Morven South 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 South Offshore Wind Array Project (hereafter 'Morven South') 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 South 1 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 South. This report therefore:

- collates all ornithological data gathered to date for the Morven South application and provides a baseline description of the ornithological interests within the Morven South Boundary;
- establishes the ornithological importance of Morven South 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 South 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 South) and breeding colonies (see Volume 2, Chapter 11: Offshore Ornithology, for more detail).

[1] This is where Morven South 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 South;
- 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 South;
- Section 5 identifies sites of conservation concern with potential connectivity with Morven South 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 South and provides discussion pertaining to trends in spatial, seasonal or inter-annual variation. The relative importance of Morven South 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 South Offshore Ornithology Baseline Characterisation Study Area;
- the Morven South Offshore Ornithology Regional Study Area.

2.1.1.2 The Morven South Offshore Ornithology Baseline Characterisation Study Area provides a site specific baseline encompassing the Morven South Boundary plus 4km buffer across which aerial surveys were undertaken (705.5km^2) (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 South 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).

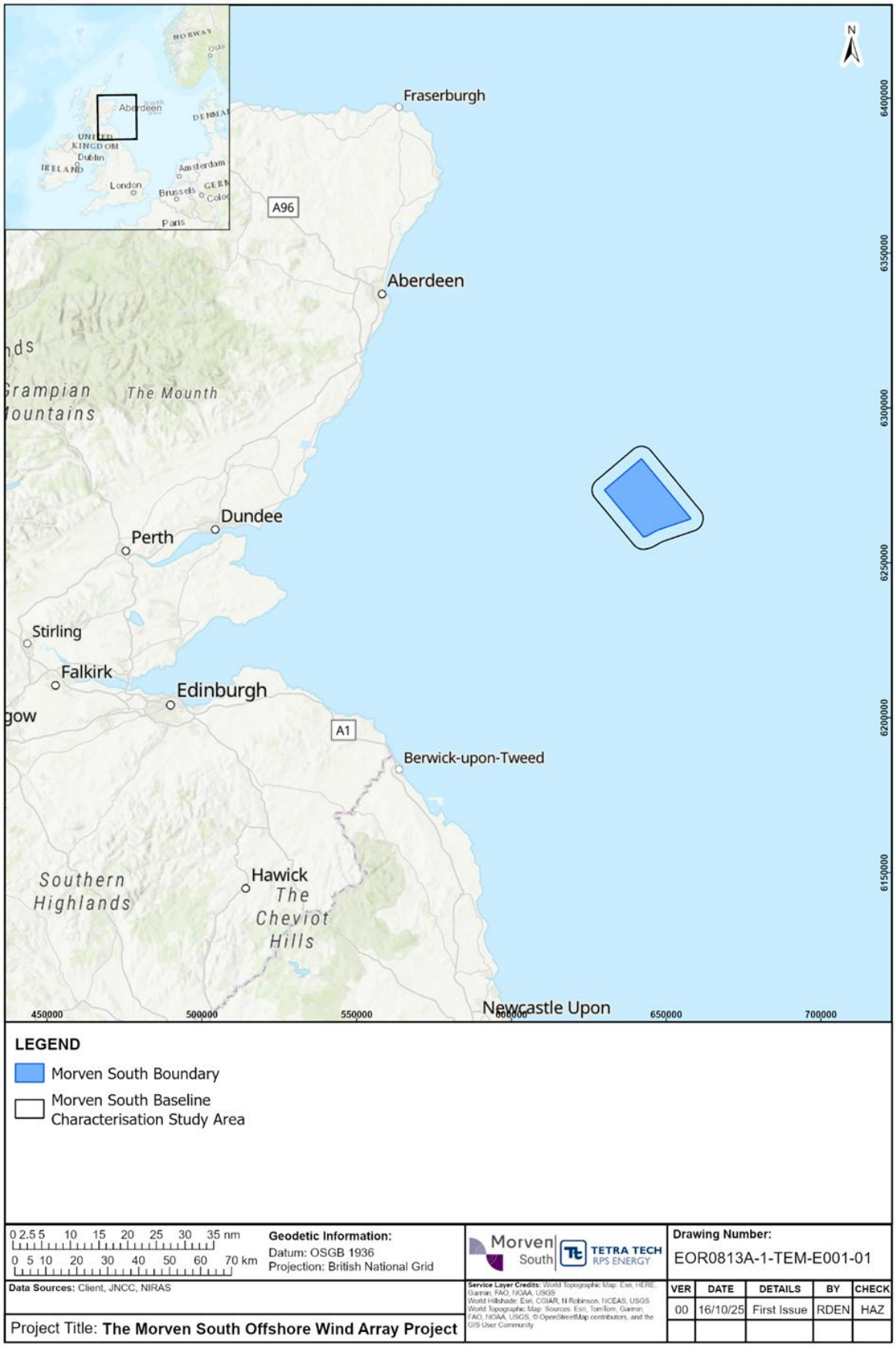

Figure 2.1: The Morven South Offshore Ornithology Baseline Characterisation Study Area used to define the ornithological baseline

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 South 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 South Offshore Ornithology Baseline Characterisation Study Area.	Digital aerial data.	January 2021 to September 2023.	Morven South 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 *et al*. (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.
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

Source/reference	Description	Data source	Date	Site coverage
				for multiple species.
Kober *et al*. (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 (2023c)	Guidance note – Identifying theoretical connectivity with breeding site Special Protection Areas using breeding season foraging ranges	Tracking data, foraging range data	Includes information up to 2019.	UK waters.
Cleasby *et al*. (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 South Offshore Ornithology Baseline Characterisation Study Area
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 June 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 involve 17 survey lines spaced approximately 2km apart within Morven South plus a 4km buffer (Morven South 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

Survey no.	Date	Start time (HH:MM)	End time (HH:MM)
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
	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 (%)	Turbidity2	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
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–

Survey no.	Date	Visibility (km)	Sea state	Glint/glare (%)	Turbidity2	Cloud (%)3	Air temp (oC)	Wind speed (knots)/direction
								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/SSW - 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 South digital aerial surveys. Percentage captured and percentage analysed statistics are provided

Survey	Percentage Captured %	Percentage Analysed %
Ju-21	33.53	11.94
Jul-21	33.71	12.01
Aug-21	33.50	12.11
Sep-21	33.38	11.95
Oct-21	34.10	12.20
Nov-21	33.00	11.97
Dec-21	33.39	12.04
Jan-22	33.76	12.19
Feb-22	33.78	12.11
Mar-22	33.78	12.11
Apr-22	33.64	12.25
May-22	34.43	11.99
Jun-22	33.39	12.00
Jul-22	33.63	12.09
Aug-22	33.85	12.14
Sep-22	33.11	11.84
Oct-22	33.07	11.88
Nov-22	34.24	12.12
Dec-22	35.19	11.95
Jan-23	34.02	12.36
Feb-23	33.54	11.98
Mar-23	33.85	12.23
Apr-23	33.78	12.08
May-23	33.62	12.07
Jun-23	33.91	12.10
Jul-23	33.61	12.07
Aug-23	33.85	12.10
Sep-23	33.50	12.08

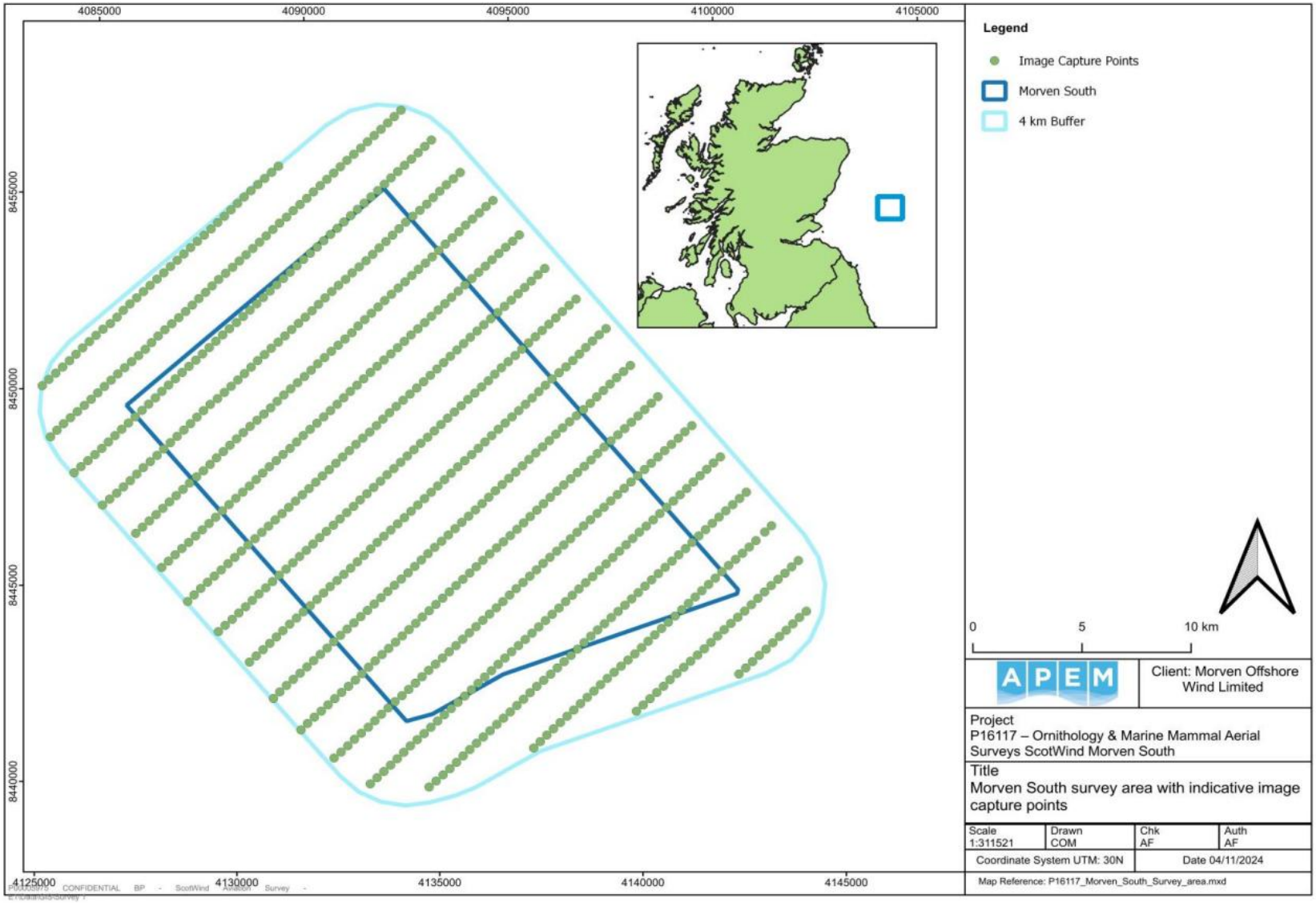

Figure 3.1: Map of the survey lines involved in the aerial surveys for the Morven South Offshore Ornithology Baseline Characterisation Study Area

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 South 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 Morven North and Morven South) which was later refined and used to develop the project 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 South plus 2km buffer) and collision risk modelling (Morven South only). However, complete coverage of the area required to identify Valued Ornithological Receptors (VORs) (Morven South 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 South 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 South Offshore Ornithology Baseline Characterisation Study Area and the area covered by the digital aerial surveys, extra caution will be employed during this process to ensure 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 subsequent assessments provide the information required to support robust assessments. 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 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 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

[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, 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.

models for low counts of models are possible with some effort in the starting conditions for the MRSea model fitting.

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 1km^2 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 1km^2 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 1km^2 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 km^2 for the Morven South footprint).

3.2.5.14 95% confidence intervals were generated using the MRSea parametric bootstrapping method, which provided confidence intervals for each 1km^2 grid cell. Estimates to the various regions were calculated by summation over the 1km^2 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). 1,108 instances during Morven South aerial surveys;
- auk/shearwater species (allocated to guillemot, razorbill, puffin after the proportion of shearwater is removed). 32 instances during Morven South aerial surveys;
- auk species (allocated to guillemot, razorbill, puffin). 153 instances during Morven South aerial surveys;
- 'commic' tern (allocated to common tern and Arctic tern). 90 instances during Morven South 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 South 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, 2013a). 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 (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 south-east 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.

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, as published by JNCC, for species relevant to Morven South 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. This data is 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 South is the Fowlsheugh SPA, located approximately 84km west of the Morven South 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 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
Kittiwake	+24	-26	-43	4	-21	-57	+8
Black-headed gull	+116[4]	-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 South 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 South 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 South (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 South 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)

Biogeographic population scale	Season	BDMPS definition	Population units	Source of population/data used to calculate population
	Non-breeding (guillemot and herring gull)	Mean maximum foraging range + 1 SD	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)
	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 *et al*. (2023) or Woodward *et al*. (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)
	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 *et al*. (2023) Wetlands International (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 South 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 South 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 South, the same regional population as used in the breeding season.

4.2.1.6 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 4.4.

4.2.1.7 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.

4.2.1.8 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 South 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.

4.2.1.9 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 *et al*. (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 *et al*. (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 *et al*. (2010)	May to October	November to December		January to April
Leach's Storm petrel	NatureScot (2020); Kober *et al*. (2010)	May to October	November to December[6]		January to May4
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 South and important colonies or designated sites with this measured from the edge of the Morven South Boundary consistent with the approach to HRA screening, as detailed within, Chapter 1: Morven Option Lease Agreement Site HRA Stage 1 Screening 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 South is located to a significant degree.

5.1.1.5 The list of SPAs within range of Morven South 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 South (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
Black guillemot	9.1
Puffin	265.4
Red-throated diver	9 (Mean maximum foraging range only)
European storm petrel	336 (Mean maximum foraging range only)
Leach's Storm petrel	657 (Mean foraging range)
Fulmar	1,200.2
Manx shearwater	2,365.5
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 South

Designated site	Distance to Morven South (km)	Kittiwake	Herring gull	Lesser black-backed gull	Great skua	Common guillemot	Razorbill	Puffin	Storm petrel	Leach's Storm petrel	Fulmar	Gannet
Auskerry SPA	283								✓			
Buchan Ness to Collieston Coast SPA	101	✓									✓	
Calf of Eday SPA	305										✓	
Cape Wrath SPA	320										✓	
Copinsay SPA	269	✓									✓	
Coquet Island SPA	130	✓		✓				✓			✓	
East Caithness Cliffs SPA	232	✓									✓	
Fair Isle SPA	316				✓						✓	✓
Farne Islands SPA	101	✓						✓				
Fetlar SPA	430				✓						✓	
Flamborough & Filey Coast SPA	241	✓						✓			✓	✓

Designated site	Distance to Morven South (km)	Kittiwake	Herring gull	Lesser black-backed gull	Great skua	Common guillemot	Razorbill	Puffin	Storm petrel	Leach's Storm petrel	Fulmar	Gannet
Forth Islands SPA	104	✓		✓			✓	✓				✓
Foula SPA	387				✓					✓	✓	
Fowlsheugh SPA	82	✓	✓			✓	✓				✓	
Hermaness, Saxa Vord and Valla Field SPA	450				✓						✓	✓
Hoy SPA	276	✓			✓						✓	
North Caithness Cliffs SPA	251	✓						✓			✓	
Noss SPA	383				✓						✓	✓
Ramna Stacks and Gruney SPA	443									✓		
Ronas Hill - North Roe and Tingon SPA and Ramsar	428				✓							
Rousay SPA	306										✓	

Designated site	Distance to Morven South (km)	Kittiwake	Herring gull	Lesser black-backed gull	Great skua	Common guillemot	Razorbill	Puffin	Storm petrel	Leach's Storm petrel	Fulmar	Gannet
St Abb`s Head to Fast Castle SPA	101	✓					✓					
Sule Skerry and Sule Stack SPA	341									✓		✓
Sumburgh Head SPA	352										✓	
Troup, Pennan and Lion`s Heads SPA	141	✓									✓	
West Westray SPA	316										✓	

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

5.1.1.6 In addition to those SPAs identified in Table 5.2 that have connectivity with Morven South 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 South (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 South

SPA	Distance to Morven South (km)	Associated breeding colony SPA(s)	Qualifying features
Northumberland Marine	93	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	359	Foula SPA	Fulmar, great skua

6 Species accounts

6.1 Overview

6.1.1.1 Those species that may occur within the Morven South 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 South Offshore Ornithology Baseline Characterisation Study Area. For species included in this section, population estimates for Morven South 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 South 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 north-east 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 3×3km.

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 South 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 also 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 South 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 South Offshore Ornithology Baseline Characterisation Study Area.

6.1.1.7 The following species accounts present abundance data for the Morven South Offshore Ornithology Baseline Characterisation Study Area to determine the population importance of each species at Morven South. 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 South 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	Conservation status All species of lowest conservation status (e.g. Green-listed species listed on the Birds of Conservation Concern 5).
	Importance Not recorded during baseline and regional surveys of the Morven South Offshore Ornithology Baseline Characterisation Study Area
Local	Conservation status 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.
	Importance A species which is present at Morven South in numbers lower than 1% of the regional population.
Regional	Conservation status 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).
	Importance A species which is present at Morven South in numbers of greater than 1% of the regional population.
National	Conservation status 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 South 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
	Importance A species which is present at Morven South in numbers of greater than 1% of the national population.
International	Conservation status Bird species that form part of a cited interest of an SPA or Ramsar site that may potentially interact Morven South 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.
	Importance A species which is present at Morven South 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 12 SPAs within the species' generic mean maximum foraging range from Morven South (Woodward *et al*., 2024) (Table 6.2). These SPAs are designated for 239,609 breeding pairs although the current population has fallen to 127,285 breeding pairs representing approximately 59% 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 South.

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 South based on generic foraging range data

Designated site	Distance to Morven South (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell *et al*. (2023) (breeding pairs)
Buchan Ness to Collieston Coast SPA	101	30,452	11,295
Copinsay SPA	269	9,550	955
Coquet Island SPA	130	426	466
East Caithness Cliffs SPA	232	32,500	24,479
Farne Islands SPA	101	8,241	4,402
Flamborough and Filey Coast SPA	241	44,520	51,535
Forth Islands SPA	104	8,400	4,542
Fowlsheugh SPA	82	36,650	14,039
Hoy SPA	276	3,000	266
North Caithness Cliffs SPA	251	13,100	5,571
St Abb's Head to Fast Castle SPA	101	21,170	5,150
Troup, Pennan and Lion's Heads SPA	141	31,600	10,616

6.2.2 Seasonal abundance and distribution

Site specific surveys

6.2.2.1 Kittiwakes were recorded in all but one of the aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area. The peak count of 3,586 birds occurred in June 2021 (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 2021 and 2022 with the peak population in 2023 occurring in May 2023 (274 birds). Outside of the breeding season the abundance of the species was generally lower than that recorded in the breeding season.

6.2.2.3 The populations of kittiwake did not surpass the thresholds for regional importance in any month (breeding season = 5,762 birds, post-breeding season = 8,299 birds, pre-breeding season = 6,278 birds).

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.

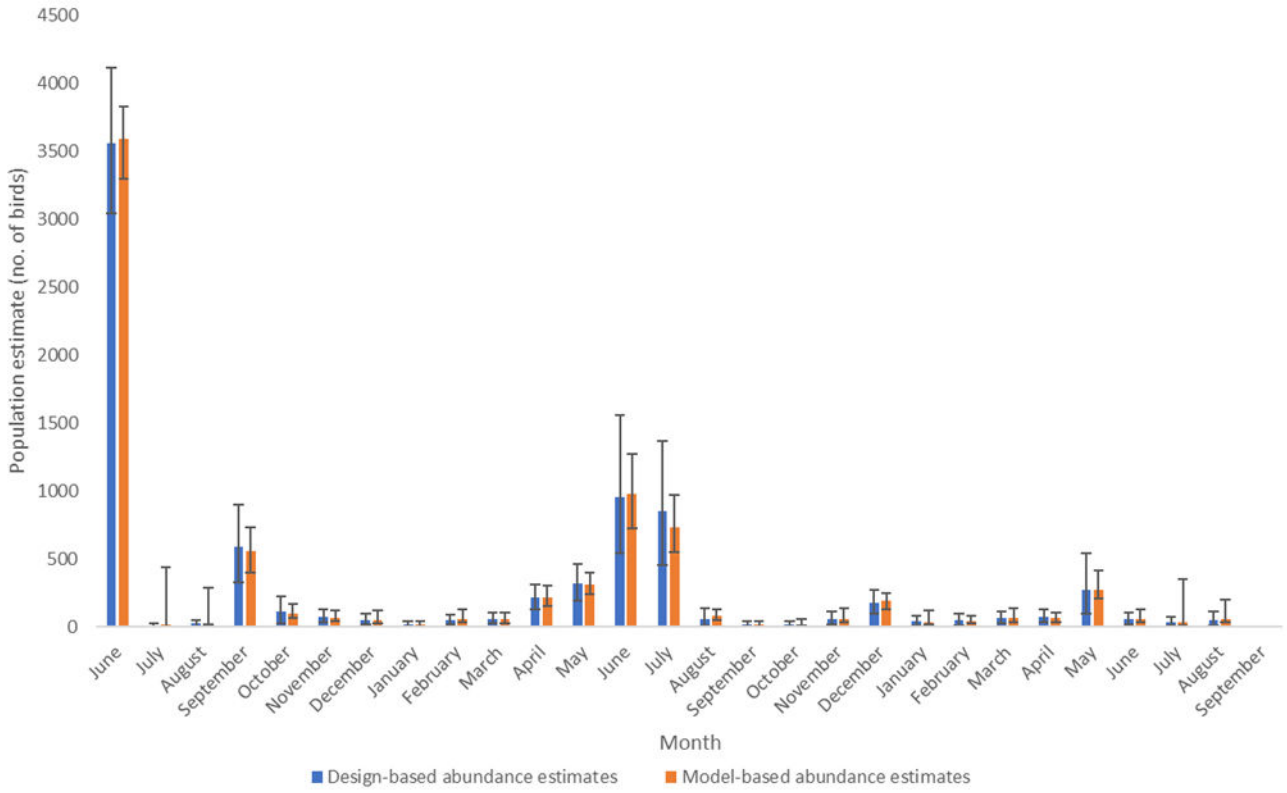

Figure 6.1: Abundance of kittiwake in the Morven South Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals)

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, and therefore not overlapping with the Morven South 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 South Offshore Ornithology Baseline Characterisation Study Area for kittiwake

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	3,586	3,295	3,829	3,557	3,043	4,110
July 2021	14	0	440	8	1	25
August 2021	24	13	284	25	3	50
September 2021	553	396	734	589	326	901
October 2021	95	64	170	109	24	222
November 2021	65	39	119	75	33	126
December 2021	49	25	116	50	17	92
January 2022	17	0	39	16	2	41
February 2022	53	34	125	50	16	91
March 2022	55	28	106	59	25	107
April 2022	217	153	301	211	130	310
May 2022	310	239	401	318	193	458
June 2022	979	720	1,270	951	540	1,553
July 2022	731	545	967	852	455	1,369
August 2022	78	45	127	57	8	133
September 2022	18	0	44	17	2	42
October 2022	15	6	55	16	2	42
November 2022	57	35	135	60	17	109
December 2022	188	131	247	177	93	267

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
January 2023	35	20	119	40	8	81
February 2023	39	21	76	45	8	98
March 2023	61	35	134	65	25	114
April 2023	66	35	106	75	33	124
May 2023	274	203	416	267	99	537
June 2023	59	34	129	58	17	107
July 2023	32	6	347	33	8	74
August 2023	53	32	201	49	8	108
September 2023	0	0	0	0	0	0

6.2.3 Tracking data

6.2.3.1 There is evidence based on GPS tracking studies that kittiwake use the Morven South Boundary and adjacent waters (BirdLife International, 2024). 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 South Boundary (Wakefield *et al*., 2017; Bogdanova *et al*., 2018, 2020, 2021, 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 South Boundary as an important area for kittiwakes (Cleasby *et al*., 2020). Tracking undertaken in 2023 and 2024 showed no overlap between Morven South and the 95% utilisation contour of kittiwake from the Buchan Ness to Collieston Coast SPA (Bennett *et al*., 2024) (Figure 6.2).

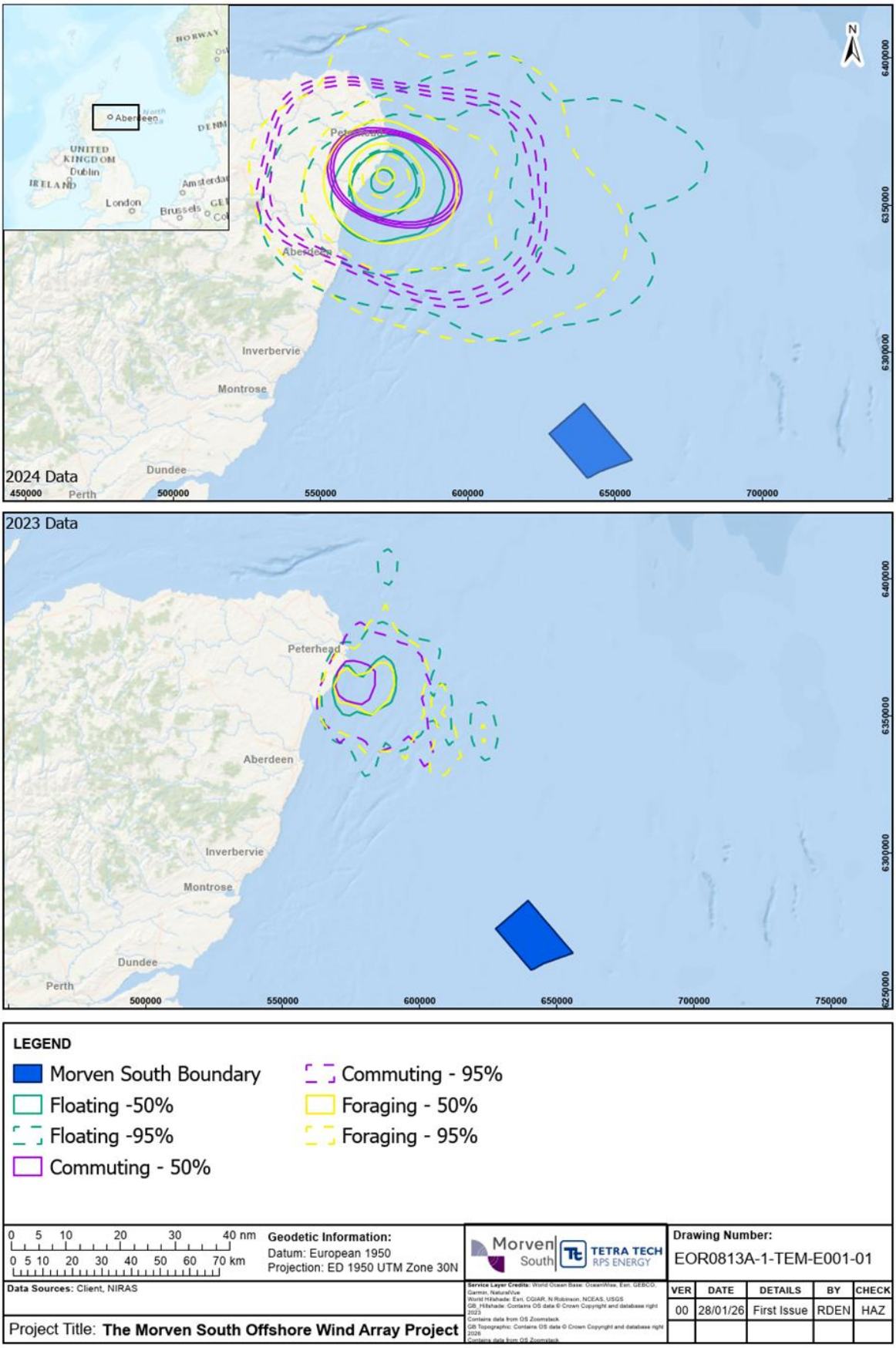

Figure 6.2: The spatial distribution of different behavioural states of kittiwake tracked from the Buchan Ness to Collieston Coast in 2023 and 2024 in relation to Morven South

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 579 individuals were aged during the site specific aerial surveys. Of these, 510 were identified as adults, 48 as immatures, and 21 as juveniles (Figure 6.3). Juvenile birds were recorded in September 2021, February 2022, and August 2023. First year birds were recorded in all seasons.

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. The limited number of birds recorded for flight direction in the pre-breeding season means no clear pattern in flight direction emerges (Figure 6.4).

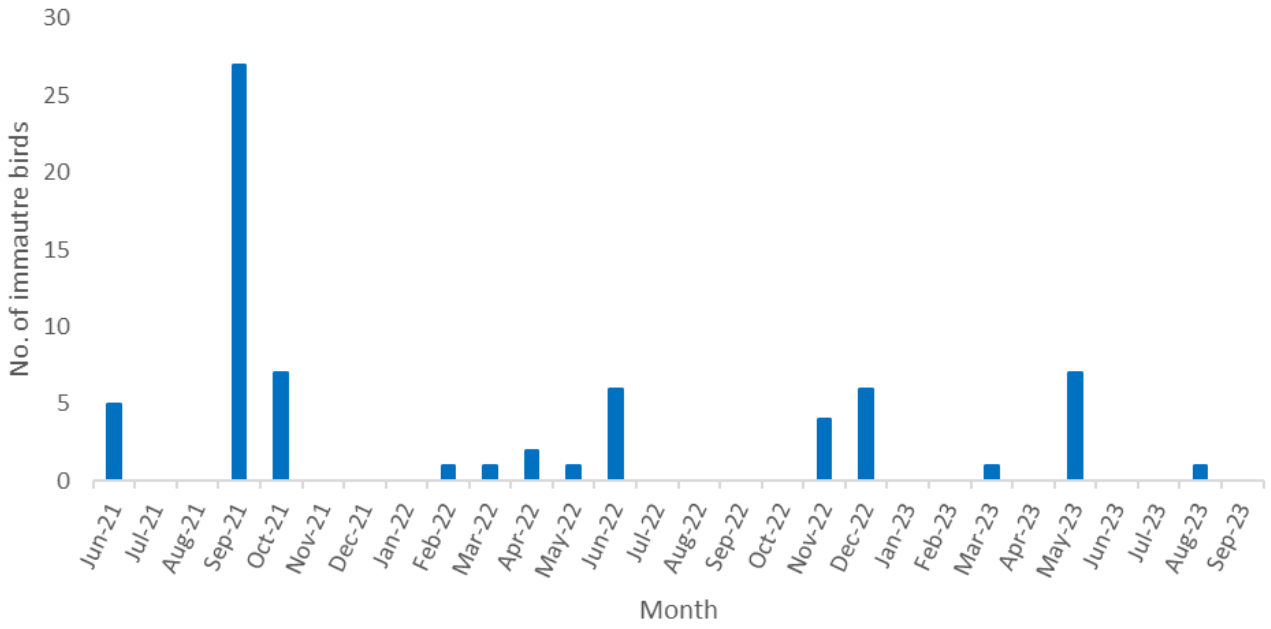

Figure 6.3: Number of immature kittiwakes recorded during each site specific aerial survey

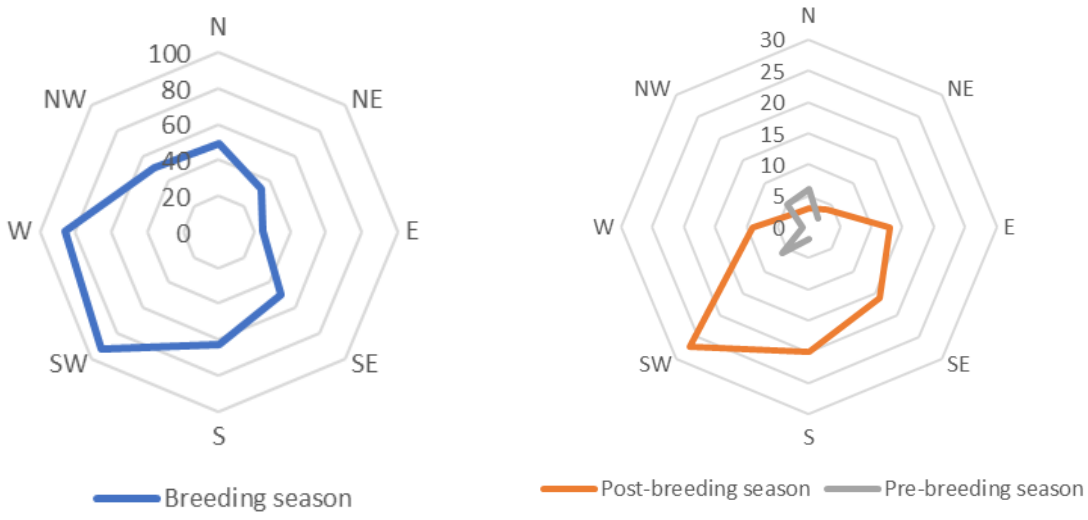

Figure 6.4: Flight directions of kittiwake, as recorded during site specific aerial surveys

6.2.5 Conclusion

6.2.5.1 Kittiwake is considered to have an international conservation status with connectivity identified between the Morven South Boundary and multiple SPAs. Population estimates of kittiwake at the Morven South Offshore Ornithology Baseline Characterisation Study Area do not exceed the 1% importance threshold of the regional population 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 South 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 South 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 South 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 South 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 South 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 South.

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 South 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 South 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 South 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 South 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 gull was recorded in four of the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area. The peak population occurred in August 2022 (41 birds).

6.5.2.2 Of the four surveys during which the species was recorded, three were during the non-breeding season (October and November 2021 and November 2022) and one was in the breeding season (August 2022). Due to the small number of birds recorded there were no obvious trends in the distribution of birds across the Morven South Baseline Characterisation survey area.

6.5.2.3 The peak population in the non-breeding season (September to March) occurred in November 2022 (17 birds). No estimate of the regional BDMPS population relevant to Morven South 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 (471 birds). In the breeding season (April to August), the peak population was recorded in August 2022 (41 birds). There are no breeding populations of common gull within the foraging range of Morven South and therefore this population is likely birds moving from breeding colonies.

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 not recorded in the Morven South Baseline Characterisation survey area.

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 four of the surveys undertaken across the Morven South 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 South.

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 (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 South 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 South Offshore Ornithology Baseline Characterisation Study Area in eight of the baseline aerial surveys (Figure 6.5; Table 6.4). Peak numbers occurred in December 2022 (34 birds).

6.6.2.2 Birds were only recorded in the non-breeding season defined for the species (September to March). No birds were recorded in the breeding season (April to August) (Figure 6.5).

6.6.2.3 The peak population in the non-breeding season (September to March) occurred in December 2022 (34 birds). This population did not surpass the 1% threshold for regional importance (914 birds).

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 South Baseline Characterisation Survey Area.

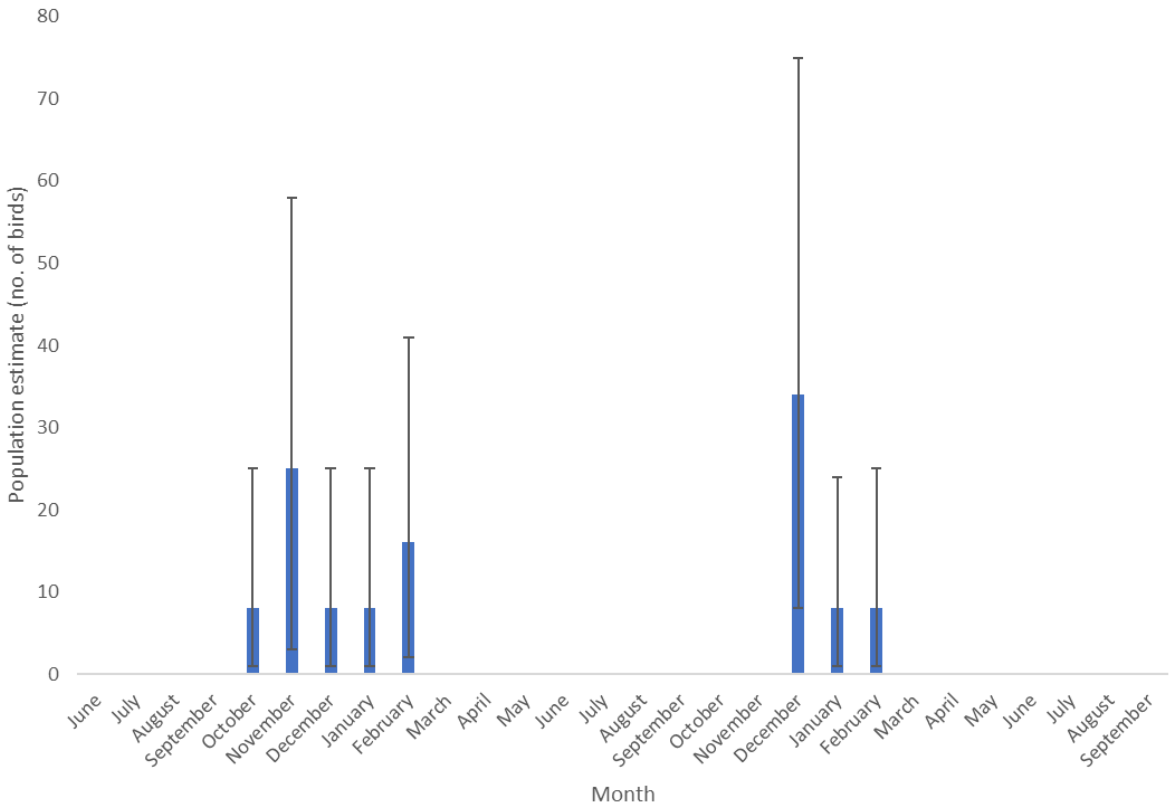

Figure 6.5: Design-based abundance estimates of great black-backed gull in the Morven South Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals)

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 South Offshore Ornithology Baseline Characterisation Study Area in the April 2023 survey.

6.6.3 Age class

6.6.3.1 A total of 14 individuals were aged during the site specific aerial surveys. Of these, 13 were identified as adults and one as an immature, first winter birds. No juveniles were identified.

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 South. Great black-backed gulls were recorded in eight of the surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area. The estimated populations did not surpass the thresholds of importance for any population level. However, as the species was recorded in multiple surveys, great black-backed gull therefore is 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 June 2021 to September 2023 for The Morven South Offshore Ornithology Baseline Characterisation Study Area for great black-backed gull

Month	Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit
June 2021	0	0	0
July 2021	0	0	0
August 2021	0	0	0
September 2021	0	0	0
October 2021	8	1	25
November 2021	25	3	58
December 2021	8	1	25
January 2022	8	1	25
February 2022	16	2	41
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	34	8	75
January 2023	8	1	24

Month	Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit
February 2023	8	1	25
March 2023	0	0	0
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 one SPA within the species mean maximum foraging range (+1 SD) of the Morven South Offshore Ornithology Baseline Characterisation Study Area (Woodward *et al*., 2024), the Fowlsheugh SPA (Table 6.5).

6.7.1.5 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 6.5 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.

6.7.1.6 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 South based on generic foraging range data

Designated site	Distance to Morven South (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell *et al*. (2023) (breeding pairs)
Fowlsheugh SPA	82	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 South Offshore Ornithology Baseline Characterisation Study Area in five of the baseline aerial surveys. The highest populations were estimated in June 2021, October 2022, and September 2023 (Figure 6.5).

6.7.2.2 The peak population in the non-breeding season (September to March) occurred in October 2022 and September 2023 (nine birds). This population did not surpass the 1% threshold for national importance (9,931 birds). In the breeding season (April to August), the peak population was recorded in June 2021 (nine birds). This population did not surpass the 1% threshold for national importance (6,398 birds).

