	140	0	0	0
2022	Aug	1,006	851	1,191	1,014	862	1,200	13	0	40

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	452	350	575	452	350	575	0	0	0
2022	Oct	36	14	91	32	0	70	11	0	36
2022	Nov	10	0	29	9	0	29	0	0	0
2022	Dec	54	29	113	54	29	113	0	0	0
2023	Jan	10	0	30	8	0	29	0	0	0
2023	Feb	544	444	699	548	454	726	9	0	30
2023	Mar	127	97	247	127	97	247	0	0	0
2023	Apr	82	45	140	76	49	267	15	0	48
2023	May	601	506	782	601	506	782	0	0	0
2023	Jun	469	389	642	469	389	642	0	0	0
2023	Jul	96	60	241	96	60	241	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	75	48	210	75	48	210	0	0	0

Table D. 11: Puffin MRSea estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	126	88	204	126	88	204	0	0	0
2021	Jul	307	235	416	272	207	370	28	12	75
2021	Aug	446	313	587	446	313	587	0	0	0
2021	Sep	2,293	2,056	2,517	2,293	2,056	2,517	0	0	0
2021	Oct	60	33	124	60	33	124	0	0	0
2021	Nov	18	0	45	18	0	44	0	0	0
2021	Dec	53	29	136	53	29	136	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	12	0	35	11	0	34	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	40	9	73	40	9	78	0	0	0
2022	May	82	56	183	82	56	183	0	0	0
2022	Jun	22	9	57	22	9	57	0	0	0
2022	Jul	46	21	110	46	23	129	0	0	0
2022	Aug	782	653	923	755	638	893	0	0	0
2022	Sep	320	243	412	320	243	412	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	26	10	65	18	0	45	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	35	17	76	35	17	76	0	0	0
2023	Jan	9	0	29	10	0	31	0	0	0
2023	Feb	477	376	613	465	375	597	0	0	0
2023	Mar	90	65	176	90	65	176	0	0	0
2023	Apr	58	32	101	45	27	177	15	0	46
2023	May	468	383	605	468	383	605	0	0	0
2023	Jun	306	253	419	306	253	419	0	0	0
2023	Jul	51	24	119	51	24	119	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	52	33	155	52	33	155	0	0	0

Table D. 12: Puffin MRSea estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	86	56	147	86	56	147	0	0	0
2021	Jul	226	166	314	207	148	284	17	6	55
2021	Aug	197	130	280	197	130	280	0	0	0
2021	Sep	1,807	1,600	2,004	1,807	1,600	2,004	0	0	0
2021	Oct	43	23	87	43	23	87	0	0	0
2021	Nov	8	0	28	8	0	27	0	0	0
2021	Dec	43	23	106	43	23	106	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	20	0	50	20	0	50	0	0	0
2022	May	64	39	137	64	39	137	0	0	0
2022	Jun	14	5	36	14	5	36	0	0	0
2022	Jul	43	20	102	42	21	112	0	0	0
2022	Aug	591	484	710	572	467	693	0	0	0
2022	Sep	216	159	288	216	159	288	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	17	6	41	10	0	29	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	21	9	49	21	9	49	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	387	295	499	374	293	481	0	0	0
2023	Mar	57	34	122	57	34	122	0	0	0
2023	Apr	39	21	69	18	9	105	16	0	51
2023	May	334	258	434	334	258	434	0	0	0
2023	Jun	192	144	271	192	144	271	0	0	0
2023	Jul	39	16	95	39	16	95	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	32	17	108	32	17	108	0	0	0

D.5 Fulmar

Table D. 13: Fulmar MRSea estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	68	51	197	27	0	68	35	17	81
2021	Jul	162	89	293	92	61	182	39	23	172
2021	Aug	787	646	907	471	397	595	346	267	431
2021	Sep	221	168	301	147	101	289	72	49	178
2021	Oct	609	505	746	280	225	378	305	239	445
2021	Nov	1,137	983	1,296	658	546	797	480	391	596
2021	Dec	617	524	768	47	29	166	554	471	693
2022	Jan	69	40	121	0	0	0	69	40	121
2022	Feb	323	241	416	105	73	218	223	159	293
2022	Mar	83	49	185	18	0	45	91	60	299
2022	Apr	70	41	131	8	0	25	67	39	126
2022	May	116	91	233	33	0	87	80	46	130
2022	Jun	7,875	4,701	15,659	7,101	3,182	18,850	777	623	1,780
2022	Jul	41	22	100	19	0	50	26	0	57
2022	Aug	31	16	113	0	0	0	27	11	65

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	99	65	178	28	12	104	71	46	165
2022	Oct	42	26	132	42	25	184	0	0	0
2022	Nov	186	141	298	141	105	228	42	20	80
2022	Dec	264	198	367	98	76	229	172	133	272
2023	Jan	211	163	326	43	31	184	174	123	244
2023	Feb	141	105	242	17	7	83	125	95	251
2023	Mar	261	204	368	183	138	278	84	56	174
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	440	359	563	235	179	344	214	163	323
2023	Jun	69	51	219	34	8	64	32	0	65
2023	Jul	105	61	179	90	50	186	26	3	54
2023	Aug	403	326	530	211	150	329	183	129	251
2023	Sep	389	310	501	148	105	234	236	186	343

Table D. 14: Fulmar MRSea estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	52	36	144	16	0	49	22	10	50
2021	Jul	89	47	170	46	26	94	30	16	134
2021	Aug	588	481	679	355	291	447	255	192	324
2021	Sep	150	107	217	100	62	217	47	28	125
2021	Oct	439	360	540	207	163	278	214	155	316
2021	Nov	884	757	1,013	531	433	644	346	276	440
2021	Dec	471	397	590	45	27	144	439	368	549
2022	Jan	61	34	105	0	0	0	61	34	105
2022	Feb	268	195	345	96	64	180	173	122	228
2022	Mar	49	29	116	17	0	42	30	16	127
2022	Apr	58	33	109	0	0	0	56	31	107
2022	May	60	41	123	8	0	24	56	32	91
2022	Jun	5,382	3,100	11,107	5,043	2,067	12,684	586	405	1,031
2022	Jul	21	11	50	8	0	24	15	0	36
2022	Aug	23	12	94	0	0	0	22	9	54
2022	Sep	63	37	117	25	10	88	48	28	112

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	39	24	116	40	22	132	0	0	0
2022	Nov	146	108	231	118	84	185	26	11	53
2022	Dec	190	140	262	67	45	144	121	89	192
2023	Jan	166	119	248	28	16	110	124	87	177
2023	Feb	107	75	180	8	3	51	101	73	183
2023	Mar	172	124	240	112	81	173	54	33	117
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	375	302	476	209	158	303	167	124	252
2023	Jun	48	33	157	26	0	53	31	0	70
2023	Jul	61	36	105	42	24	96	17	0	43
2023	Aug	263	201	342	139	97	206	129	89	180
2023	Sep	318	248	409	124	84	192	201	157	282

