Spiorad na Mara Offshore Wind Farm

Offshore Project

Environmental Impact Assessment Report

Appendix 14.1: Ornithology Baseline Report, Volume 2c

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1 INTRODUCTION

1.1 OVERVIEW

1.1.1.1 This appendix of the Environmental Impact Assessment Report (EIAR) provides a detailed baseline characterisation of birds in the offshore environment within and around the proposed Spiorad na Mara Offshore Wind Farm (hereafter referred to as 'the Offshore Project') in line with the guidance on baseline characterisation provided by NatureScot (2023a). This appendix accompanies Chapter 14: Marine and Nearshore Ornithology, Volume 2a of the EIAR.

1.1.1.2 This appendix should be read in conjunction with the project description provided in Chapter 3: Project Description, Volume 1a and the following annexes:

- Annex 14.1.1: Apportioned Abundance Estimates Turbine Area Plus Buffers, Volume 2c;
- Annex 14.1.2: Unapportioned Abundance Estimates Turbine Area Plus Buffers, Volume 2c;
- Annex 14.1.3: Survey Distribution Figures, Volume 2c;
- Annex 14.1.4: MRSea Modelling Report, Volume 2c (and associated annexes);
  - Annex 14.1.4.A: MRSea Unapportioned and Uncorrected Abundance and Density Estimates;
  - Annex 14.1.4.B: Apportioned and Corrected Abundance and Density Estimates;
  - Annex 14.1.4.C: MRSea Model Abundance Confidence Limits and Coefficient of Variation;
  - Annex 14.1.4.D: MRSea Model Diagnostics;
- Annex 14.1.5: Colonies in Regional Breeding Population, Volume 2c.

PROJECT BACKGROUND

1.1.1.3 Spiorad na Mara Limited (hereafter referred to as 'the Applicant') is proposing to develop the Project. The Project is an offshore wind farm (OWF) that will consist of up to 60 fixed-bottom wind turbine generators (WTGs).

1.1.1.4 The Project will include both offshore and onshore infrastructure. This Offshore EIAR supports the application for the offshore components of the Project as outlined in Chapter 1: Introduction, Volume 1a. The offshore components of the Project (hereafter referred to as the 'Offshore Project') include all infrastructure and activities located seaward of Mean High Water Springs (MHWS) within the Array Area and Offshore Cable Area of Search (OCAS) (Figure 1.2: Offshore Project Location, Volume 1b). Further detailed information is provided in Chapter 3, Volume 1a.

1.1.1.5 The Offshore Project is situated off the northwest coast of Isle of Lewis/*Eilean Leòdhais* and the Array Area is located approximately 5-13 km offshore and is approximately 161 km^2 in size. It will comprise WTGs, foundations, Offshore Cables, Offshore Substation Platform (OSP) (if required), and Landfall.

The Array Area combined with the OCAS is defined as the Offshore Project Boundary. The water depths across the Array Area range from 37 m-67 m with the southwest corner of the Array Area reaching 72 m. The proposed WTGs and fixed foundations will be located within a Turbine Area of approximately 140 km^2, within the Array Area.

1.2 PURPOSE OF THIS APPENDIX

1.2.1.1 This appendix describes the following:

- Desk-Based Study presents an overview of results gathered from desk-based studies to characterise the baseline environment. It also discusses seabird population trends, which inform the expected future baseline in the absence of the Offshore Project (Section 3);
- Site Specific Surveys provides an overview of the methodologies used to gather, analyse and present baseline data, as well as identifying the list of species present in the Offshore Ornithology Study Area (Section 4);
- Overview of Species Sensitivity presents an overview of each key species' sensitivity based on a literature review (Section 5);
- Designated Sites identifies sites of conservation concern with potential connectivity with the Offshore Project Offshore Ornithology Study Area during the breeding season, based on the foraging behaviour of those species designated as qualifying features at relevant sites of conservation concern (Section 6);
- Species Accounts contains individual species accounts for key species recorded during surveys of the Offshore Project Offshore Ornithology Study Area and provides discussion pertaining to trends in spatial, seasonal or inter-annual variation. The relative importance of the Offshore Project to the species' background populations are also considered in a wider spatial context, and a determination of whether or not each species is considered a Valued Ornithological Receptors (VOR) is made (Section 7);
- Identification of VORs provides a summary of the species that have been identified as VORs (Section 8).