6.7.2.3 In all months, the number of birds recorded was too low to detect any trends in the distribution of the species in the Morven South Offshore Ornithology Baseline Characterisation Study Area.

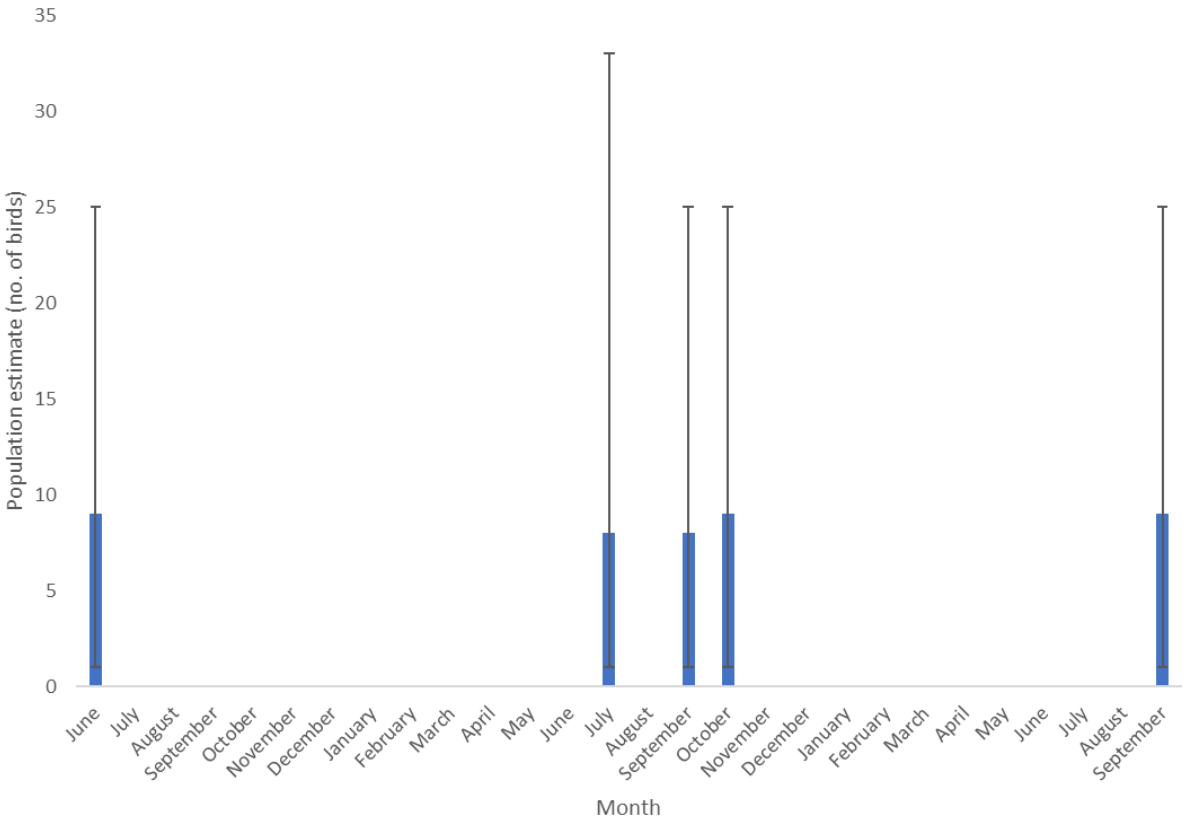

Figure 6.6: Design-based abundance estimates of herring gull in the Morven South Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals)

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 South Offshore Ornithology Baseline Characterisation Study Area in both 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 but did occur in the Morven South Offshore Ornithology Baseline Characterisation Study Area in the February 2023 survey (Figure C. 4, Figure C. 5 and Figure C. 6).

6.7.3 Conclusion

6.7.3.1 Herring gull is considered to have an international conservation status due to Morven South being within the foraging range of herring gull from the Fowlsheugh SPA, at which the species is designated as a breeding feature. Herring gulls were recorded in four of the surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area however, the estimated populations are not considered to be of importance. Herring gull is therefore not identified as a VOR and not considered for further assessment.

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 South (Woodward *et al*., 2024) (Table 6.6). 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. 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 South.

6.8.1.4 Populations recorded as part of the Seabirds Count are presented in Table 6.6 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 6.6, 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 6.6: Designated sites at which lesser black-backed gull is a qualifying feature with which there is connectivity with Morven South based on generic foraging range data

Designated site	Distance to Morven South (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell *et al*. (2023) (breeding pairs)
Coquet Island SPA	130	52 individuals	466
Forth Islands SPA	104	1,500	2,015

6.8.2 Seasonal abundance and distribution

Site specific surveys

6.8.2.1 Lesser black-backed gulls were not recorded in the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

6.8.2.2 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 not recorded in the Morven South Offshore Ornithology Baseline Characterisation Study Area.

6.8.3 Conclusion

6.8.3.1 Lesser black-backed gull is considered to have an international conservation status due to Morven South being within the foraging range of the species from two SPAs at which the species is designated as a breeding feature. Lesser black-backed gulls were not recorded in the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area. Lesser black-backed gulls are therefore not considered for further assessment in relation to impacts associated with Morven South.

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 South (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 not recorded in the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

6.9.2.2 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

6.9.2.3 Tracking of Sandwich terns from the Ythan Estuary, Sands of Forvie and Meikle Loch SPA has shown no connectivity with the Morven South 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. Sandwich tern were not recorded in the baseline aerial surveys undertaken across the Morven South 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 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, 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 South 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 South 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 South 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 South South 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 South 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. 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 South 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 South 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 3.2.3.3 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 not recorded in the Morven South Offshore Ornithology Baseline Characterisation Study Area during any survey.

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 South 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 South 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 South 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 fourteen SPAs across the Shetlands, Orkney, Scotland east coast and the north-east of England. Morven South 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 four of the aerial surveys undertaken across Morven South Offshore Ornithology Baseline Characterisation Study Area. Throughout the survey programme birds were only recorded in May, July and August. These months span the pre-breeding, breeding and post-breeding seasons defined for the species in Table 4.4. Morven South is however, beyond the foraging range of Arctic tern from any breeding colonies and therefore these birds are considered to be birds migrating to or from breeding grounds. The populations recorded in the Morven South Offshore Ornithology Baseline Characterisation Study Area are therefore compared to the relevant importance thresholds in the pre- and post-breeding seasons.

6.13.2.2 In the pre-breeding season (April to May), birds were recorded in May 2022 (17 birds). The threshold for national importance (962 birds) was not surpassed by the populations recorded in this month. In the post-breeding season (August to October), birds were recorded in August 2022 (2,810 birds). The population estimated in August 2022 surpassed the threshold for national importance. The international threshold is not surpassed. Birds were also recorded in August 2021 (24 birds) and July 2023 (8 birds). If it is assumed these birds are failed breeders the associated populations in these months do not surpass the threshold for national importance.

Regional distribution

6.13.2.3 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 South Offshore Ornithology Baseline Characterisation Study Area during the July 2022 and August 2023.

Tracking data

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

6.13.3 Behaviour

6.13.3.1 Analysis of flight directions across the seasonal extents for the breeding season showed prevailing flight direction of southwest with south as the next most common compass direction (Figure 6.7).

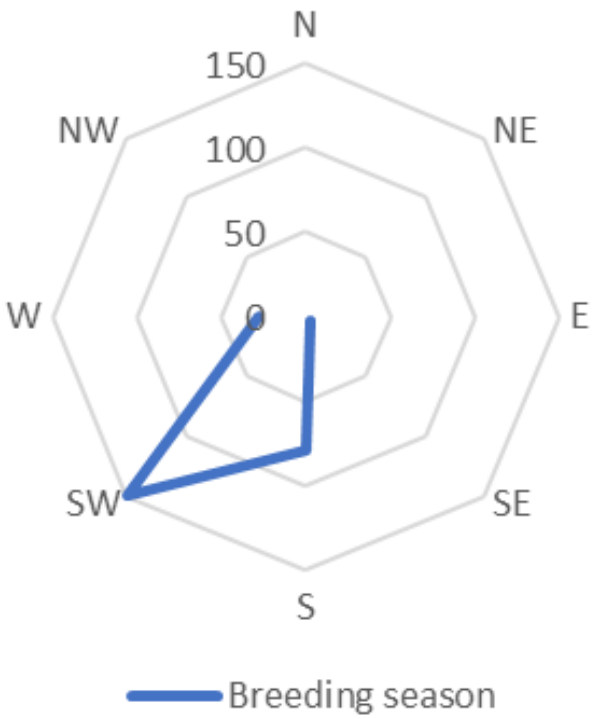

Figure 6.7: Flight directions of Arctic tern, as recorded during site specific aerial surveys

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 South 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 6.7). 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 South. 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 South.

6.14.1.4 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, 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 6.7, 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 6.7: Designated sites at which great skua is a qualifying feature with which there is connectivity with Morven South based on generic foraging range data

Designated site	Distance to Morven South (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell *et al*. (2023) (breeding pairs)
Fair Isle SPA	316	110	430
Fetlar SPA	430	508	854
Foula SPA	387	2,270	1,846
Hermaness, Saxa Vord and Valla Field SPA	450	788	1,030
Hoy SPA	276	1,900	1,405
Noss SPA	383	420	476

Designated site	Distance to Morven South (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell *et al.* (2023) (breeding pairs)
Ronas Hill - North Roe and Tingon SPA and Ramsar	428	130	190

6.14.2 Seasonal abundance and distribution

Site specific surveys

6.14.2.1 Great skuas were recorded in one of the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area. This record occurred during the September 2023 survey with a single bird recorded, translating into a population estimate of eight birds.

6.14.2.2 Although Morven South is within the foraging range of great skua from a number of breeding colonies, this bird was likely to be on migration. The population estimated does not surpass the threshold for regional importance in either the breeding or post-breeding seasons (481 and 196 birds respectively).

6.14.2.3 Due to the small number of birds recorded there were no obvious trends in the distribution of great skua across the Morven South Baseline Characterisation Survey Area.

Regional distribution

6.14.2.4 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 South 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 South is within the foraging range of the species from multiple UK SPAs. Great skuas were only recorded in one of the baseline aerial surveys undertaken across the Morven South 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 South 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 South 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 (16 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 Arctic skua across the Morven South 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 South Offshore Ornithology Baseline Characterisation Study Area. No Arctic skuas were recorded in the Morven South 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 only recorded in one of the baseline aerial surveys undertaken across the Morven South 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. 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 South 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). A single bird was recorded in November 2022, January 2023 and February 2023. No little auks were recorded in the Morven South 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 not recorded in the surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area and were only recorded in three of the regional surveys undertaken across the Scottish North Sea.

6.16.3.2 Little auk is therefore not considered for further assessment in relation to impacts associated with Morven South.

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 one SPA within the species' mean maximum foraging range from Morven South (Woodward *et al*., 2019) (Table 6.8), the Fowlsheugh SPA. This SPA is designated for 37,822 breeding pairs. The most recent count for each SPA suggests the population associated with these SPAs has increased to 46,785 representing approximately 5% 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 6.8 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 6.8 (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 6.8: Designated sites at which common guillemot is a qualifying feature with which there is connectivity with Morven South based on generic foraging range data

Designated site	Distance to Morven South (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell *et al*. (2023) (breeding pairs)
Fowlsheugh SPA	82	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 South Offshore Ornithology Baseline Characterisation Study Area. The species was most abundant towards the end of the breeding season and the start of the non-breeding season (June to August) in all years although this was more pronounced in 2022. The peak population was recorded in August 2022 (20,180 birds) (Table 6.10; Figure 6.8). Outside of this period the abundance of the species was considerably lower.

6.17.2.2 The populations estimated in July of all three years surpassed the threshold for regional importance in the breeding season (April to mid-August) (1,781 birds). The threshold for national importance (29,515 birds) was not surpassed during any survey. During the breeding season, densities are generally higher in the northern sector of the Morven South 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 population estimates surpassed the threshold for regional importance (1,781 birds) in September and November 2021 and February, August, October, November and December 2022. The threshold for national importance (27,562 birds) was not surpassed during any survey. 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 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 guillemot chicks leave breeding colonies and swim offshore accompanied by their father. To understand if the populations recorded at Morven South 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 6.9. 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 South 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 South. 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.

Table 6.9: 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

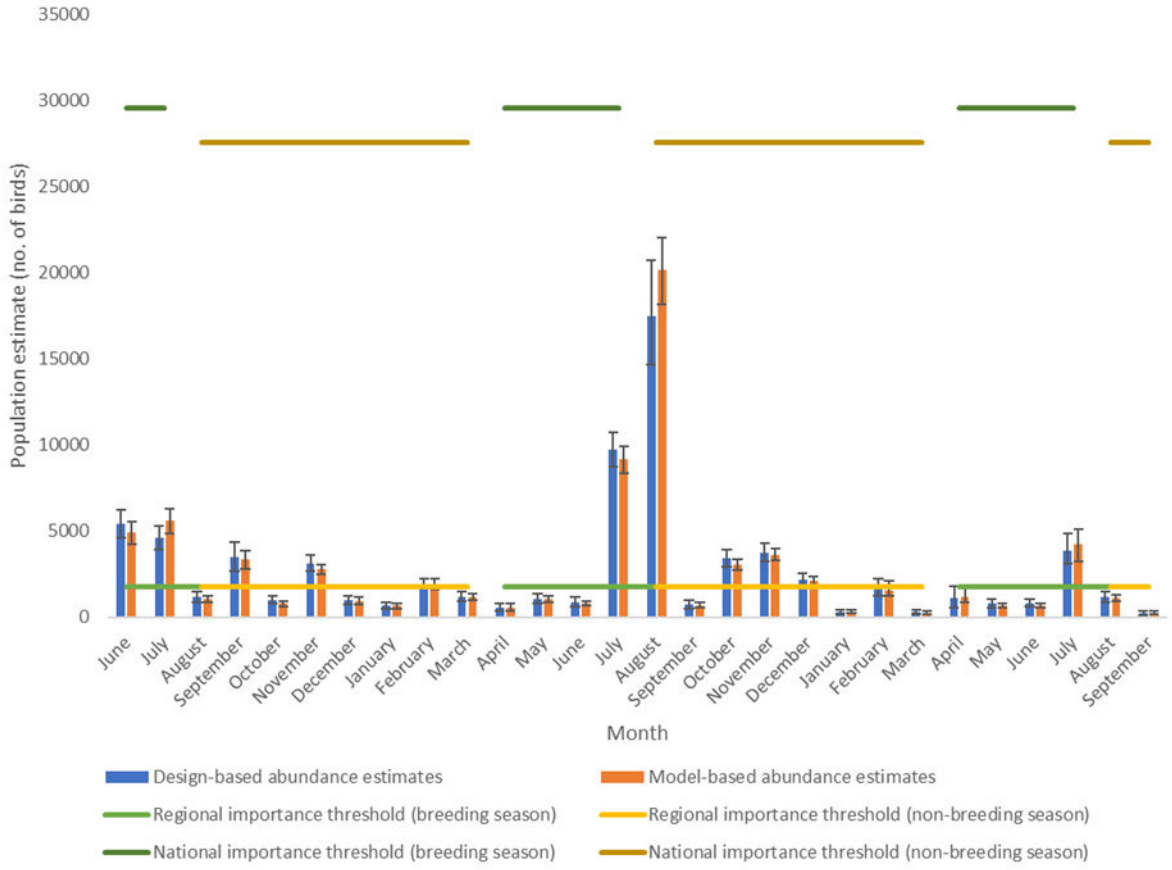

Figure 6.8: Abundance of common guillemot in the Morven South Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals). The regional and national importance threshold for all seasons are also shown

Table 6.10: 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 South Offshore Ornithology Baseline Characterisation Study Area for common guillemot

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	4,948	4,250	5,559	5,399	4,600	6,206
July 2021	5,603	4,852	6,305	4,622	3,899	5,325
August 2021	1,055	888	1,249	1,178	874	1,488
September 2021	3,352	2,825	3,871	3,506	2,680	4,385
October 2021	783	624	940	1,023	787	1,263
November 2021	2,782	2,463	3,077	3,130	2,690	3,611
December 2021	923	723	1,181	973	738	1,226
January 2022	652	522	836	672	502	855
February 2022	1,921	1,627	2,238	1,952	1,657	2,263
March 2022	1,162	983	1,356	1,178	910	1,511
April 2022	537	383	804	581	389	819
May 2022	1,055	882	1,230	1,080	831	1,357
June 2022	810	683	963	886	611	1,169
July 2022	9,156	8,338	9,926	9,745	8,760	10,710
August 2022	20,180	18,154	22,040	17,485	14,677	20,715
September 2022	699	558	881	755	511	1,007
October 2022	3,068	2,737	3,367	3,411	2,933	3,907
November 2022	3,640	3,289	3,979	3,729	3,222	4,274
December 2022	2,106	1,839	2,378	2,204	1,867	2,569

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
January 2023	309	221	458	324	205	446
February 2023	1,586	1,218	2,122	1,705	1,229	2,271
March 2023	266	196	383	308	196	436
April 2023	1,159	848	1,707	1,143	575	1,781
May 2023	653	538	796	807	565	1,074
June 2023	681	546	823	816	622	1,041
July 2023	4,221	3,238	5,143	3,885	3,091	4,833
August 2023	1,102	919	1,311	1,166	870	1,478
September 2023	229	162	363	249	141	369

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 South 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 South 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 South 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 South 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 South 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 South Boundary (Wakefield *et al*., 2017).

6.17.3 Behaviour and age class

6.17.3.1 A total of 322 guillemot were aged during site specific aerial surveys. Of these, 143 were identified as adults and 179 as juveniles. Across the three summers of the aerial surveys, juveniles were identified predominantly in July surveys, with small numbers identified in June and August, consistent with the timing of fledging of juvenile birds from breeding colonies.

6.17.3.2 Analysis of flight directions recorded in the breeding season showed the prevailing flight direction was strongly northwest, with only small numbers of birds making up other directions. In the non-breeding season, the prevailing flight direction reversed, with southeast being the most common flight direction (Figure 6.9).

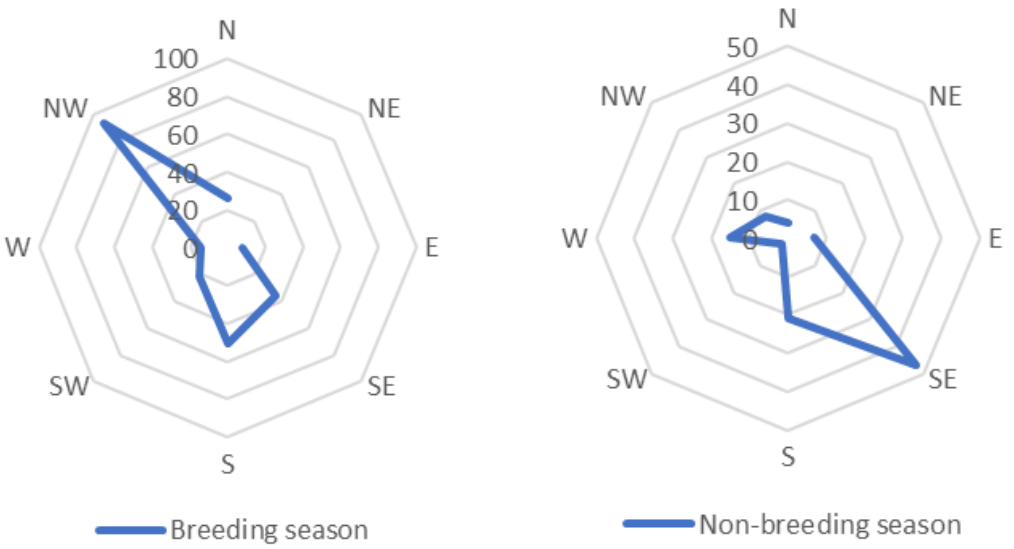

Figure 6.9: Flight directions of guillemots as recorded during site specific aerial surveys

6.17.4 Conclusion

6.17.4.1 Guillemot is considered to have an international conservation status due to connectivity between the Morven South Boundary and the Fowlsheugh SPA. Population estimates of guillemot within the Morven South Offshore Ornithology Baseline Characterisation Study Area during the breeding and non-breeding seasons exceeded the 1% importance threshold of the regional 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 three SPAs within the species' mean maximum foraging range from Morven South (Woodward *et al*., 2019) (Table 6.11). These SPAs are designated for 10,070 breeding individuals. The most recent count for each SPA suggests the population associated with these SPAs has increased to 15,202 breeding pairs

representing approximately 10% 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 6.11 to provide a more recent contemporaneous dataset. Further counts have been conducted at all of the SPAs included in Table 6.11 with increases at the Forth Islands SPA and decreases at the Fowlsheugh SPA and St Abb's Head to Fast Castle SPA.

Table 6.11: Designated sites at which razorbill is a qualifying feature with which there is connectivity with Morven South based on generic foraging range data

Designated site	Distance to Morven South (km)	Population at designation (breeding individuals) (JNCC, 2022)	Population estimate from Burnell *et al*. (2023) (breeding pairs)
Forth Islands SPA	104	2,090	4,250
Fowlsheugh SPA	82	5,800	10,495
St Abb's Head to Fast Castle SPA	101	2,180	2,187

6.18.2 Seasonal abundance and distribution

Site specific surveys

6.18.2.1 Razorbills were recorded in all but two of the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area. The species was most abundant towards the end of the breeding season and the start of the non-breeding season (July and August) of 2021 and 2022 with the peak population recorded in August 2022. Outside of this period the abundance of the species was considerably lower with the exception of June 2021 and November 2022.

6.18.2.2 The peak population estimated in the breeding season (April to mid-August) occurred in August 2022 (6,075 birds). The populations estimated in the breeding season in June and July 2021 and July and August 2022 surpass the threshold for regional importance (888 birds). The threshold for national importance is surpassed in August 2022 (5,844 birds).

6.18.2.3 There is an overlap between the breeding and post-breeding seasons with August included in the seasonal definitions and therefore the peak population in the post-breeding season (August to October) also occurred in August 2022 (6,075 birds). This population surpasses the threshold for regional importance (5,919 birds). The threshold for national importance (11,988 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 (905 birds) with the peak population estimated in the pre-breeding season (January to March) estimated in March 2023. The thresholds associated with regional importance in the non-breeding season (2,186 birds) and pre-breeding season (5,919 birds) were not surpassed in any month.

6.18.2.5 There is no obvious trend in the distribution of razorbill on a seasonal or annual basis (Figure B. 3).

6.18.2.6 The populations recorded during the July 2021 and July and August 2022 surveys are significantly higher than the populations recorded in other 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 South 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 6.12. Data were only available for the Forth Islands SPA which is located to the southwest of Morven South 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.

6.18.2.7 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 South. This is further supported by the presence of juvenile birds in site specific surveys undertaken in July (see Section 6.18.3). This will be considered in the analyses and assessments required Chapter 2, Volume 11: Offshore Ornithology and the Report to Inform Appropriate Assessment Part 3: SPA and Ramsar Site Assessments.

Table 6.12: 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

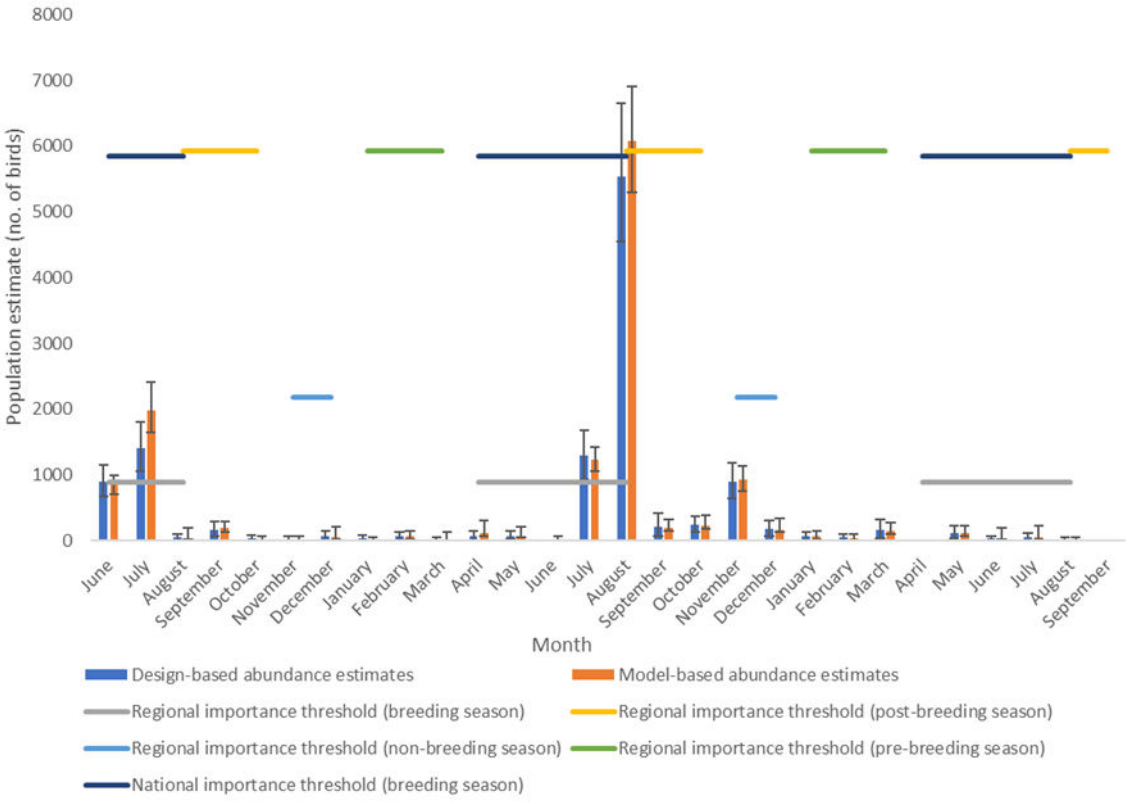

Figure 6.10: Abundance of razorbill in the Morven South Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals). The regional importance threshold for all seasons are also shown.

Table 6.13: 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 South Offshore Ornithology Baseline Characterisation Study Area for razorbill: Monthly population estimates and densities of razorbill at Morven South plus a 4km buffer

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	848	708	1,002	907	679	1,156
July 2021	1,980	1,645	2,419	1,412	1,059	1,812
August 2021	46	24	201	50	11	105
September 2021	194	139	290	161	63	289
October 2021	31	11	78	33	2	86
November 2021	18	6	71	25	2	65
December 2021	60	26	219	66	3	147
January 2022	22	8	62	40	3	88
February 2022	65	28	147	72	15	140
March 2022	20	9	138	23	2	59
April 2022	115	77	309	72	15	152
May 2022	74	48	221	74	21	147
June 2022	6	1	76	0	0	0
July 2022	1,237	1,062	1,422	1,300	926	1,674
August 2022	6,075	5,298	6,910	5,532	4,552	6,645
September 2022	206	149	320	218	71	425
October 2022	234	180	383	241	131	371
November 2022	933	758	1,134	905	652	1,179

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
December 2022	171	132	336	178	70	315
January 2023	67	28	152	73	15	140
February 2023	33	15	105	51	8	110
March 2023	154	104	271	165	36	321
April 2023	0	0	0	0	0	0
May 2023	112	70	226	120	34	231
June 2023	36	20	205	34	3	77
July 2023	60	17	227	59	10	122
August 2023	20	0	50	23	2	59
September 2023	0	0	0	0	0	0

Regional distribution

6.18.2.8 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.

6.18.2.9 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 which did not overlap with the Morven South Offshore Ornithology Baseline Characterisation Study Area. 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 South Baseline Characterisation survey area. There was also no obvious trend in the distribution of the species in the non-breeding season with birds recorded in the Morven South Baseline Characterisation survey area in some surveys (Figure C. 10, Figure C. 11 and Figure C. 12).

Tracking data

6.18.2.10 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 South 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 South Boundary (Buckingham *et al*., 2021). Furthermore, data presented in the Seabird Tracking Database shows some tracks to overlap with the Morven South 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).

6.18.3 Age class

6.18.3.1 A total of 73 individuals were aged during the site specific aerial surveys. Of these, 30 were identified as adults and 43 as juveniles. All the juveniles were identified in July of each year of the surveys, consistent with the timing of fledging of juvenile birds from breeding colonies.

6.18.4 Conclusion

6.18.4.1 Razorbill is considered to have an international conservation status due connectivity between the Morven South Boundary and three SPAs. Population estimates of razorbill within the Morven South Offshore Ornithology Baseline Characterisation Study Area during the breeding season exceeded the threshold for regional 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 Deeside 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 South (Woodward *et al*., 2024).

6.19.2 Seasonal abundance and distribution

Site specific surveys

6.19.2.1 Black guillemot were recorded in one of the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area. A single bird was recorded in the August 2023 survey translating to a population of eight birds. As Morven South is not within foraging range of any breeding colonies it is considered that these are not breeding birds. The populations estimated in these months are not considered to be of importance in any season.

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 South. Black guillemots were recorded in one of the surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area however, the estimated populations is not considered to be of 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 north-western North Sea before spreading out more widely into open sea with ring recoveries throughout the north Atlantic (Furness, 2015). During the breeding season puffin are aggregated around their colonies along the east coast of the UK. During post-breeding, however, the birds disperse towards the north-western North Sea before spreading out more widely throughout the winter months (Stone *et al*., 1995).

6.20.1.3 Puffin is listed as a qualifying interest species in the breeding season for five SPAs within the species foraging range of Morven South (Woodward *et al*., 2019) (Table 6.14). These SPAs are designated for 87,145 breeding pairs. The most recent count for each SPA suggests the population associated with these SPAs has increased to 114,743 breeding pairs (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 South.

6.20.1.4 Populations recorded as part of the Seabirds Count are presented in Table 6.14 to provide a more recent contemporaneous dataset. Further counts have been conducted at all of the SPAs included in Table 6.14 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 6.14: Designated sites at which puffin is a qualifying feature with which there is connectivity with Morven South based on generic foraging range data

Designated site	Distance to Morven South (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell *et al*. (2023) (breeding pairs)
Coquet Island SPA	130	31,686	25,029
Farne Islands SPA	101	38,399	43,752
Flamborough and Filey Coast SPA	241	980	4,279 (at sea count)
Forth Islands SPA	104	14,000	42,923
North Caithness Cliffs SPA	251	2,080	3,039

6.20.2 Seasonal abundance and distribution

Site specific surveys

6.20.2.1 Puffins were recorded in 22 of the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area. The species was most abundant towards the end of the breeding season and the start of the non-breeding season (mid-August and September) in 2021 and 2002 with the highest populations in 2023 occurring in May and June (Table 6.15; Figure 6.11). Outside of these periods, population estimates were considerably lower.

6.20.2.2 The peak population in the breeding season (mid-April to August) occurred in June 2021 (318 birds). The threshold for regional importance (4,491 birds) was not surpassed in any month. The peak population in the non-breeding season (mid-August to March) occurred in September 2022 (907 birds). The threshold for regional importance (2,320 birds) was not surpassed in any month.

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

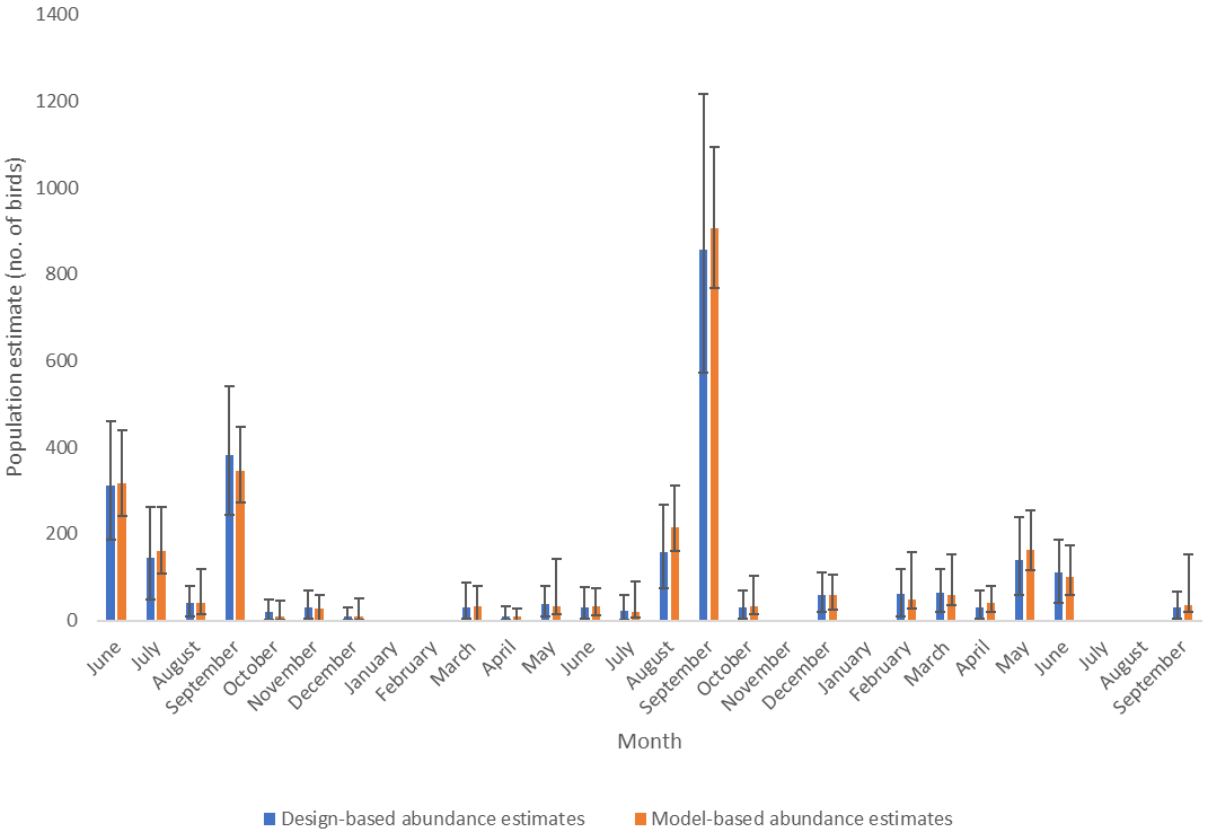

Figure 6.11: Abundance of puffin in the Morven South Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals)

Table 6.15: 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 South Offshore Ornithology Baseline Characterisation Study Area for puffin

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	318	240	440	312	187	460
July 2021	161	107	261	145	48	262
August 2021	41	15	119	40	10	80
September 2021	345	272	448	382	245	540
October 2021	10	2	47	20	2	48
November 2021	28	0	59	30	3	70
December 2021	10	2	52	10	1	29
January 2022	0	0	0	0	0	0
February 2022	0	0	0	0	0	0
March 2022	32	0	80	31	3	88
April 2022	9	0	28	10	1	33
May 2022	33	14	143	39	10	80
June 2022	32	13	73	29	3	77
July 2022	20	8	89	21	2	60
August 2022	214	159	311	159	74	268
September 2022	907	768	1,094	856	573	1,216
October 2022	33	14	102	29	3	69
November 2022	0	0	0	0	0	0
December 2022	59	26	105	60	20	111

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South 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	49	28	157	61	10	120
March 2023	60	35	153	64	20	118
April 2023	40	20	81	30	3	70
May 2023	162	115	254	139	58	240
June 2023	101	59	174	110	40	186
July 2023	0	0	0	0	0	0
August 2023	0	0	0	0	0	0
September 2023	37	19	153	29	3	67

Regional distribution

6.20.2.4 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.

6.20.2.5 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

6.20.2.6 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 South Boundary (Harris *et al*., 2012). However, outside of the breeding season, puffins are known to range extensively throughout eastern UK waters, including the Morven South 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 South and five SPAs. Population estimates of puffin within the Morven South Offshore Ornithology Baseline Characterisation Study Area did not exceed the threshold for regional importance in any month. Due to SPA connectivity and the species being recorded in the majority of baseline surveys, puffin is 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 South 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 South (Woodward *et al*., 2024). There is also no connectivity between Morven South 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 recorded in three of the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area. Single birds were recorded in the May 2022, July 2022 and May 2023 surveys translating into population estimates of eight birds in each month. Although these birds were recorded during the breeding season defined for red-throated diver (Table 4.4), these birds are not breeding birds. Birds recorded in the Morven South Offshore Ornithology Baseline Characterisation Study Area during the defined breeding season for red-throated diver are therefore considered to be non-breeding birds or birds on passage.

6.21.2.2 The populations of red-throated diver estimated in these months do not surpass the threshold for regional importance (133 birds) in migratory seasons.

6.21.2.3 Due to the small number of birds recorded there were no obvious trends in the distribution of red-throated diver across the Morven South Baseline Characterisation survey area.

Regional distribution

6.21.2.4 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 not recorded in the Morven South Offshore Ornithology Baseline Characterisation Study Area.

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 recorded in three of the baseline aerial surveys conducted across the Morven South Offshore Ornithology Baseline Characterisation Study Area although only in small numbers that do not reach the threshold for regional importance.

6.21.3.2 Red-throated diver is therefore not considered for further assessment in relation to impacts associated with Morven South.

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 South Offshore Ornithology Baseline Characterisation Study Area is within the foraging range of European storm petrel of one SPA at which the species is a qualifying feature (Table 6.16), Auskerry SPA. This SPA is designated for 3,600 breeding pairs. The most recent count for the SPA suggests the total population associated with this SPA has decreased to 692 breeding pairs.

Table 6.16: Designated sites at which European storm petrel is a qualifying feature with which there is connectivity with Morven South based on generic foraging range data.

Designated site	Distance to Morven South (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell *et al.* (2023) (breeding pairs)
Auskerry SPA	283	3,600	692

6.22.2 Seasonal abundance and distribution

Site specific surveys

6.22.2.1 European storm petrels were not recorded in the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

6.22.2.2 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 South Offshore Ornithology Baseline Characterisation Study Area in any survey.

Tracking data

6.22.2.3 GPS tracking of 58 individuals tagged within the Mousa SPA between 2014 and 2017 during the breeding season showed no connectivity with the Morven South 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 South and the Auskerry SPA. This species was not recorded during the baseline aerial surveys conducted across the Morven South 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 Storm 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 South is within the generic foraging range of Leach's petrel from three SPAs designated for this species (Table 6.17). 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 6.17: Designated sites at which Leach's Storm petrel is a qualifying feature with which there is connectivity with Morven South based on generic foraging range data

Designated site	Distance to Morven South (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell *et al*. (2023) (breeding pairs)
Foula SPA	387	50	0
Ramna Stacks and Gruney SPA	443	20	5
Sule Skerry and Sule Stack SPA	341	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 South Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

6.23.2.2 Leach's Storm 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 Storm petrels were not recorded within the Morven South Offshore Ornithology Baseline Characterisation Study Area in any survey.

6.23.3 Conclusion

6.23.3.1 Leach's Storm petrel is considered to have an international conservation status due connectivity between Morven South and three SPAs. The species was not recorded during baseline aerial surveys of the Morven South 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 Storm 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 South is within the generic mean maximum foraging range of fulmar (Woodward *et al*., 2024) from 19 SPAs (Table 6.18). 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 South.