Table D. 15: Fulmar MRSea estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	25	13	80	16	0	49	13	5	31
2021	Jul	46	23	91	32	15	69	21	10	91
2021	Aug	414	339	480	248	195	320	177	129	231
2021	Sep	90	59	137	62	33	153	24	10	62
2021	Oct	299	237	382	135	102	189	145	93	225
2021	Nov	650	545	752	405	319	494	236	176	307
2021	Dec	354	283	450	39	23	116	317	261	399
2022	Jan	49	27	84	0	0	0	49	27	84
2022	Feb	209	150	276	82	51	145	125	88	165
2022	Mar	40	22	98	17	0	40	23	11	97
2022	Apr	46	23	88	0	0	0	42	21	81
2022	May	35	19	74	8	0	24	37	20	61
2022	Jun	3,062	1,569	7,091	2,858	1,020	8,827	401	242	739
2022	Jul	10	5	28	0	0	0	15	0	43
2022	Aug	11	4	60	0	0	0	17	6	41
2022	Sep	37	19	75	18	8	63	26	13	61

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	37	20	108	37	20	117	0	0	0
2022	Nov	109	76	176	95	65	151	15	6	33
2022	Dec	129	92	178	49	27	109	80	54	131
2023	Jan	125	82	192	20	9	85	83	57	119
2023	Feb	74	47	129	4	1	27	72	48	133
2023	Mar	105	70	157	64	41	110	32	17	75
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	293	233	377	161	116	235	122	83	194
2023	Jun	27	15	96	17	0	44	15	0	39
2023	Jul	32	18	61	16	7	48	7	0	25
2023	Aug	163	119	221	88	60	129	84	55	122
2023	Sep	258	195	335	101	66	159	168	124	234

D.6 Gannet

Table D. 16: Gannet MRSea estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	830	711	995	362	289	482	477	394	623
2021	Jul	1,651	1,464	1,869	850	725	1,020	789	677	955
2021	Aug	574	469	721	304	240	424	274	225	380
2021	Sep	1,099	947	1,275	504	406	633	580	477	718
2021	Oct	742	629	880	223	169	346	523	437	652
2021	Nov	71	40	124	49	22	101	25	0	50
2021	Dec	24	0	51	0	0	0	24	0	51
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	33	0	72	0	0	0	33	0	73
2022	Mar	17	0	42	0	0	0	16	0	41
2022	Apr	61	29	109	18	0	60	48	25	214
2022	May	885	748	1,058	638	531	802	245	184	349
2022	Jun	1,318	1,098	1,674	913	498	1,673	439	364	567
2022	Jul	377	270	493	182	137	266	194	154	326
2022	Aug	285	221	403	94	70	224	201	150	312

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	110	80	243	35	0	82	65	43	197
2022	Oct	118	81	219	46	32	189	75	55	224
2022	Nov	83	49	140	58	32	116	25	0	56
2022	Dec	19	7	48	0	0	0	16	0	38
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	17	0	43	0	0	0	18	0	43
2023	Mar	79	61	232	0	0	0	77	56	197
2023	Apr	86	60	170	23	0	52	59	38	138
2023	May	319	260	413	60	36	95	273	220	370
2023	Jun	488	403	645	261	204	410	237	184	364
2023	Jul	617	523	754	273	215	382	347	280	461
2023	Aug	331	265	442	138	100	219	190	143	275
2023	Sep	306	228	429	115	73	201	191	137	321

Table D. 17: Gannet MRSea estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	629	530	750	286	222	381	328	259	425
2021	Jul	1,148	990	1,291	540	453	644	617	516	740
2021	Aug	419	333	521	193	146	278	222	178	305
2021	Sep	822	703	957	381	303	479	445	357	550
2021	Oct	607	516	716	158	117	242	442	366	546
2021	Nov	64	36	107	34	15	70	24	0	47
2021	Dec	22	0	49	0	0	0	22	0	47
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	31	0	68	0	0	0	32	0	75
2022	Mar	17	0	50	0	0	0	16	0	43
2022	Apr	46	22	82	17	0	55	36	19	143
2022	May	542	461	649	422	347	532	121	88	176
2022	Jun	1,144	913	1,429	637	354	1,170	361	292	465
2022	Jul	270	190	354	129	93	188	129	94	206
2022	Aug	217	165	305	45	31	131	161	119	248
2022	Sep	54	35	122	25	0	70	40	24	126

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	90	62	161	35	21	124	56	38	153
2022	Nov	55	33	100	36	20	80	18	0	45
2022	Dec	14	5	36	0	0	0	16	0	38
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	16	0	41	0	0	0	18	0	42
2023	Mar	48	31	134	0	0	0	46	30	126
2023	Apr	76	51	152	23	0	45	53	33	122
2023	May	251	199	325	41	23	66	214	168	290
2023	Jun	351	279	452	172	132	258	181	136	278
2023	Jul	449	371	555	194	150	273	244	188	329
2023	Aug	225	172	302	99	67	162	136	99	209
2023	Sep	185	137	257	75	47	134	118	86	199

Table D. 18: Gannet MRSea estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	458	370	549	221	165	296	226	168	298
2021	Jul	777	654	889	329	268	402	465	376	571
2021	Aug	279	208	356	116	82	174	162	119	228
2021	Sep	580	480	687	262	200	341	311	243	387
2021	Oct	444	366	529	107	75	175	334	268	418
2021	Nov	53	29	88	21	9	45	16	0	38
2021	Dec	23	0	51	0	0	0	23	0	52
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	17	0	41	0	0	0	17	0	42
2022	Mar	7	0	25	0	0	0	8	0	23
2022	Apr	33	16	59	0	0	0	27	14	76
2022	May	355	289	437	289	225	373	63	40	101
2022	Jun	787	602	1,008	377	193	737	281	216	367
2022	Jul	177	123	233	87	59	133	82	55	137
2022	Aug	152	109	217	29	17	95	127	90	196
2022	Sep	31	18	78	0	0	0	23	12	84

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	67	43	124	26	14	99	42	26	116
2022	Nov	31	17	63	19	9	47	8	0	23
2022	Dec	10	3	25	0	0	0	15	0	36
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	17	0	44	0	0	0	17	0	43
2023	Mar	31	18	100	0	0	0	29	17	93
2023	Apr	63	39	127	16	0	39	46	27	107
2023	May	188	144	246	26	14	43	160	118	222
2023	Jun	273	207	356	130	89	200	141	97	214
2023	Jul	307	241	387	131	96	189	164	117	227
2023	Aug	153	110	212	66	41	120	98	65	160
2023	Sep	103	74	149	43	25	81	69	46	123

Appendix E Design-based abundance estimates for the Morven North Offshore Ornithology Baseline Characterisation Study Area