1.3 SCOPE OF THIS APPENDIX

1.3.1.1 This appendix presents information on the Offshore Project including both a desk-based review of relevant published information, and information obtained by undertaking site-specific Digital Aerial Surveys (DAS) (see Section 4 and Appendix 13.1: Digital Aerial Bird and Marine Megafauna Surveys, Volume 2c). This appendix therefore:

- Collates all ornithological data gathered to date for the Offshore Project application;

- Provides a baseline description of the ornithological interests within spatial regions relevant to the Offshore Project;
- Establishes the ornithological importance of the Offshore Project for breeding, wintering and migratory birds by analysing DAS data, and other data sources from the wider area.

1.3.1.2 The spatial regions (such as Study Area and Survey Area) defined for the purpose of the offshore ornithology assessment are described in Section 1.4 and shown in Plate 1-1.

1.3.1.3 Offshore ornithology encompasses all bird populations that occur seaward of MHWS. Birds occurring onshore and in the intertidal region (i.e. between MHWS and Mean Low Water Springs (MLWS)) will be considered in the Onshore Application.

1.3.1.4 For this appendix, the overarching term 'seabird' is used to refer to species that depend on the marine environment for survival at some point in their life cycle. Therefore, in addition to the true seabirds, this term also includes seaducks, divers and grebes because of their additional reliance on marine areas, especially in the non-breeding season.

1.3.1.5 This appendix considers whether these seabird populations are VORs with respect to the Offshore Project. VORs are seabird species with offshore ornithology bird populations of significance due to their conservation status and/or population size, that are likely to interact with the Offshore Project and thus require further assessment (e.g. consideration of vulnerability to collision and/or displacement).

1.3.1.6 Birds other than seabirds can occur in the offshore environment, for example during migration. When such birds are identified following the methodology set out in Section 2 they will be included within this appendix. However, it is acknowledged that the methodology set out in Section 2 focuses on regularly occurring seabirds. Therefore, birds other than regularly occurring seabirds, such as migratory birds, are unlikely to be identified following this approach, and so would not be discussed in this appendix. This does not mean that those other species are scoped out from impact assessment, but merely that any impact assessment (if deemed necessary) will be informed by methods and approaches that are outwith the scope of this appendix. Consideration of migratory birds is provided in Chapter 14, Volume 2a and Appendix 14.4, Volume 2c;

1.3.1.7 In relation to nature conservation legislation, 3 receptor groups relating to the construction, operation and maintenance, and decommissioning phases of the Offshore Project have been identified. The potential for the Offshore Project to adversely affect:

- Seabirds of highest conservation concern, listed on Annex 1 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)) which was transposed into United Kingdom (UK) legislation through The Conservation of Habitats and Species Regulations 2017 (2017 No. 1012) (as amended) and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (2017 No. 1013) (as amended) and subsequently retained in UK law through The Conservation of

Habitats and Species (Amendment) (EU Exit) Regulations 2019 (2019 No. 579), and/or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);

- 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 sites);
- Other species in internationally, nationally or regionally important numbers in winter, during migration, or whilst commuting locally between foraging areas (which may include the Study Area) and breeding colonies.