6.24.1.5 Populations recorded as part of the Seabirds Count are presented in Table 6.18 to provide a more recent contemporaneous dataset. Further counts have been conducted at four of the SPAs included in Table 6.18 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 6.18: Designated sites at which fulmar is a qualifying feature with which there is connectivity with Morven South based on generic foraging range data

Designated site	Distance to Morven South (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell *et al.* (2023) (breeding pairs)
Buchan Ness to Collieston Coast SPA	101	1,765	826
Calf of Eday SPA	305	1,955	2,324
Cape Wrath SPA	320	2,300	1,477
Copinsay SPA	269	1,615	1,618
Coquet Island SPA	130	63	53
East Caithness Cliffs SPA	232	15,000	13,964
Fair Isle SPA	316	35,210	32,491
Fetlar SPA	430	9,500	9,177
Flamborough and Filey Coast SPA	241	1,447	1,360
Foula SPA	387	46,800	10,253
Fowlsheugh SPA	82	1,170	525
Hermaness, Saxa Vord and Valla Field SPA	450	19,539	13,208
Hoy SPA	276	35,000	20,541
North Caithness Cliffs SPA	251	14,700	15,370
Noss SPA	383	6,350	5,092
Rousay SPA	306	1,240	2,192
Sumburgh Head SPA	352	2,542	5,950
Troup, Pennan and Lion's Heads SPA	141	4,400	1,894
West Westray SPA	316	1,400	1,214

6.24.2 Seasonal abundance and distribution

Site specific surveys

6.24.2.1 Fulmars were recorded in all of the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area. The species was most abundant in the post-and non-breeding seasons of 2021 and in June 2022.

6.24.2.2 The peak population estimated in the breeding season (April to September) occurred in August 2021 (714 birds). The populations estimated did not surpass the threshold for regional importance in any month (8,346 birds).

6.24.2.3 The peak population estimated in the post-breeding season (October) occurred in October 2021 (635 birds) with the peak population in the non-breeding season (November) in November 2021 (659 birds). The peak population in the pre-breeding season (December to March) occurred January 2023 (285 birds). The threshold for regional importance was not surpassed during surveys undertaken in any of these seasons (post-breeding season = 9,575 birds, non-breeding season = 5,687 birds and pre-breeding season = 9,575 birds).

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

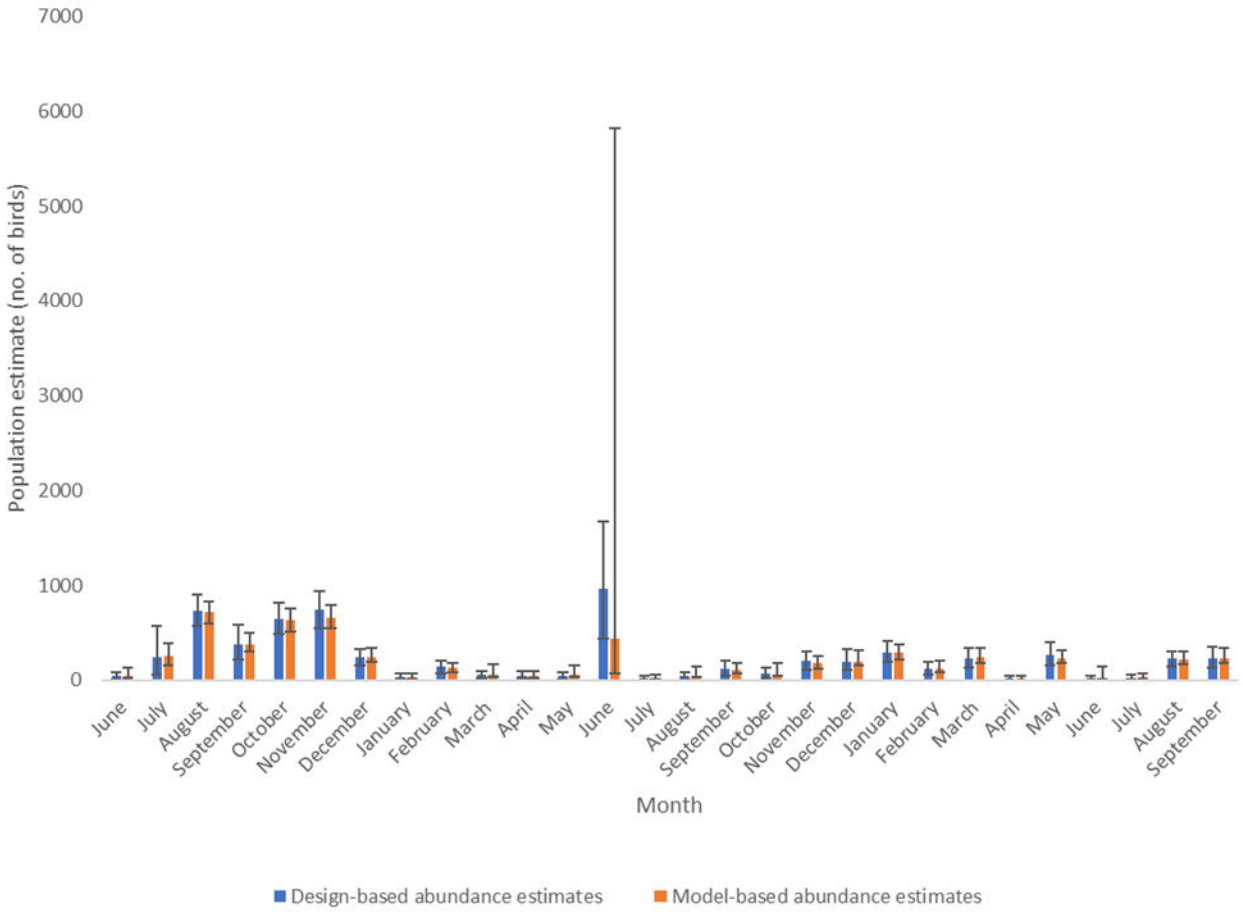

Figure 6.12: Abundance of fulmar in the Morven South Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals)

Table 6.19: 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 Morven South plus a 4km buffer for fulmar. Monthly population estimates and densities of fulmar at Morven South plus a 4km buffer

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	41	25	126	42	8	84
July 2021	248	154	393	245	58	574
August 2021	714	594	824	735	577	908
September 2021	380	303	499	381	217	583
October 2021	635	514	761	646	492	821
November 2021	659	546	788	739	551	945
December 2021	246	189	344	241	150	333
January 2022	30	13	72	33	8	73
February 2022	133	85	184	140	74	207
March 2022	59	38	170	58	17	100
April 2022	48	23	91	49	16	90
May 2022	53	29	154	42	8	83
June 2022	433	67	5,820	962	433	1,669
July 2022	23	10	54	17	2	41
August 2022	48	29	148	41	8	82
September 2022	110	72	178	119	51	210
October 2022	63	41	175	68	25	126
November 2022	177	122	256	202	111	303
December 2022	197	152	309	198	101	326

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
January 2023	285	222	382	292	194	411
February 2023	118	77	201	122	58	191
March 2023	237	176	335	229	131	336
April 2023	16	0	50	16	2	42
May 2023	232	177	312	269	157	397
June 2023	14	6	141	17	2	41
July 2023	28	12	74	25	3	58
August 2023	220	162	307	225	141	307
September 2023	234	175	340	233	133	348

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 South 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 South 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) (Edwards *et al*., 2016).

6.24.3 Behaviour

6.24.3.1 Analysis of flight directions across the seasonal extents for the breeding season revealed northwest as the prevailing flight direction, though a number of individuals demonstrated west, northeast, and southwest directions too. In the pre-breeding season, the prevailing flight direction was southwest, with many birds also flying in directions across the southern half of the compass. Flight directions were analysed for a comparatively smaller number of birds in the post-breeding and non-breeding seasons and, whilst no clear prevailing direction emerges in either season, the majority of birds were recorded having flight directions either north or west (Figure 6.13).

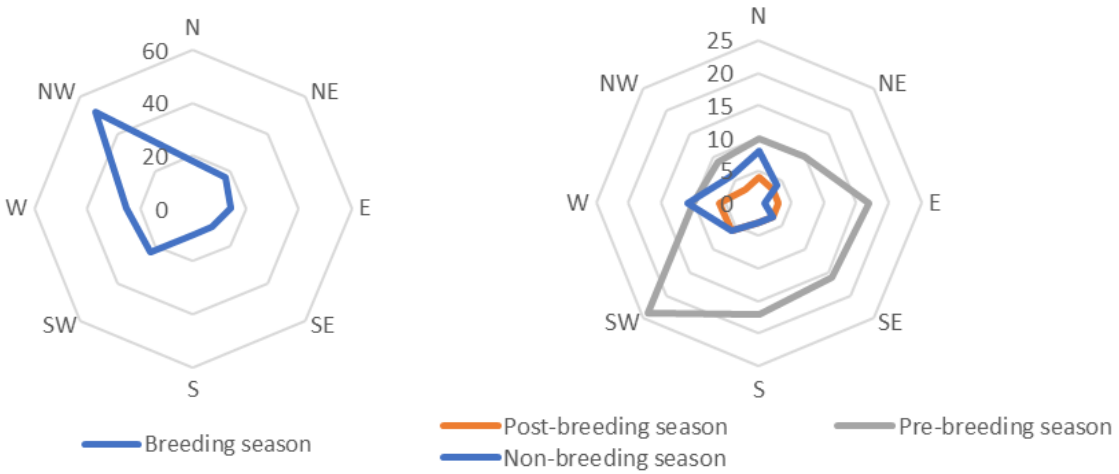

Figure 6.13: Flight directions of northern fulmar, as recorded during site specific aerial surveys

6.24.4 Conclusion

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

Area although the estimated populations did not surpass the thresholds of regional 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 Manx shearwater (*Puffinus puffinus*)

6.25.1 Status overview

6.25.1.1 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).

6.25.1.2 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).

6.25.1.3 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).

6.25.1.4 Manx shearwater has a large generic mean maximum foraging range (Woodward *et al*., 2024) which means that there is theoretical connectivity between Morven South 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.

6.25.2 Seasonal abundance and distribution

Site specific surveys

6.25.2.1 Manx shearwaters were recorded in two of the baseline aerial surveys undertaken across the Morven South Baseline Characterisation Study Area. Birds were recorded during the July 2021 and 2023 survey (population estimates of 147 and 17 birds respectively). Manx shearwaters are known to breed on the Isle of May in the Firth of Forth, but the latest count (2015) suggested only one breeding pair was present (Burnell *et al*., 2023). The numbers recorded at Morven South are therefore originating from elsewhere and 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 post-breeding population with the population recorded in July 2021 exceeding the threshold for regional importance (85 birds).

Regional distribution

6.25.2.2 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.

6.25.2.3 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

6.25.2.4 When applying generic foraging ranges for the species presented in Woodward *et al*. (2020), the Morven South 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 South Boundary from these breeding colonies.

6.25.3 Conclusion

6.25.3.1 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 South and SPAs at which this species is a qualifying feature based on tracking data (Dean *et al*., 2013). Manx shearwaters were recorded in two of the baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area. The population estimated in one of these surveys did surpass the relevant thresholds for regional importance.

6.25.3.2 Manx shearwater is identified therefore as a VOR and considered for further assessment in relation to impacts associated with Morven South as a receptor with a Regional conservation value.

6.26 Northern gannet (*Morus bassanus*)

6.26.1 Status overview

6.26.1.1 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).

6.26.1.2 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).

6.26.1.3 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 South 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).

6.26.1.4 Gannet is listed as a qualifying feature at six SPAs within the species' generic mean maximum foraging range from Morven South (Woodward *et al*., 2024) (Table 6.20). 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 South.

6.26.1.5 Populations recorded as part of the Seabirds Count are presented in Table 6.20 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 6.20 (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 6.20: Designated sites at which gannet is a qualifying feature with which there is connectivity with Morven South based on generic foraging range data

Designated site	Distance to Morven South (km)	Population at designation (breeding pairs) (JNCC, 2022)	Population estimate from Burnell *et al*. (2023) (breeding pairs)
Fair Isle SPA	316	1,166	4,971
Flamborough and Filey Coast SPA	241	8,469	13,392
Forth Islands SPA	104	21,600	75,259
Hermaness, Saxa Vord and Valla Field SPA	450	16,400	29,562
Noss SPA	383	6,860	13,765
Sule Skerry and Sule Stack SPA	341	5,900	9,065

6.26.2 Seasonal abundance and distribution

Site specific surveys

6.26.2.1 Gannets were recorded in all but one of the baseline aerial surveys conducted across the Morven South Offshore Ornithology Baseline Characterisation Study Area. The abundance of the species was generally higher in the breeding season increasing from April to a peak between June to August and then declining into the post-breeding season. The abundance of the species was considerably lower between December and February (Figure 6.14).

6.26.2.2 The peak population estimated in the breeding season (March to September) occurred in July 2021 (1,397 birds) with the next highest population in occurring in August 2022 (694 birds). These populations did not surpass the threshold for regional importance (5,600 birds).

6.26.2.3 The peak population in the post-breeding season (October to November) occurred in October 2021 (166 birds) with the peak population in the pre-breeding season (December to February) occurring in December 2022 (46 birds). The populations in these seasons did not surpass the respective thresholds for regional importance.

6.26.2.4 There is no obvious trend in the distribution of gannet on a seasonal or annual basis (Figure B. 6).

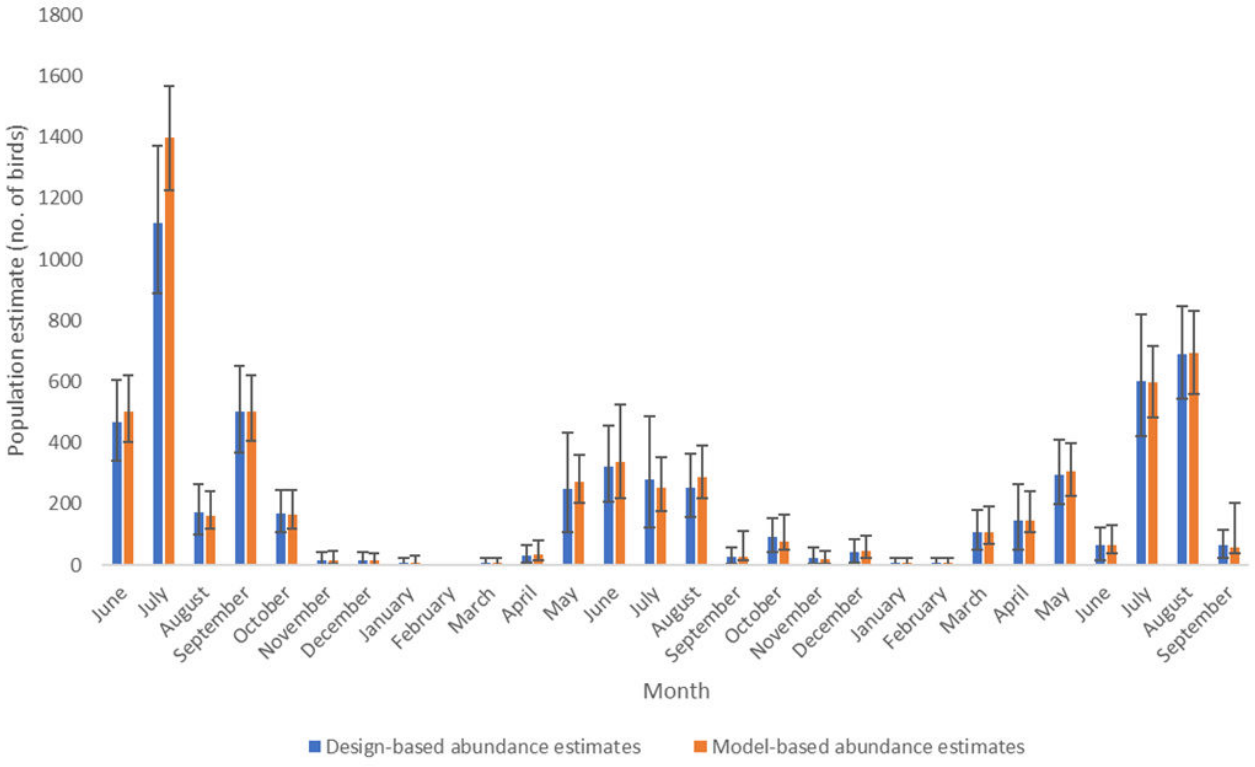

Figure 6.14: Abundance of gannet in the Morven South Offshore Ornithology Baseline Characterisation Study Area during site specific aerial surveys (with 95% confidence intervals)

Table 6.21: 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 Morven South plus a 4km buffer for gannet. Monthly population estimates and densities of gannet at Morven South plus a 4km buffer

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
June 2021	504	404	619	469	341	604
July 2021	1,397	1,228	1,568	1,120	890	1,372
August 2021	163	118	242	173	99	263
September 2021	502	406	621	502	367	650
October 2021	166	119	248	170	106	245
November 2021	16	4	46	17	2	42
December 2021	15	0	39	16	2	42
January 2022	10	0	30	8	1	25
February 2022	0	0	0	0	0	0
March 2022	8	0	23	9	1	25
April 2022	36	16	81	33	8	66
May 2022	272	205	362	250	108	433
June 2022	336	218	526	323	209	457
July 2022	252	178	353	279	123	488
August 2022	288	217	393	255	157	363
September 2022	29	16	113	26	3	59
October 2022	77	50	166	93	42	152
November 2022	19	5	47	24	3	58
December 2022	46	22	96	42	8	84

Month	Model-based population estimates (Morven South plus 4km buffer) (no. of birds)			Design-based population estimates (Morven South plus 4km buffer) (no. of birds)		
	Mean	Lower confidence limit	Upper confidence limit	Mean	Lower confidence limit	Upper confidence limit
January 2023	7	0	24	7	1	24
February 2023	8	0	24	8	1	25
March 2023	107	69	193	106	49	179
April 2023	145	108	241	148	50	265
May 2023	307	227	397	297	198	410
June 2023	65	38	131	66	17	124
July 2023	597	482	717	603	422	819
August 2023	694	561	832	691	546	848
September 2023	58	39	202	67	25	116

Regional distribution

6.26.2.5 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

6.26.2.6 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 South Boundary.

6.26.3 Behaviour and age class

6.26.3.1 A total of 610 individuals were aged during the site specific aerial surveys. Of these, 586 were identified as adults and 24 as immatures one or more calendar years old. No juveniles were identified. The majority of immature birds were recorded between April and September (Figure 6.15).

6.26.3.2 Analysis of flight directions across the seasonal extents for the breeding season showed prevailing flight direction of southwest with west, northeast, 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, northeast is the prevailing flight direction (Figure 6.16).

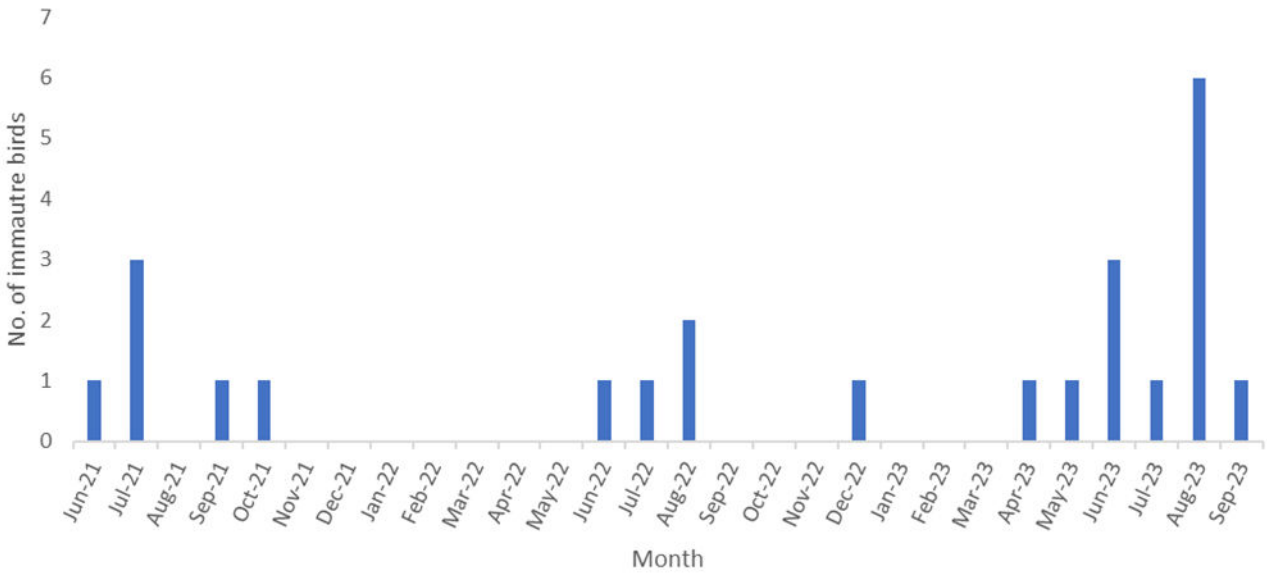

Figure 6.15: Number of immature gannets (one or more calendar years old) recorded during each site specific aerial survey

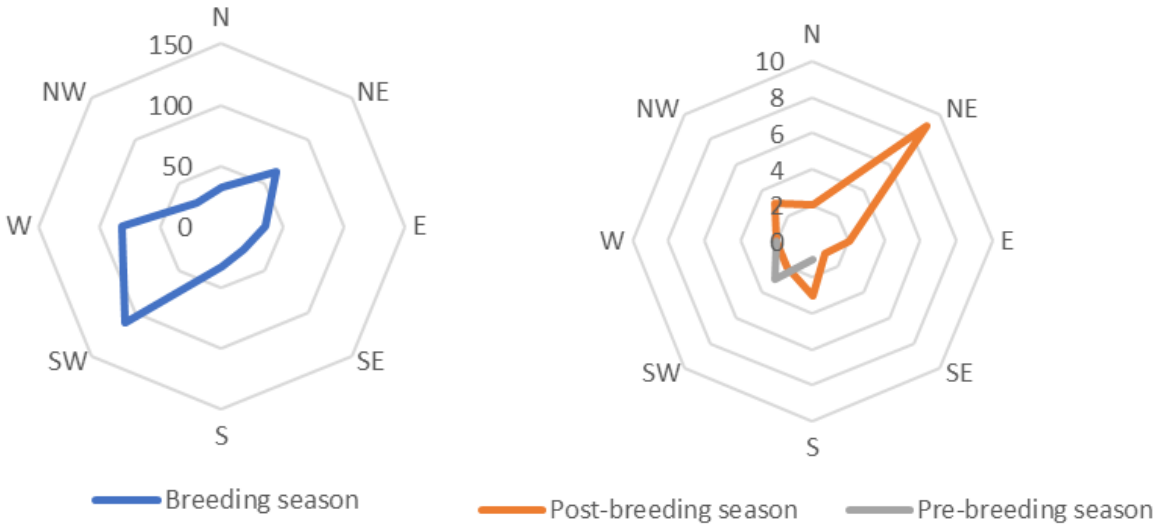

Figure 6.16: Flight directions of gannet as recorded during site specific aerial surveys

6.26.4 Conclusion

6.26.4.1 Gannet is considered to have an international conservation status due to connectivity between Morven South and a number of SPA colonies. Gannets were recorded in all but one of the baseline aerial surveys undertaken across the Morven South 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 and the species having been recorded in all but one of the baseline surveys, gannet is identified as a VOR and considered for further assessment in relation to impacts associated with Morven South as a receptor with an International conservation value.

6.27 Cormorant (*Phalacrocorax carbo*)

6.27.1 Status overview

6.27.1.1 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).

6.27.1.2 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).

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

6.27.2 Seasonal abundance and distribution

Site specific surveys

6.27.2.1 Cormorants were not recorded in baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

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

6.27.3 Conclusion

6.27.3.1 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 South 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 South project will affect the species. Cormorants is therefore not considered for further assessment in relation to impacts associated with Morven South.

6.28 Shag (*Gulosus aristotelis*)

6.28.1 Status overview

6.28.1.1 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).

6.28.1.2 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).

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

6.28.2 Seasonal abundance and distribution

Site specific surveys

6.28.2.1 Shags were not recorded in baseline aerial surveys undertaken across the Morven South Offshore Ornithology Baseline Characterisation Study Area.

Regional distribution

6.28.2.2 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

6.28.2.3 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 South Boundary (Wakefield *et al*., 2017).

6.28.3 Conclusion

6.28.3.1 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 South Offshore Ornithology Baseline Characterisation Study Area and regional surveys suggest limited, if any, birds will be present. The species is therefore considered to have a negligible population importance and therefore it is considered highly unlikely that impacts associated with Morven South will affect the species. Shag is therefore not considered for further assessment in relation to impacts associated with Morven South.

6.29 Other species

6.29.1.1 In addition to those species already discussed, one osprey was recorded in June 2021 and 28 golden plovers were recorded in the April 2023 survey.

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 South. Based on the results presented in each species account in Section 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 South:

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

7.1.1.2 Therefore, of the species considered in this report, black-headed gull, common gull, herring 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 South.

7.1.1.3 Section 3.2.3 discusses differences between the area covered by the digital aerial surveys and the Morven South 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 South 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
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 (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	Negligible	N/A	Local	Regional	Yes – species recorded during multiple baseline aerial surveys
Herring gull	International (SPA connectivity)	Yes	Local	N/A	Local	International	No - peak estimates did not surpass population importance 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
Lesser black-backed gull	International (SPA connectivity)	Yes	Negligible	Negligible	Negligible	International	No - species not recorded during baseline aerial surveys
Sandwich tern	National (Annex I)	No	Negligible	Negligible	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 recorded in only one baseline survey. Population did not surpass importance 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
Common guillemot	International (SPA connectivity)	Yes	Regional	N/A	Regional	International	Yes – SPA connectivity, species recorded in the majority of baseline surveys, peak populations surpass importance thresholds
Razorbill	International (SPA connectivity)	Yes	Regional	Regional	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	Local	N/A	Negligible	Local	No – species recorded in two baseline surveys. Population did not surpass importance thresholds
Puffin	International (SPA connectivity)	Yes	Local	N/A	Local	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
Red-throated diver	National (Annex I; Schedule 1)	No	Negligible	Local	Negligible	National	No – species recorded in three baseline surveys. Population did not surpass importance thresholds
European storm petrel	International (SPA connectivity)	Yes	Negligible	Negligible	N/A	International	Yes – migratory species
Leach's Storm 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
Manx shearwater	Regional (Scottish Biodiversity List)	Yes	Negligible	Regional	N/A	Regional	Yes - peak estimates surpass population importance thresholds
Gannet	International (SPA connectivity)	Yes	Local	Local	N/A	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
Cormorant	Negligible (BoCC Green-list)	No	Negligible	N/A	Negligible	Negligible	No – species not recorded during baseline aerial surveys
Shag	National (Annex I)	No	Negligible	N/A	Negligible	National	No – species not recorded during baseline aerial surveys

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Appendix A Raw count data

Table A. 1: Raw count data for the Morven South Offshore Ornithology Baseline Characterisation Study Area between June 2021 and July 2022

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
Arctic Skua				2										
Arctic Tern												2		
Auk species	2	6	4	2		8		2		7	2	1		34
Auk/Shearwater species	2	26										1		
Black Guillemot														
Commic Tern[7]			3											
Common Gull					1	1								
Duck species												1		
Fulmar	5	30	89	45	79	88	29	4	17	7	6	5	116	2
Fulmar/Gull species														
Gannet	56	134	21	60	21	2	2	1		1	4	30	39	34
Golden Plover														
Great Black-backed Gull					1	3	1	1	2					
Great Skua														
Guillemot	470	365	90	302	57	227	42	48	126	99	57	96	79	825

[7] Represents birds that are either common tern or Arctic tern but identification is uncertain

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
Guillemot/Razorbill	22	50	15	16	39	52	51	14	57	7	4	2	3	51
Gull species	1													1
Herring Gull	1													1
Kittiwake	423	1	3	69	13	9	6	2	6	7	26	38	114	102
Large Gull species														
Little Auk														
Manx Shearwater		17												
Osprey	1													
Puffin	32	15	4	39	2	3	1			3	1	4	3	2
Razorbill	86	120	4	15	2	2	3	3	5	2	8	7		118
Red-throated Diver												1		1
Small Gull species														
Storm Petrel species					2									
Thrush species						6								
Unidentified Bird species		1		1	1				1			1	1	3
Wader species														1

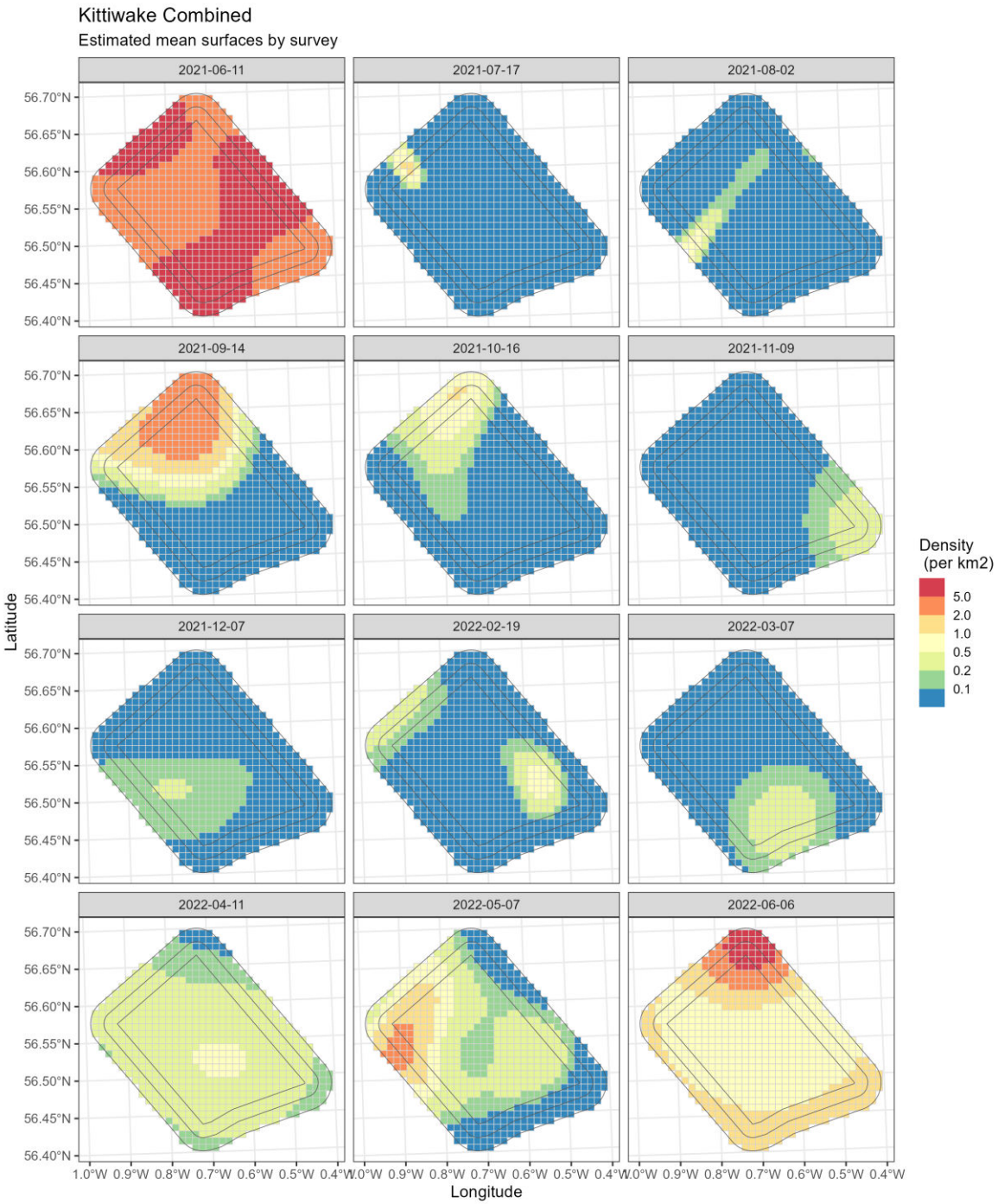
Table A. 2: Raw count data for the Morven South Offshore Ornithology Baseline Characterisation Study Area between August 2022 and September 2023

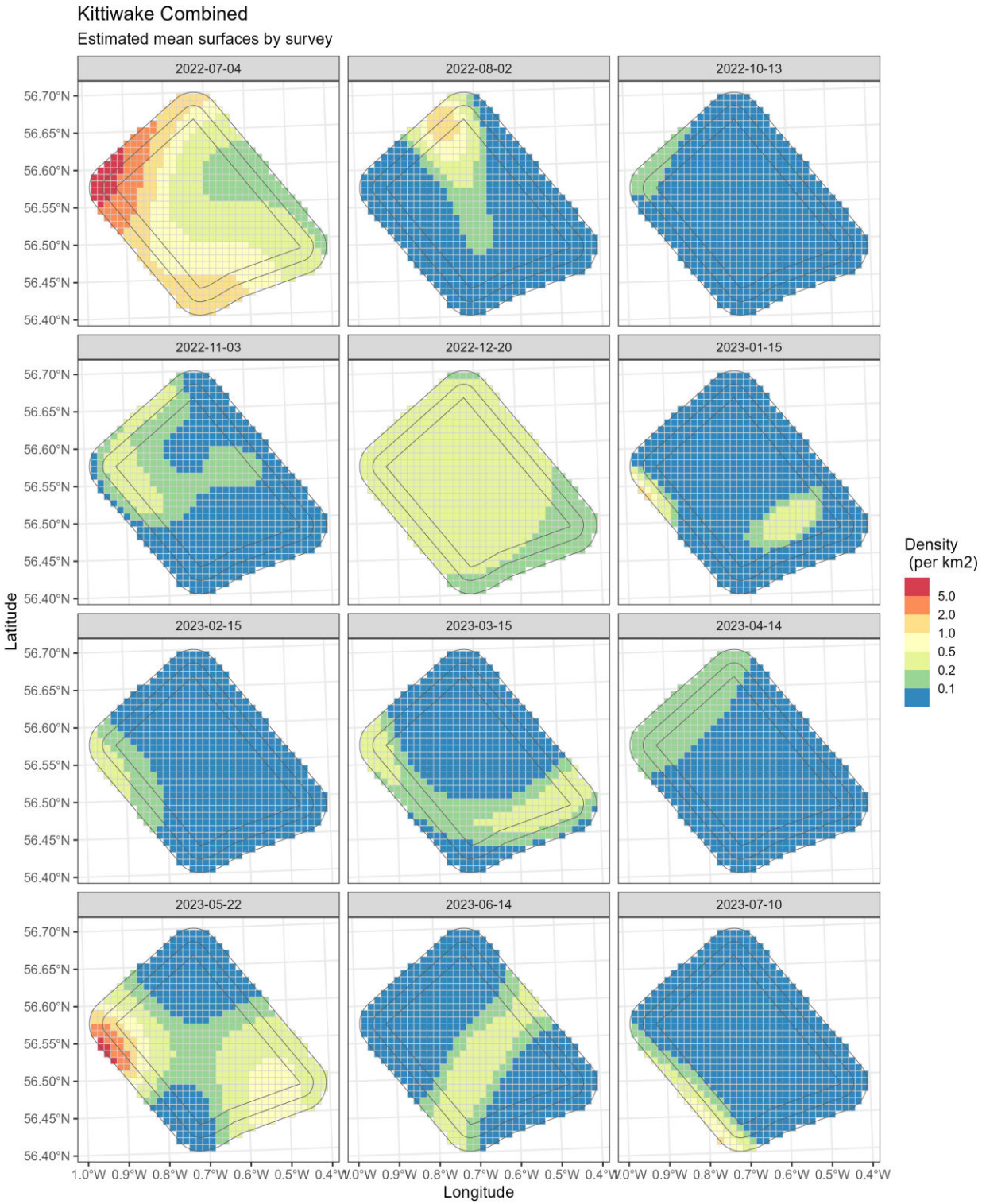
Species	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
Arctic Skua														
Arctic Tern	262													
Auk species	13	12	5		7	1	3	2	1	2	1	1		
Auk/Shearwater species								1		1	1			
Black Guillemot													1	
Commic Tern	86											1		
Common Gull	5			2										
Duck species														
Fulmar	5	14	8	22	24	36	14	28	2	32	2	3	27	28
Fulmar/Gull species				3			1							
Gannet	31	3	11	3	5	1	1	13	18	36	8	73	84	8
Golden Plover									28					
Great Black-backed Gull					4	1	1							
Great Skua														1
Guillemot	1465	54	249	257	151	20	151	23	130	67	69	375	96	19
Guillemot/Razorbill	196	13	61	112	49	12	19	9		7	6	1	12	4
Gull species														
Herring Gull		1	1											1
Kittiwake	7	2	2	7	21	5	5	8	9	32	7	4	6	

Species	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
Large Gull species														
Little Auk														
Manx Shearwater												2		
Osprey														
Puffin	16	81	3		6		6	6	3	14	11			3
Razorbill	500	17	19	69	13	5	5	14		11	3	6	2	
Red-throated Diver										1				
Small Gull species														
Storm Petrel species														
Thrush species														
Unidentified Bird species	1	1	1	1			1	2			1	2		1
Wader species										1				

Appendix B Distribution of birds from site specific aerial surveys

B.1 Kittiwake




Kittiwake Combined
Estimated mean surfaces by survey
2022-07-04
2022-08-02
2022-10-13
2022-11-03
2022-12-20
2023-01-15
2023-02-15
2023-03-15
2023-04-14
2023-05-22
2023-06-14
2023-07-10
56.70°N
56.65°N
56.60°N
56.55°N
56.50°N
56.45°N
56.40°N
1.0°W 0.9°W 0.8°W 0.7°W 0.6°W 0.5°W 0.4°W
Latitude
Longitude
Density (per km2)
5.0
2.0
1.0
0.5
0.2
0.1