E.1 Kittiwake

Table E. 1: Kittiwake design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	4,925	4,317	5,552	2,292	1,809	2,775	2,633	2,231	3,054
2021	Jul	596	178	1,149	536	102	1,085	60	17	119
2021	Aug	112	51	187	43	9	85	69	17	128
2021	Sep	899	542	1,290	415	153	737	484	270	723
2021	Oct	305	182	463	0	0	0	305	182	463
2021	Nov	86	43	145	26	3	60	60	17	112
2021	Dec	17	2	43	0	0	0	17	2	43
2022	Jan	25	3	59	0	0	0	25	3	59
2022	Feb	259	167	359	41	8	84	218	134	310
2022	Mar	149	83	219	25	3	58	125	66	192
2022	Apr	185	118	265	9	1	26	176	103	255
2022	May	625	417	869	128	51	230	497	308	740
2022	Jun	2,181	1,581	2,928	472	287	693	1,710	1,153	2,417

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Jul	1,772	1,255	2,383	952	511	1,435	820	560	1,133
2022	Aug	90	25	182	25	3	58	65	8	150
2022	Sep	17	2	43	9	1	26	9	1	26
2022	Oct	50	17	94	0	0	0	50	17	94
2022	Nov	109	38	199	43	4	120	66	25	116
2022	Dec	229	152	322	44	9	85	185	118	270
2023	Jan	68	25	118	33	3	67	34	8	69
2023	Feb	45	8	101	20	2	68	25	3	59
2023	Mar	68	25	119	17	2	42	51	17	93
2023	Apr	92	42	149	0	0	0	92	42	149
2023	May	417	219	702	9	1	25	409	211	698
2023	Jun	519	345	703	234	101	395	285	193	389
2023	Jul	5,092	3,652	6,868	3,672	2,413	5,209	1,419	629	2,446
2023	Aug	25	3	58	9	1	25	25	3	58
2023	Sep	9	1	25	9	1	25	0	0	0

Table E. 2: Kittiwake design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	3,602	3,150	4,142	1,721	1,363	2,148	1,882	1,586	2,242
2021	Jul	377	98	737	345	66	707	32	8	65
2021	Aug	108	49	180	42	8	82	66	16	131
2021	Sep	684	383	1,043	363	106	690	321	171	519
2021	Oct	231	112	372	0	0	0	231	112	372
2021	Nov	66	25	124	25	3	58	41	8	83
2021	Dec	8	1	25	0	0	0	8	1	25
2022	Jan	16	2	41	0	0	0	16	2	41
2022	Feb	209	129	297	40	8	81	168	97	250
2022	Mar	138	73	209	24	3	56	114	57	185
2022	Apr	147	90	214	9	1	25	139	82	204
2022	May	472	303	679	75	16	148	397	245	593
2022	Jun	1,788	1,232	2,541	358	207	537	1,431	913	2,168
2022	Jul	1,319	929	1,780	705	374	1,101	614	405	862
2022	Aug	80	24	168	16	2	40	63	8	151
2022	Sep	17	2	41	8	1	25	8	1	25

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	41	8	82	0	0	0	41	8	82
2022	Nov	96	32	173	40	4	105	56	16	97
2022	Dec	185	114	260	41	8	88	144	81	211
2023	Jan	33	8	70	16	2	41	17	2	43
2023	Feb	35	8	73	10	1	32	25	3	57
2023	Mar	50	16	89	17	2	41	33	8	66
2023	Apr	65	24	113	0	0	0	65	24	113
2023	May	201	121	286	8	1	24	193	114	278
2023	Jun	388	244	558	170	65	310	218	137	309
2023	Jul	4,314	2,777	5,972	3,022	1,829	4,427	1,292	530	2,315
2023	Aug	16	2	40	0	0	0	16	2	40
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 3: Kittiwake design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	2,728	2,295	3,176	1,250	933	1,571	1,478	1,197	1,780
2021	Jul	41	8	82	16	2	41	25	3	57
2021	Aug	72	25	132	32	8	66	40	8	90
2021	Sep	408	172	738	294	65	617	114	50	189
2021	Oct	175	79	295	0	0	0	175	79	295
2021	Nov	42	8	83	17	2	42	26	3	59
2021	Dec	9	1	33	0	0	0	9	1	33
2022	Jan	16	2	41	0	0	0	16	2	41
2022	Feb	129	65	200	8	1	24	122	59	186
2022	Mar	123	57	187	24	3	56	99	48	160
2022	Apr	124	66	190	8	1	25	116	58	181
2022	May	199	131	285	17	2	42	183	115	266
2022	Jun	1,080	738	1,482	205	90	358	875	562	1,274
2022	Jul	950	599	1,388	528	234	912	421	269	644
2022	Aug	62	8	143	16	2	40	46	6	121
2022	Sep	17	2	41	8	1	25	9	1	25

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	33	8	74	0	0	0	33	8	74
2022	Nov	61	8	130	29	3	94	33	8	72
2022	Dec	137	74	204	33	8	66	105	49	163
2023	Jan	33	8	69	16	2	41	17	2	44
2023	Feb	8	1	25	0	0	0	8	1	25
2023	Mar	40	8	82	16	2	41	24	3	57
2023	Apr	65	24	113	0	0	0	65	24	113
2023	May	147	81	217	8	1	24	139	73	209
2023	Jun	258	145	403	112	24	248	146	81	228
2023	Jul	2,457	1,411	3,615	1,672	859	2,644	785	246	1,433
2023	Aug	8	1	24	0	0	0	8	1	24
2023	Sep	0	0	0	0	0	0	0	0	0

E.2 Common gull

Table E. 4: Common gull design-based estimates for the Morven South Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	49	6	133	0	0	0	49	6	133

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	0	0	0	0	0	0	0	0	0
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	9	1	25	0	0	0	9	1	25
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	33	8	68	25	3	59	8	1	25
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 5: Common gull design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	41	5	120	0	0	0	41	5	120
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	25	3	57	17	2	41	8	1	24
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 6: Common gull design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	31	4	97	0	0	0	31	4	97
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.3 Great black-backed gull

Table E. 7: Great black-backed gull design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	8	1	26	0	0	0	8	1	26
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	8	1	25	0	0	0	8	1	25
2021	Nov	52	17	95	9	1	26	43	9	86
2021	Dec	33	8	68	25	3	59	8	1	26
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	41	8	84	25	3	59	16	2	42
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	9	1	34	9	1	34	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	0	0	0	0	0	0	0	0	0
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	11	1	38	11	1	38	0	0	0
2022	Dec	26	3	59	26	3	59	0	0	0
2023	Jan	16	2	51	16	2	51	0	0	0
2023	Feb	19	2	51	11	1	39	9	1	25
2023	Mar	9	1	33	9	1	33	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 8: Great black-backed gull design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	8	1	24	0	0	0	8	1	24
2021	Nov	50	17	92	8	1	25	42	8	83
2021	Dec	33	8	73	24	3	57	9	1	25
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	40	8	80	24	3	56	16	2	40
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	9	1	25	9	1	25	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	10	1	34	10	1	34	0	0	0
2022	Dec	24	3	57	24	3	57	0	0	0
2023	Jan	16	2	49	16	2	49	0	0	0
2023	Feb	18	2	48	10	1	33	8	1	25
2023	Mar	9	1	32	9	1	32	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 9: Great black-backed gull design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	17	2	42	0	0	0	17	2	42
2021	Dec	33	8	66	24	3	58	8	1	25
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	24	3	56	8	1	24	16	2	41
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	8	1	25	8	1	25	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	10	1	35	10	1	35	0	0	0
2022	Dec	8	1	25	8	1	25	0	0	0
2023	Jan	16	2	49	16	2	49	0	0	0
2023	Feb	8	1	25	8	1	25	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.4 Herring gull