1.4 SPATIAL DEFINITIONS

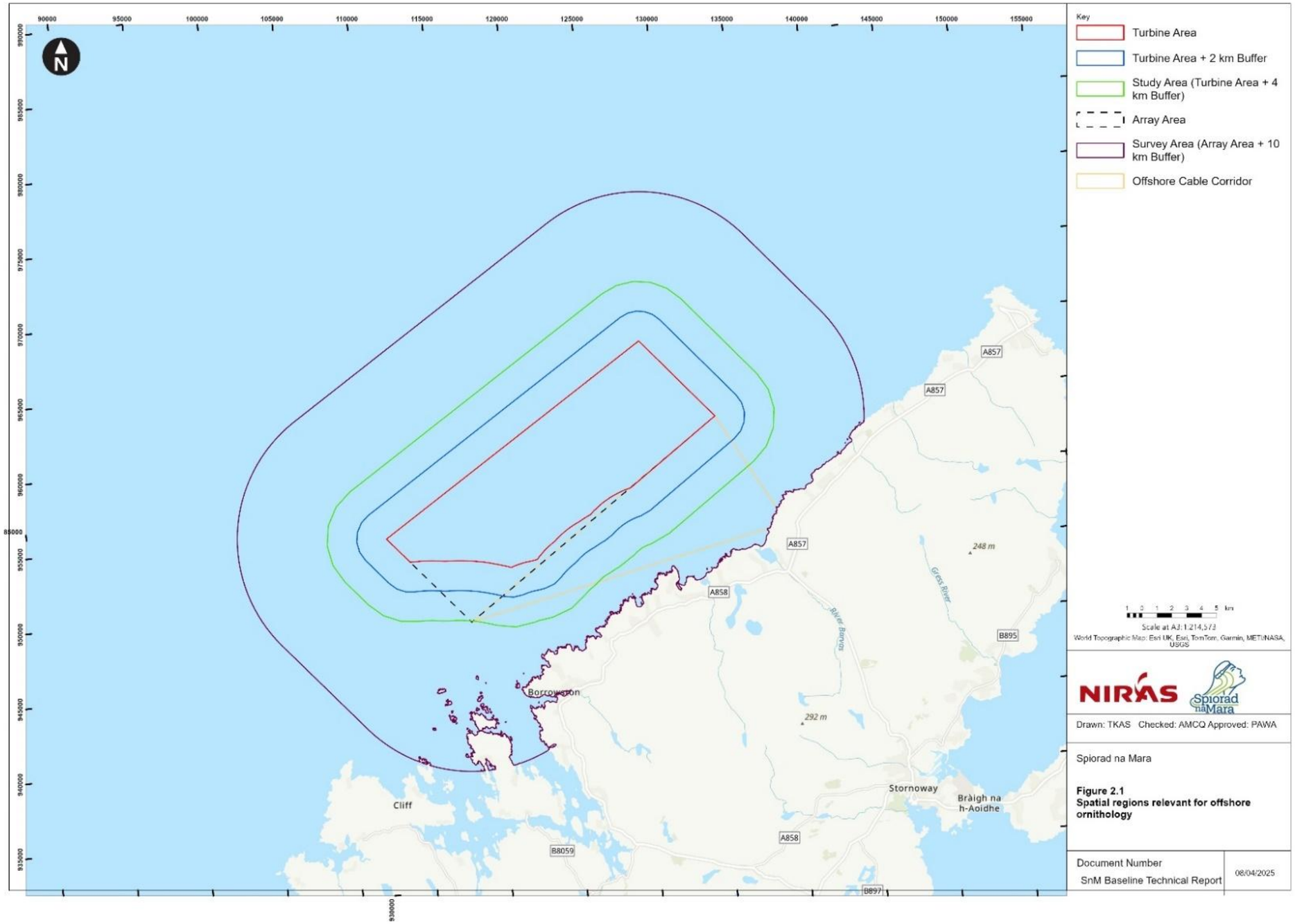
1.4.1.1 In order to characterise the baseline environment, the following spatial regions have been defined:

- The Array Area: the total area within which offshore WTGs, associated foundations, inter-array cables and OSP (if required) will be located;
- The Turbine Area: a reduced area within the Array Area where above water surface infrastructure would be located i.e. WTG or OSP;
- The OCAS : the region in which the export cable will be situated, between the Array Area and MHWS;
- The Offshore Ornithology Study Area (hereafter “the Study Area”): Defined as the Turbine Area plus a 4 km buffer, extending seaward up to MHWS but excluding any terrestrial areas within 4 km. The 4 km buffer follows UK SNCB guidance for assessing displacement impacts, reflecting the recommended distance for the most sensitive species (e.g. divers and sea ducks) (NatureScot, 2023d);
- The Turbine Area + 2 km buffer: defined to support the displacement assessment for other seabird species, in line with JNCC (2022) guidance, which recommends a 2 km buffer for all species other than divers and sea ducks;
- The Offshore Ornithology Survey Area (hereafter “the Survey Area”) has been defined as the offshore Array Area plus a 10 km buffer, up to MHWS (i.e. excluding any land within 10 km of the Array Area). The OCAS falls entirely within the Survey Area. It should be noted that the Turbine Area has been refined from the Array Area (refer to Chapter 4: Consideration of Alternatives, Volume 1a for further details), and therefore the Survey Area represents a buffer of at least 10 km around the Array Area. The 10 km buffer has been applied in line with NatureScot guidance (NatureScot, 2023a) to minimise edge effects in spatial modelling and to ensure adequate coverage for sensitive species, which may be present in the wider area surrounding the Turbine Area.

1.4.1.2 These areas are shown in Plate 1-1.

1.4.1.3 In addition, it is important to consider that ornithological receptors are highly mobile, travelling potentially long distances whilst foraging and on migration. As such, the Offshore Project has the potential to impact seabird populations over a much wider region. Consideration has therefore also been given to regional populations of seabirds that may have connectivity to the Offshore Project. The geographic spread of these regional populations varies according to biological connectivity, which differs between species and seasons, as detailed in Section 4.5.

Plate 1-1 Spatial regions relevant for offshore ornithology



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2 METHODOLOGY

2.1 APPROACH TO BASELINE CHARACTERISATION

2.1.1.1 This Baseline Characterisation Technical Report follows a sequential approach to describe the ornithological receptors in the Offshore Ornithology Study Area (spatial extent defined in paragraph 2.2.1) and identify which receptors are VORs. The sequential approach has been discussed in Section 1.2, which form the structure of this appendix.

3 DESK-BASED STUDY

3.1 OVERVIEW OF ORNITHOLOGICAL INTEREST

3.1.1.1 Extensive ornithological surveys (e.g. Stone *et al.*, 1995; Bradbury *et al.*, 2014; Waggitt *et al.*, 2020) and reviews (e.g. Monaghan, 1992; Furness, 2015) as well as results from other OWF EIARs and monitoring reports have shown that the region[1] in which the Offshore Project is located (i.e. the seas off the west coast of Scotland/*Alba*) is an important area for seabirds. The mix of birds present indicates that the Study Area is likely used at different times by birds:

- Overwintering in the area;
- Foraging from nearby breeding coastal colonies;
- On post-breeding dispersal, migration and pre-breeding return.

3.1.1.2 The Offshore Project is located in the area defined by the Joint Nature Conservation Committee (JNCC) (1997) as northwest Scotland/*Alba*: the Western Isles/*Na h-Eileanan Siar* and west Highland. In the breeding season, the Western Isles/*Na h-Eileanan Siar* and west Highland area is nationally or internationally important for at least 21 breeding seabird species, with 9 species (northern fulmar *Fulmarus glacialis* (hereafter fulmar), Manx shearwater *Puffinus puffinus*, European storm petrel *Hydrobates pelagicus* (hereafter storm petrel), Leach's storm petrel *Hydrobates leucorhous*, northern gannet *Morus bassanus* (hereafter gannet), common guillemot *Uria aalg*e (hereafter guillemot), razorbill *Alca torda*, black guillemot *Cepphus grylle* and Atlantic puffin *Fratercula arctica* (hereafter puffin) being present at levels above 20% of the European population (JNCC, 1997; NatureScot, 2020). In addition to important breeding colonies, the seas in the region are also an important area for foraging seabirds (Stone *et al.*, 1995; Bradbury *et al.*, 2014; Waggitt *et al.*, 2020).