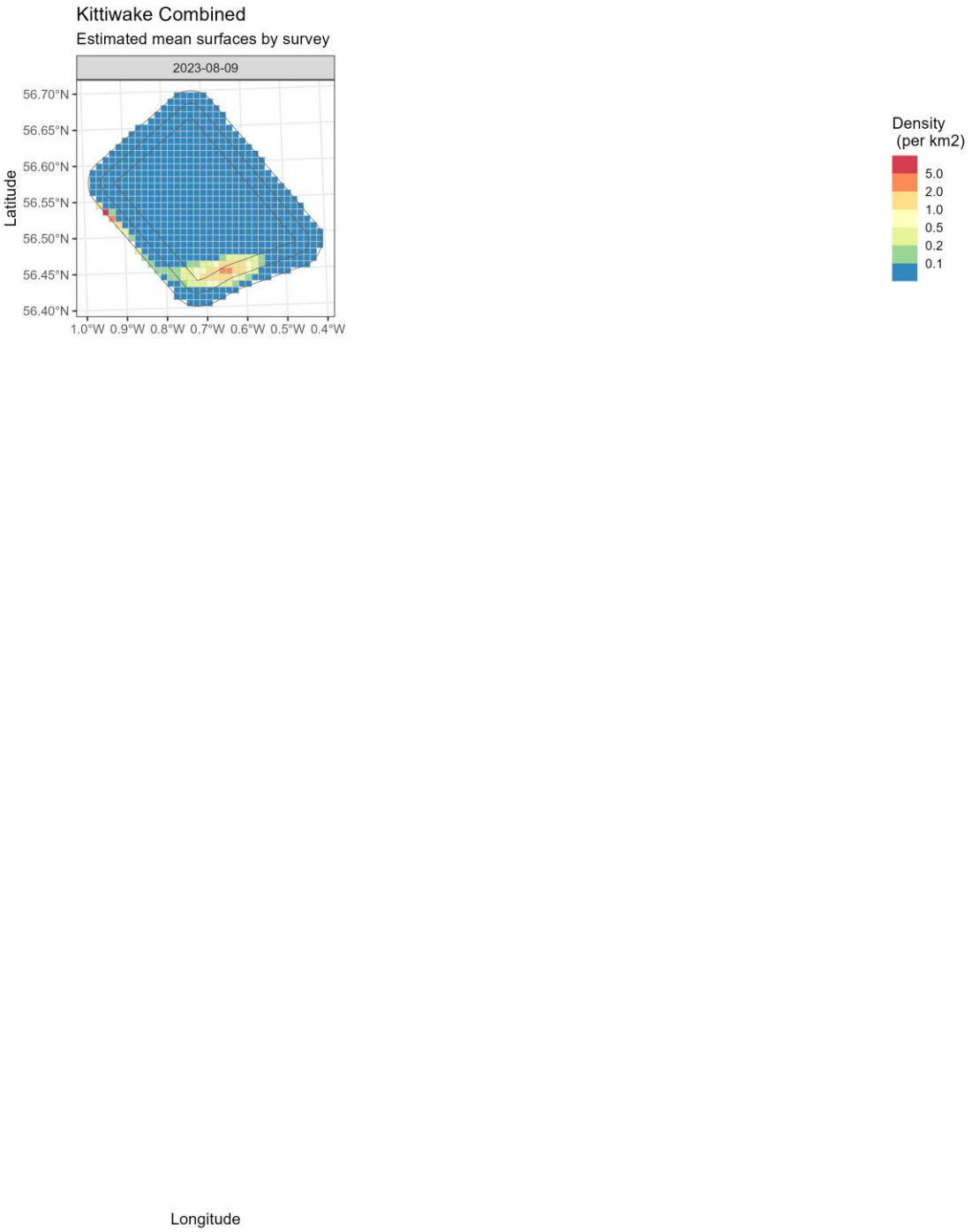
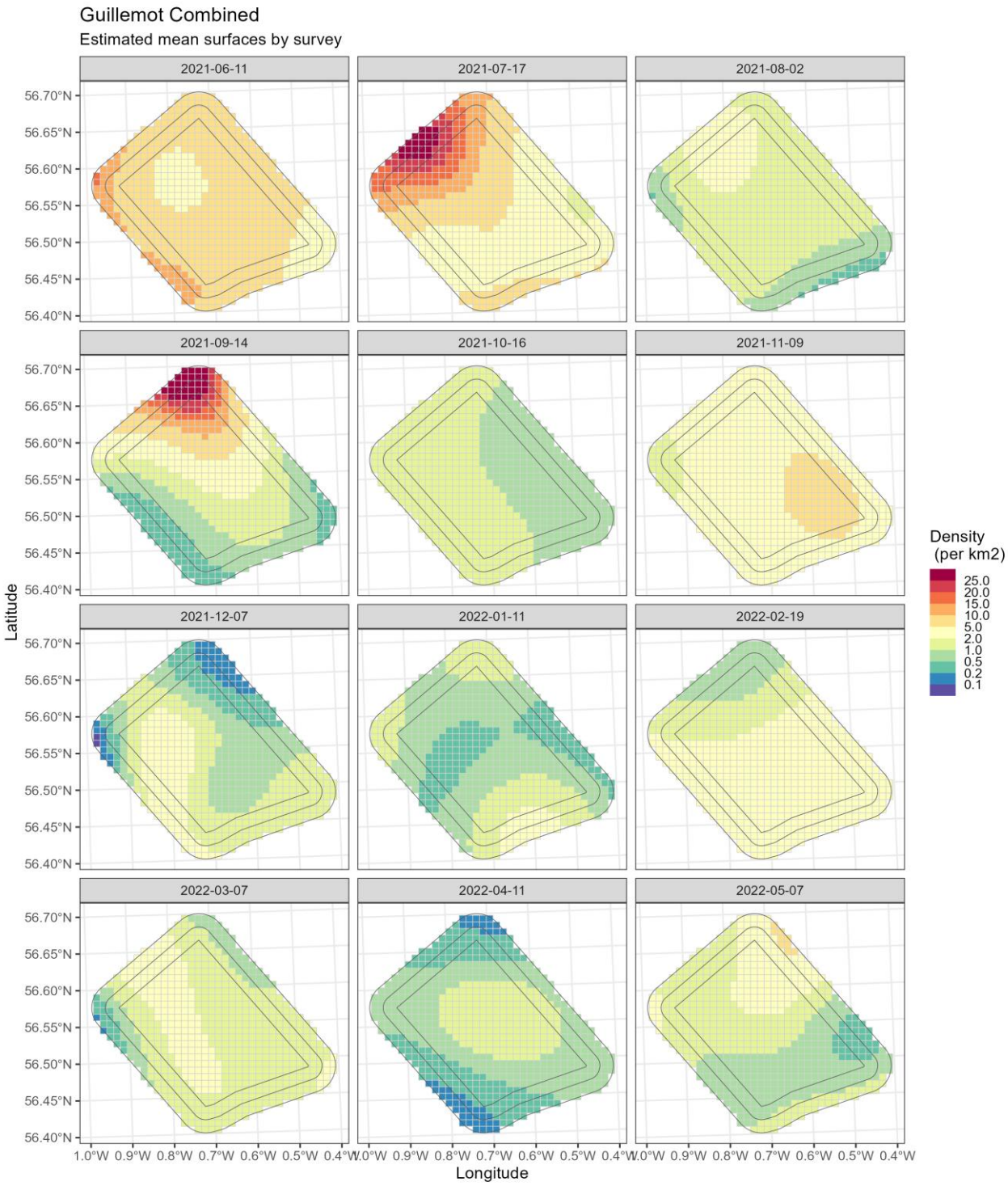
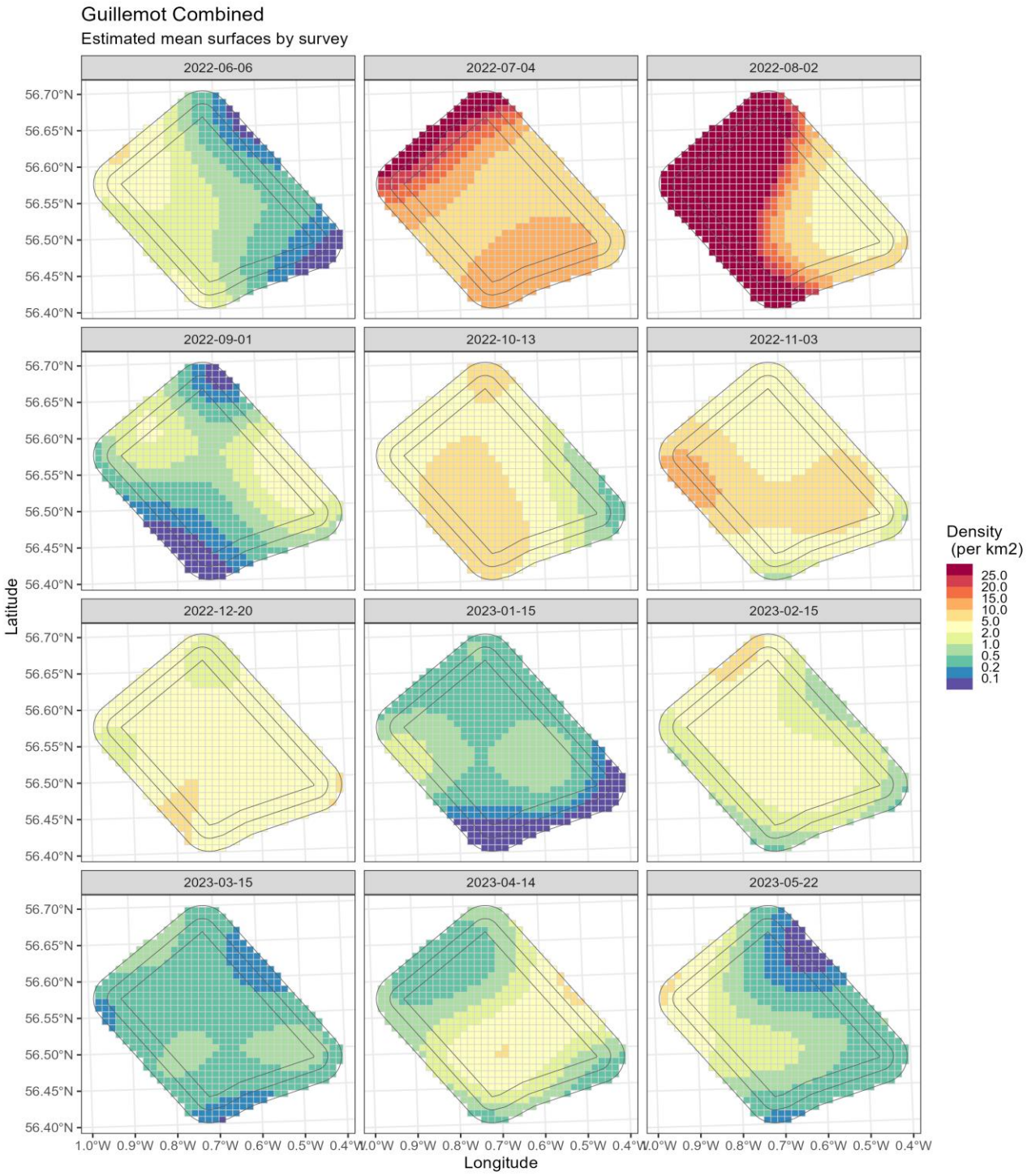


Figure B. 1: Monthly estimated density surfaces for kittiwake across the Morven South Offshore Ornithology Baseline Characterisation Study Area

B.2 Common guillemot




Guillemot Combined
Estimated mean surfaces by survey
2022-06-06
2022-07-04
2022-08-02
2022-09-01
2022-10-13
2022-11-03
2022-12-20
2023-01-15
2023-02-15
2023-03-15
2023-04-14
2023-05-22
Latitude
56.70°N
56.65°N
56.60°N
56.55°N
56.50°N
56.45°N
56.40°N
Longitude
1.0°W 0.9°W 0.8°W 0.7°W 0.6°W 0.5°W 0.4°W
Density (per km2)
25.0
20.0
15.0
10.0
5.0
2.0
1.0
0.5
0.2
0.1

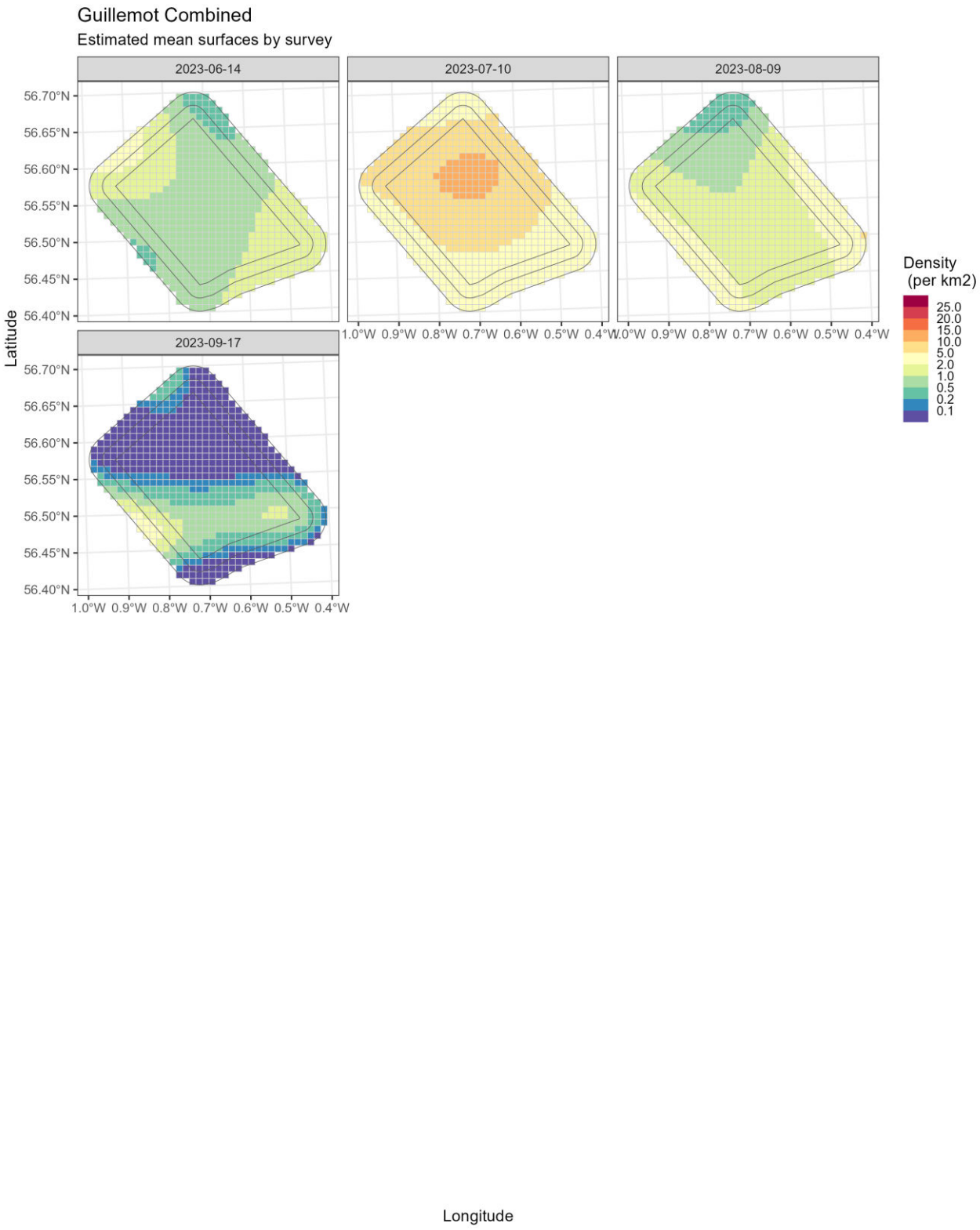
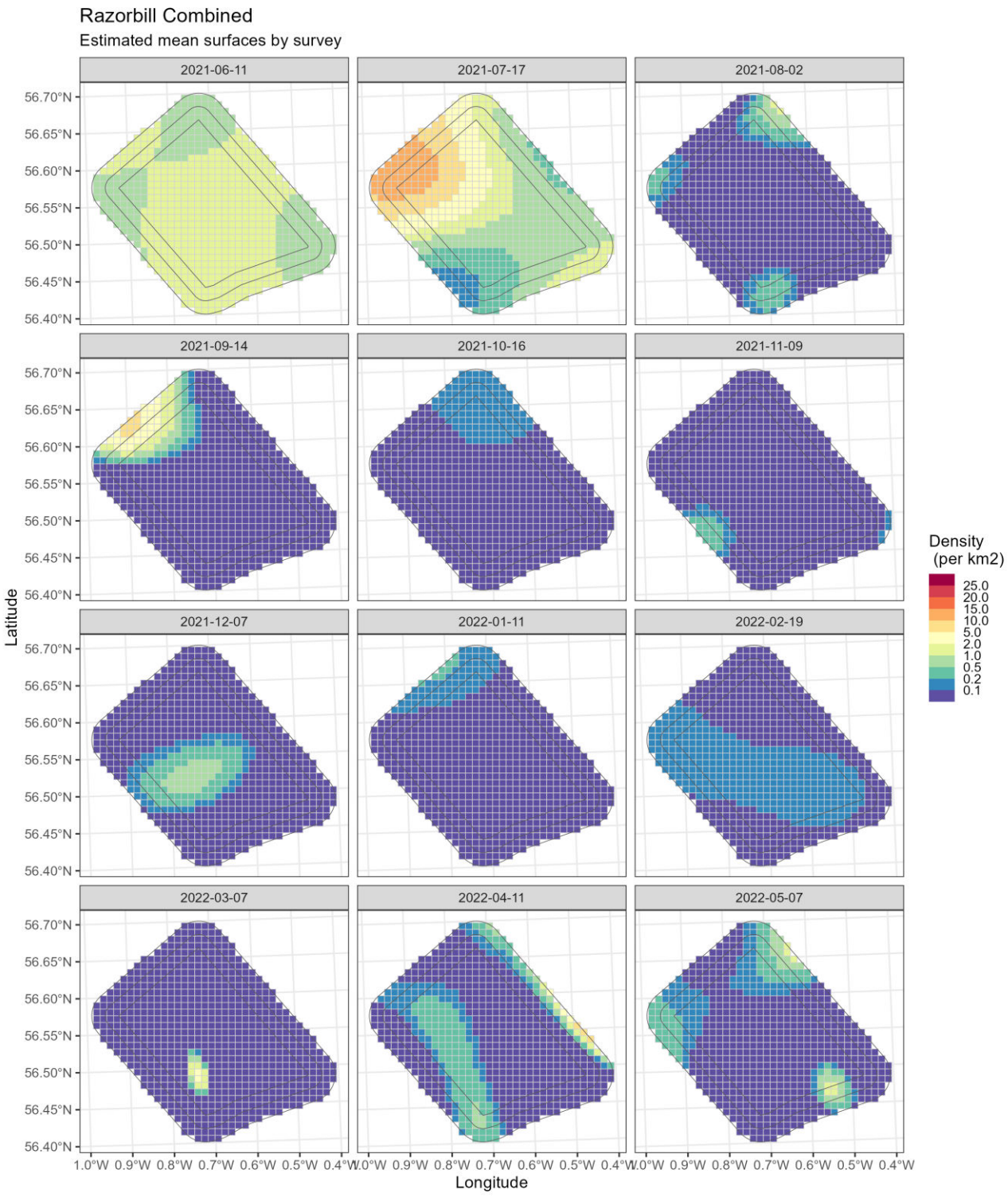
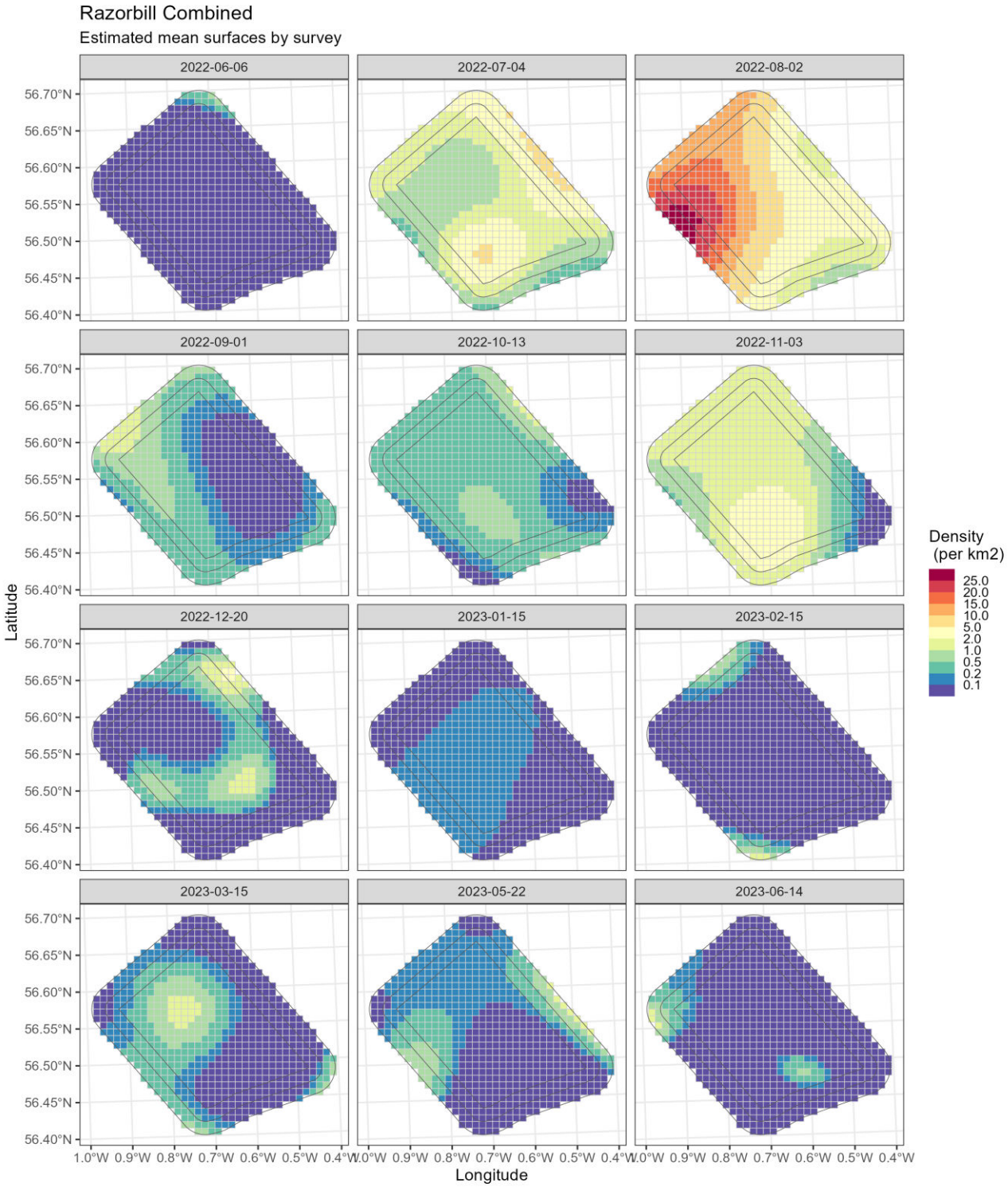


Figure B. 2: Monthly estimated density surfaces for common guillemot across the Morven South Offshore Ornithology Baseline Characterisation Study Area

B.3 Razorbill




Razorbill Combined
Estimated mean surfaces by survey
2022-06-06
2022-07-04
2022-08-02
2022-09-01
2022-10-13
2022-11-03
2022-12-20
2023-01-15
2023-02-15
2023-03-15
2023-05-22
2023-06-14
Latitude
Longitude
Density (per km2)
25.0
20.0
15.0
10.0
5.0
2.0
1.0
0.5
0.2
0.1

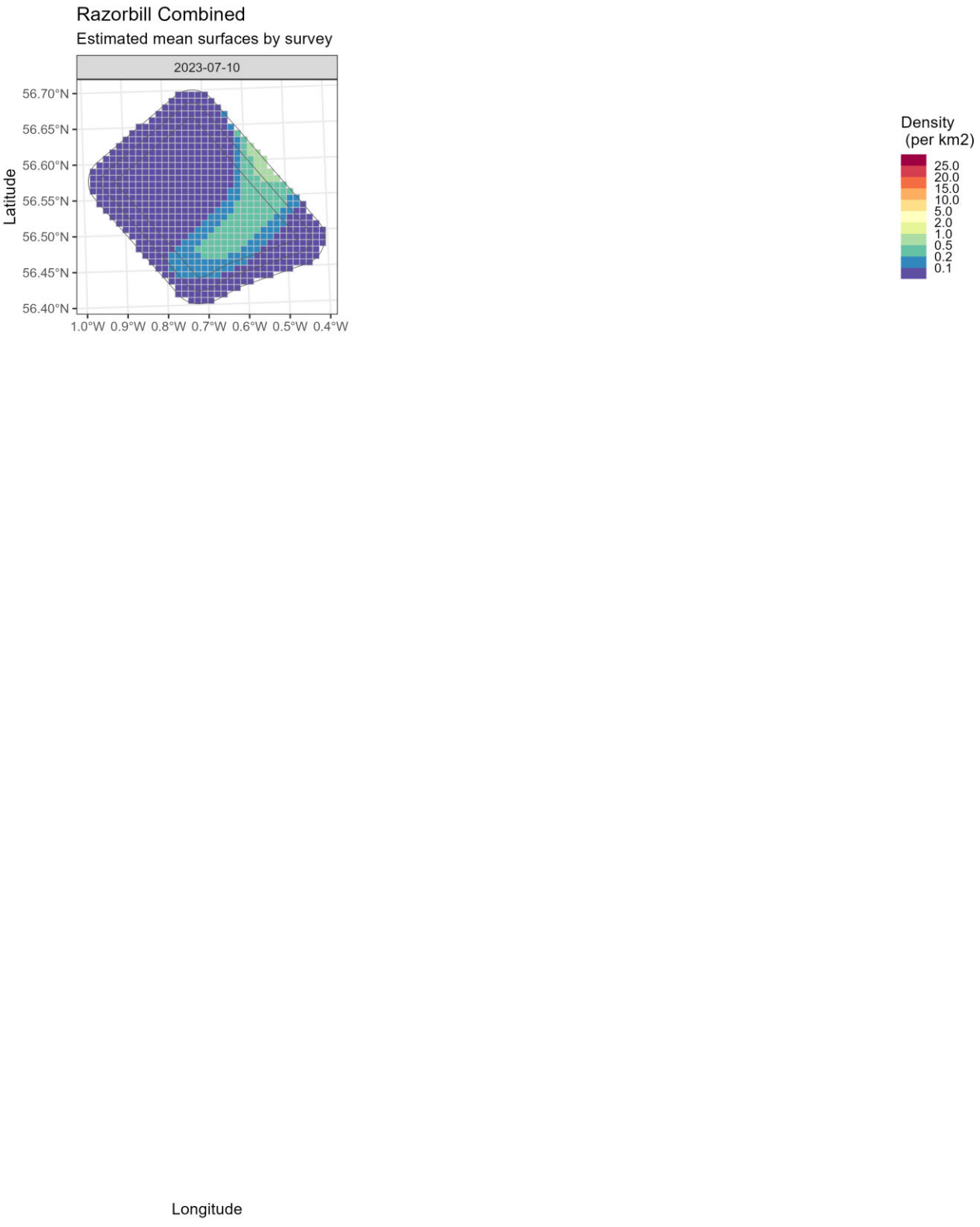
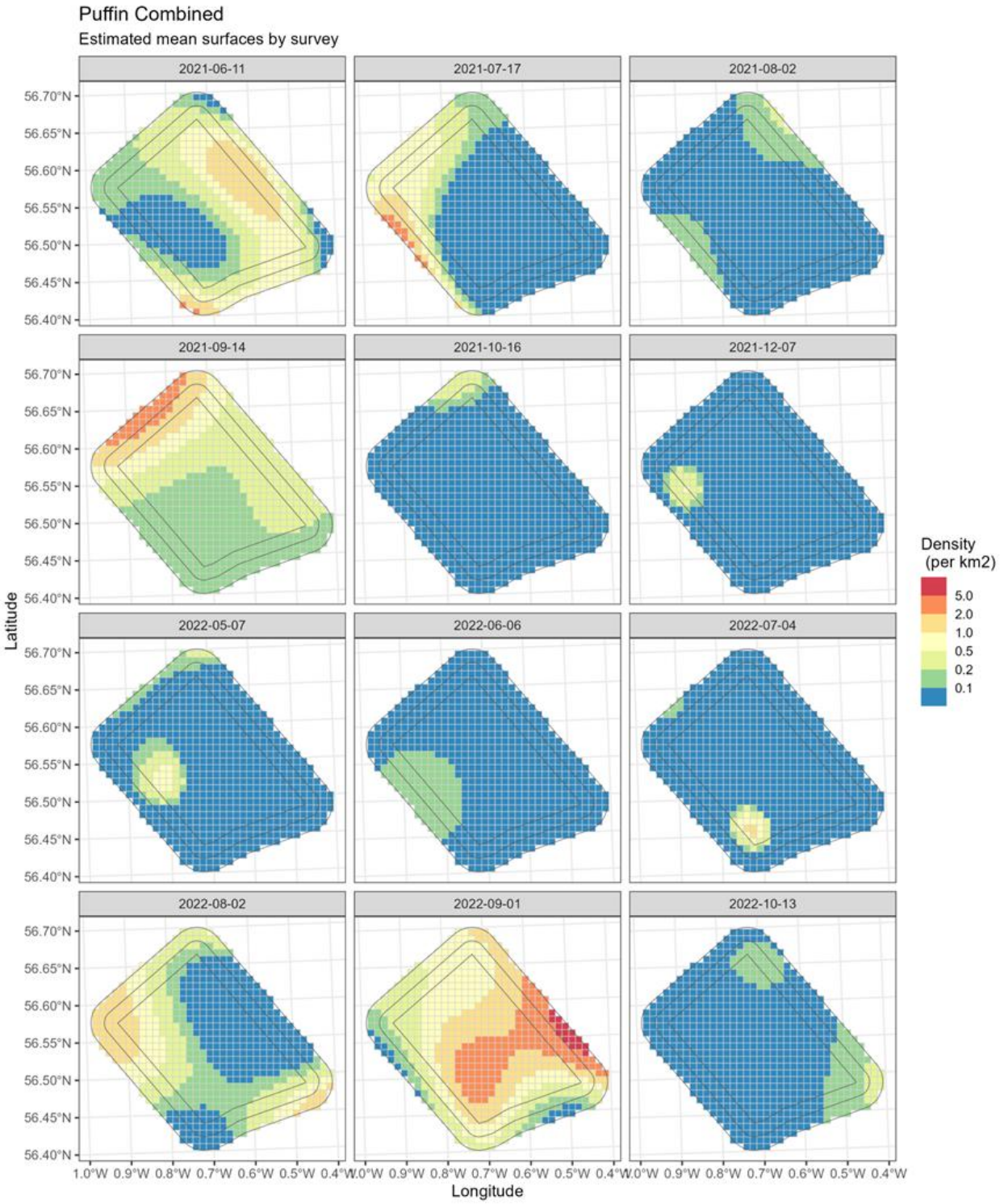


Figure B. 3: Monthly estimated density surfaces for razorbill across the Morven South Offshore Ornithology Baseline Characterisation Study Area

B.4 Puffin


Puffin Combined
Estimated mean surfaces by survey
2021-06-11
2021-07-17
2021-08-02
2021-09-14
2021-10-16
2021-12-07
2022-05-07
2022-06-06
2022-07-04
2022-08-02
2022-09-01
2022-10-13
Latitude
56.70°N
56.65°N
56.60°N
56.55°N
56.50°N
56.45°N
56.40°N
1.0°W 0.9°W 0.8°W 0.7°W 0.6°W 0.5°W 0.4°W
Longitude
Density (per km2)
5.0
2.0
1.0
0.5
0.2
0.1

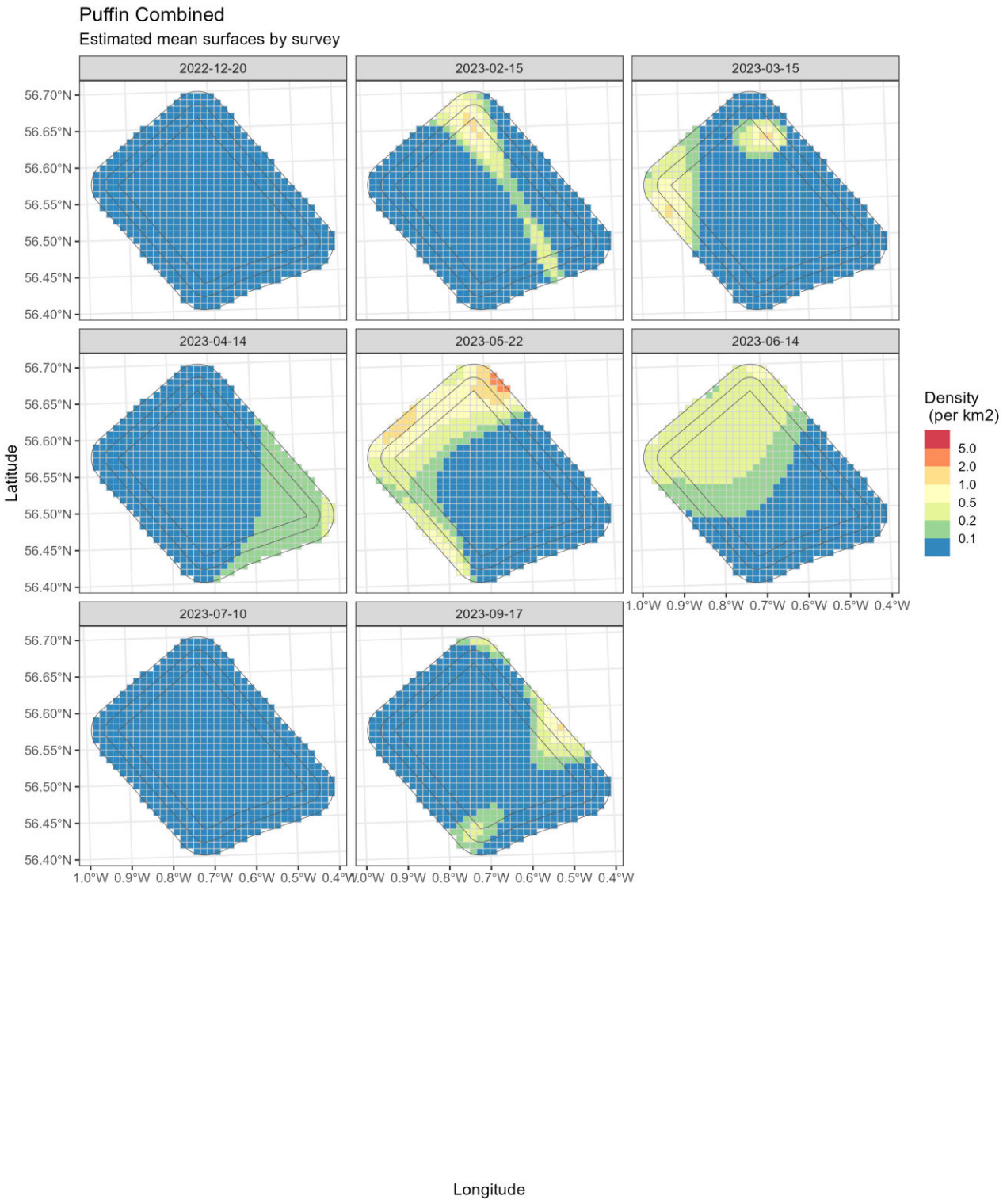
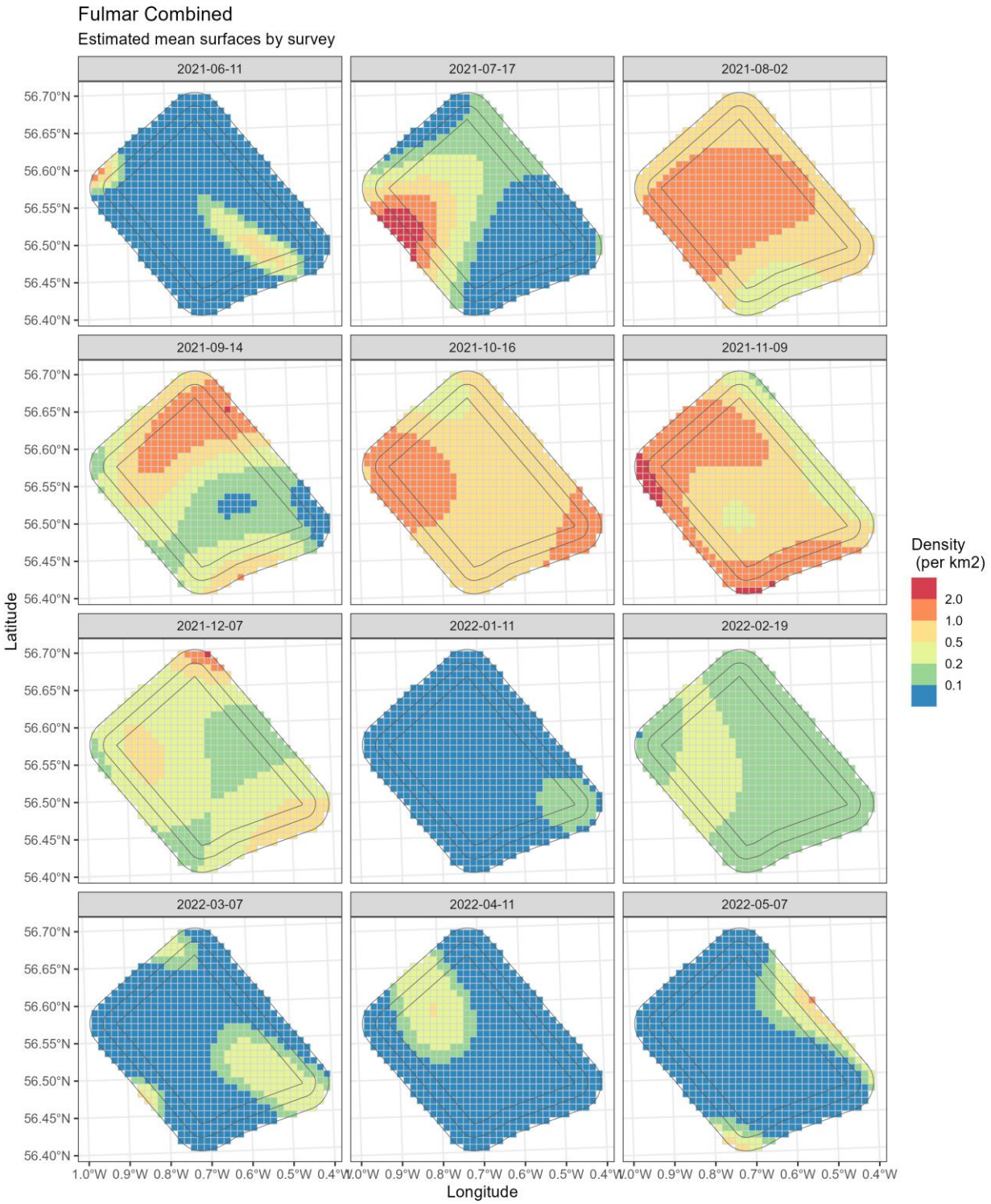
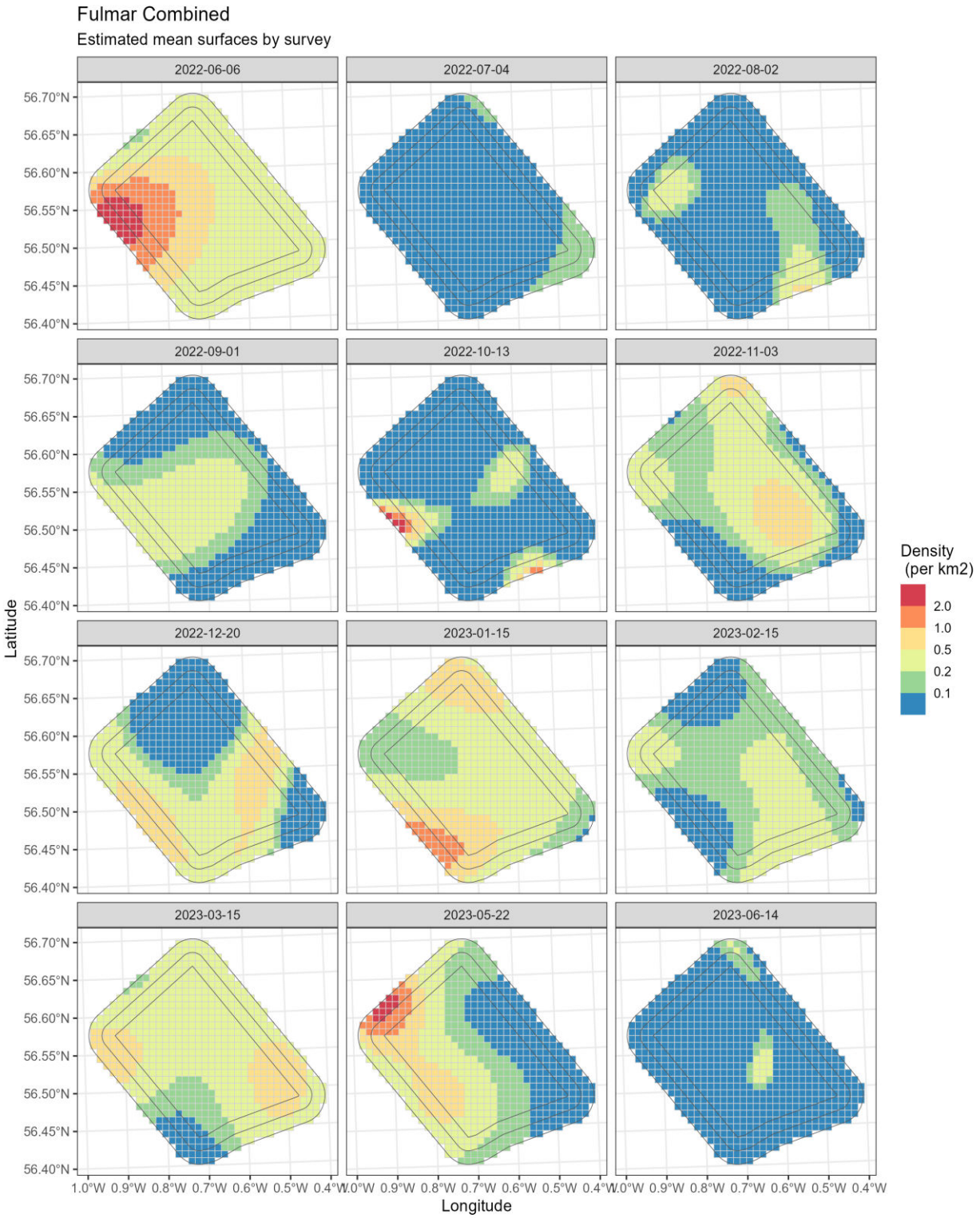