Table E. 10: Herring gull design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	9	1	34	9	1	34	0	0	0
2021	Jul	368	41	892	344	38	867	25	3	59
2021	Aug	9	0	34	9	0	34	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	9	1	26	0	0	0	9	1	26
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	8	1	26	8	1	26	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	25	3	59	17	2	42	8	1	25
2022	Aug	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	0	0	0	0	0	0	0	0	0
2022	Oct	9	1	26	0	0	0	9	1	26
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	9	1	26	0	0	0	9	1	26
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	16	2	42	0	0	0	16	2	42
2023	Jun	60	7	152	52	6	135	8	1	25
2023	Jul	8	1	33	8	1	33	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 11: Herring gull design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	229	28	665	212	26	638	16	2	41
2021	Aug	9	0	25	9	0	25	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	9	1	25	0	0	0	9	1	25
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	8	1	25	8	1	25	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	16	2	41	16	2	41	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	8	1	25	0	0	0	8	1	25
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	16	2	41	0	0	0	16	2	41
2023	Jun	24	3	72	16	2	49	8	1	25
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 12: Herring gull design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	8	1	25	8	1	25	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	9	1	33	0	0	0	9	1	33
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	9	1	25	9	1	25	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	16	2	41	16	2	41	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	8	1	33	0	0	0	8	1	33
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	17	2	41	0	0	0	17	2	41
2023	Jun	24	3	65	16	2	49	8	1	25
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.5 Lesser black-backed gull

Table E. 13: Lesser black-backed gull design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	0	0	0	0	0	0	0	0	0
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	8	1	25	8	1	25	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 14: Lesser black-backed gull design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 15: Lesser black-backed gull design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.6 Sandwich tern

Table E. 16: Sandwich tern design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	8	1	25	0	0	0	8	1	25

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	0	0	0	0	0	0	0	0	0
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 17: Sandwich tern design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	9	1	24	0	0	0	9	1	24
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 18: Sandwich tern design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	8	1	24	0	0	0	8	1	24
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.7 Arctic tern

Table E. 19: Arctic tern design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	84	4	203	25	0	77	59	4	153
2021	Aug	100	26	205	40	0	110	60	9	129
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	3,690	2,554	4,986	1,015	507	1,671	2,676	1,754	3,688

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	0	0	0	0	0	0	0	0	0
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	41	5	127	0	0	0	41	5	127
2023	Aug	67	25	117	0	0	0	67	25	117
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 20: Arctic tern design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	59	4	155	0	0	0	59	4	155
2021	Aug	33	0	74	0	0	0	33	0	74
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	2,308	1,420	3,422	0	0	0	2,308	1,420	3,422
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	42	5	123	0	0	0	42	5	123
2023	Aug	48	16	88	0	0	0	48	16	88
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 21: Arctic tern design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	16	0	41	0	0	0	16	0	41
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	1,796	1,076	2,638	0	0	0	1,796	1,076	2,638
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	47	16	89	0	0	0	47	16	89
2023	Sep	0	0	0	0	0	0	0	0	0

E.8 Great skua

Table E. 22: Great skua design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	9	0	34	9	0	34	0	0	0
2021	Aug	9	1	26	9	1	26	0	0	0
2021	Sep	8	1	26	0	0	0	8	1	26
2021	Oct	8	1	25	0	0	0	8	1	25
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	0	0	0	0	0	0	0	0	0
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	8	1	25	0	0	0	8	1	25

Table E. 23: Great skua design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	8	0	25	8	0	25	0	0	0
2021	Aug	8	1	25	8	1	25	0	0	0
2021	Sep	8	1	25	0	0	0	8	1	25
2021	Oct	8	1	24	0	0	0	8	1	24
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 24: Great skua design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	8	0	25	8	0	25	0	0	0
2021	Aug	8	1	25	8	1	25	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.9 Arctic skua

Table E. 25: Arctic skua design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	26	2	76	0	0	0	26	2	76
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	0	0	0	0	0	0	0	0	0
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 26: Arctic skua design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 27: Arctic skua design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.10 Common guillemot

Table E. 28: Common guillemot design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	23,051	20,911	25,388	23,017	20,853	25,363	34	9	69
2021	Jul	46,679	42,341	51,584	46,424	41,917	51,299	255	79	535
2021	Aug	1,424	1,060	1,839	1,424	1,060	1,839	0	0	0
2021	Sep	14,419	12,543	16,459	14,403	12,537	16,425	17	1	42
2021	Oct	1,018	816	1,248	994	791	1,217	24	3	58
2021	Nov	2,580	2,175	2,982	2,571	2,168	2,981	9	1	26
2021	Dec	2,969	2,444	3,469	2,943	2,409	3,434	26	0	59
2022	Jan	622	456	796	605	438	784	17	2	42
2022	Feb	1,663	1,388	1,955	1,638	1,366	1,920	25	3	59
2022	Mar	4,453	3,851	5,136	4,282	3,702	4,961	171	33	386
2022	Apr	1,299	922	1,751	550	383	735	749	401	1,160
2022	May	6,265	5,336	7,227	6,240	5,319	7,200	25	2	76
2022	Jun	4,247	3,559	4,921	4,239	3,559	4,918	8	1	25
2022	Jul	23,355	21,397	25,394	23,338	21,382	25,385	17	1	42
2022	Aug	18,018	15,944	20,165	18,010	15,935	20,165	8	1	25

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	1,206	865	1,595	1,198	852	1,587	8	0	26
2022	Oct	3,002	2,573	3,404	2,960	2,534	3,376	41	9	84
2022	Nov	2,616	2,222	3,028	2,558	2,163	2,965	58	17	109
2022	Dec	1,963	1,675	2,267	1,937	1,650	2,238	26	3	59
2023	Jan	375	219	548	375	219	548	0	0	0
2023	Feb	2,792	2,140	3,523	2,222	1,780	2,729	570	192	1,111
2023	Mar	1,542	1,260	1,826	1,508	1,240	1,792	34	8	68
2023	Apr	1,263	869	1,737	458	290	676	804	453	1,237
2023	May	5,825	4,975	6,787	5,671	4,828	6,625	153	67	253
2023	Jun	3,226	2,759	3,763	3,210	2,736	3,746	16	2	42
2023	Jul	38,992	33,002	46,199	38,312	32,275	45,469	594	310	940
2023	Aug	396	253	559	396	253	559	0	0	0
2023	Sep	236	132	352	236	132	352	0	0	0