3.2 RECENT SEABIRD POPULATION TRENDS

3.2.1.1 An increase in sea surface temperature is being observed in UK waters (Cornes *et al.*, 2023). Specifically, the sea temperature in Scottish waters has shown an average increase of over 0.2 °C per decade since at least the 1980s (Marine Scotland, 2011). These temperature shifts have been linked to reduced availability of fish prey for seabirds, resulting in diminished breeding success and population declines (Carroll *et al.*, 2015). Forecasts suggest that the Atlantic Ocean is likely to experience ongoing temperature rises in the coming decades (Tibaldi *et al.*, 2021), which could further exacerbate adverse effects on seabird populations through prey related impacts.

[1] The word region here is used in the general sense, as the different sources referenced use different regional definitions, or do not define regions as such at all.

3.2.1.2 A recent review of mechanisms by which climate change is affecting seabirds in the INTERREG VA region (the seas between the west coast of Scotland/*Alba*, Northern Ireland and the Republic of Ireland) concluded that the strongest evidence is for indirect effects due to temperature-mediated changes on prey populations (Johnston *et al.*, 2021). There was also evidence, though considerably less, for mechanisms associated with single or short-term events, often leading to complete breeding failures in some seasons or mass mortality events (wrecks), particularly during winter (Johnston *et al.*, 2021).

3.2.1.3 However, there is some evidence to suggest the seabird populations in the west of Scotland/*Alba* are less sensitive to temperature effects than those that forage in the North Sea, potentially due to greater reliance on species other than sandeels (Burton *et al.*, 2023).

3.2.1.4 Seabirds have also been severely affected by Highly Pathogenic Avian Influenza (HPAI). The most recent HPAI outbreak began in 2021 and has now spread through more than 70 bird species (British Trust for Ornithology (BTO), 2023). The virus has affected species such as guillemot, razorbill, and black-legged kittiwake *Rissa tridactyla* (hereafter kittiwake), with dead birds washing up on beaches in Wales, and along the coasts of Scotland/*Alba* and England. In the 2 weeks following the first cases in these species in summer 2023, NatureScot recorded 1,443 dead guillemots, 1,570 dead kittiwakes and 236 dead European herring gulls *Larus argentatus* (hereafter herring gull), all suspected to have died from HPAI (BTO, 2023). It is therefore likely that the site-specific surveys carried out in 2022–2024 have been impacted to some extent by HPAI. Surveys of priority sites were carried out in 2023 to further understand the impact of HPAI (Tremlett *et al.*, 2024), although work is ongoing to further understand the impacts of HPAI and the potential for recovery. It should also be noted that the Statutory Nature Conservation Bodies (SNCBs), including NatureScot, are yet to produce detailed guidance on how to incorporate the potential impacts of HPAI into baseline characterisation or assessment. In the absence of any such guidance from NatureScot or other SNCBs, it has been assumed that the site-specific surveys continue to represent the most accurate data for the baseline characterisation of the Study Area for use in assessment, with reference to more recent survey data (e.g. Tremlett *et al.*, 2024), where relevant. The data presented in this appendix do not demonstrate any clear evidence of impact from HPAI when comparing between the survey years.

3.2.1.5 Seabird population trends have been used by UK Government as a 'sustainable development strategy indicator.' JNCC, through the seabird monitoring programme (JNCC, 2021), publishes annual updates on seabird population trends. The latest trends in species relevant to the Study Area (i.e. those recorded in the Study Area in the site-specific surveys – see Section 4.4) are summarised in Table 3-1 (JNCC, 2021). Note that red-throated diver *Gavia stellata* is not included in this table as it has not been monitored by Operation Seafarer, the Seabird 2000 census or included in the Seabird Colony Register.