Figure B. 4: Monthly estimated density surfaces for puffin across the Morven South Offshore Ornithology Baseline Characterisation Study Area

B.5 Fulmar


Fulmar Combined
Estimated mean surfaces by survey
2021-06-11
2021-07-17
2021-08-02
2021-09-14
2021-10-16
2021-11-09
2021-12-07
2022-01-11
2022-02-19
2022-03-07
2022-04-11
2022-05-07
Latitude
56.70°N
56.65°N
56.60°N
56.55°N
56.50°N
56.45°N
56.40°N
1.0°W 0.9°W 0.8°W 0.7°W 0.6°W 0.5°W 0.4°W
Longitude
Density (per km2)
2.0
1.0
0.5
0.2
0.1


Fulmar Combined
Estimated mean surfaces by survey
2022-06-06
2022-07-04
2022-08-02
2022-09-01
2022-10-13
2022-11-03
2022-12-20
2023-01-15
2023-02-15
2023-03-15
2023-05-22
2023-06-14
56.70°N
56.65°N
56.60°N
56.55°N
56.50°N
56.45°N
56.40°N
Latitude
1.0°W 0.9°W 0.8°W 0.7°W 0.6°W 0.5°W 0.4°W
Longitude
Density
(per km2)
2.0
1.0
0.5
0.2
0.1

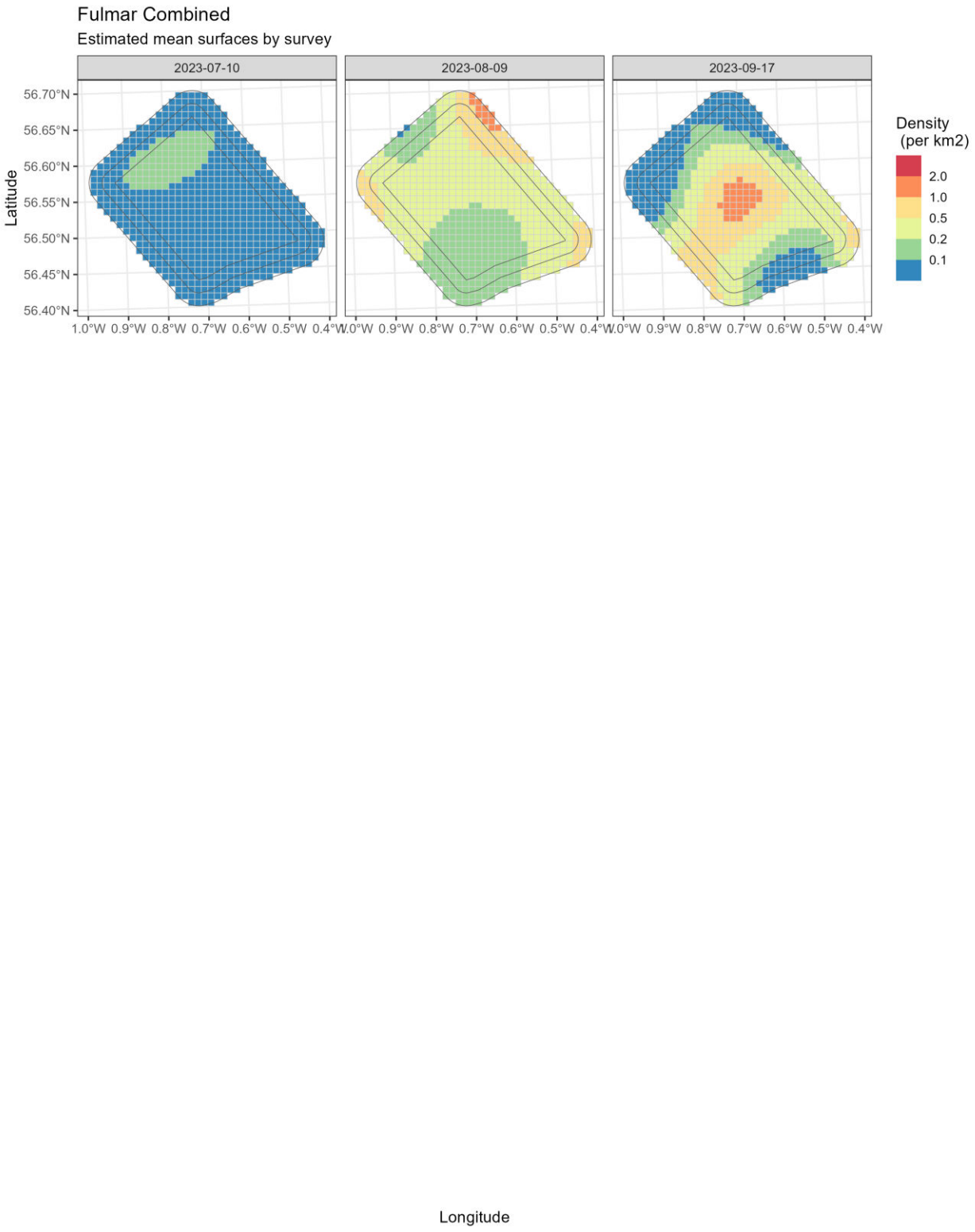
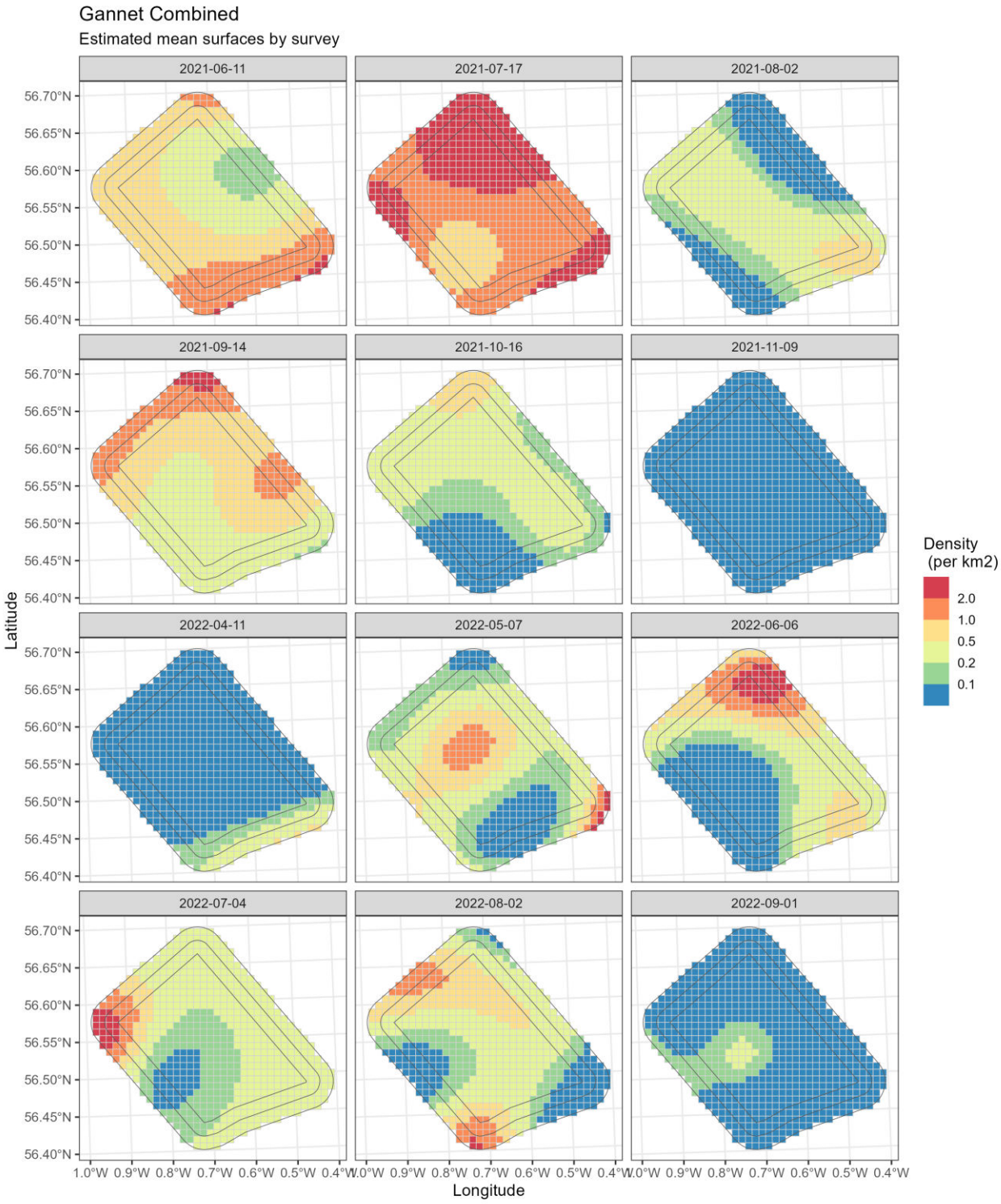


Figure B. 5: Monthly estimated density surfaces for fulmar across the Morven South Offshore Ornithology Baseline Characterisation Study Area

B.6 Gannet


Gannet Combined
Estimated mean surfaces by survey
2021-06-11
2021-07-17
2021-08-02
2021-09-14
2021-10-16
2021-11-09
2022-04-11
2022-05-07
2022-06-06
2022-07-04
2022-08-02
2022-09-01
56.70°N
56.65°N
56.60°N
56.55°N
56.50°N
56.45°N
56.40°N
Latitude
1.0°W 0.9°W 0.8°W 0.7°W 0.6°W 0.5°W 0.4°W
Longitude
Density (per km2)
2.0
1.0
0.5
0.2
0.1

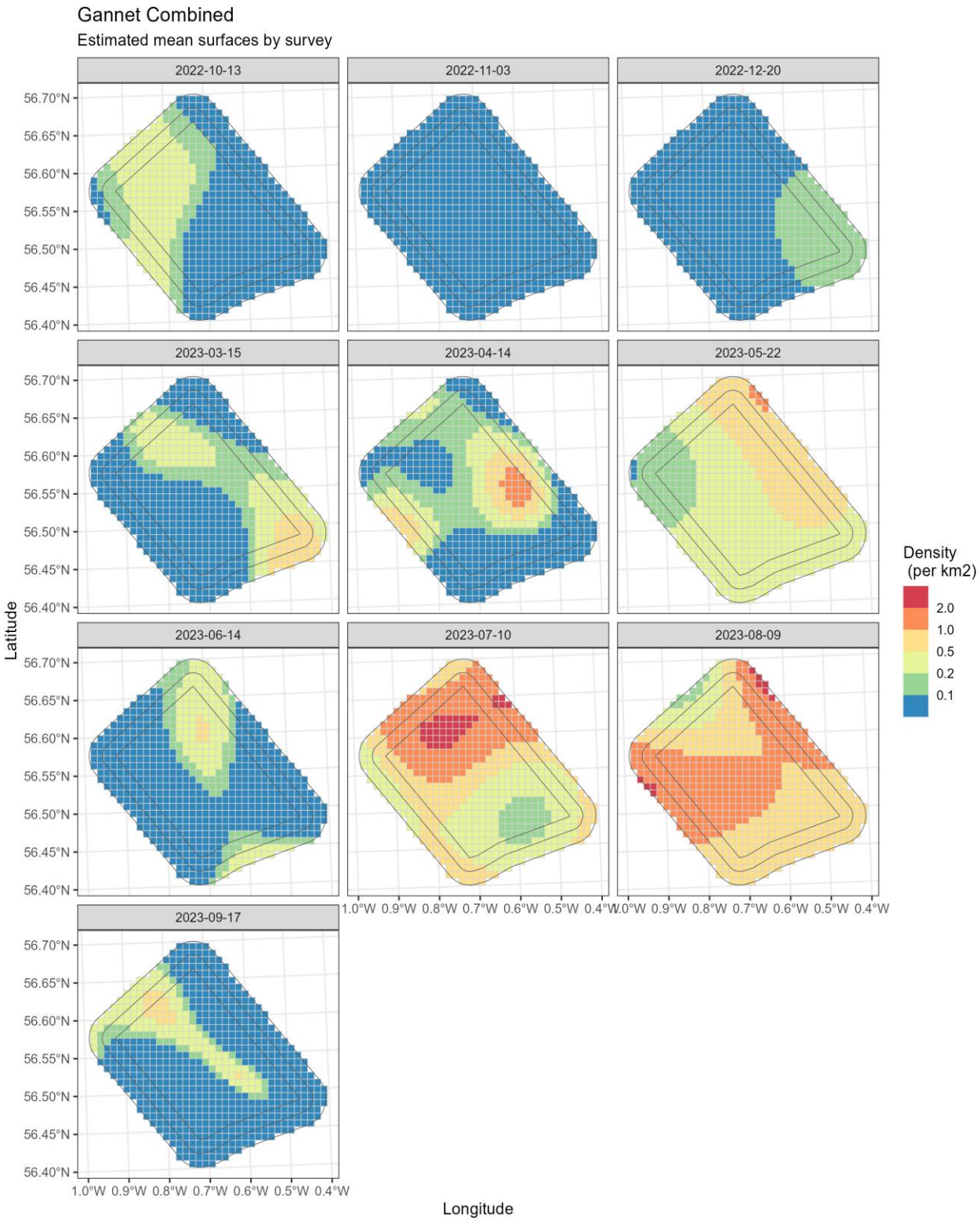


Figure B. 6: Monthly estimated density surfaces for gannet across the Morven South Offshore Ornithology Baseline Characterisation Study Area

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

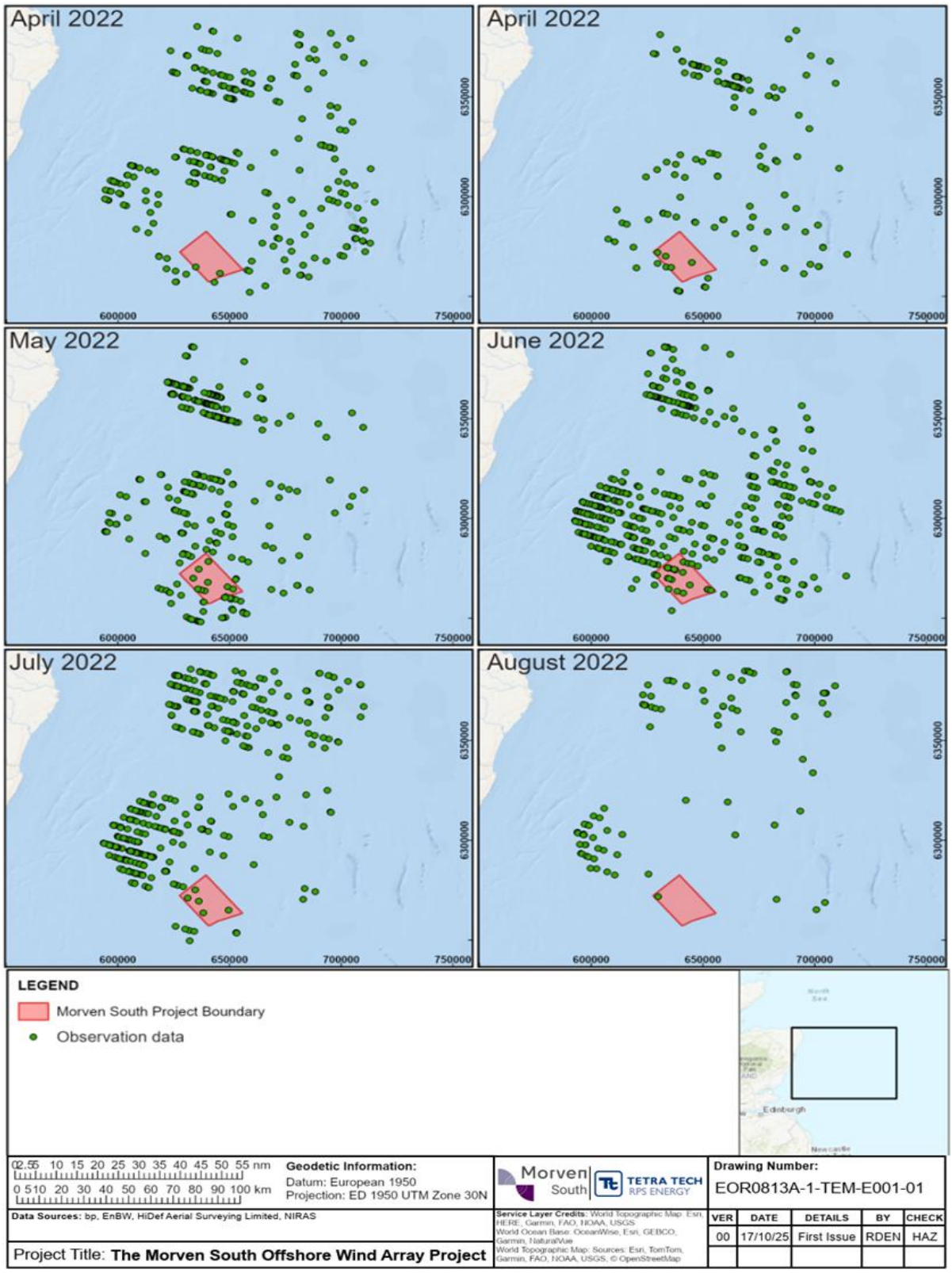


Figure C. 1: Regional distribution of kittiwake (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

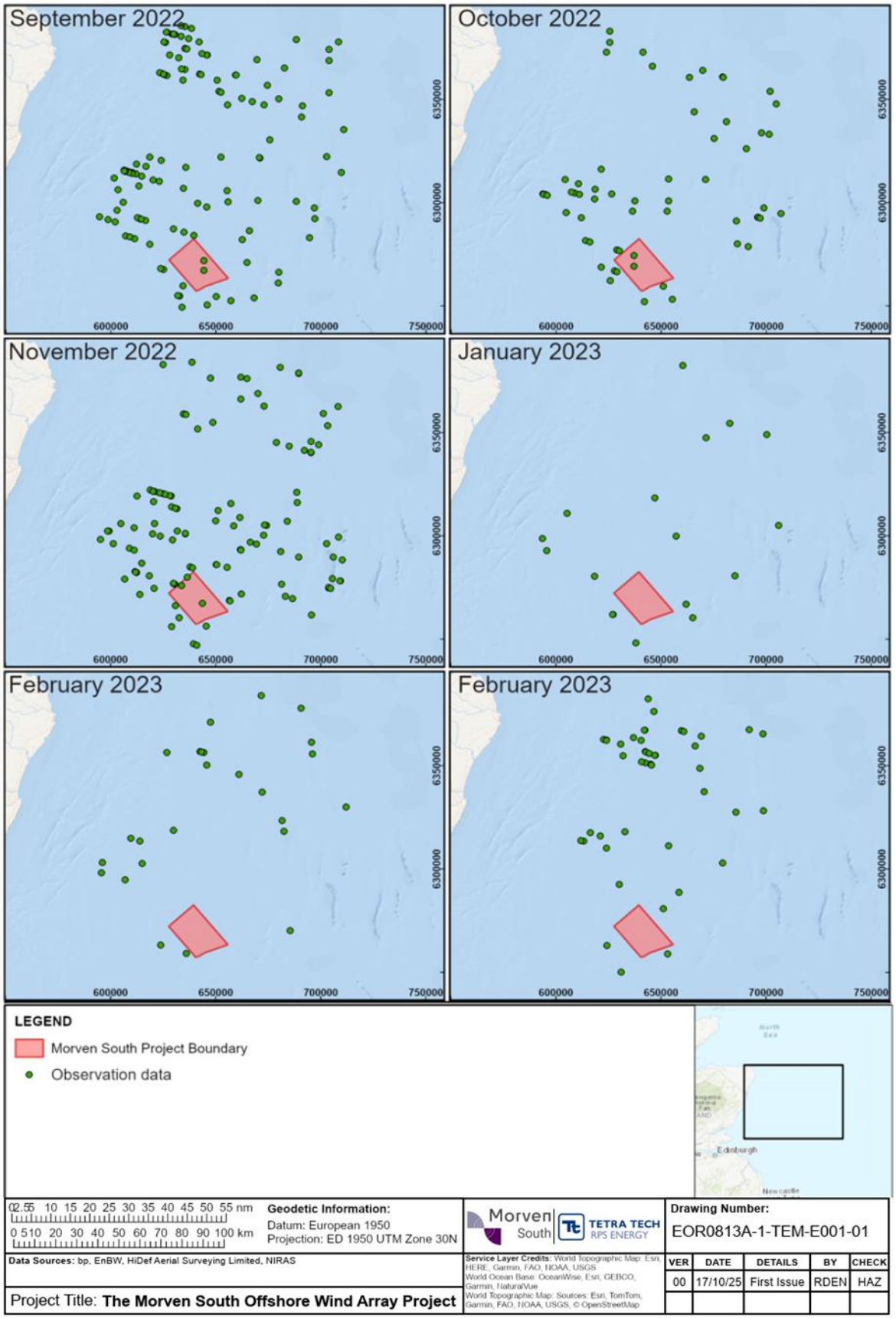


Figure C. 2: Regional distribution of kittiwake (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

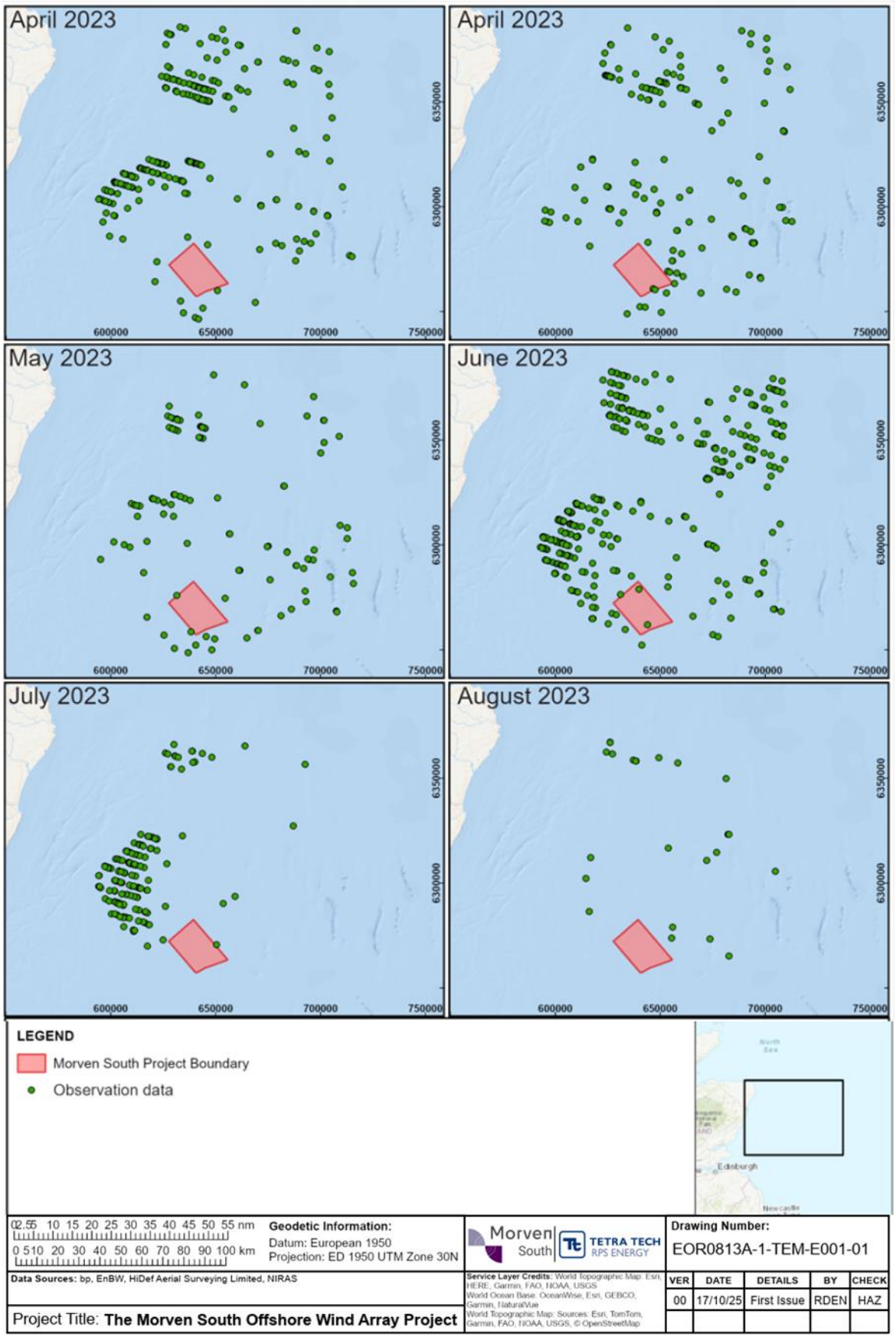


Figure C. 3: Regional distribution of kittiwake (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

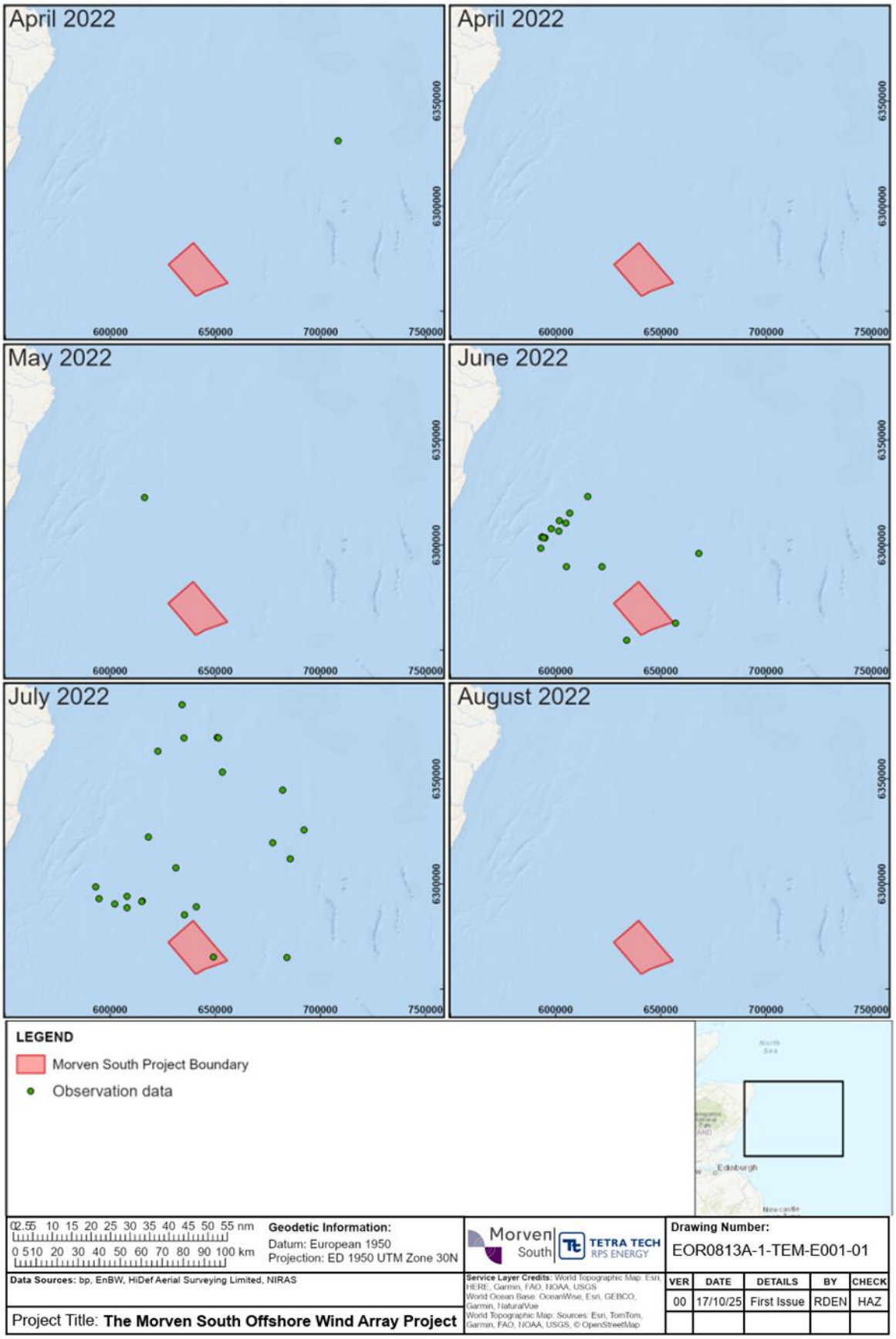


Figure C. 4: Regional distribution of herring gull (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

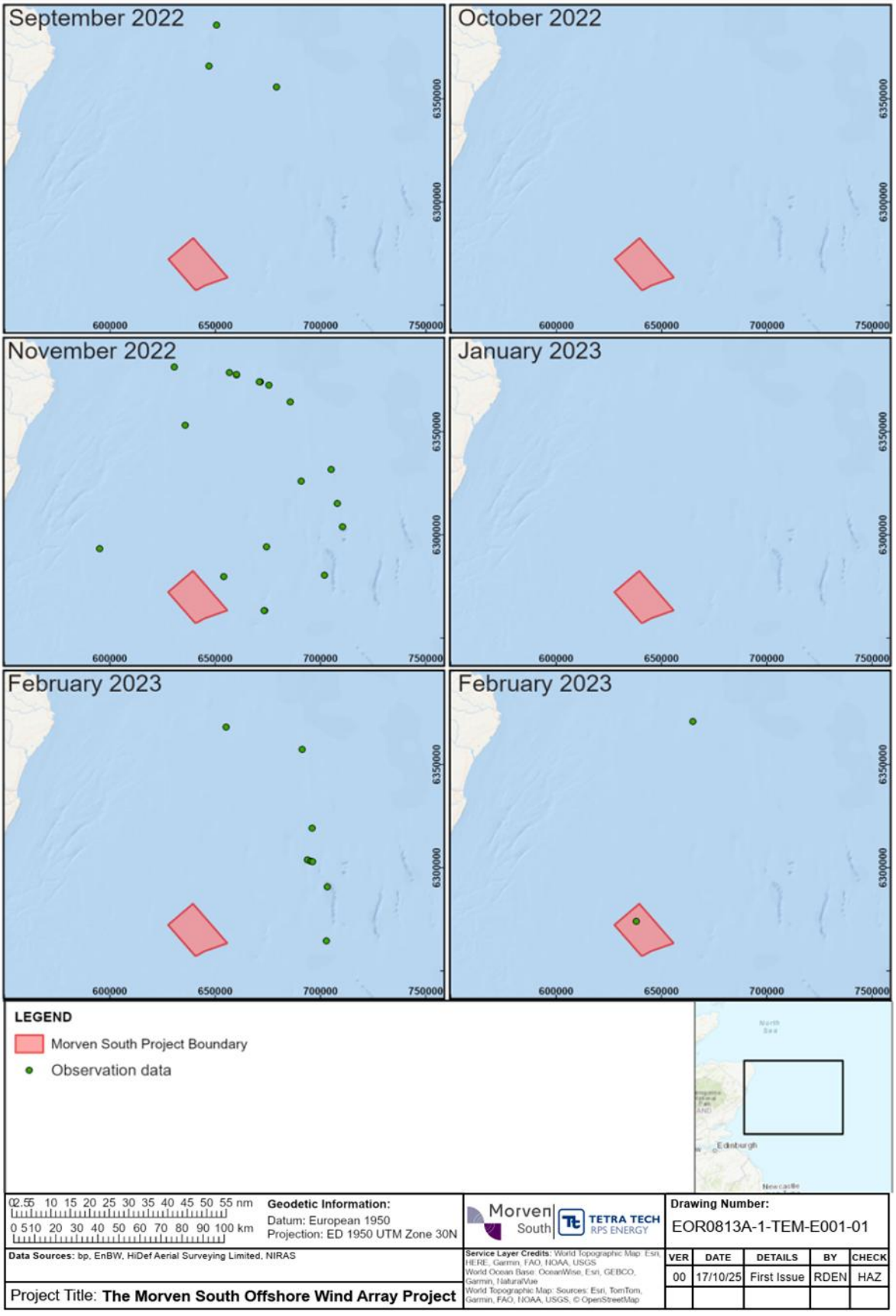


Figure C. 5: Regional distribution of herring gull (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

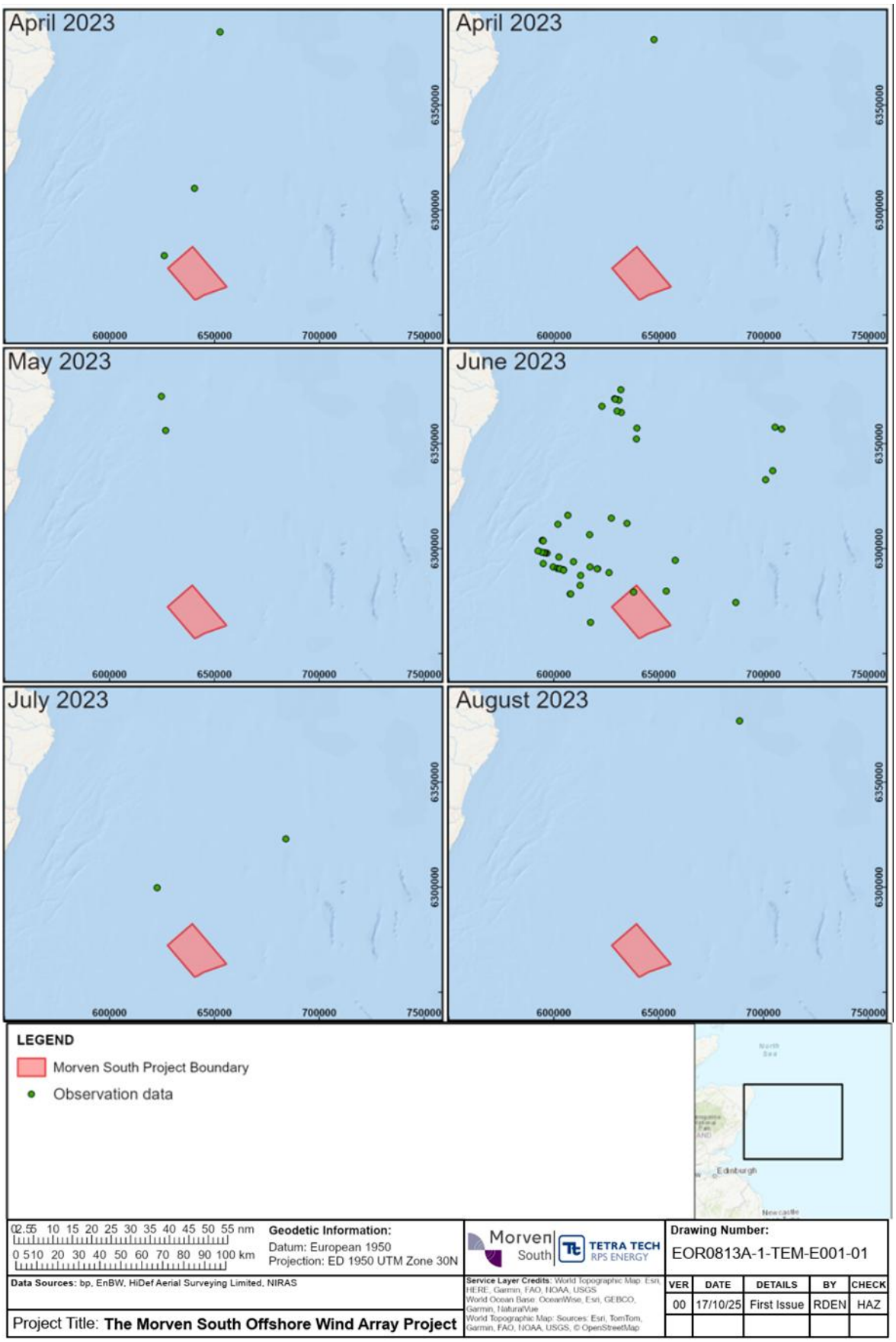


Figure C. 6: Regional distribution of herring gull (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