Table E. 29: Common guillemot design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	18,118	16,360	20,114	18,110	16,358	20,101	9	1	25
2021	Jul	33,456	29,913	37,244	33,250	29,667	37,055	205	49	466
2021	Aug	1,081	767	1,416	1,081	767	1,416	0	0	0
2021	Sep	11,540	10,000	13,181	11,532	9,997	13,181	8	0	25
2021	Oct	759	603	940	735	579	919	24	3	55
2021	Nov	2,071	1,710	2,426	2,071	1,710	2,426	0	0	0
2021	Dec	2,395	1,961	2,850	2,370	1,944	2,826	25	0	57
2022	Jan	446	308	600	438	300	587	8	1	24
2022	Feb	1,225	1,005	1,447	1,209	995	1,427	16	2	40
2022	Mar	3,629	3,061	4,226	3,556	2,986	4,135	74	9	162
2022	Apr	968	613	1,367	337	217	477	630	297	1,017
2022	May	4,122	3,431	4,929	4,122	3,431	4,929	0	0	0
2022	Jun	3,210	2,652	3,759	3,210	2,652	3,759	0	0	0
2022	Jul	18,400	16,762	20,259	18,392	16,746	20,251	8	1	24
2022	Aug	13,016	11,366	14,680	13,016	11,366	14,680	0	0	0
2022	Sep	949	637	1,329	941	625	1,316	8	0	25

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	2,240	1,897	2,615	2,207	1,873	2,587	33	8	66
2022	Nov	1,849	1,524	2,198	1,792	1,458	2,135	57	16	112
2022	Dec	1,496	1,263	1,755	1,480	1,246	1,738	16	2	41
2023	Jan	274	159	408	274	159	408	0	0	0
2023	Feb	2,139	1,566	2,770	1,627	1,223	2,052	512	168	1,051
2023	Mar	1,243	1,001	1,494	1,211	969	1,460	32	8	65
2023	Apr	978	618	1,389	403	231	596	575	270	936
2023	May	4,561	3,783	5,491	4,448	3,685	5,374	112	48	196
2023	Jun	2,416	2,026	2,837	2,400	2,007	2,822	16	2	41
2023	Jul	31,356	25,792	37,866	30,796	25,321	37,353	478	225	803
2023	Aug	286	168	420	286	168	420	0	0	0
2023	Sep	173	96	260	173	96	260	0	0	0

Table E. 30: Common guillemot design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	14,063	12,498	15,695	14,063	12,498	15,695	0	0	0
2021	Jul	19,378	17,137	21,720	19,202	17,024	21,482	175	25	432
2021	Aug	667	446	915	667	446	915	0	0	0
2021	Sep	8,123	6,826	9,330	8,115	6,818	9,322	8	0	25
2021	Oct	572	420	739	548	401	710	24	3	55
2021	Nov	1,621	1,331	1,943	1,621	1,331	1,943	0	0	0
2021	Dec	1,817	1,435	2,218	1,792	1,416	2,191	25	0	58
2022	Jan	304	198	419	304	198	419	0	0	0
2022	Feb	866	683	1,054	858	676	1,044	8	1	25
2022	Mar	2,854	2,360	3,349	2,815	2,335	3,308	39	5	114
2022	Apr	674	390	1,011	219	118	324	455	181	777
2022	May	2,799	2,165	3,513	2,799	2,165	3,513	0	0	0
2022	Jun	2,267	1,791	2,760	2,267	1,791	2,760	0	0	0
2022	Jul	12,954	11,457	14,448	12,954	11,457	14,448	0	0	0
2022	Aug	8,428	7,113	9,865	8,428	7,113	9,865	0	0	0
2022	Sep	606	356	883	606	356	883	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	1,598	1,297	1,928	1,573	1,267	1,906	26	2	57
2022	Nov	1,267	985	1,558	1,259	979	1,547	8	0	24
2022	Dec	1,101	879	1,317	1,093	868	1,311	8	1	25
2023	Jan	167	60	288	167	60	288	0	0	0
2023	Feb	1,739	1,207	2,354	1,268	903	1,679	471	137	1,002
2023	Mar	961	743	1,182	927	710	1,144	33	8	66
2023	Apr	620	366	948	254	117	414	366	153	630
2023	May	3,349	2,681	4,160	3,293	2,624	4,111	56	16	106
2023	Jun	1,836	1,480	2,176	1,820	1,465	2,168	17	2	41
2023	Jul	23,598	18,285	28,974	23,305	18,009	28,686	213	121	325
2023	Aug	157	84	242	157	84	242	0	0	0
2023	Sep	83	32	139	83	32	139	0	0	0

E.11 Razorbill

Table E. 31: Razorbill design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	1,298	1,024	1,598	1,279	1,016	1,588	18	2	52
2021	Jul	12,743	11,313	14,246	12,633	11,209	14,164	110	19	252
2021	Aug	179	75	310	179	75	310	0	0	0
2021	Sep	928	661	1,236	928	661	1,236	0	0	0
2021	Oct	64	13	119	64	13	119	0	0	0
2021	Nov	180	94	275	180	94	275	0	0	0
2021	Dec	528	284	795	528	284	795	0	0	0
2022	Jan	141	58	237	141	58	237	0	0	0
2022	Feb	60	14	125	60	14	125	0	0	0
2022	Mar	129	45	237	112	34	209	17	2	50
2022	Apr	187	81	325	126	28	242	62	9	138
2022	May	541	369	736	541	369	736	0	0	0
2022	Jun	63	10	138	63	10	138	0	0	0
2022	Jul	2,037	1,565	2,545	2,037	1,565	2,545	0	0	0
2022	Aug	3,879	3,099	4,702	3,879	3,099	4,702	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	1,155	826	1,529	1,155	826	1,529	0	0	0
2022	Oct	271	161	392	271	161	392	0	0	0
2022	Nov	957	717	1,266	957	717	1,266	0	0	0
2022	Dec	114	30	210	114	30	210	0	0	0
2023	Jan	147	65	256	147	65	256	0	0	0
2023	Feb	127	51	223	93	28	168	34	4	94
2023	Mar	121	42	221	79	22	144	42	5	117
2023	Apr	52	6	144	0	0	0	52	6	144
2023	May	237	129	368	237	129	368	0	0	0
2023	Jun	304	182	442	304	182	442	0	0	0
2023	Jul	7,764	6,476	9,200	7,711	6,424	9,151	53	17	98
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	50	4	121	50	4	121	0	0	0

Table E. 32: Razorbill design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	1,031	759	1,307	1,031	759	1,307	0	0	0
2021	Jul	9,680	8,485	10,919	9,588	8,383	10,811	92	10	226
2021	Aug	114	33	213	114	33	213	0	0	0
2021	Sep	810	562	1,099	810	562	1,099	0	0	0
2021	Oct	38	3	84	38	3	84	0	0	0
2021	Nov	126	55	214	126	55	214	0	0	0
2021	Dec	413	218	628	413	218	628	0	0	0
2022	Jan	105	36	184	105	36	184	0	0	0
2022	Feb	50	3	113	50	3	113	0	0	0
2022	Mar	96	32	189	96	32	189	0	0	0
2022	Apr	110	37	197	51	4	123	59	16	124
2022	May	465	286	649	465	286	649	0	0	0
2022	Jun	49	5	120	49	5	120	0	0	0
2022	Jul	1,528	1,134	1,969	1,528	1,134	1,969	0	0	0
2022	Aug	2,737	2,113	3,474	2,737	2,113	3,474	0	0	0
2022	Sep	813	523	1,120	813	523	1,120	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	214	124	338	214	124	338	0	0	0
2022	Nov	739	504	995	739	504	995	0	0	0
2022	Dec	68	15	140	68	15	140	0	0	0
2023	Jan	98	29	181	98	29	181	0	0	0
2023	Feb	86	24	161	54	13	112	32	4	82
2023	Mar	64	10	155	32	3	76	32	4	98
2023	Apr	40	5	123	0	0	0	40	5	123
2023	May	164	80	264	164	80	264	0	0	0
2023	Jun	241	134	355	241	134	355	0	0	0
2023	Jul	6,453	5,305	7,651	6,405	5,266	7,615	48	16	89
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	45	4	107	45	4	107	0	0	0