Table 3-1 Summary of seabird population trends in the UK (taken from JNCC, 2021 and Burnell *et al*., 2023)

Species	Population Change (%)			
	1969-70 to 1985-88	1985–88 to 1998–2002	2000–2019	Seabird 2000 (1998–2002) to Seabirds Count (2015–2021)
Kittiwake	+24	-25	-29	-42
Black-headed gull *Chroicocephalus ridibundus*	+5	0	+26	-26
Common gull *Larus canus*	+25	+36	N/A	-49
Great black-backed gull *Larus marinus*	-7	-4	-23	-43
Herring gull	-48	-13	N/A	-41
Common tern *Sterna hirundo*)	+9	-9	-3	+7
Arctic tern *Sterna paradisaea*	+50	-31	-5	-35
Great skua *Stercorarius skua*	+148	+26	N/A	+14
Parasitic Jaeger *Stercorarius parasiticus* (hereafter Arctic skua)	+226	-37	-70	-66
Guillemot	+77	+31	+60	-8
Razorbill	+16	+21	+37	+18
Puffin	+15	+19	N/A	-24
Fulmar	+77	-3	-33	-35
Manx shearwater	N/A	N/A	N/A	+174
Gannet	+39	+392	+343	+384
Great cormorant *Phalacrocorax carbo* (hereafter cormorant)	+9	+10	+16	-5
European shag *Gulosus aristotelis* (hereafter shag)	+21	-27	-40	-20

4 SITE-SPECIFIC SURVEYS

4.1 SURVEY DETAILS

4.1.1.1 A programme of 24 DAS surveys of the Survey Area was carried out by APEM Ltd, between March 2022 to February 2024, as shown in Table 4-1. It should be noted that for consistency and clarity, surveys are named according to the month they were intended to be flown, but in some instances, surveys were in fact flown early in the following month due to inclement weather (December 2022, January 2023, December 2023, January 2024 and February 2024). Surveys covered the Array Area plus a 10 km buffer, excluding areas of land within the 10 km buffer (referred to as the 'Survey Area'; as shown in Plate 1-1). The OCAS is entirely within the Survey Area. Surveys were carried out using abutting still images in a transect design, consisting of 19 transect lines, oriented approximately perpendicular to the coastline. Further details are provided in Appendix 13.1, Volume 2c. Note that abundances presented in Appendix 13.1, Volume 2c refer to the Array Area and therefore will differ from abundances presented for the Turbine Area and/or Study Area, as per this appendix.

Table 4-1 DAS survey dates

Survey Name	Date
March 2022	26 March 2022
April 2022	15 April 2022
May 2022	15 May 2022
June 2022	01 June 2022
July 2022	21 July 2022
August 2022	26 August 2022
September 2022	10 September 2022
October 2022	29 October 2022
November 2022	21 November 2022
December 2022	04 December 2022
January 2023	13 January 2023
February 2023	24 February 2023
March 2023	23 March 2023
April 2023	15 April 2023
May 2023	02 May 2023
June 2023	09 June 2023
July 2023	14 July 2023
August 2023	09 August 2023
September 2023	07 September 2023
October 2023	17 October 2023
November 2023	12 November 2023
December 2023	05 December 2023

Survey Name	Date
January 2024	14 January 2024
February 2024	03 February 2024

4.2 DESIGN-BASED ABUNDANCE ESTIMATES

4.2.1.1 For each monthly aerial survey of the Survey Area, geo-referenced locations of marine fauna contained within each individual digital still image were used to generate raw counts. Marine fauna locations contained within the boundaries of the Survey Area were then extracted using Geographic information system (GIS), providing raw count data.