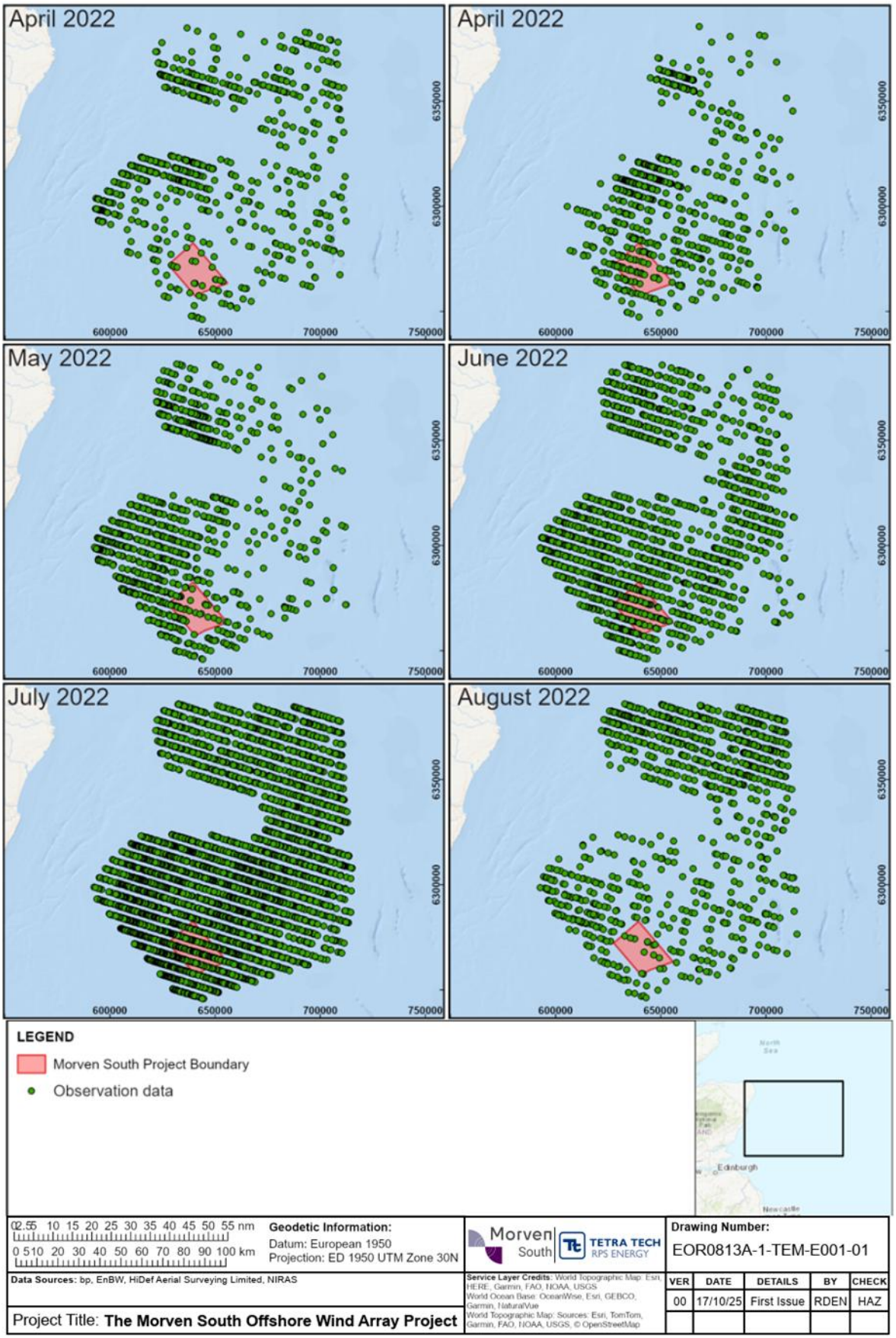


Figure C. 7: Regional distribution of guillemot (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

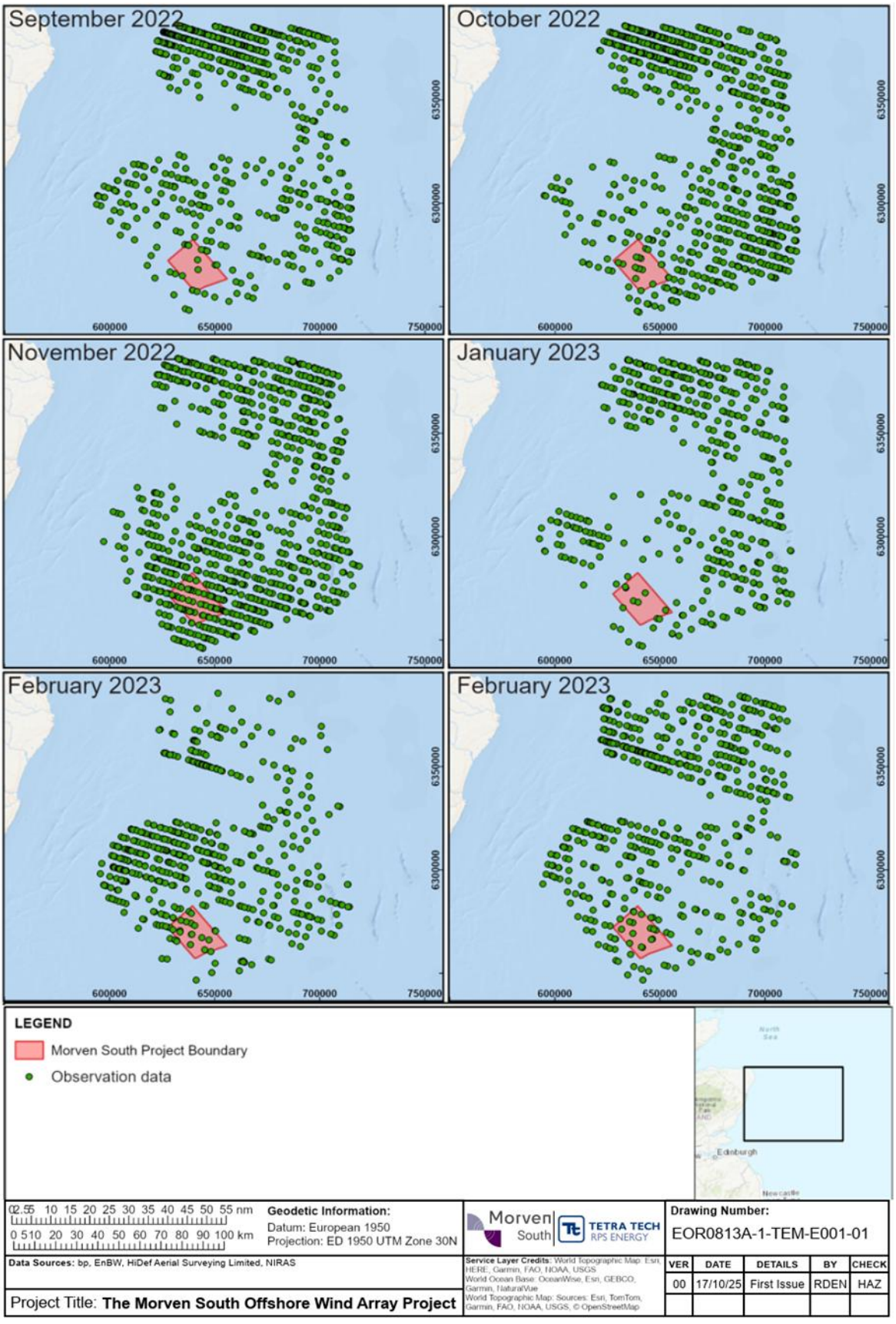


Figure C. 8: Regional distribution of guillemot (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

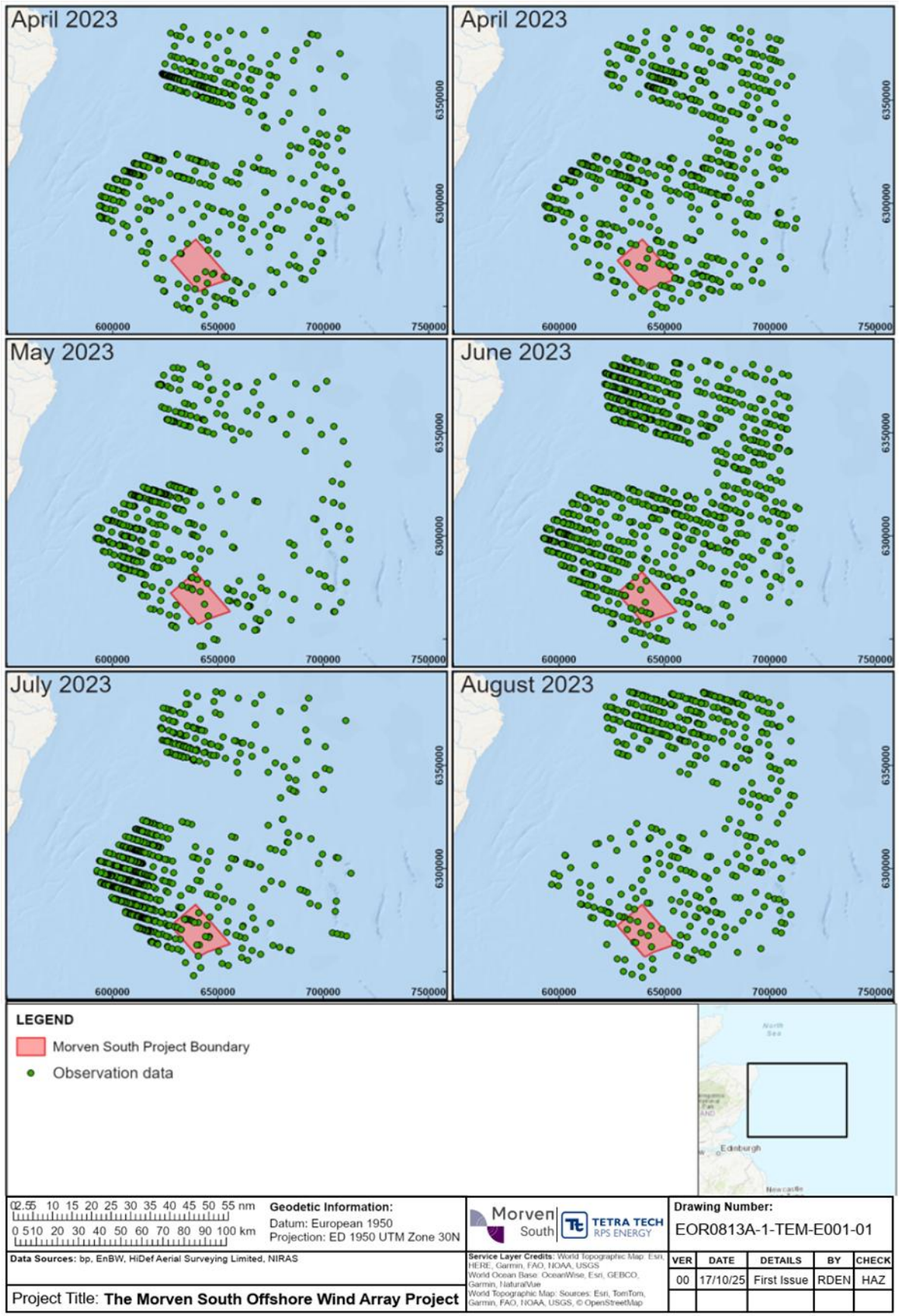


Figure C. 9: Regional distribution of guillemot (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

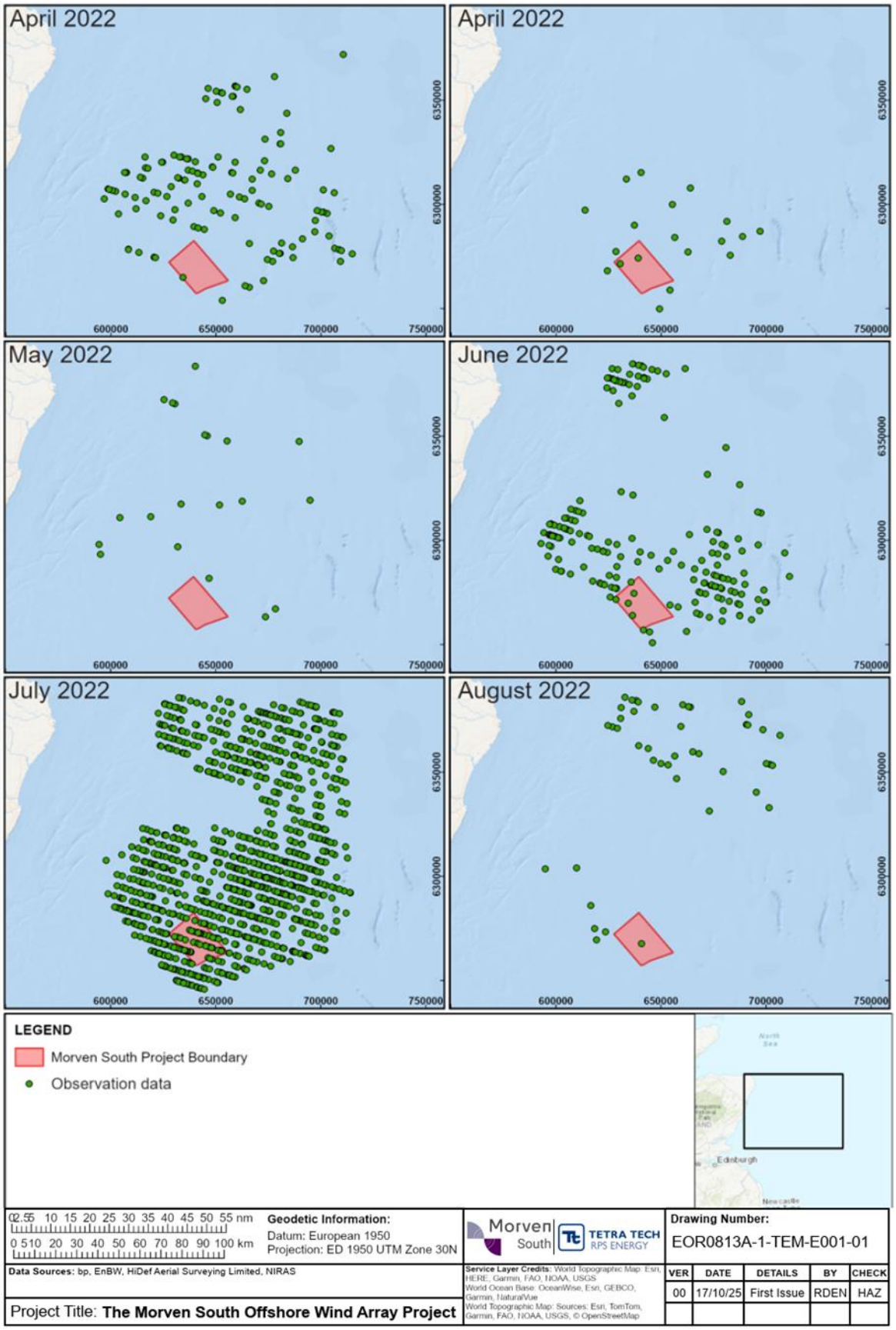


Figure C. 10: Regional distribution of razorbill (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

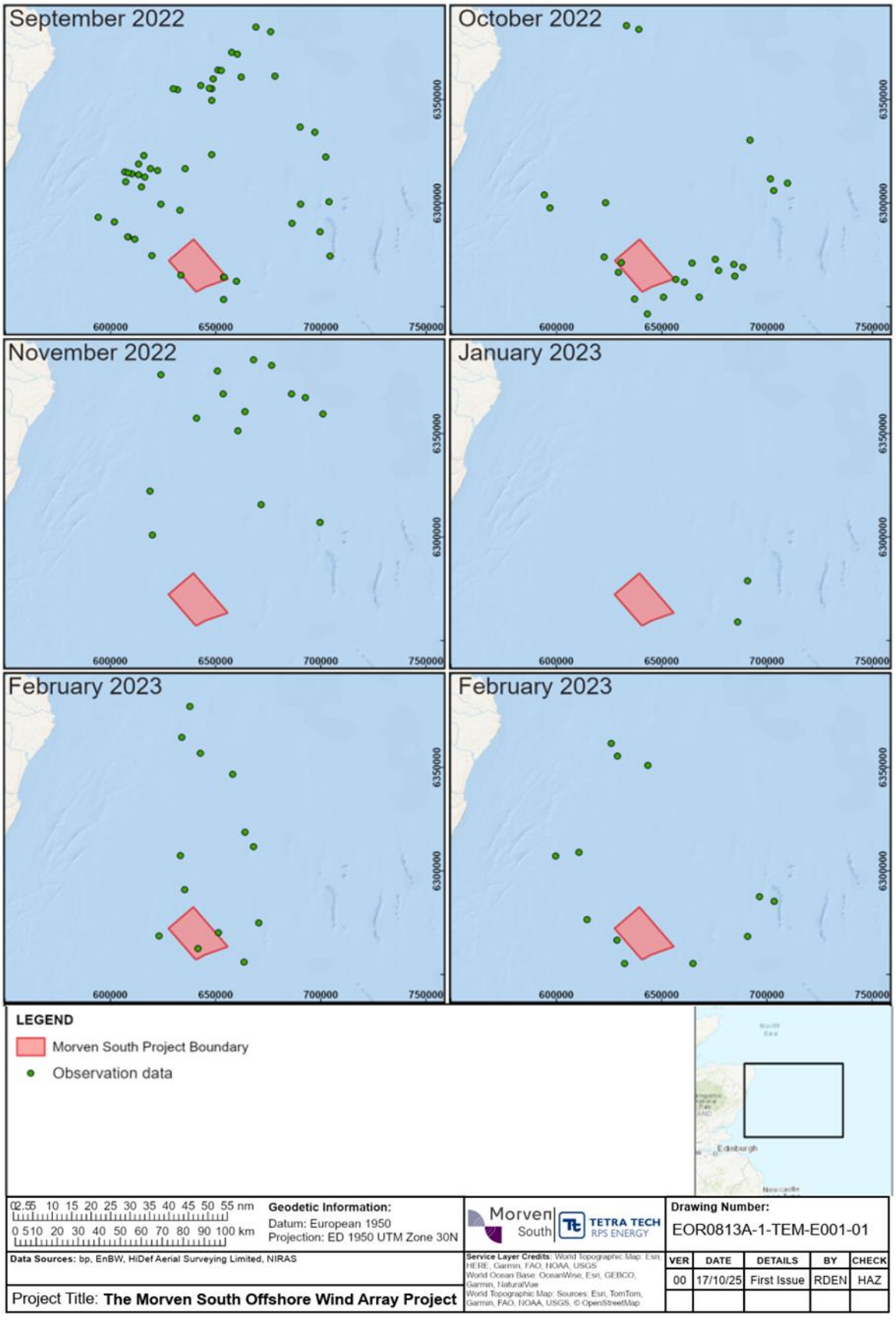


Figure C. 11: Regional distribution of razorbill (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

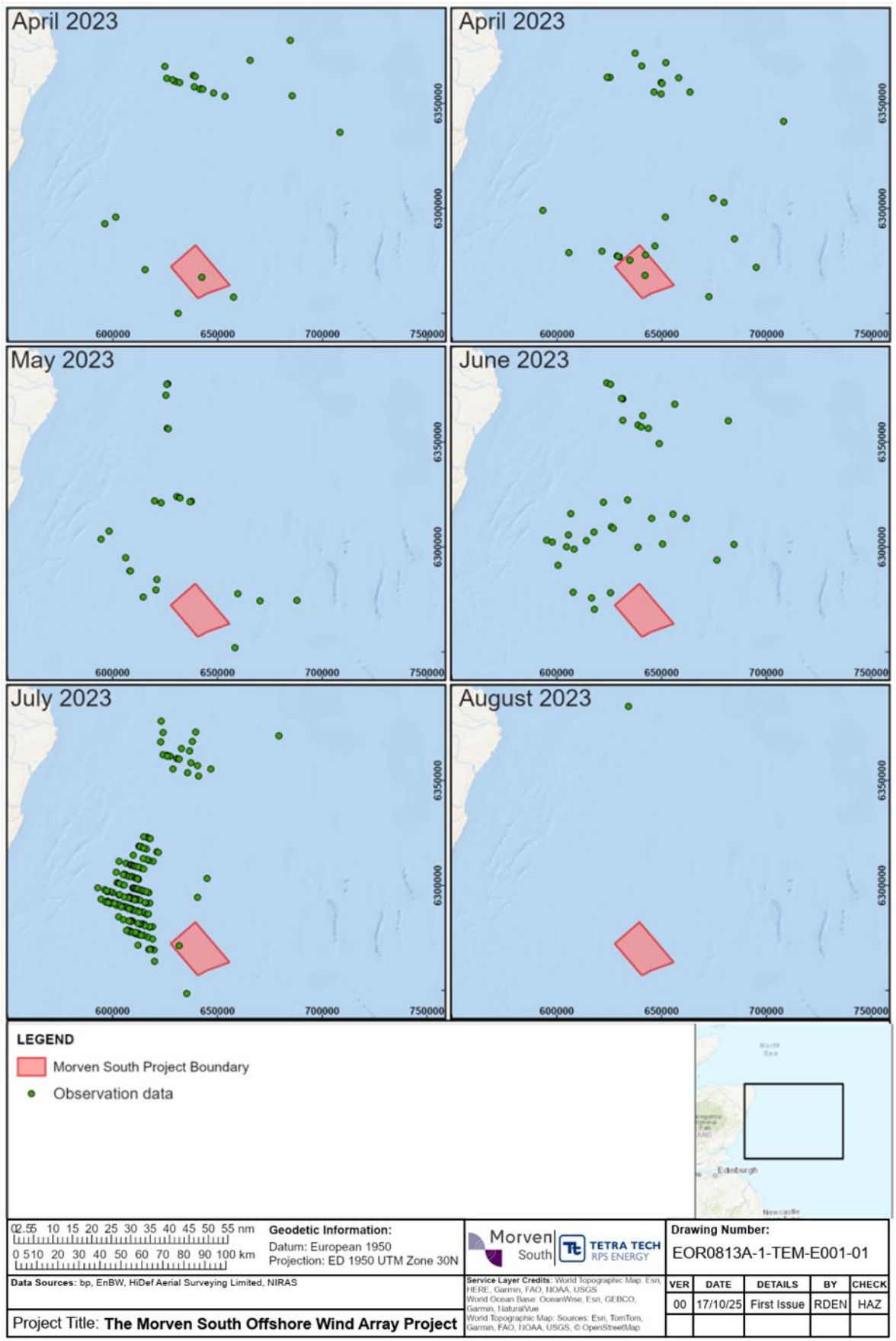


Figure C. 12: Regional distribution of razorbill (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

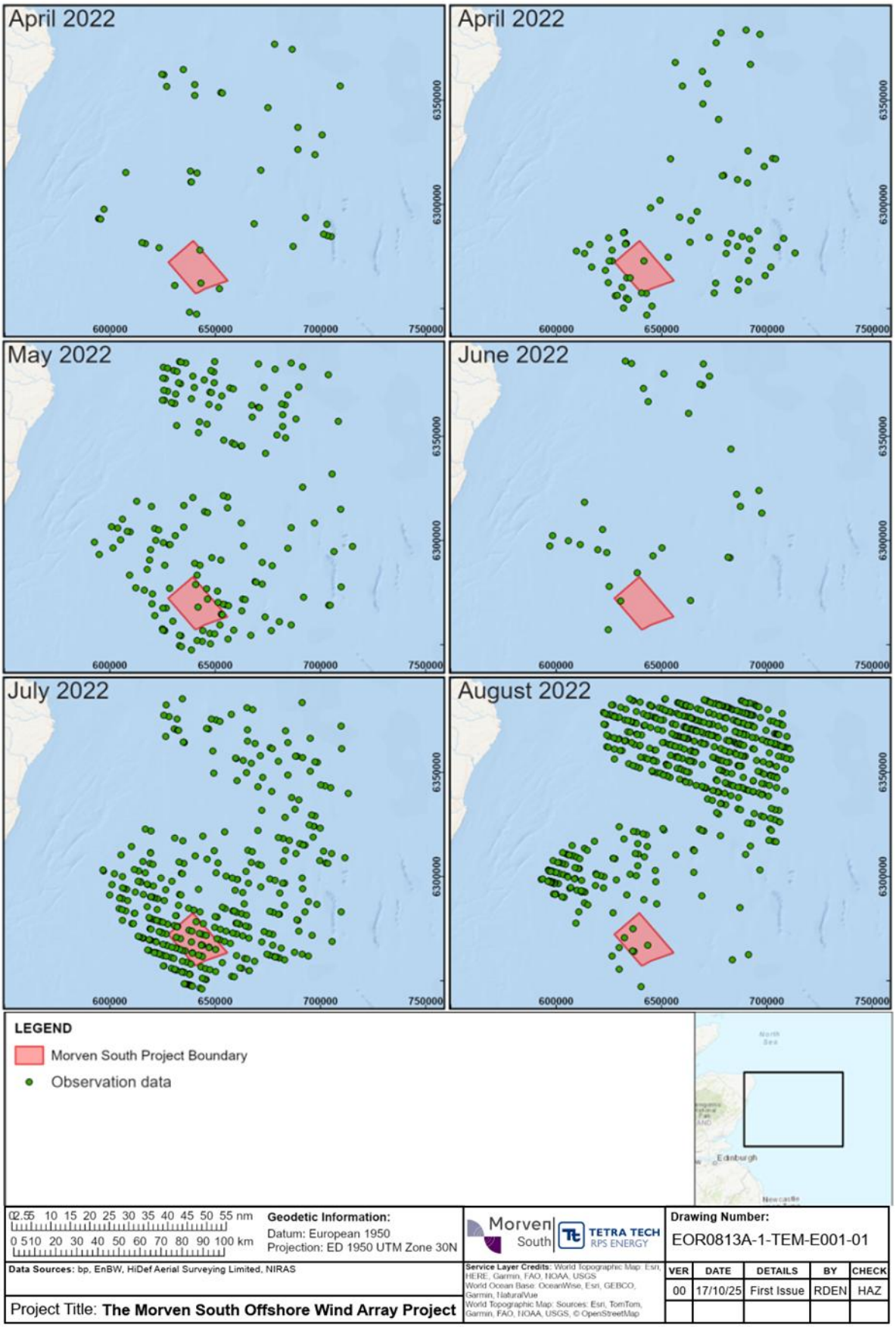


Figure C. 13: Regional distribution of puffin (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

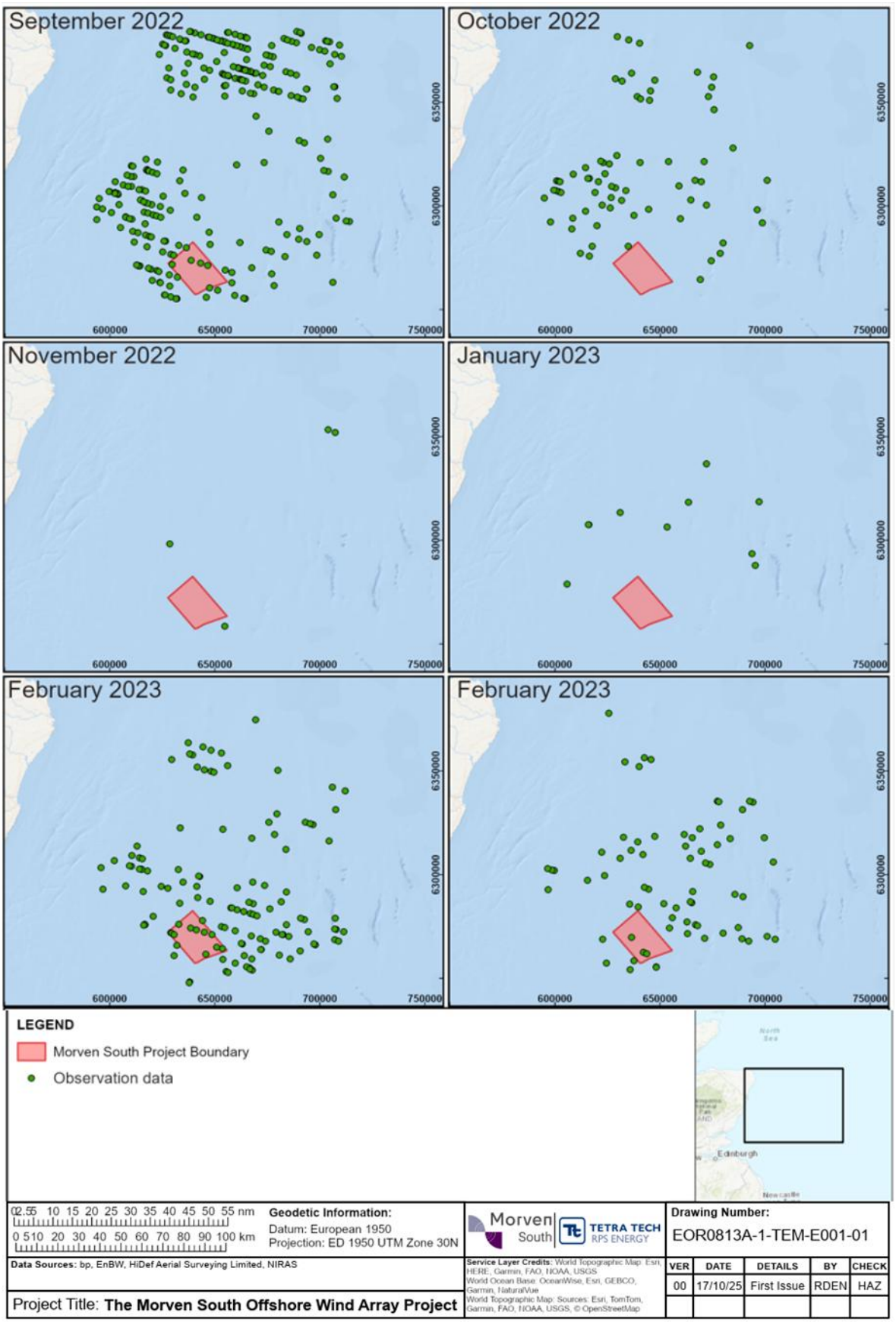


Figure C. 14: Regional distribution of puffin (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

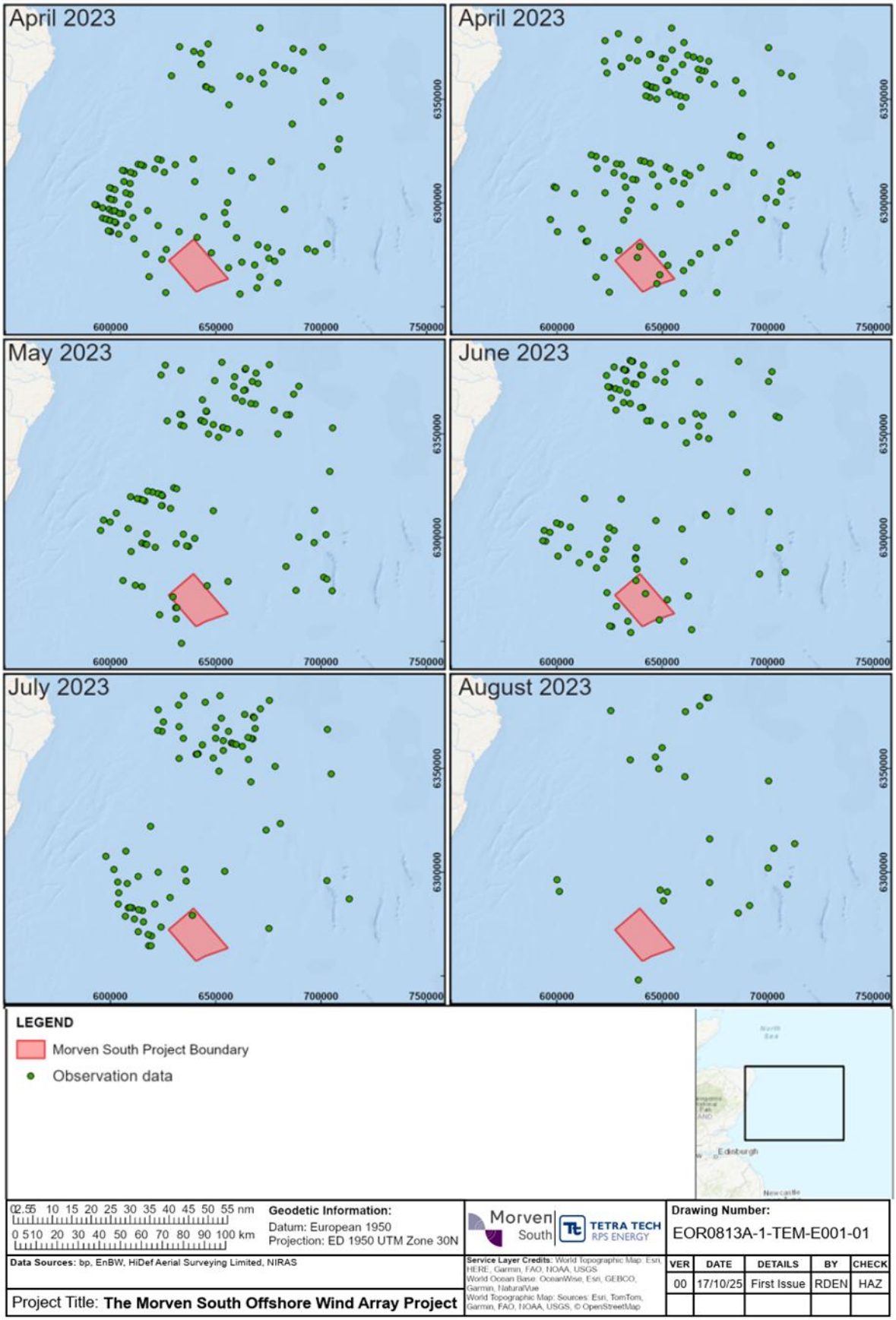


Figure C. 15: Regional distribution of puffin (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

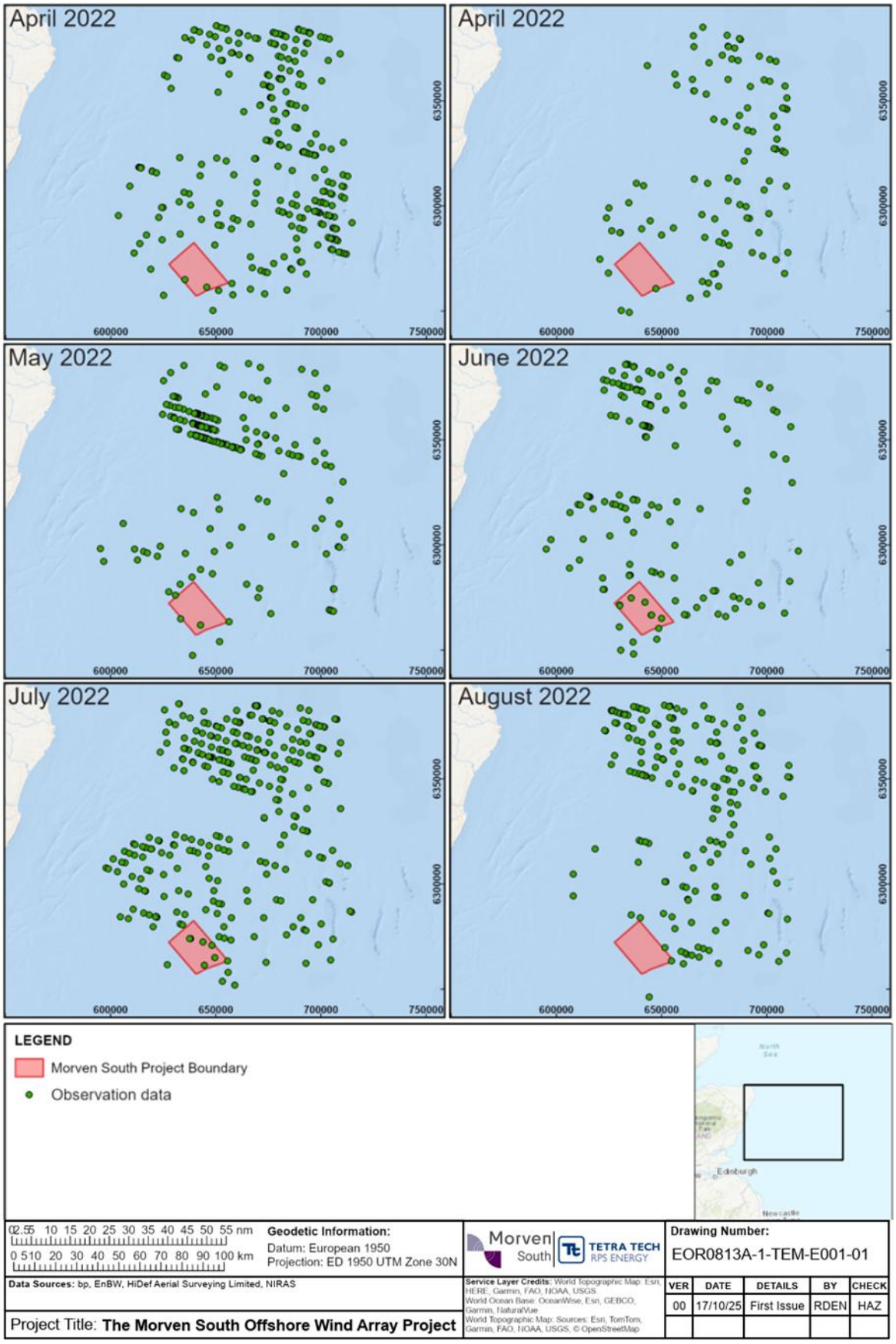


Figure C. 16: Regional distribution of fulmar (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

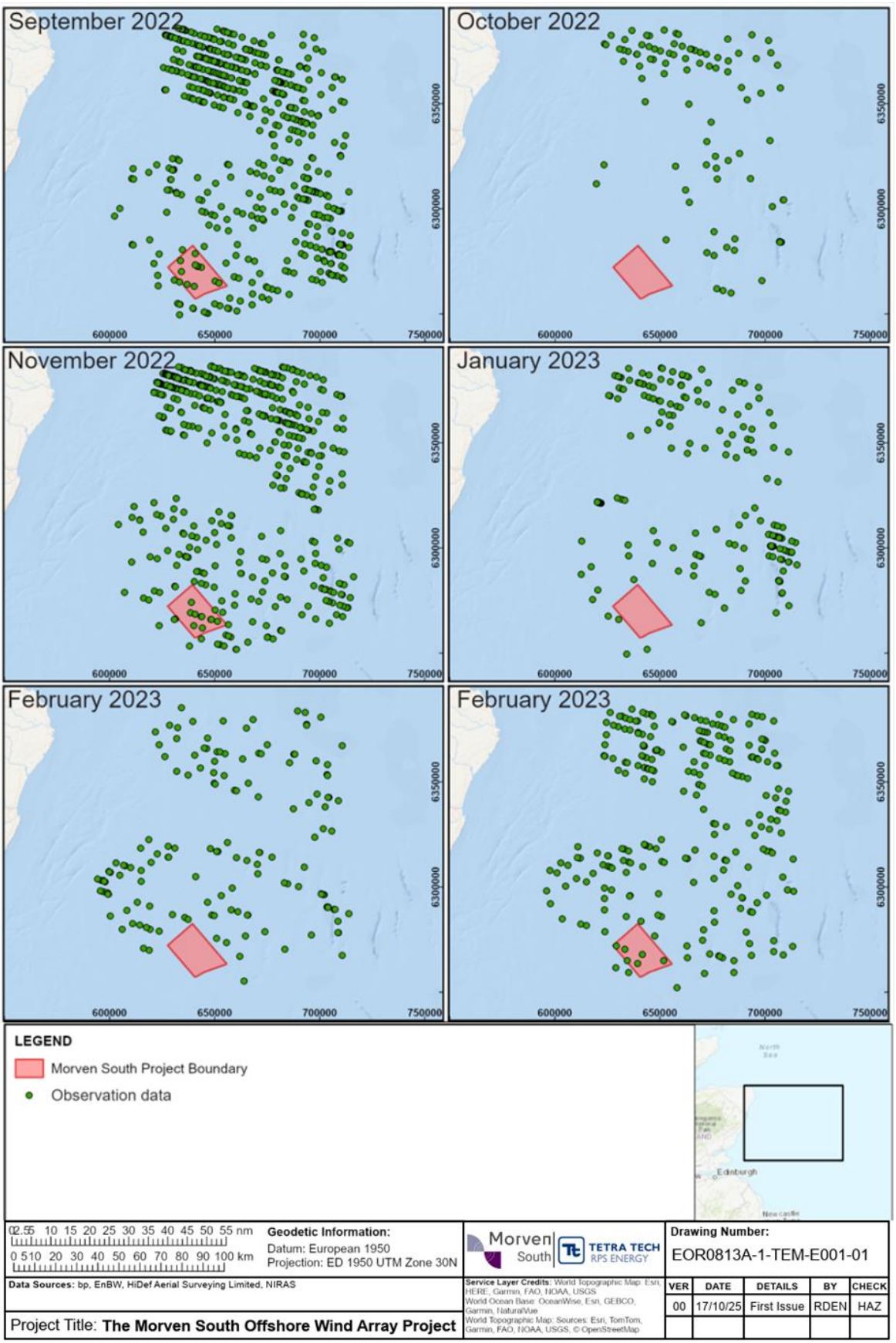


Figure C. 17: Regional distribution of fulmar (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