Table E. 33: Razorbill design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	874	633	1,146	874	633	1,146	0	0	0
2021	Jul	6,253	5,436	7,160	6,168	5,375	7,052	85	9	219
2021	Aug	45	4	102	45	4	102	0	0	0
2021	Sep	744	500	1,023	744	500	1,023	0	0	0
2021	Oct	35	3	80	35	3	80	0	0	0
2021	Nov	105	35	193	105	35	193	0	0	0
2021	Dec	287	118	494	287	118	494	0	0	0
2022	Jan	61	14	124	61	14	124	0	0	0
2022	Feb	51	3	114	51	3	114	0	0	0
2022	Mar	99	32	185	99	32	185	0	0	0
2022	Apr	48	8	97	16	1	52	32	8	73
2022	May	310	179	462	310	179	462	0	0	0
2022	Jun	31	3	81	31	3	81	0	0	0
2022	Jul	1,016	698	1,400	1,016	698	1,400	0	0	0
2022	Aug	1,908	1,411	2,505	1,908	1,411	2,505	0	0	0
2022	Sep	550	317	836	550	317	836	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	130	58	207	130	58	207	0	0	0
2022	Nov	570	378	810	570	378	810	0	0	0
2022	Dec	55	13	116	55	13	116	0	0	0
2023	Jan	90	20	166	90	20	166	0	0	0
2023	Feb	80	15	164	55	11	112	26	3	77
2023	Mar	64	10	151	31	3	72	33	4	99
2023	Apr	43	5	127	0	0	0	43	5	127
2023	May	142	61	234	142	61	234	0	0	0
2023	Jun	188	95	297	188	95	297	0	0	0
2023	Jul	4,943	3,813	6,091	4,919	3,789	6,066	25	3	57
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	32	3	89	32	3	89	0	0	0

E.12 Puffin

Table E. 34: Puffin design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	181	90	289	181	90	289	0	0	0
2021	Jul	401	255	566	374	237	535	27	3	72
2021	Aug	809	492	1,167	809	492	1,167	0	0	0
2021	Sep	2,857	2,376	3,396	2,857	2,376	3,396	0	0	0
2021	Oct	77	29	144	77	29	144	0	0	0
2021	Nov	31	3	71	31	3	71	0	0	0
2021	Dec	60	20	110	60	20	110	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	10	1	29	10	1	29	0	0	0
2022	Mar	20	2	60	20	2	60	0	0	0
2022	Apr	41	10	84	41	10	84	0	0	0
2022	May	112	41	195	112	41	195	0	0	0
2022	Jun	30	3	69	30	3	69	0	0	0
2022	Jul	50	10	109	50	10	109	0	0	0
2022	Aug	969	665	1,292	961	648	1,280	8	1	25

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	436	278	624	436	278	624	0	0	0
2022	Oct	42	10	86	32	3	72	10	1	34
2022	Nov	10	1	30	10	1	30	0	0	0
2022	Dec	60	20	114	60	20	114	0	0	0
2023	Jan	10	1	29	10	1	29	0	0	0
2023	Feb	566	419	731	557	409	726	9	1	34
2023	Mar	140	70	216	140	70	216	0	0	0
2023	Apr	84	20	163	68	10	143	16	2	50
2023	May	635	450	831	635	450	831	0	0	0
2023	Jun	460	300	635	460	300	635	0	0	0
2023	Jul	80	20	157	80	20	157	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	76	22	141	76	22	141	0	0	0

Table E. 35: Puffin design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	107	47	184	107	47	184	0	0	0
2021	Jul	289	173	424	265	148	395	25	3	67
2021	Aug	425	230	661	425	230	661	0	0	0
2021	Sep	2,303	1,877	2,739	2,303	1,877	2,739	0	0	0
2021	Oct	64	19	119	64	19	119	0	0	0
2021	Nov	20	2	50	20	2	50	0	0	0
2021	Dec	59	19	107	59	19	107	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	9	1	28	9	1	28	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	42	10	85	42	10	85	0	0	0
2022	May	88	29	167	88	29	167	0	0	0
2022	Jun	29	3	67	29	3	67	0	0	0
2022	Jul	46	9	105	46	9	105	0	0	0
2022	Aug	640	405	908	640	405	908	0	0	0
2022	Sep	328	205	469	328	205	469	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	20	2	50	20	2	50	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	49	10	96	49	10	96	0	0	0
2023	Jan	9	1	28	9	1	28	0	0	0
2023	Feb	471	328	625	471	328	625	0	0	0
2023	Mar	95	38	163	95	38	163	0	0	0
2023	Apr	55	9	124	39	4	94	16	2	48
2023	May	444	292	623	444	292	623	0	0	0
2023	Jun	331	206	477	331	206	477	0	0	0
2023	Jul	47	9	113	47	9	113	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	50	9	105	50	9	105	0	0	0

Table E. 36: Puffin design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	76	29	135	76	29	135	0	0	0
2021	Jul	213	114	338	188	98	308	25	3	69
2021	Aug	119	51	194	119	51	194	0	0	0
2021	Sep	1,792	1,420	2,177	1,792	1,420	2,177	0	0	0
2021	Oct	46	9	92	46	9	92	0	0	0
2021	Nov	10	1	31	10	1	31	0	0	0
2021	Dec	49	10	97	49	10	97	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	21	2	54	21	2	54	0	0	0
2022	May	59	10	120	59	10	120	0	0	0
2022	Jun	29	3	67	29	3	67	0	0	0
2022	Jul	38	4	86	38	4	86	0	0	0
2022	Aug	558	320	821	558	320	821	0	0	0
2022	Sep	208	108	334	208	108	334	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	10	1	30	10	1	30	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	29	3	68	29	3	68	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	391	265	530	391	265	530	0	0	0
2023	Mar	38	4	94	38	4	94	0	0	0
2023	Apr	36	4	93	19	2	75	16	2	49
2023	May	309	185	449	309	185	449	0	0	0
2023	Jun	204	104	319	204	104	319	0	0	0
2023	Jul	20	2	48	20	2	48	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	19	2	48	19	2	48	0	0	0