4.2.1.2 These raw counts were divided by the number of images collected to give the mean number of animals per image (*i*). Population estimates (*N*) for each survey month were subsequently generated by multiplying the mean number of animals per image by the total number of images required to cover the Survey Area (*A*):

$$N = i\,A$$

4.2.1.3 Non-parametric bootstrap methods were used for variance estimation. A variability statistic was generated by re-sampling 999 times with replacement from the raw count data because it is recommended that a value between 400 and 1,000 is used for distance sampling when estimating abundance of biological populations (Buckland *et al*., 2001). The statistic was evaluated from each of these 999 bootstrap samples and upper and lower 95% confidence intervals of these taken as the variability of the statistic over the population (Efron and Tibshirani, 1993).

4.2.1.4 A measure of precision was calculated using a Poisson estimator, suitable for a pseudo-Poisson over-dispersed distribution. This produced a coefficient of variation (CV) based on the relationship of the standard error to the mean.

4.2.1.5 All analyses and data manipulation were conducted in the R programming language (R Development Core Team, 2012) and non-parametric 95% confidence intervals were generated using the 'boot' library of function (Canty and Ripley, 2010). This resulted in species-specific monthly abundance estimates being calculated from the raw count data, with upper and lower confidence limits. Where appropriate, a level of precision is also presented in this appendix for each monthly abundance estimate. Dividing the monthly abundance estimates by the size of the area covered calculates the associated density (i.e. birds per km^2) for any given species.

4.2.2 APPORTIONMENT OF UNIDENTIFIED INDIVIDUALS FOR DESIGN-BASED ABUNDANCE ESTIMATES

4.2.2.1 Individuals were identified to species level when there is a high level of confidence. The majority of individuals recorded during the surveys were identified to species level; however, on occasion,

there was not sufficient visual data to identify to species level. In these instances, where possible, individuals are identified to group level only.

4.2.2.2 For example, when analysing an image containing a group of guillemots and razorbills sitting interspersed amongst one another, there may be some difficulty differentiating between the 2 species for some of the individuals present. On these occasions, they would be recorded as guillemot/razorbill.

4.2.2.3 To account for individuals identified to group level only, apportionment is used to estimate, proportionally, the quantities of specific species contained within the group-level species recorded. Following the same methodology, confidence limits were also apportioned.

4.2.2.4 For example, if a survey month had 10 'small gull species' recorded (group-level), the proportions of any small gulls identified to species level within the same month would be used to calculate how many of the 'small gull species' recorded are those specific species. If the same survey month contained 20 kittiwakes and 20 common gulls, it would be estimated proportionally that the 10 'small gull species' recorded are likely to consist of 5 kittiwakes and 5 common gulls.

4.2.2.5 The apportioned individuals are added to the original abundance estimates to give an apportioned total (for the above example, the apportioned totals would be 25 kittiwakes and 25 common gulls).

4.2.2.6 As the abundance estimates are divided into Turbine Area, Turbine Area plus 2 km buffer, Study Area and Survey Area, the apportionment was also calculated for each spatial region separately.

4.2.2.7 Apportionment was carried out separately for all birds combined, flying birds and sitting birds only. Note that this approach means that the estimated abundance after apportionment for all birds may not always equal the sum of flying and sitting birds.

4.2.2.8 If no birds within the group were identified to species level in the same area in the same survey (such that apportionment could not be carried out), then a hierarchical approach was used for apportionment. For example, if no birds were identified to species level within the same area (e.g. the Turbine Area) but birds were identified to species level in the wider Survey Area, then numbers of birds identified to from that wider area would be used to determine the proportions used for apportionment. The levels of the hierarchy for design-based abundance estimates are as follows:

- Same month, same year, same area;
- Same month, same year, Survey Area;
- Same bio-season or season (combined sum), same year, same area;
- Same bio-season or season (combined sum), same year, Survey Area;
- Same bio-season or season (combined sum), same year, wider buffer (if available);
- Same bio-season or season (combined sum), same year, Survey Area, different behaviour (use for sitting and diving only);
- Same bio-season or season (combined sum), different year, same area;
- Same bio-season or season (combined sum), different year, Survey Area;

- Same bio-season or season (combined sum), different year, wider buffer (if available);
- Same bio-season or season (combined sum), different year, different behaviour (use for sitting and diving only).