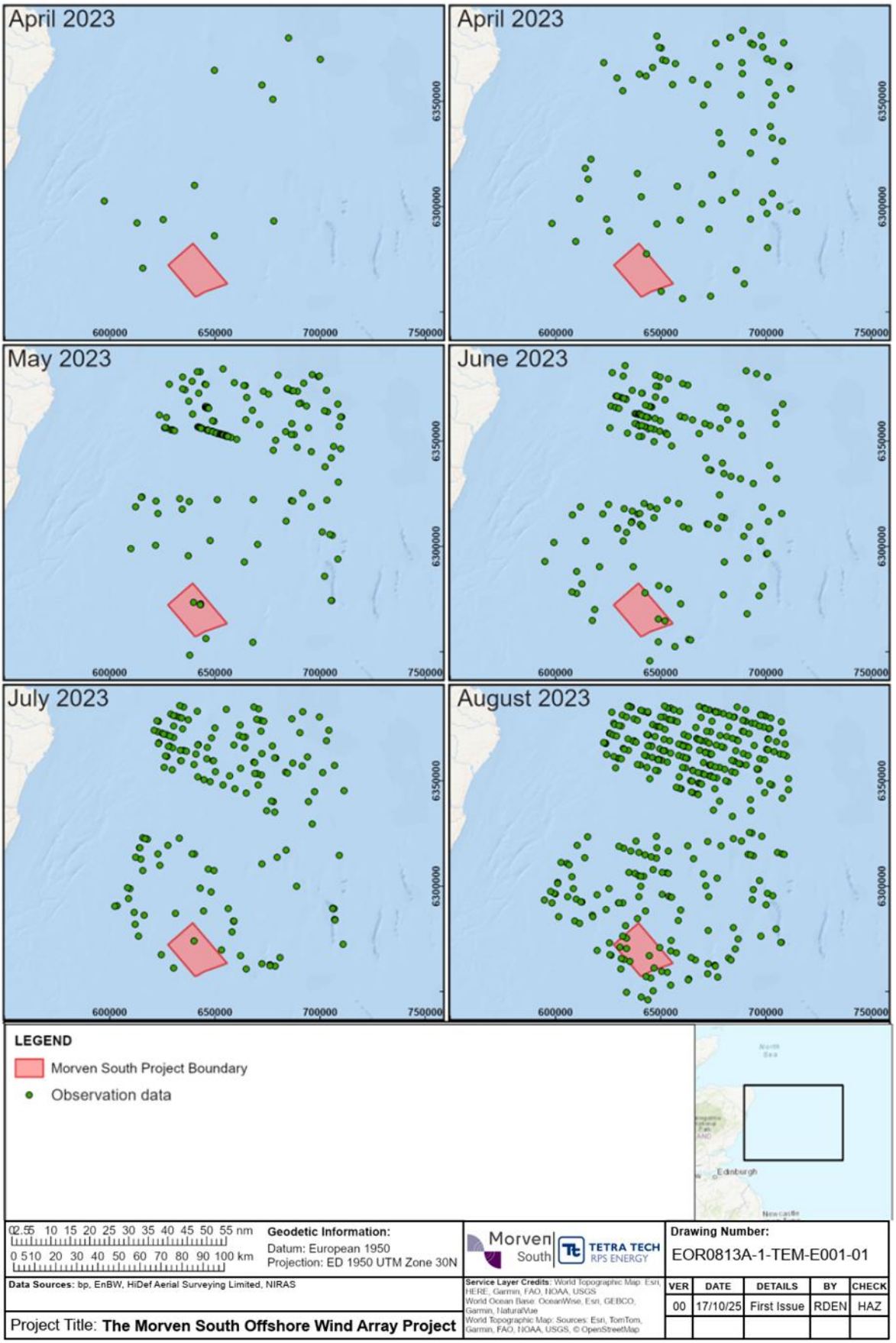


Figure C. 18: Regional distribution of fulmar (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

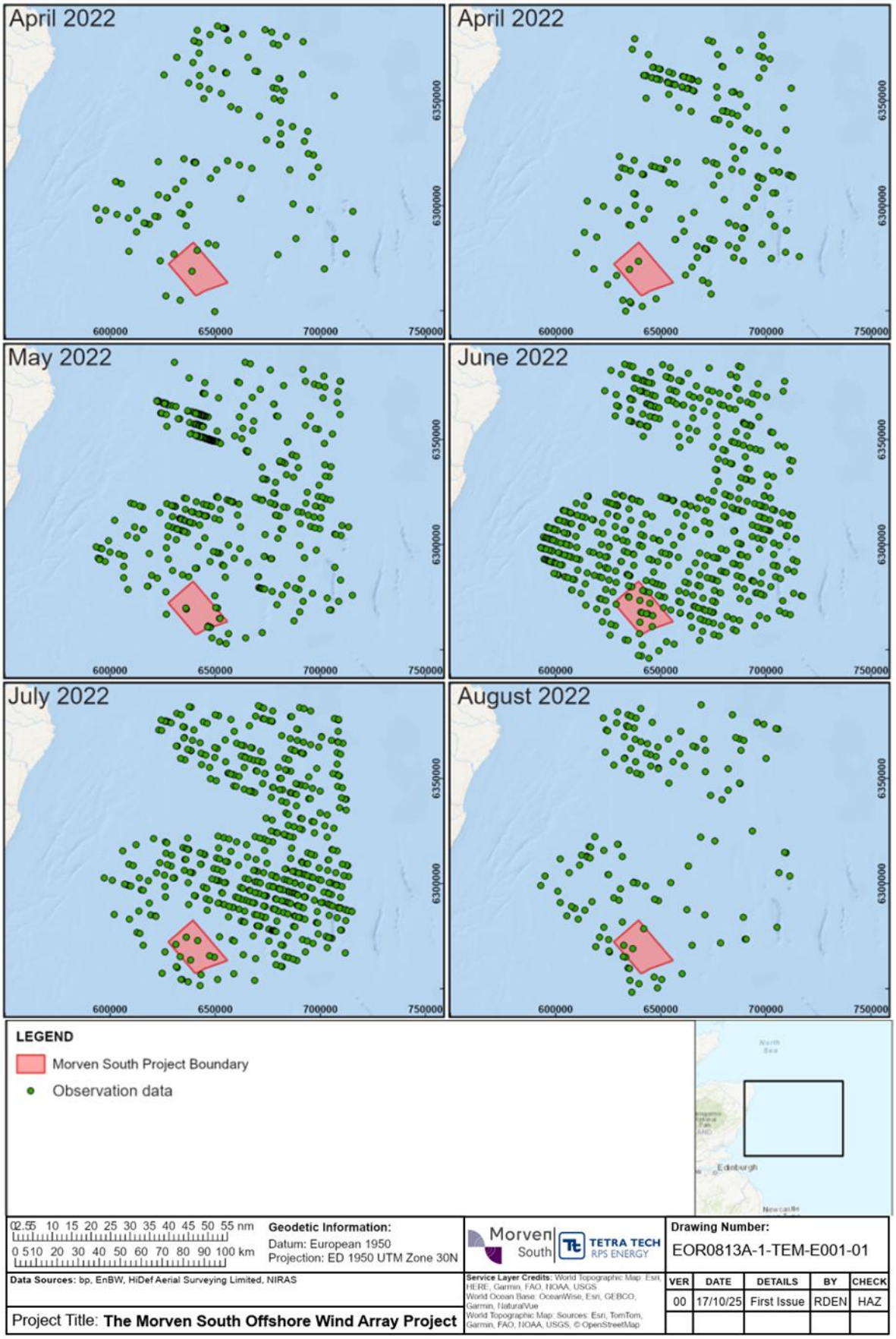


Figure C. 19: Regional distribution of gannet (April 2022 to August 2022) (HiDef Aerial Surveying Limited, 2023)

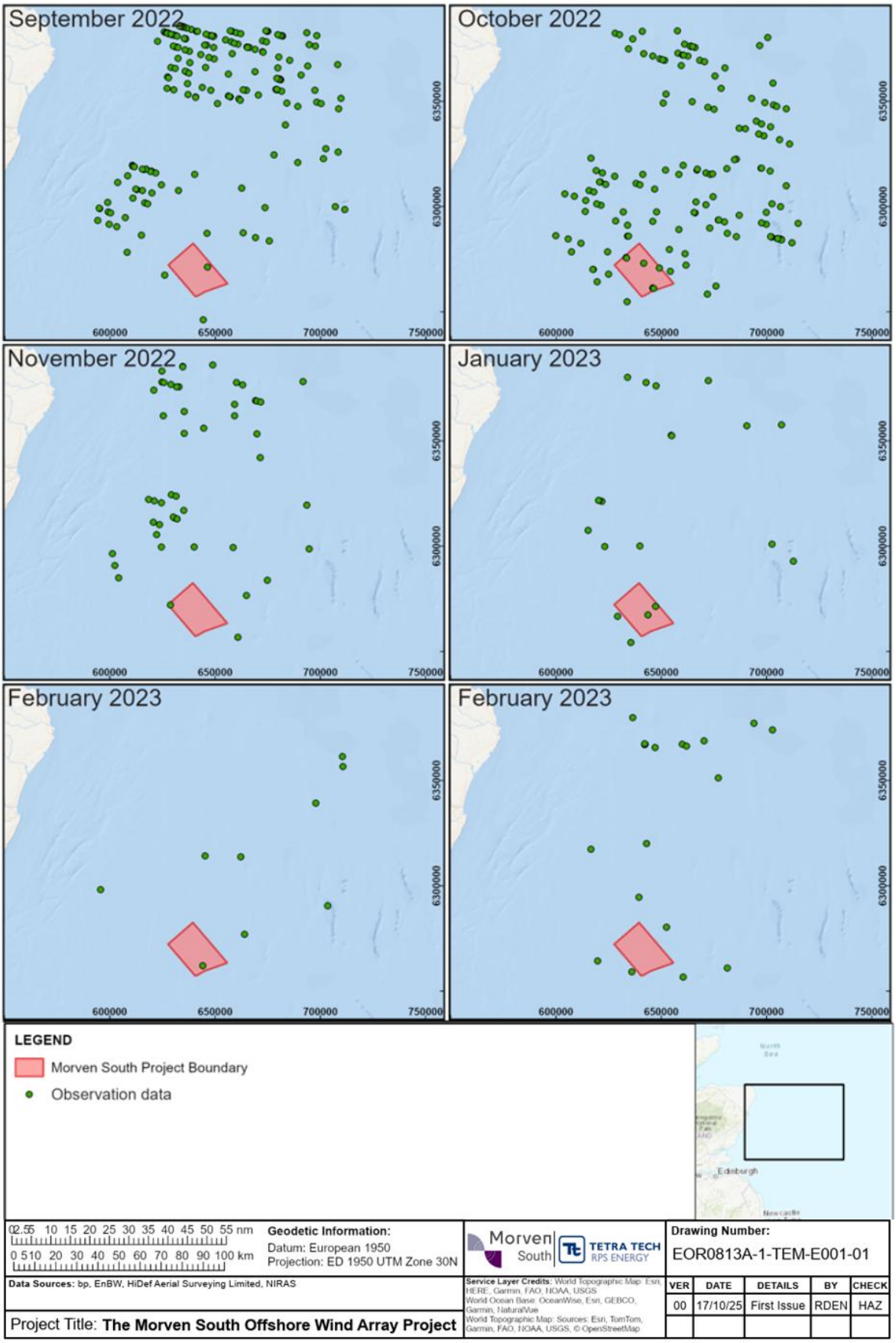


Figure C. 20: Regional distribution of gannet (September 2022 to February 2023) (HiDef Aerial Surveying Limited, 2023)

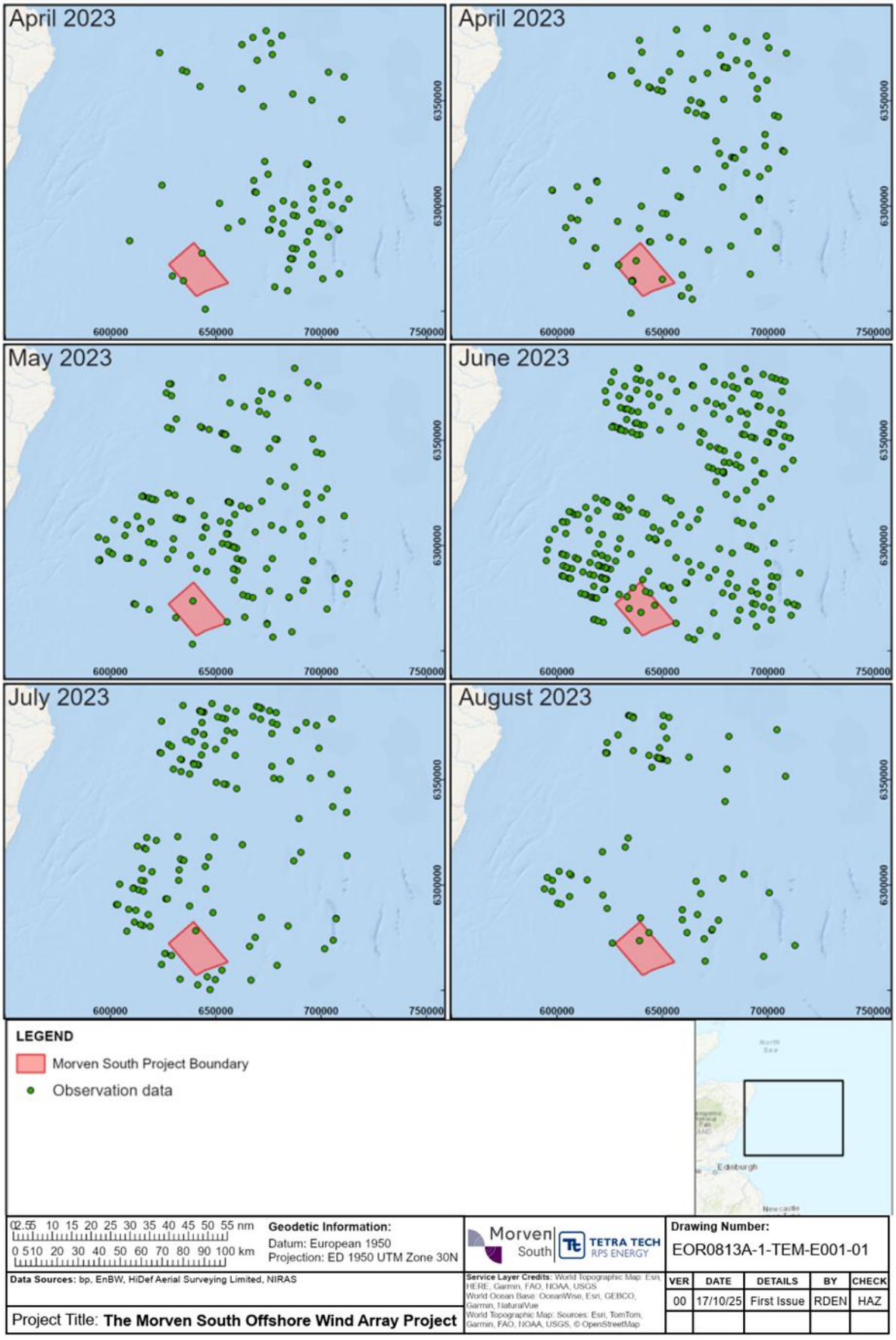


Figure C. 21: Regional distribution of gannet (April 2023 to August 2023) (HiDef Aerial Surveying Limited, 2023)

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

D.1 Kittiwake

Table D. 1: Kittiwake MRSea estimates for the Morven South 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	3,586	3,295	3,829	1,731	1,526	1,922	1,841	1,644	2,055
2021	Jul	14	0	440	5	0	50	0	0	0
2021	Aug	24	13	284	18	6	53	6	1	136
2021	Sep	553	396	734	238	162	365	309	245	423
2021	Oct	95	64	170	0	0	0	95	64	170
2021	Nov	65	39	119	0	0	0	77	45	132
2021	Dec	49	25	116	10	0	31	40	19	97
2022	Jan	17	0	39	0	0	0	17	0	39
2022	Feb	53	34	125	23	9	56	33	20	157
2022	Mar	55	28	106	25	9	65	31	15	94
2022	Apr	217	153	301	16	0	38	200	140	287

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	310	239	401	97	63	169	217	158	299
2022	Jun	979	720	1,270	281	208	380	718	529	1,000
2022	Jul	731	545	967	357	247	584	364	297	465
2022	Aug	78	45	127	17	0	39	62	46	96
2022	Sep	18	0	44	0	0	0	17	0	41
2022	Oct	15	6	55	0	0	0	15	6	55
2022	Nov	57	35	135	7	0	24	44	24	118
2022	Dec	188	131	247	14	5	55	168	122	259
2023	Jan	35	20	119	9	0	28	28	14	62
2023	Feb	39	21	76	23	0	58	15	0	39
2023	Mar	61	35	134	10	0	28	53	32	130
2023	Apr	66	35	106	8	0	24	58	28	98
2023	May	274	203	416	18	0	59	256	174	391
2023	Jun	59	34	129	0	0	0	56	35	133
2023	Jul	32	6	347	29	9	2,071	0	0	26
2023	Aug	53	32	201	0	0	0	53	32	201

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	0	0	0	0	0	0	0	0	0

Table D. 2: Kittiwake MRSea estimates for the Morven South 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	2,598	2,381	2,802	1,333	1,161	1,485	1,287	1,144	1,435
2021	Jul	9	0	336	4	0	36	0	0	0
2021	Aug	17	8	108	15	5	44	0	0	11
2021	Sep	413	283	564	190	125	302	234	180	321
2021	Oct	67	41	129	0	0	0	67	41	129
2021	Nov	44	25	79	0	0	0	48	26	84
2021	Dec	39	20	97	0	0	0	36	17	85
2022	Jan	16	0	39	0	0	0	17	0	40
2022	Feb	43	24	103	15	6	38	24	13	111
2022	Mar	46	22	89	18	6	48	27	12	79
2022	Apr	177	122	244	15	0	35	161	108	229
2022	May	236	183	311	67	39	117	171	123	240

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Jun	631	450	832	145	103	203	480	338	678
2022	Jul	426	302	588	154	94	279	247	193	325
2022	Aug	59	32	100	17	0	40	60	44	92
2022	Sep	18	0	45	0	0	0	17	0	46
2022	Oct	6	2	38	0	0	0	6	2	38
2022	Nov	45	26	108	7	0	22	37	19	101
2022	Dec	147	99	196	6	2	33	137	94	210
2023	Jan	23	11	86	0	0	0	15	7	34
2023	Feb	26	13	49	8	0	25	14	0	37
2023	Mar	44	24	97	10	0	29	35	19	89
2023	Apr	47	25	76	8	0	24	41	19	70
2023	May	156	108	247	18	0	57	145	93	233
2023	Jun	48	27	102	0	0	0	48	28	109
2023	Jul	10	1	168	16	4	1,534	0	0	19
2023	Aug	35	20	91	0	0	0	35	20	91
2023	Sep	0	0	0	0	0	0	0	0	0

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

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	1,734	1,557	1,892	9,18	784	1,040	815	703	922
2021	Jul	3	0	213	2	0	24	0	0	0
2021	Aug	11	4	62	12	3	35	0	0	2
2021	Sep	281	185	397	134	81	221	154	107	216
2021	Oct	42	23	90	0	0	0	42	23	90
2021	Nov	26	13	49	0	0	0	26	12	48
2021	Dec	30	15	73	0	0	0	30	14	71
2022	Jan	16	0	39	0	0	0	16	0	40
2022	Feb	32	16	85	9	3	24	18	8	75
2022	Mar	35	16	67	12	4	31	23	10	65
2022	Apr	134	91	186	14	0	34	119	76	176
2022	May	152	110	209	22	9	47	122	83	176
2022	Jun	352	230	485	72	47	107	268	175	409
2022	Jul	216	139	322	67	33	143	152	111	209
2022	Aug	41	21	76	17	0	38	23	13	43
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	2	0	24	0	0	0	2	0	24
2022	Nov	31	15	75	8	0	27	26	12	78
2022	Dec	107	69	147	2	0	19	106	68	165
2023	Jan	19	8	70	0	0	0	8	3	19
2023	Feb	16	8	30	7	0	23	8	0	24
2023	Mar	25	13	56	9	0	27	19	8	51
2023	Apr	31	16	51	7	0	22	27	12	47
2023	May	85	51	146	20	0	68	73	41	125
2023	Jun	38	20	85	0	0	0	38	21	85
2023	Jul	3	0	75	10	1	1,042	0	0	13
2023	Aug	13	5	46	0	0	0	13	5	46
2023	Sep	0	0	0	0	0	0	0	0	0

D.2 Guillemot

Table D. 4: Guillemot MRSea 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	4,948	4,250	5,559	4,929	4,274	5,572	30	17	128
2021	Jul	5,603	4,852	6,305	5,516	4,770	6,212	86	49	231
2021	Aug	1,055	888	1,249	1,055	888	1,249	0	0	0
2021	Sep	3,352	2,825	3,871	3,340	2,815	3,858	15	0	48
2021	Oct	783	624	940	802	644	977	0	0	0
2021	Nov	2,782	2,463	3,077	2,771	2,446	3,068	0	0	0
2021	Dec	923	723	1,181	923	723	1,181	0	0	0
2022	Jan	652	522	836	649	514	840	15	0	37
2022	Feb	1,921	1,627	2,238	1,931	1,624	2,207	0	0	0
2022	Mar	1,162	983	1,356	968	795	1,139	154	102	319
2022	Apr	537	383	804	264	200	401	299	192	526
2022	May	1,055	882	1,230	1,020	852	1,191	30	0	73
2022	Jun	810	683	963	748	616	898	30	23	38
2022	Jul	9,156	8,338	9,926	9,155	8,336	9,925	0	0	0
2022	Aug	20,180	18,154	22,040	20,149	18,125	22,009	34	0	79

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	699	558	881	699	558	881	0	0	0
2022	Oct	3,068	2,737	3,367	3,064	2,741	3,388	18	0	45
2022	Nov	3,640	3,289	3,979	3,552	3,142	3,933	47	0	146
2022	Dec	2,106	1,839	2,378	2,141	1,895	2,426	25	0	67
2023	Jan	309	221	458	309	221	458	0	0	0
2023	Feb	1,586	1,218	2,122	974	780	1,166	549	375	893
2023	Mar	266	196	383	242	170	334	22	0	59
2023	Apr	1,159	848	1,707	324	249	433	828	575	1,330
2023	May	653	538	796	651	531	797	18	8	94
2023	Jun	681	546	823	625	511	779	51	26	111
2023	Jul	4,221	3,238	5,143	3,151	2,407	3,921	708	516	1,142
2023	Aug	1,102	919	1,311	1,102	919	1,311	0	0	0
2023	Sep	229	162	363	229	152	368	8	0	26

Table D. 5: Guillemot MRSea estimates for the Morven South 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	3,385	2,855	3,837	3,349	2,841	3,823	25	12	95
2021	Jul	3,931	3,358	4,487	3,880	3,310	4,432	46	22	126
2021	Aug	821	675	971	821	675	971	0	0	0
2021	Sep	2,209	1,837	2,578	2,202	1,830	2,570	0	0	0
2021	Oct	563	443	683	578	448	721	0	0	0
2021	Nov	2,150	1,886	2,388	2,155	1,873	2,398	0	0	0
2021	Dec	717	552	917	717	552	917	0	0	0
2022	Jan	445	347	574	445	342	577	7	0	22
2022	Feb	1,421	1,191	1,651	1,419	1,197	1,635	0	0	0
2022	Mar	890	740	1,045	763	614	907	99	58	197
2022	Apr	450	314	663	202	146	304	234	142	416
2022	May	741	605	876	736	599	866	18	0	54
2022	Jun	569	466	689	544	434	669	1	0	1
2022	Jul	6,200	5,504	6,807	6,201	5,504	6,807	0	0	0
2022	Aug	14,567	12,861	16,003	14,544	12,840	15,979	20	0	61
2022	Sep	520	408	665	520	408	665	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	2,399	2,131	2,637	2,396	2,125	2,667	18	0	43
2022	Nov	2,787	2,473	3,068	2,732	2,392	3,040	0	0	0
2022	Dec	1,529	1,316	1,755	1,566	1,367	1,784	25	0	75
2023	Jan	244	163	368	244	163	368	0	0	0
2023	Feb	1,250	948	1,720	688	548	845	453	295	748
2023	Mar	203	144	301	192	132	269	0	0	0
2023	Apr	930	633	1,359	238	179	325	687	440	1,068
2023	May	423	336	533	410	324	517	16	6	77
2023	Jun	475	374	575	458	363	575	37	19	83
2023	Jul	3,394	2,541	4,162	2,621	1,975	3,290	508	362	792
2023	Aug	698	573	834	698	573	834	0	0	0
2023	Sep	161	107	254	147	94	244	7	0	23

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

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	2,158	1,790	2,480	2,119	1,740	2,457	22	10	75
2021	Jul	2,568	2,136	3,012	2,542	2,112	2,984	23	8	77
2021	Aug	581	458	702	581	458	702	0	0	0
2021	Sep	1,339	1,076	1,589	1,336	1,073	1,586	0	0	0
2021	Oct	376	290	460	385	288	488	0	0	0
2021	Nov	1,510	1,301	1,697	1,509	1,287	1,696	0	0	0
2021	Dec	521	389	689	521	389	689	0	0	0
2022	Jan	276	201	367	278	200	371	0	0	0
2022	Feb	978	803	1,144	976	796	1,149	0	0	0
2022	Mar	632	516	752	553	441	663	85	49	164
2022	Apr	356	246	522	149	101	231	186	106	343
2022	May	500	389	604	504	400	606	9	0	30
2022	Jun	375	295	469	366	275	457	0	0	0
2022	Jul	3,868	3,327	4,342	3,869	3,328	4,343	0	0	0
2022	Aug	9,605	8,186	10,739	9,590	8,172	10,723	0	0	0
2022	Sep	339	249	444	339	249	444	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	1,736	1,516	1,931	1,710	1,478	1,922	18	0	44
2022	Nov	1,915	1,653	2,134	1,890	1,622	2,126	0	0	0
2022	Dec	1,063	894	1,238	1,071	907	1,247	8	0	25
2023	Jan	175	110	270	175	110	270	0	0	0
2023	Feb	916	642	1,296	466	356	589	352	215	579
2023	Mar	143	97	213	143	96	201	0	0	0
2023	Apr	930	633	1,359	238	179	325	687	440	1,068
2023	May	423	336	533	410	324	517	16	6	77
2023	Jun	475	374	575	458	363	575	37	19	83
2023	Jul	2,533	1,873	3,133	2,028	1,495	2,593	330	206	539
2023	Aug	423	330	513	423	330	513	0	0	0
2023	Sep	106	67	174	82	49	143	8	0	24

D.3 Razorbill

Table D. 7: Razorbill MRSea 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	848	708	1,002	837	697	984	23	0	71
2021	Jul	1,980	1,645	2,419	1,990	1,611	2,359	26	13	83
2021	Aug	46	24	201	46	24	201	0	0	0
2021	Sep	194	139	290	194	139	290	0	0	0
2021	Oct	31	11	78	31	11	78	0	0	0
2021	Nov	18	6	71	18	6	71	0	0	0
2021	Dec	60	26	219	60	26	219	0	0	0
2022	Jan	22	8	62	22	8	62	0	0	0
2022	Feb	65	28	147	65	28	147	0	0	0
2022	Mar	20	9	138	21	6	72	0	0	0
2022	Apr	115	77	309	14	4	44	74	47	198
2022	May	74	48	221	74	48	221	0	0	0
2022	Jun	6	1	76	6	1	76	0	0	0
2022	Jul	1,237	1,062	1,422	1,237	1,062	1,422	0	0	0
2022	Aug	6,075	5,298	6,910	6,075	5,298	6,910	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	206	149	320	206	149	320	0	0	0
2022	Oct	234	180	383	234	180	383	0	0	0
2022	Nov	933	758	1,134	933	758	1,134	0	0	0
2022	Dec	171	132	336	171	132	336	0	0	0
2023	Jan	67	28	152	67	28	152	0	0	0
2023	Feb	33	15	105	20	6	115	8	0	24
2023	Mar	154	104	271	59	35	177	93	36	348
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	112	70	226	112	70	226	0	0	0
2023	Jun	36	20	205	36	20	205	0	0	0
2023	Jul	60	17	227	62	20	208	0	0	10
2023	Aug	20	0	50	19	0	50	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table D. 8: Razorbill MRSea estimates for the Morven South 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	647	529	777	615	507	732	23	0	70
2021	Jul	1,411	1,127	1,753	1,356	1,067	1,625	23	11	74
2021	Aug	23	13	120	23	13	120	0	0	0
2021	Sep	90	56	156	90	56	156	0	0	0
2021	Oct	23	8	58	23	8	58	0	0	0
2021	Nov	8	2	39	8	2	39	0	0	0
2021	Dec	56	24	204	56	24	204	0	0	0
2022	Jan	13	4	39	13	4	39	0	0	0
2022	Feb	53	23	120	53	23	120	0	0	0
2022	Mar	20	9	137	21	6	70	0	0	0
2022	Apr	53	30	125	4	1	17	35	20	95
2022	May	47	28	152	47	28	152	0	0	0
2022	Jun	1	0	20	1	0	20	0	0	0
2022	Jul	852	713	988	852	713	988	0	0	0
2022	Aug	4,459	3,806	5,089	4,459	3,806	5,089	0	0	0
2022	Sep	134	89	213	134	89	213	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	170	122	275	170	122	275	0	0	0
2022	Nov	751	593	918	751	593	918	0	0	0
2022	Dec	136	99	261	136	99	261	0	0	0
2023	Jan	55	23	119	55	23	119	0	0	0
2023	Feb	9	3	36	3	0	29	7	0	23
2023	Mar	125	78	205	27	14	85	86	32	295
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	61	33	120	61	33	120	0	0	0
2023	Jun	22	11	171	22	11	171	0	0	0
2023	Jul	43	12	152	41	12	124	0	0	7
2023	Aug	19	0	50	19	0	47	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

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

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	467	363	572	425	344	509	21	0	72
2021	Jul	899	674	1,154	814	620	998	15	6	54
2021	Aug	9	3	57	9	3	57	0	0	0
2021	Sep	32	14	74	32	14	74	0	0	0
2021	Oct	16	5	40	16	5	40	0	0	0
2021	Nov	3	0	18	3	0	18	0	0	0
2021	Dec	50	21	174	50	21	174	0	0	0
2022	Jan	7	2	25	7	2	25	0	0	0
2022	Feb	40	16	88	40	16	88	0	0	0
2022	Mar	20	8	135	21	6	70	0	0	0
2022	Apr	37	18	89	1	0	7	27	13	76
2022	May	23	12	80	23	12	80	0	0	0
2022	Jun	0	0	7	0	0	7	0	0	0
2022	Jul	569	466	667	569	466	667	0	0	0
2022	Aug	3,045	2,497	3,535	3,045	2,497	3,535	0	0	0
2022	Sep	80	45	136	80	45	136	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	121	78	200	121	78	200	0	0	0
2022	Nov	558	438	690	558	438	690	0	0	0
2022	Dec	94	60	197	94	60	197	0	0	0
2023	Jan	42	17	89	42	17	89	0	0	0
2023	Feb	2	0	13	0	0	10	0	0	0
2023	Mar	108	64	174	13	5	46	71	26	223
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	34	15	75	34	15	75	0	0	0
2023	Jun	14	6	124	14	6	124	0	0	0
2023	Jul	31	7	112	27	8	89	0	0	5
2023	Aug	10	0	31	9	0	28	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

D.4 Puffin

Table D. 10: Puffin MRSea 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	318	240	440	318	240	440	0	0	0
2021	Jul	161	107	261	107	69	184	52	25	104
2021	Aug	41	15	119	41	15	119	0	0	0
2021	Sep	345	272	448	345	272	448	0	0	0
2021	Oct	10	2	47	10	2	47	0	0	0
2021	Nov	28	0	59	28	0	55	0	0	0
2021	Dec	10	2	52	10	2	52	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	32	0	80	32	0	85	0	0	0
2022	Apr	9	0	28	9	0	28	0	0	0
2022	May	33	14	143	33	14	143	0	0	0
2022	Jun	32	13	73	32	13	73	0	0	0
2022	Jul	20	8	89	21	8	101	0	0	0
2022	Aug	214	159	311	201	145	300	22	0	64

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	907	768	1,094	907	768	1,094	0	0	0
2022	Oct	33	14	102	29	0	68	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	59	26	105	59	26	105	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	49	28	157	53	28	148	0	0	0
2023	Mar	60	35	153	60	35	153	0	0	0
2023	Apr	40	20	81	30	15	216	0	0	0
2023	May	162	115	254	162	115	254	0	0	0
2023	Jun	101	59	174	101	59	174	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	37	19	153	37	19	153	0	0	0

Table D. 11: Puffin MRSea estimates for the Morven South 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	239	178	326	239	178	326	0	0	0
2021	Jul	77	48	130	50	28	91	39	18	79
2021	Aug	27	9	82	27	9	82	0	0	0
2021	Sep	206	152	281	206	152	281	0	0	0
2021	Oct	4	0	25	4	0	25	0	0	0
2021	Nov	18	0	42	17	0	42	0	0	0
2021	Dec	9	2	44	9	2	44	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	32	0	80	29	0	74	0	0	0
2022	Apr	9	0	27	9	0	26	0	0	0
2022	May	26	10	103	26	10	103	0	0	0
2022	Jun	24	10	55	24	10	55	0	0	0
2022	Jul	18	7	79	15	5	75	0	0	0
2022	Aug	128	88	193	114	75	173	0	0	0
2022	Sep	661	542	794	661	542	794	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	20	8	71	20	0	49	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	43	19	77	43	19	77	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	39	22	121	40	20	120	0	0	0
2023	Mar	39	20	99	39	20	99	0	0	0
2023	Apr	25	11	55	23	10	134	0	0	0
2023	May	84	54	141	84	54	141	0	0	0
2023	Jun	73	40	131	73	40	131	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	18	8	87	18	8	87	0	0	0

Table D. 12: Puffin MRSea estimates for the Morven South 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 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	41	25	126	0	0	0	47	25	100
2021	Jul	248	154	393	182	131	276	80	58	196
2021	Aug	714	594	824	451	356	558	263	194	333
2021	Sep	380	303	499	276	207	450	106	76	211
2021	Oct	635	514	761	397	315	501	228	147	334
2021	Nov	659	546	788	437	352	551	230	172	322
2021	Dec	246	189	344	40	23	170	197	144	290
2022	Jan	30	13	72	0	0	0	30	13	72
2022	Feb	133	85	184	40	22	138	89	57	134
2022	Mar	59	38	170	8	0	24	52	30	123
2022	Apr	48	23	91	7	0	23	43	21	87
2022	May	53	29	154	8	0	25	51	27	95
2022	Jun	433	67	5,820	69	0	8,309	357	200	771
2022	Jul	23	10	54	8	0	24	7	0	24
2022	Aug	48	29	148	8	0	26	38	17	77

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	110	72	178	75	51	158	37	23	128
2022	Oct	63	41	175	49	31	182	17	0	38
2022	Nov	177	122	256	104	67	174	74	41	122
2022	Dec	197	152	309	67	39	135	130	96	231
2023	Jan	285	222	382	49	28	129	231	172	305
2023	Feb	118	77	201	39	15	80	76	46	153
2023	Mar	237	176	335	135	92	220	104	72	176
2023	Apr	16	0	50	0	0	0	16	0	46
2023	May	232	177	312	132	94	223	113	80	195
2023	Jun	14	6	141	8	0	25	8	0	25
2023	Jul	28	12	74	16	5	72	8	0	24
2023	Aug	220	162	307	45	27	143	176	123	245
2023	Sep	234	175	340	157	109	260	91	55	155

Table D. 14: Fulmar MRSea estimates for the Morven South 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 South Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	24	12	78	0	0	0	20	9	46
2021	Jul	105	61	173	32	16	58	37	20	86
2021	Aug	397	317	471	231	178	285	129	94	163
2021	Sep	182	131	251	115	72	190	86	62	167
2021	Oct	312	250	376	239	179	312	117	74	170
2021	Nov	292	222	368	206	145	274	84	55	122
2021	Dec	103	71	149	21	10	78	83	53	125
2022	Jan	16	7	34	0	0	0	16	7	34
2022	Feb	68	43	95	18	8	63	44	28	65
2022	Mar	32	17	78	0	0	0	33	17	78
2022	Apr	34	15	64	7	0	22	27	11	57
2022	May	12	5	37	0	0	0	22	11	42
2022	Jun	219	30	2,181	29	0	3,215	203	100	411
2022	Jul	6	2	14	0	0	0	8	0	24
2022	Aug	26	13	75	0	0	0	26	10	56
2022	Sep	74	45	118	60	37	119	9	3	40

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	20	9	66	6	1	48	10	0	29
2022	Nov	116	75	170	74	43	127	30	16	51
2022	Dec	88	57	142	50	28	96	41	25	77
2023	Jan	126	88	177	13	4	48	114	82	152
2023	Feb	61	38	101	20	8	40	51	28	102
2023	Mar	111	72	164	54	32	92	60	38	106
2023	Apr	14	0	46	0	0	0	15	0	47
2023	May	97	65	148	54	32	103	56	33	102
2023	Jun	9	3	92	0	0	0	7	0	23
2023	Jul	15	5	44	4	1	26	8	0	23
2023	Aug	85	58	122	19	9	58	97	66	135
2023	Sep	161	110	231	102	64	163	59	33	101

D.6 Gannet

Table D. 16: Gannet MRSea 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	504	404	619	197	141	306	320	247	424
2021	Jul	1,397	1,228	1,568	634	528	762	763	630	908
2021	Aug	163	118	242	65	37	156	111	72	184
2021	Sep	502	406	621	199	149	279	309	237	417
2021	Oct	166	119	248	38	20	123	127	91	212
2021	Nov	16	4	46	14	5	89	0	0	0
2021	Dec	15	0	39	0	0	0	16	0	39
2022	Jan	10	0	30	0	0	0	10	0	29
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	8	0	23	0	0	0	8	0	24
2022	Apr	36	16	81	0	0	0	29	15	60
2022	May	272	205	362	45	25	108	228	169	346
2022	Jun	336	218	526	70	10	351	258	195	359
2022	Jul	252	178	353	105	67	166	145	101	234
2022	Aug	288	217	393	74	47	146	223	160	320

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	29	16	113	0	0	0	26	16	150
2022	Oct	77	50	166	31	16	110	51	33	156
2022	Nov	19	5	47	19	5	49	0	0	0
2022	Dec	46	22	96	24	0	48	18	0	45
2023	Jan	7	0	24	0	0	0	8	0	25
2023	Feb	8	0	24	0	0	0	8	0	23
2023	Mar	107	69	193	7	0	23	97	64	189
2023	Apr	145	108	241	8	0	29	137	100	231
2023	May	307	227	397	133	85	198	165	112	236
2023	Jun	65	38	131	24	12	100	43	23	122
2023	Jul	597	482	717	243	179	327	343	271	443
2023	Aug	694	561	832	323	255	441	379	287	488
2023	Sep	58	39	202	19	7	61	43	27	177