E.13 European storm petrel

Table E. 37: European storm petrel design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	16	0	50	0	0	0	16	0	50
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	0	0	0	0	0	0	0	0	0
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	109	13	251	0	0	0	109	13	251
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 38: European storm petrel design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	105	13	247	0	0	0	105	13	247
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 39: European storm petrel design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	93	11	217	0	0	0	93	11	217
2023	Sep	0	0	0	0	0	0	0	0	0

E.14 Fulmar

Table E. 40: Fulmar design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	69	26	128	26	3	68	43	9	77
2021	Jul	109	59	170	76	34	128	33	8	68
2021	Aug	810	639	1,000	477	343	622	333	222	462
2021	Sep	249	110	440	165	34	354	84	34	143
2021	Oct	613	363	929	288	165	447	325	140	614
2021	Nov	1,177	929	1,437	684	508	867	494	320	692
2021	Dec	621	458	814	51	17	94	570	407	753
2022	Jan	68	17	117	0	0	0	68	17	117
2022	Feb	335	228	444	109	58	176	226	142	326
2022	Mar	76	33	126	17	2	42	59	17	110
2022	Apr	69	25	119	8	1	26	60	17	103
2022	May	110	51	179	35	4	77	75	34	128
2022	Jun	7,314	1,094	18,612	6,606	761	17,845	708	313	1,383
2022	Jul	43	8	84	17	2	42	25	3	59
2022	Aug	25	3	50	0	0	0	25	3	50

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	101	51	154	25	3	59	76	34	128
2022	Oct	44	5	111	44	5	111	0	0	0
2022	Nov	241	143	360	199	107	307	42	8	84
2022	Dec	255	161	363	85	25	160	170	93	253
2023	Jan	235	152	324	42	8	84	193	123	276
2023	Feb	148	79	223	20	2	50	128	68	200
2023	Mar	259	169	362	184	109	268	75	34	126
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	467	319	632	247	127	397	220	143	304
2023	Jun	68	25	118	34	8	68	33	8	68
2023	Jul	102	50	167	76	25	136	25	3	59
2023	Aug	394	277	519	210	125	317	184	110	267
2023	Sep	377	256	522	141	67	236	236	152	330

Table E. 41: Fulmar design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	41	8	83	16	2	49	25	3	57
2021	Jul	88	41	146	65	24	114	23	3	57
2021	Aug	611	474	771	339	237	456	272	173	381
2021	Sep	138	41	269	98	16	228	40	8	74
2021	Oct	475	252	776	234	119	374	241	79	509
2021	Nov	915	689	1,158	526	372	696	389	243	577
2021	Dec	438	307	588	41	8	82	397	270	538
2022	Jan	57	16	105	0	0	0	57	16	105
2022	Feb	290	194	391	105	56	162	185	106	266
2022	Mar	40	8	80	16	2	40	24	3	56
2022	Apr	49	16	97	0	0	0	49	16	97
2022	May	40	8	74	8	1	25	32	8	66
2022	Jun	7,105	1,011	18,273	6,499	753	17,383	606	239	1,243
2022	Jul	23	3	49	8	1	25	16	2	41
2022	Aug	24	3	56	0	0	0	24	3	56
2022	Sep	56	16	99	16	2	41	41	8	81

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	41	5	100	41	5	100	0	0	0
2022	Nov	160	72	256	135	54	233	24	3	56
2022	Dec	204	121	293	75	16	139	129	66	196
2023	Jan	178	112	251	33	8	65	145	82	211
2023	Feb	126	66	190	20	2	52	106	57	168
2023	Mar	186	113	275	123	65	193	63	24	115
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	379	251	534	201	99	341	178	112	250
2023	Jun	56	24	97	24	3	57	32	8	65
2023	Jul	66	24	122	49	16	97	17	2	41
2023	Aug	262	169	362	134	65	214	127	72	193
2023	Sep	315	211	439	112	49	194	203	122	302

Table E. 42: Fulmar design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	23	3	66	15	2	50	8	1	25
2021	Jul	48	16	90	41	8	81	8	1	25
2021	Aug	407	281	543	230	138	328	178	99	271
2021	Sep	115	32	267	90	11	246	25	3	57
2021	Oct	340	144	663	126	40	232	214	48	504
2021	Nov	631	464	820	381	244	544	250	158	351
2021	Dec	363	248	496	41	8	82	323	213	450
2022	Jan	41	8	81	0	0	0	41	8	81
2022	Feb	234	147	323	89	40	145	145	82	226
2022	Mar	32	8	65	16	2	40	16	2	41
2022	Apr	49	16	91	0	0	0	49	16	91
2022	May	41	8	82	8	1	25	32	8	66
2022	Jun	6,271	751	16,851	5,771	691	16,335	500	148	1,246
2022	Jul	16	2	41	0	0	0	16	2	41
2022	Aug	8	1	24	0	0	0	8	1	24
2022	Sep	40	8	82	16	2	41	24	3	57

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	40	5	106	40	5	106	0	0	0
2022	Nov	137	58	226	122	44	208	16	2	41
2022	Dec	140	73	228	50	8	107	90	40	154
2023	Jan	151	89	217	24	3	57	127	65	192
2023	Feb	56	16	97	8	1	24	48	16	89
2023	Mar	106	49	173	73	25	131	33	8	73
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	321	201	462	182	81	314	139	74	211
2023	Jun	32	8	65	16	2	41	16	2	41
2023	Jul	25	3	57	16	2	41	8	1	25
2023	Aug	178	112	256	71	32	114	107	56	169
2023	Sep	253	162	373	89	24	170	165	91	245

E.15 Sooty shearwater

Table E. 43: Sooty shearwater design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	17	2	51	0	0	0	17	2	51
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	0	0	0	0	0	0	0	0	0
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 44: Sooty shearwater design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	16	2	49	0	0	0	16	2	49
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 45: Sooty shearwater design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	0	0	0	0	0	0	0	0	0
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	16	2	50	0	0	0	16	2	50
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	0	0	0	0	0	0	0	0	0
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.16 Manx shearwater

Table E. 46: Manx shearwater design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	18	2	68	18	2	68	0	0	0
2021	Jul	310	153	540	129	61	207	181	46	392
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	0	0	0	0	0	0	0	0	0
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	9	1	25	0	0	0	9	1	25
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	58	17	110	17	2	42	41	8	85
2023	Aug	25	2	58	0	0	0	25	2	58
2023	Sep	9	1	25	9	1	25	0	0	0

Table E. 47: Manx shearwater design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	17	2	50	17	2	50	0	0	0
2021	Jul	256	117	448	108	42	185	148	27	329
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	41	8	81	16	2	41	25	2	56
2023	Aug	16	1	40	0	0	0	16	1	40
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 48: Manx shearwater design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	17	2	50	17	2	50	0	0	0
2021	Jul	244	102	462	110	50	184	133	16	333
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	0	0	0	0	0	0	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	0	0	0	0	0	0	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0
2022	May	0	0	0	0	0	0	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	0	0	0	0	0	0	0	0	0
2022	Sep	0	0	0	0	0	0	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	0	0	0	0	0	0	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	0	0	0	0	0	0	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	0	0	0	0	0	0	0	0	0
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	0	0	0	0	0	0	0	0	0
2023	Jun	0	0	0	0	0	0	0	0	0
2023	Jul	24	2	57	8	1	25	15	1	41
2023	Aug	16	1	40	0	0	0	16	1	40
2023	Sep	0	0	0	0	0	0	0	0	0

E.17 Gannet

Table E. 49: Gannet design-based estimates for the Morven North Boundary + 4km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only			Diving only		
		Pop	LCL	UCL	Pop	Pop	Pop	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	838	634	1,062	359	231	505	471	324	636	9	1	34
2021	Jul	1,411	1,142	1,686	711	514	916	699	519	883	0	0	0
2021	Aug	584	442	728	300	197	402	284	187	402	0	0	0
2021	Sep	1,092	869	1,361	519	348	692	573	407	768	0	0	0
2021	Oct	745	589	919	207	132	289	538	406	679	0	0	0
2021	Nov	78	26	130	52	17	95	26	3	60	0	0	0
2021	Dec	26	3	59	0	0	0	26	3	59	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0	0	0	0
2022	Feb	32	8	67	0	0	0	32	8	67	0	0	0
2022	Mar	16	2	42	0	0	0	16	2	42	0	0	0
2022	Apr	61	17	111	18	2	51	43	9	85	0	0	0
2022	May	792	623	976	586	436	750	207	127	299	0	0	0
2022	Jun	1,373	720	2,306	879	270	1,786	494	346	660	0	0	0
2022	Jul	386	220	580	186	84	320	200	76	347	0	0	0
2022	Aug	224	133	341	74	25	141	150	67	242	0	0	0

Year	Month	All behaviours			Sitting only			Flying only			Diving only		
		Pop	LCL	UCL	Pop	Pop	Pop	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	93	42	153	34	8	76	59	17	103	0	0	0
2022	Oct	120	60	189	42	9	85	77	26	129	0	0	0
2022	Nov	85	42	142	59	25	109	26	3	59	0	0	0
2022	Dec	18	2	42	0	0	0	18	2	42	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0	0	0	0
2023	Feb	17	2	42	0	0	0	17	2	42	0	0	0
2023	Mar	67	25	117	0	0	0	67	25	117	0	0	0
2023	Apr	85	25	159	25	3	59	60	8	126	0	0	0
2023	May	309	177	464	51	17	94	258	136	406	0	0	0
2023	Jun	470	311	657	241	119	397	229	135	330	0	0	0
2023	Jul	616	454	787	270	151	405	346	229	473	0	0	0
2023	Aug	324	217	443	134	75	202	190	108	284	0	0	0
2023	Sep	287	185	412	110	51	178	177	101	271	0	0	0

Table E. 50: Gannet design-based estimates for the Morven North Boundary + 2km buffer (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only			Diving only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	614	456	800	264	163	393	342	224	465	8	1	25
2021	Jul	1,106	882	1,359	518	376	693	588	421	764	0	0	0
2021	Aug	393	278	506	188	115	270	205	131	293	0	0	0
2021	Sep	853	652	1,091	389	245	553	464	311	661	0	0	0
2021	Oct	581	443	716	144	87	215	437	318	553	0	0	0
2021	Nov	68	25	117	42	8	84	26	3	58	0	0	0
2021	Dec	25	3	57	0	0	0	25	3	57	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0	0	0	0
2022	Feb	32	8	65	0	0	0	32	8	65	0	0	0
2022	Mar	16	2	40	0	0	0	16	2	40	0	0	0
2022	Apr	58	16	114	16	2	65	41	8	81	0	0	0
2022	May	616	467	788	479	340	628	138	73	213	0	0	0
2022	Jun	1,140	522	2,177	822	220	1,872	318	211	431	0	0	0
2022	Jul	234	122	388	106	57	163	128	33	278	0	0	0
2022	Aug	160	87	256	32	8	65	128	56	216	0	0	0
2022	Sep	73	25	123	24	3	57	49	16	90	0	0	0

Year	Month	All behaviours			Sitting only			Flying only			Diving only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	92	41	149	41	8	81	50	16	98	0	0	0
2022	Nov	64	24	113	48	16	89	16	2	40	0	0	0
2022	Dec	16	2	41	0	0	0	16	2	41	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0	0	0	0
2023	Feb	17	2	41	0	0	0	17	2	41	0	0	0
2023	Mar	48	16	97	0	0	0	48	16	97	0	0	0
2023	Apr	81	24	152	24	3	49	57	8	121	0	0	0
2023	May	260	146	394	40	8	73	220	113	349	0	0	0
2023	Jun	383	236	555	195	89	342	188	105	278	0	0	0
2023	Jul	477	339	637	195	98	317	282	178	400	0	0	0
2023	Aug	216	135	305	72	32	120	144	72	217	0	0	0
2023	Sep	176	98	260	73	24	130	104	49	170	0	0	0

Table E. 51: Gannet design-based estimates for the Morven North Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only			Diving only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	451	319	609	229	125	345	214	131	312	8	1	32
2021	Jul	697	504	912	256	140	394	442	289	613	0	0	0
2021	Aug	282	183	379	116	58	181	166	91	252	0	0	0
2021	Sep	536	389	681	228	131	337	308	212	416	0	0	0
2021	Oct	446	327	576	103	55	160	344	237	457	0	0	0
2021	Nov	58	17	109	42	8	84	16	2	42	0	0	0
2021	Dec	25	3	57	0	0	0	25	3	57	0	0	0
2022	Jan	0	0	0	0	0	0	0	0	0	0	0	0
2022	Feb	16	2	41	0	0	0	16	2	41	0	0	0
2022	Mar	8	1	24	0	0	0	8	1	24	0	0	0
2022	Apr	33	8	66	0	0	0	33	8	66	0	0	0
2022	May	378	270	511	303	198	423	74	33	130	0	0	0
2022	Jun	858	317	1,790	581	71	1,504	277	172	394	0	0	0
2022	Jul	130	73	194	90	41	145	40	8	81	0	0	0
2022	Aug	89	32	160	23	3	56	65	16	136	0	0	0
2022	Sep	25	3	57	0	0	0	25	3	57	0	0	0

Year	Month	All behaviours			Sitting only			Flying only			Diving only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	74	33	124	25	3	57	50	16	90	0	0	0
2022	Nov	32	8	72	25	3	57	7	1	32	0	0	0
2022	Dec	16	2	41	0	0	0	16	2	41	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0	0	0	0
2023	Feb	17	2	41	0	0	0	17	2	41	0	0	0
2023	Mar	41	8	82	0	0	0	41	8	82	0	0	0
2023	Apr	55	8	122	16	2	40	39	5	105	0	0	0
2023	May	201	90	339	24	3	57	177	73	312	0	0	0
2023	Jun	253	139	391	116	32	237	137	73	213	0	0	0
2023	Jul	328	204	470	165	73	285	163	89	243	0	0	0
2023	Aug	145	80	218	56	16	97	88	32	153	0	0	0
2023	Sep	114	57	173	32	8	65	82	40	132	0	0	0