Table D. 17: Gannet MRSea estimates for the Morven South 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	317	242	395	93	65	146	221	168	293
2021	Jul	964	831	1,088	415	344	504	526	432	631
2021	Aug	130	90	195	43	22	97	90	56	149
2021	Sep	334	267	414	131	93	191	201	146	271
2021	Oct	121	82	184	34	17	105	89	62	147
2021	Nov	13	4	39	8	2	65	0	0	0
2021	Dec	8	0	23	0	0	0	7	0	22
2022	Jan	9	0	30	0	0	0	9	0	29
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	7	0	25	0	0	0	8	0	24
2022	Apr	17	7	44	0	0	0	17	9	38
2022	May	201	147	267	31	16	81	168	117	246
2022	Jun	230	141	362	62	8	330	168	120	233
2022	Jul	158	107	222	66	40	109	92	61	154
2022	Aug	205	149	280	57	33	112	142	99	211
2022	Sep	23	12	86	0	0	0	20	9	113

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	58	35	124	28	13	95	28	14	82
2022	Nov	13	4	34	13	4	35	0	0	0
2022	Dec	34	16	70	23	0	49	9	0	28
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	7	0	23	0	0	0	7	0	23
2023	Mar	77	49	141	0	0	0	74	47	143
2023	Apr	119	84	194	7	0	22	113	79	187
2023	May	217	157	286	95	61	140	110	74	157
2023	Jun	50	28	103	16	7	67	40	22	115
2023	Jul	449	355	545	185	136	249	274	209	355
2023	Aug	502	404	604	228	176	307	284	214	363
2023	Sep	48	30	174	12	4	47	37	21	132

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

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	185	131	240	50	29	85	148	106	208
2021	Jul	615	525	704	245	190	308	360	283	445
2021	Aug	96	63	146	34	16	79	66	38	112
2021	Sep	207	161	258	81	53	122	119	79	166
2021	Oct	80	50	125	27	13	89	54	33	95
2021	Nov	10	3	28	4	1	40	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0
2022	Jan	10	0	29	0	0	0	10	0	29
2022	Feb	0	0	0	0	0	0	0	0	0
2022	Mar	7	0	25	0	0	0	8	0	23
2022	Apr	7	2	23	0	0	0	9	5	22
2022	May	160	109	219	20	9	56	139	92	204
2022	Jun	123	68	214	51	6	278	88	59	131
2022	Jul	84	54	124	37	21	63	55	32	99
2022	Aug	133	93	187	42	23	83	83	51	132
2022	Sep	19	8	70	0	0	0	17	7	97

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	41	23	90	23	10	75	16	6	55
2022	Nov	9	2	23	9	2	24	0	0	0
2022	Dec	23	11	45	8	0	23	9	0	28
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	7	0	23	0	0	0	7	0	23
2023	Mar	48	28	88	0	0	0	49	28	100
2023	Apr	90	56	145	8	0	27	92	59	150
2023	May	142	99	188	61	37	91	69	44	100
2023	Jun	38	20	80	8	3	39	34	18	95
2023	Jul	317	245	387	132	95	181	203	151	267
2023	Aug	344	276	411	142	102	197	200	149	257
2023	Sep	38	22	133	5	1	30	32	17	105

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

E.1 Kittiwake

Table E. 1: Kittiwake 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	3,557	3,043	4,110	1,739	1,391	2,103	1,818	1,469	2,233
2021	Jul	8	1	25	8	1	25	0	0	0
2021	Aug	25	3	50	16	2	41	8	1	25
2021	Sep	589	326	901	263	67	528	326	159	521
2021	Oct	109	24	222	0	0	0	109	24	222
2021	Nov	75	33	126	0	0	0	75	33	126
2021	Dec	50	17	92	8	1	25	42	8	83
2022	Jan	16	2	41	0	0	0	16	2	41
2022	Feb	50	16	91	25	3	58	24	3	58
2022	Mar	59	25	107	25	3	58	34	8	67
2022	Apr	211	130	310	16	2	41	194	114	285
2022	May	318	193	458	99	12	209	219	134	307
2022	Jun	951	540	1,553	284	142	449	667	307	1,256

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Jul	852	455	1,369	471	148	952	381	199	632
2022	Aug	57	8	133	17	2	42	40	5	115
2022	Sep	17	2	42	0	0	0	17	2	42
2022	Oct	16	2	42	0	0	0	16	2	42
2022	Nov	60	17	109	10	1	33	49	16	99
2022	Dec	177	93	267	9	1	25	169	91	258
2023	Jan	40	8	81	8	1	24	32	8	65
2023	Feb	45	8	98	28	3	73	17	2	42
2023	Mar	65	25	114	8	1	25	57	16	106
2023	Apr	75	33	124	8	1	25	67	25	116
2023	May	267	99	537	16	2	50	251	83	522
2023	Jun	58	17	107	0	0	0	58	17	107
2023	Jul	33	8	74	33	8	74	0	0	0
2023	Aug	49	8	108	0	0	0	49	8	108
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 2: Kittiwake design-based estimates for the Morven South 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	2,510	2,133	2,947	1,250	954	1,557	1,260	994	1,593
2021	Jul	8	1	24	8	1	24	0	0	0
2021	Aug	16	2	40	16	2	40	0	0	0
2021	Sep	422	177	693	203	25	430	219	81	379
2021	Oct	39	8	87	0	0	0	39	8	87
2021	Nov	74	32	122	0	0	0	74	32	122
2021	Dec	33	8	72	0	0	0	33	8	72
2022	Jan	16	2	40	0	0	0	16	2	40
2022	Feb	48	16	88	24	3	56	24	3	56
2022	Mar	48	16	88	15	2	40	33	8	64
2022	Apr	174	95	260	16	2	39	158	86	243
2022	May	241	136	367	72	9	187	169	104	240
2022	Jun	712	351	1,265	152	56	274	560	225	1,105
2022	Jul	308	183	467	96	48	159	213	104	372
2022	Aug	56	8	127	16	2	40	40	5	110
2022	Sep	16	2	41	0	0	0	16	2	41

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	50	16	91	10	1	34	40	8	79
2022	Dec	120	49	193	0	0	0	120	49	193
2023	Jan	23	3	47	0	0	0	23	3	47
2023	Feb	24	3	56	8	1	24	16	2	40
2023	Mar	54	16	102	8	1	24	47	16	87
2023	Apr	64	24	112	8	1	24	56	16	97
2023	May	209	63	405	17	2	63	192	48	398
2023	Jun	47	16	88	0	0	0	47	16	88
2023	Jul	16	2	40	16	2	40	0	0	0
2023	Aug	22	3	72	0	0	0	22	3	72
2023	Sep	0	0	0	0	0	0	0	0	0

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

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	1,698	1,338	2,073	891	623	1,164	806	590	1,061
2021	Jul	0	0	0	0	0	0	0	0	0
2021	Aug	16	2	40	16	2	40	0	0	0
2021	Sep	263	65	497	114	14	301	149	40	297
2021	Oct	40	8	87	0	0	0	40	8	87
2021	Nov	24	3	56	0	0	0	24	3	56
2021	Dec	32	8	64	0	0	0	32	8	64
2022	Jan	16	2	39	0	0	0	16	2	39
2022	Feb	31	4	64	15	2	40	16	2	40
2022	Mar	40	8	79	8	1	24	31	8	64
2022	Apr	110	55	173	16	2	40	94	39	152
2022	May	176	96	270	31	4	97	144	81	212
2022	Jun	297	160	467	88	11	193	209	104	353
2022	Jul	203	118	309	56	16	96	147	64	245
2022	Aug	24	3	55	16	2	40	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	24	3	55	9	1	28	15	2	39
2022	Dec	96	32	163	0	0	0	96	32	163
2023	Jan	16	2	39	0	0	0	16	2	39
2023	Feb	16	2	40	8	1	24	8	1	24
2023	Mar	23	3	54	8	1	24	15	2	39
2023	Apr	32	8	64	8	1	24	24	3	55
2023	May	56	16	103	15	2	48	40	8	80
2023	Jun	38	8	79	0	0	0	38	8	79
2023	Jul	16	2	40	16	2	40	0	0	0
2023	Aug	22	3	72	0	0	0	22	3	72
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	8	1	25	0	0	0	8	1	25
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	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	123	0	0	0	41	5	123

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	17	2	41	0	0	0	17	2	41
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. 5: Common gull design-based estimates for the Morven South 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	8	1	24	0	0	0	8	1	24
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	39	5	127	0	0	0	39	5	127
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	16	2	40	0	0	0	16	2	40
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. 6: Common gull design-based estimates for the Morven South 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	8	1	24	0	0	0	8	1	24
2021	Nov	8	1	32	0	0	0	8	1	32
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	8	1	24	0	0	0	8	1	24
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 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	8	1	25	0	0	0	8	1	25
2021	Nov	25	3	58	17	2	42	8	1	25
2021	Dec	8	1	25	8	1	25	0	0	0
2022	Jan	8	1	25	0	0	0	8	1	25
2022	Feb	16	2	41	0	0	0	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	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	34	8	75	34	8	75	0	0	0
2023	Jan	8	1	24	0	0	0	8	1	24
2023	Feb	8	1	25	0	0	0	8	1	25
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. 8: Great black-backed gull design-based estimates for the Morven South 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	16	2	40	8	1	24	8	1	24
2021	Dec	8	1	24	8	1	24	0	0	0
2022	Jan	8	1	24	0	0	0	8	1	24
2022	Feb	16	2	40	0	0	0	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	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	31	8	65	31	8	65	0	0	0
2023	Jan	8	1	23	0	0	0	8	1	23
2023	Feb	8	1	24	0	0	0	8	1	24
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. 9: Great black-backed gull design-based estimates for the Morven South 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	8	1	24	0	0	0	8	1	24
2021	Dec	8	1	24	8	1	24	0	0	0
2022	Jan	8	1	24	0	0	0	8	1	24
2022	Feb	16	2	40	0	0	0	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	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	16	2	41	16	2	41	0	0	0
2023	Jan	7	1	24	0	0	0	7	1	24
2023	Feb	8	1	24	0	0	0	8	1	24
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 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	9	1	25	9	1	25	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	8	1	33	8	1	33	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	8	1	25	0	0	0	8	1	25
2022	Oct	9	1	25	0	0	0	9	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	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	9	1	25	0	0	0	9	1	25

Table E. 11: Herring gull design-based estimates for the Morven South 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	8	1	25	8	1	25	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	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	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	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	24	0	0	0	8	1	24

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

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	8	1	25	8	1	25	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	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	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	24	0	0	0	8	1	24

E.5 Arctic tern

Table E. 13: Arctic tern 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	24	0	66	0	0	0	24	0	66
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	17	2	50	0	0	0	17	2	50
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	2,810	1,818	3,906	420	156	738	2,390	1,527	3,494

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	8	0	25	0	0	0	8	0	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. 14: Arctic tern design-based estimates for the Morven South 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	8	0	24	0	0	0	8	0	24
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	15	2	49	0	0	0	15	2	49
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	1,728	1,015	2,570	237	63	466	1,491	803	2,366
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	8	0	24	0	0	0	8	0	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. 15: Arctic tern design-based estimates for the Morven South 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	16	2	48	0	0	0	16	2	48
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	0	0	0	0	0	0	0	0	0
2022	Aug	842	526	1,237	169	16	390	672	403	1,010
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	8	0	24	0	0	0	8	0	24
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.6 Great skua

Table E. 16: Great skua 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	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. 17: Great skua design-based estimates for the Morven South 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	8	1	24	0	0	0	8	1	24

Table E. 18: Great skua design-based estimates for the Morven South 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	8	1	24	0	0	0	8	1	24

E.7 Arctic skua

Table E. 19: Arctic skua design-based estimates for the Morven South Boundary + 4km buffer

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

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. 20: Arctic skua design-based estimates for the Morven South Boundary + 2km buffer

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. 21: Arctic skua design-based estimates for the Morven South Boundary only

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.8 Common guillemot

Table E. 22: Common guillemot 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	5,399	4,600	6,206	5,366	4,581	6,167	33	4	67
2021	Jul	4,622	3,899	5,325	4,562	3,862	5,253	60	16	132
2021	Aug	1,178	874	1,488	1,178	874	1,488	0	0	0
2021	Sep	3,506	2,680	4,385	3,498	2,673	4,368	9	1	25
2021	Oct	1,023	787	1,263	1,022	787	1,263	0	0	0
2021	Nov	3,129	2,690	3,611	3,129	2,690	3,611	0	0	0
2021	Dec	973	738	1,226	973	738	1,226	0	0	0
2022	Jan	672	502	855	655	483	839	17	2	41
2022	Feb	1,952	1,657	2,263	1,952	1,657	2,263	0	0	0
2022	Mar	1,178	910	1,511	1,041	826	1,274	137	16	355
2022	Apr	581	389	819	287	169	423	294	139	503
2022	May	1,079	831	1,357	1,054	804	1,329	25	3	58
2022	Jun	886	611	1,169	844	585	1,117	42	5	126
2022	Jul	9,744	8,760	10,709	9,744	8,760	10,709	0	0	0
2022	Aug	17,488	14,678	20,715	17,462	14,637	20,714	25	2	74

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	755	511	1,008	755	511	1,008	0	0	0
2022	Oct	3,410	2,933	3,907	3,394	2,914	3,890	17	2	42
2022	Nov	3,729	3,222	4,273	3,635	3,152	4,158	94	1	281
2022	Dec	2,205	1,868	2,569	2,181	1,859	2,550	24	3	67
2023	Jan	324	205	446	324	205	446	0	0	0
2023	Feb	1,705	1,229	2,270	1,064	789	1,355	641	267	1,126
2023	Mar	308	196	436	280	172	386	28	2	106
2023	Apr	1,143	575	1,781	344	192	517	799	290	1,408
2023	May	807	565	1,074	790	544	1,049	17	2	50
2023	Jun	816	622	1,041	767	573	987	49	8	107
2023	Jul	3,884	3,091	4,833	3,164	2,541	3,844	721	265	1,366
2023	Aug	1,166	870	1,478	1,166	870	1,478	9	1	25
2023	Sep	249	141	369	240	131	359	9	1	25

Table E. 23: Common guillemot design-based estimates for the Morven South 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	3,731	3,126	4,403	3,699	3,102	4,362	32	8	65
2021	Jul	3,392	2,811	4,020	3,368	2,795	3,996	24	3	56
2021	Aug	878	635	1,124	878	635	1,124	0	0	0
2021	Sep	2,114	1,506	2,800	2,114	1,506	2,800	0	0	0
2021	Oct	765	577	964	765	577	964	0	0	0
2021	Nov	2,261	1,889	2,645	2,261	1,889	2,645	0	0	0
2021	Dec	722	532	929	722	532	929	0	0	0
2022	Jan	458	317	615	450	309	601	8	1	24
2022	Feb	1,453	1,199	1,717	1,453	1,199	1,717	0	0	0
2022	Mar	938	710	1,210	835	638	1,052	102	13	293
2022	Apr	516	323	735	247	144	373	269	119	462
2022	May	711	528	924	695	514	908	16	2	40
2022	Jun	568	383	784	568	383	784	0	0	0
2022	Jul	6,492	5,703	7,319	6,492	5,703	7,319	0	0	0
2022	Aug	11,784	9,857	13,960	11,769	9,849	13,952	15	2	40
2022	Sep	522	344	725	522	344	725	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	2,439	2,033	2,879	2,423	2,013	2,861	16	2	41
2022	Nov	2,690	2,294	3,161	2,610	2,224	3,054	80	0	240
2022	Dec	1,689	1,377	2,021	1,664	1,353	1,986	25	3	65
2023	Jan	238	141	349	238	141	349	0	0	0
2023	Feb	1,107	822	1,432	738	552	958	370	152	619
2023	Mar	225	134	326	225	134	326	0	0	0
2023	Apr	1,010	507	1,640	270	145	416	740	266	1,374
2023	May	474	281	677	458	270	657	16	2	48
2023	Jun	537	382	709	505	350	675	32	4	80
2023	Jul	3,045	2,303	3,805	2,486	1,924	3,071	559	136	1,098
2023	Aug	863	606	1,131	863	606	1,131	8	1	24
2023	Sep	177	91	281	169	83	272	8	1	24

Table E. 24: Common guillemot design-based estimates for the Morven South Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	2,499	2,041	2,997	2,475	2,015	2,965	24	3	56
2021	Jul	2,104	1,675	2,581	2,081	1,647	2,558	23	3	48
2021	Aug	625	430	838	625	430	838	0	0	0
2021	Sep	1,504	1,061	2,095	1,504	1,061	2,095	0	0	0
2021	Oct	557	405	721	557	405	721	0	0	0
2021	Nov	1,592	1,289	1,893	1,592	1,289	1,893	0	0	0
2021	Dec	477	347	632	477	347	632	0	0	0
2022	Jan	305	194	425	305	194	425	0	0	0
2022	Feb	1,027	836	1,251	1,027	836	1,251	0	0	0
2022	Mar	728	510	975	631	448	815	97	12	282
2022	Apr	408	240	619	174	92	267	233	79	437
2022	May	499	330	701	491	316	693	8	1	32
2022	Jun	416	242	622	416	242	622	0	0	0
2022	Jul	4,160	3,585	4,816	4,160	3,585	4,816	0	0	0
2022	Aug	8,262	6,571	10,310	8,262	6,571	10,310	0	0	0
2022	Sep	243	134	371	243	134	371	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	1,765	1,417	2,153	1,749	1,404	2,135	16	2	48
2022	Nov	1,831	1,479	2,211	1,831	1,479	2,211	0	0	0
2022	Dec	1,156	900	1,414	1,148	893	1,406	8	1	25
2023	Jan	177	93	266	177	93	266	0	0	0
2023	Feb	749	505	1,041	428	302	570	321	120	576
2023	Mar	176	98	264	176	98	264	0	0	0
2023	Apr	671	306	1,166	241	126	375	430	105	902
2023	May	302	173	459	286	161	442	16	2	48
2023	Jun	367	241	513	350	224	493	16	2	48
2023	Jul	2,342	1,718	3,101	1,887	1,372	2,460	455	88	1,026
2023	Aug	385	231	575	385	231	575	0	0	0
2023	Sep	153	63	255	145	62	244	8	1	24

E.9 Razorbill

Table E. 25: Razorbill 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	907	679	1,156	881	639	1,125	26	3	68
2021	Jul	1,412	1,059	1,812	1,395	1,047	1,800	17	2	42
2021	Aug	50	11	105	50	11	105	0	0	0
2021	Sep	161	63	289	161	63	289	0	0	0
2021	Oct	33	2	86	33	2	86	0	0	0
2021	Nov	25	2	65	25	2	65	0	0	0
2021	Dec	66	3	147	66	3	147	0	0	0
2022	Jan	40	3	88	40	3	88	0	0	0
2022	Feb	72	15	140	72	15	140	0	0	0
2022	Mar	23	2	59	23	2	59	0	0	0
2022	Apr	72	15	152	13	1	46	58	7	138
2022	May	74	21	147	74	21	147	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	1,300	926	1,674	1,300	926	1,674	0	0	0
2022	Aug	5,532	4,552	6,645	5,532	4,552	6,645	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	218	71	425	218	71	425	0	0	0
2022	Oct	241	131	371	241	131	371	0	0	0
2022	Nov	905	652	1,179	905	652	1,179	0	0	0
2022	Dec	179	70	315	179	70	315	0	0	0
2023	Jan	73	15	140	73	15	140	0	0	0
2023	Feb	51	8	110	26	2	67	25	3	68
2023	Mar	165	36	321	61	14	117	104	9	258
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	120	34	231	120	34	231	0	0	0
2023	Jun	34	3	77	34	3	77	0	0	0
2023	Jul	59	10	122	59	10	122	0	0	0
2023	Aug	23	2	59	23	2	59	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 26: Razorbill design-based estimates for the Morven South 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	598	416	792	574	395	770	24	3	65
2021	Jul	1,130	831	1,478	1,114	813	1,467	16	2	40
2021	Aug	12	1	38	12	1	38	0	0	0
2021	Sep	123	41	245	123	41	245	0	0	0
2021	Oct	33	2	86	33	2	86	0	0	0
2021	Nov	12	1	37	12	1	37	0	0	0
2021	Dec	61	3	136	61	3	136	0	0	0
2022	Jan	13	1	42	13	1	42	0	0	0
2022	Feb	56	13	114	56	13	114	0	0	0
2022	Mar	23	2	58	23	2	58	0	0	0
2022	Apr	55	7	134	0	0	0	55	7	134
2022	May	60	10	119	60	10	119	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	981	705	1,280	981	705	1,280	0	0	0
2022	Aug	3,838	2,954	4,755	3,838	2,954	4,755	0	0	0
2022	Sep	157	34	321	157	34	321	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	195	97	308	195	97	308	0	0	0
2022	Nov	762	537	998	762	537	998	0	0	0
2022	Dec	135	29	267	135	29	267	0	0	0
2023	Jan	74	18	141	74	18	141	0	0	0
2023	Feb	8	1	26	0	0	0	8	1	26
2023	Mar	108	22	233	37	3	79	72	9	190
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	68	6	161	68	6	161	0	0	0
2023	Jun	21	2	57	21	2	57	0	0	0
2023	Jul	49	10	108	49	10	108	0	0	0
2023	Aug	22	2	55	22	2	55	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 27: Razorbill design-based estimates for the Morven South Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	444	292	623	420	273	586	24	3	65
2021	Jul	745	513	1,028	737	506	1,026	8	1	24
2021	Aug	0	0	0	0	0	0	0	0	0
2021	Sep	41	4	85	41	4	85	0	0	0
2021	Oct	17	1	56	17	1	56	0	0	0
2021	Nov	0	0	0	0	0	0	0	0	0
2021	Dec	37	2	92	37	2	92	0	0	0
2022	Jan	12	1	41	12	1	41	0	0	0
2022	Feb	27	2	68	27	2	68	0	0	0
2022	Mar	22	2	56	22	2	56	0	0	0
2022	Apr	24	3	71	0	0	0	24	3	71
2022	May	29	3	68	29	3	68	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	678	449	930	678	449	930	0	0	0
2022	Aug	2,634	1,912	3,447	2,634	1,912	3,447	0	0	0
2022	Sep	133	14	305	133	14	305	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	162	72	267	162	72	267	0	0	0
2022	Nov	582	383	807	582	383	807	0	0	0
2022	Dec	108	15	219	108	15	219	0	0	0
2023	Jan	52	12	107	52	12	107	0	0	0
2023	Feb	0	0	0	0	0	0	0	0	0
2023	Mar	90	11	210	23	2	58	67	9	187
2023	Apr	0	0	0	0	0	0	0	0	0
2023	May	25	2	82	25	2	82	0	0	0
2023	Jun	20	2	51	20	2	51	0	0	0
2023	Jul	29	3	78	29	3	78	0	0	0
2023	Aug	11	1	41	11	1	41	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.10 Black guillemot

Table E. 28: Black guillemot 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	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	8	1	25	8	1	25	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 29: Black guillemot design-based estimates for the Morven South 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	8	1	24	8	1	24	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 30: Black guillemot design-based estimates for the Morven South 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	8	1	24	8	1	24	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.11 Puffin

Table E. 31: Puffin 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	312	187	460	312	187	460	0	0	0
2021	Jul	145	48	262	104	21	203	41	5	92
2021	Aug	40	10	80	40	10	80	0	0	0
2021	Sep	382	245	540	382	245	540	0	0	0
2021	Oct	20	2	48	20	2	48	0	0	0
2021	Nov	30	3	70	30	3	70	0	0	0
2021	Dec	10	1	29	10	1	29	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	31	3	88	31	3	88	0	0	0
2022	Apr	10	1	33	10	1	33	0	0	0
2022	May	39	10	80	39	10	80	0	0	0
2022	Jun	29	3	77	29	3	77	0	0	0
2022	Jul	21	2	60	21	2	60	0	0	0
2022	Aug	159	74	268	136	59	232	23	2	78

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	856	573	1,216	856	573	1,216	0	0	0
2022	Oct	29	3	69	29	3	69	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	60	20	111	60	20	111	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	61	10	120	61	10	120	0	0	0
2023	Mar	64	20	118	64	20	118	0	0	0
2023	Apr	30	3	70	30	3	70	0	0	0
2023	May	139	58	240	139	58	240	0	0	0
2023	Jun	110	40	186	110	40	186	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	29	3	67	29	3	67	0	0	0

Table E. 32: Puffin design-based estimates for the Morven South 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	226	124	348	226	124	348	0	0	0
2021	Jul	54	10	109	30	3	70	23	3	64
2021	Aug	28	3	65	28	3	65	0	0	0
2021	Sep	199	112	305	199	112	305	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	19	2	49	19	2	49	0	0	0
2021	Dec	9	1	28	9	1	28	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	30	3	82	30	3	82	0	0	0
2022	Apr	10	1	32	10	1	32	0	0	0
2022	May	28	3	66	28	3	66	0	0	0
2022	Jun	9	1	28	9	1	28	0	0	0
2022	Jul	19	2	58	19	2	58	0	0	0
2022	Aug	74	28	132	74	28	132	0	0	0
2022	Sep	677	431	965	677	431	965	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	19	2	48	19	2	48	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	39	10	81	39	10	81	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	39	4	89	39	4	89	0	0	0
2023	Mar	50	10	98	50	10	98	0	0	0
2023	Apr	20	2	48	20	2	48	0	0	0
2023	May	79	19	160	79	19	160	0	0	0
2023	Jun	74	20	138	74	20	138	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	19	2	47	19	2	47	0	0	0

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

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	182	85	282	182	85	282	0	0	0
2021	Jul	10	1	30	10	1	30	0	0	0
2021	Aug	19	2	48	19	2	48	0	0	0
2021	Sep	124	47	225	124	47	225	0	0	0
2021	Oct	0	0	0	0	0	0	0	0	0
2021	Nov	18	2	48	18	2	48	0	0	0
2021	Dec	10	1	28	10	1	28	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	19	2	65	19	2	65	0	0	0
2022	Apr	10	1	39	10	1	39	0	0	0
2022	May	19	2	49	19	2	49	0	0	0
2022	Jun	10	1	36	10	1	36	0	0	0
2022	Jul	19	2	59	19	2	59	0	0	0
2022	Aug	56	9	112	56	9	112	0	0	0
2022	Sep	516	291	804	516	291	804	0	0	0

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	19	2	48	19	2	48	0	0	0
2022	Nov	0	0	0	0	0	0	0	0	0
2022	Dec	19	2	49	19	2	49	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0
2023	Feb	20	2	51	20	2	51	0	0	0
2023	Mar	31	3	72	31	3	72	0	0	0
2023	Apr	20	2	55	20	2	55	0	0	0
2023	May	39	4	97	39	4	97	0	0	0
2023	Jun	56	10	111	56	10	111	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	10	1	28	10	1	28	0	0	0

E.12 Red-throated diver

Table E. 34: Red-throated diver 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	8	1	25	8	1	25	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	8	1	25	8	1	25	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	8	1	25	0	0	0	8	1	25
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. 35: Red-throated diver design-based estimates for the Morven South 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	8	1	24	8	1	24	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	8	1	24	8	1	24	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	8	1	24	0	0	0	8	1	24
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. 36: Red-throated diver design-based estimates for the Morven South 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	8	1	24	8	1	24	0	0	0
2022	Jun	0	0	0	0	0	0	0	0	0
2022	Jul	8	1	24	8	1	24	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.13 Fulmar

Table E. 37: Fulmar 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	42	8	84	0	0	0	42	8	84
2021	Jul	245	58	574	178	22	490	67	17	125
2021	Aug	735	577	908	471	347	605	265	174	369
2021	Sep	381	217	583	272	118	468	109	50	175
2021	Oct	646	492	820	409	279	565	237	147	336
2021	Nov	739	551	945	465	323	626	274	159	428
2021	Dec	241	150	333	41	8	91	201	125	283
2022	Jan	33	8	73	0	0	0	33	8	73
2022	Feb	140	74	207	41	8	82	99	49	157
2022	Mar	58	17	100	8	1	25	49	16	91
2022	Apr	50	16	90	8	1	25	41	8	82
2022	May	41	8	83	8	1	25	34	8	67
2022	Jun	962	434	1,669	623	116	1,346	340	208	492
2022	Jul	17	2	41	8	1	25	9	1	25
2022	Aug	41	8	82	8	1	25	33	8	66

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Sep	119	51	210	77	17	160	42	8	84
2022	Oct	68	25	126	51	8	109	17	2	42
2022	Nov	202	111	303	129	57	219	73	33	123
2022	Dec	198	101	326	67	8	159	132	59	218
2023	Jan	292	194	411	57	16	113	235	147	332
2023	Feb	122	58	191	47	10	89	75	33	133
2023	Mar	229	131	336	124	49	220	105	49	172
2023	Apr	16	2	42	0	0	0	16	2	42
2023	May	269	157	397	143	58	265	126	66	191
2023	Jun	17	2	41	8	1	25	8	1	25
2023	Jul	25	3	58	17	2	42	9	1	33
2023	Aug	225	141	307	50	16	99	175	107	248
2023	Sep	233	133	348	142	58	240	90	41	148

Table E. 38: Fulmar design-based estimates for the Morven South 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	25	3	57	0	0	0	25	3	57
2021	Jul	195	32	489	139	17	400	57	16	104
2021	Aug	524	401	661	341	245	448	183	118	263
2021	Sep	287	137	478	189	56	370	98	48	161
2021	Oct	513	373	665	347	223	486	166	95	245
2021	Nov	500	364	652	332	202	470	168	97	249
2021	Dec	162	96	239	34	4	79	129	72	193
2022	Jan	24	3	55	0	0	0	24	3	55
2022	Feb	95	40	152	32	4	64	63	24	112
2022	Mar	56	16	103	8	1	24	48	16	88
2022	Apr	40	8	78	8	1	24	32	8	70
2022	May	16	2	40	8	1	24	8	1	24
2022	Jun	874	325	1,604	584	72	1,331	289	167	441
2022	Jul	16	2	40	8	1	24	8	1	32
2022	Aug	39	8	79	7	1	24	32	8	64
2022	Sep	89	32	163	73	16	145	16	2	41

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	24	3	57	8	1	25	17	2	41
2022	Nov	181	87	282	125	48	214	56	16	103
2022	Dec	169	81	275	63	8	146	107	40	184
2023	Jan	210	133	298	40	8	86	170	101	249
2023	Feb	103	48	161	32	8	65	71	24	121
2023	Mar	165	86	259	71	16	134	93	40	156
2023	Apr	16	2	40	0	0	0	16	2	40
2023	May	166	95	247	72	24	128	94	40	152
2023	Jun	8	1	24	0	0	0	8	1	24
2023	Jul	16	2	40	8	1	24	8	1	24
2023	Aug	136	79	199	33	8	64	103	48	161
2023	Sep	184	103	272	112	47	192	72	32	127

Table E. 39: Fulmar design-based estimates for the Morven South Boundary only (no. of birds)

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2021	Jun	24	3	56	0	0	0	24	3	56
2021	Jul	32	8	71	0	0	0	32	8	71
2021	Aug	388	277	498	230	143	319	158	94	229
2021	Sep	188	89	314	98	24	214	90	40	146
2021	Oct	370	255	501	244	142	356	126	63	198
2021	Nov	290	184	412	209	112	322	81	40	134
2021	Dec	127	64	193	32	4	73	96	47	151
2022	Jan	24	3	55	0	0	0	24	3	55
2022	Feb	56	16	96	16	2	40	40	8	79
2022	Mar	23	3	55	0	0	0	23	3	55
2022	Apr	30	8	63	8	1	24	23	3	55
2022	May	8	1	24	0	0	0	8	1	24
2022	Jun	798	270	1,546	567	69	1,336	231	119	367
2022	Jul	8	1	24	0	0	0	8	1	24
2022	Aug	24	3	55	0	0	0	24	3	55
2022	Sep	64	24	115	48	8	96	16	2	41

Year	Month	All behaviours			Sitting only			Flying only		
		Pop	LCL	UCL	Pop	LCL	UCL	Pop	LCL	UCL
2022	Oct	16	2	41	9	1	25	8	1	24
2022	Nov	112	48	192	72	20	147	40	8	79
2022	Dec	82	16	171	66	8	154	16	2	41
2023	Jan	106	54	172	8	1	24	98	47	163
2023	Feb	79	32	135	24	3	56	55	17	97
2023	Mar	78	24	141	38	5	95	40	8	78
2023	Apr	16	2	40	0	0	0	16	2	40
2023	May	111	55	176	56	16	110	55	16	96
2023	Jun	7	1	24	0	0	0	7	1	24
2023	Jul	16	2	40	8	1	24	8	1	24
2023	Aug	97	47	160	16	2	40	81	33	137
2023	Sep	143	71	223	88	32	160	55	16	96

E.14 Manx shearwater

Table E. 40: Manx shearwater 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	147	68	250	114	36	211	33	8	67
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	0	0	0	0	0	0	0	0	0
2023	Jul	17	2	42	0	0	0	17	2	42
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 41: Manx shearwater design-based estimates for the Morven South 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	102	33	201	94	26	190	8	1	24
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	16	2	40	0	0	0	16	2	40
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

Table E. 42: Manx shearwater design-based estimates for the Morven South 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	82	17	172	74	16	164	8	1	24
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	16	2	41	0	0	0	16	2	41
2023	Aug	0	0	0	0	0	0	0	0	0
2023	Sep	0	0	0	0	0	0	0	0	0

E.15 Gannet

Table E. 43: Gannet design-based estimates for the Morven South 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	469	341	604	167	92	243	302	192	417	0	0	0
2021	Jul	1,120	890	1,372	484	365	612	635	440	849	0	0	0
2021	Aug	173	99	263	59	17	115	115	58	189	0	0	0
2021	Sep	502	367	650	219	133	325	283	183	400	0	0	0
2021	Oct	170	106	245	32	8	66	138	82	204	0	0	0
2021	Nov	17	2	42	17	2	42	0	0	0	0	0	0
2021	Dec	16	2	42	0	0	0	16	2	42	0	0	0
2022	Jan	8	1	25	0	0	0	8	1	25	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0	0	0	0
2022	Mar	8	1	25	0	0	0	8	1	25	0	0	0
2022	Apr	33	8	66	0	0	0	33	8	66	0	0	0
2022	May	250	108	433	49	17	92	202	67	375	0	0	0
2022	Jun	323	209	457	65	17	133	258	158	374	0	0	0
2022	Jul	279	123	488	124	41	255	155	41	332	0	0	0
2022	Aug	255	157	363	65	25	115	189	107	281	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	26	3	59	0	0	0	26	3	59	0	0	0
2022	Oct	93	42	152	34	8	68	59	17	110	0	0	0
2022	Nov	24	3	58	24	3	58	0	0	0	0	0	0
2022	Dec	42	8	84	25	3	58	17	2	50	0	0	0
2023	Jan	7	1	24	0	0	0	7	1	24	0	0	0
2023	Feb	8	1	25	0	0	0	8	1	25	0	0	0
2023	Mar	106	49	179	8	1	25	98	41	171	0	0	0
2023	Apr	148	50	265	8	1	25	140	50	257	0	0	0
2023	May	297	198	410	140	75	208	149	75	240	8	1	25
2023	Jun	66	17	124	25	3	58	42	8	91	0	0	0
2023	Jul	603	422	819	245	141	373	358	214	548	0	0	0
2023	Aug	691	546	848	314	216	414	377	264	490	0	0	0
2023	Sep	67	25	116	17	2	42	50	17	91	0	0	0

Table E. 44: Gannet design-based estimates for the Morven South Boundary + 2km 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	323	212	443	82	33	137	242	139	354	0	0	0
2021	Jul	762	581	958	290	195	388	473	317	659	0	0	0
2021	Aug	136	72	209	48	8	95	88	40	144	0	0	0
2021	Sep	313	210	423	120	64	183	194	106	288	0	0	0
2021	Oct	118	63	182	32	8	70	86	39	143	0	0	0
2021	Nov	16	2	40	16	2	40	0	0	0	0	0	0
2021	Dec	8	1	24	0	0	0	8	1	24	0	0	0
2022	Jan	8	1	24	0	0	0	8	1	24	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0	0	0	0
2022	Mar	8	1	24	0	0	0	8	1	24	0	0	0
2022	Apr	32	4	63	0	0	0	32	4	63	0	0	0
2022	May	212	89	370	41	8	80	171	56	322	0	0	0
2022	Jun	228	128	346	42	5	104	187	103	288	0	0	0
2022	Jul	118	32	258	39	8	79	79	10	204	0	0	0
2022	Aug	208	128	295	56	24	103	151	80	231	0	0	0
2022	Sep	16	2	41	0	0	0	16	2	41	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	Oct	58	16	106	34	8	72	24	3	57	0	0	0
2022	Nov	15	2	40	15	2	40	0	0	0	0	0	0
2022	Dec	32	8	72	24	3	57	8	1	25	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0	0	0	0
2023	Feb	8	1	24	0	0	0	8	1	24	0	0	0
2023	Mar	54	16	95	0	0	0	54	16	95	0	0	0
2023	Apr	134	40	248	8	1	24	126	32	240	0	0	0
2023	May	223	134	319	104	55	166	119	55	199	0	0	0
2023	Jun	64	24	127	24	3	56	41	8	88	0	0	0
2023	Jul	472	326	638	189	97	297	282	168	416	0	0	0
2023	Aug	488	366	616	231	151	314	257	160	355	0	0	0
2023	Sep	57	16	105	16	2	40	41	8	80	0	0	0

Table E. 45: Gannet design-based estimates for the Morven South Boundary only (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	176	97	267	32	8	65	143	73	229	0	0	0
2021	Jul	463	314	648	176	103	263	288	160	437	0	0	0
2021	Aug	104	48	173	39	8	87	65	24	112	0	0	0
2021	Sep	209	129	290	80	32	130	129	64	202	0	0	0
2021	Oct	95	47	150	31	8	64	63	24	110	0	0	0
2021	Nov	16	2	40	16	2	40	0	0	0	0	0	0
2021	Dec	0	0	0	0	0	0	0	0	0	0	0	0
2022	Jan	8	1	24	0	0	0	8	1	24	0	0	0
2022	Feb	0	0	0	0	0	0	0	0	0	0	0	0
2022	Mar	8	1	24	0	0	0	8	1	24	0	0	0
2022	Apr	0	0	0	0	0	0	0	0	0	0	0	0
2022	May	151	40	287	16	2	40	135	32	277	0	0	0
2022	Jun	167	80	273	39	5	97	128	56	224	0	0	0
2022	Jul	106	24	232	33	8	71	73	9	199	0	0	0
2022	Aug	125	70	192	40	8	79	86	39	141	0	0	0
2022	Sep	17	2	41	0	0	0	17	2	41	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	Oct	32	8	66	24	3	57	8	1	25	0	0	0
2022	Nov	8	1	24	8	1	24	0	0	0	0	0	0
2022	Dec	16	2	40	8	1	24	8	1	25	0	0	0
2023	Jan	0	0	0	0	0	0	0	0	0	0	0	0
2023	Feb	8	1	24	0	0	0	8	1	24	0	0	0
2023	Mar	40	8	78	0	0	0	40	8	78	0	0	0
2023	Apr	104	24	214	8	1	24	96	16	206	0	0	0
2023	May	152	80	233	56	16	97	96	32	170	0	0	0
2023	Jun	47	8	96	8	1	24	39	8	88	0	0	0
2023	Jul	296	168	446	97	31	213	199	96	312	0	0	0
2023	Aug	335	239	444	152	88	223	184	104	278	0	0	0
2023	Sep	32	8	65	8	1	24	24	3	56	0	0	0