4.2.2.9 Levels of the hierarchy are tried sequentially, i.e. if no birds are identified to species level in the top level of the hierarchy, then the next level down is tried. If no birds are identified to species level despite considering every level of the hierarchy, then apportionment of that group is not carried out.

4.2.2.10 It should be noted that due to the difficulty in distinguishing between common and Arctic terns in DAS imagery, apportionment of "commic" terns (i.e. birds that were either common or Arctic terns) was not carried out.

4.2.3 CORRECTION FOR AVAILABILITY BIAS

4.2.3.1 For auk species such as guillemot, razorbill and puffin which make foraging dives underwater, a proportion will not be detectable at the surface during analysis of survey images. As a result, density and abundance estimates for these auk species needed to be adjusted to allow for this 'availability bias'. A species-specific correction factor was applied to the number of guillemots, razorbills and puffins recorded on the sea surface. Whilst other species may also exhibit diving behaviour, no suitable data exist to quantify this in any other species and so other species have not been corrected.

4.2.3.2 The correction factor applied to each relevant auk species was based on that recommended by JNCC in a submission during the examination phase of the East Anglia ONE OWF, referred to by JNCC as Method C (JNCC, 2013). The correction factors were derived from time spent under water (during the chick-rearing stage) from Thaxter *et al.* (2010) for guillemots and razorbills and from records from data loggers from Spencer (2012) for puffins. Therefore, to correct for availability bias, the 'unavailable' birds were added to the bird totals monthly to create revised population estimates. 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.

4.3 MODEL-BASED ABUNDANCE ESTIMATES

4.3.1.1 In line with NatureScot guidance (NatureScot, 2023a), abundance and density estimates have also been produced using a model-based approach. Model-based abundance and density estimates were produced for 5 key species (gannet, kittiwake, guillemot, razorbill and puffin) using the Marine Renewables Strategic Environmental Assessment (R package) (MRSea) package (Scott-Hayward *et al.*, 2013) in R (R Core Team, 2024). The MRSea packages allows the fitting of spatially adaptive regression splines using Spatially Adaptive Local Smoothing Algorithm (SALSA); Walker *et al.*, 2010). Further details of the MRSea modelling conducted are provided in Annex 14.1.4, Volume 2c.

4.3.1.2 MRSea modelling was only carried out for surveys with sufficient observations across the Survey Area. The minimum requirement for modelling to be attempted was a minimum of 10 DAS images with at least 1 observation of the target species. For surveys for which modelling was not carried out, design-based estimates were used to inform the species' baseline.

4.3.1.3 Modelling was carried out using bird observations identified to species level. It was therefore necessary subsequently to apportion unidentified birds to species level after the modelling was undertaken. Abundances for birds that were not identified to species level were extracted from the design-based abundance estimates. A hierarchical approach to apportioning for model-based abundance estimates was followed, with the following options used in order of preference:

- Observations from the same area and same behaviour;
- Observations from the Study Area and same behaviour;
- Observations from the same area and all behaviours;
- Observations from the Study Area and all behaviours.

4.3.1.4 Note that as apportioning is carried out separately for all behaviours, sitting birds and flying birds, this may lead to slight discrepancies, whereby after apportioning, the total estimate for each species may differ slightly from the sum of the sitting and flying birds.

4.3.1.5 The correction for availability bias for guillemot, razorbill and puffin is applied as set out in paragraphs 4.2.3.1 and 4.2.3.2.

4.3.1.6 Results presented in this Ornithology Baseline Report are inclusive of apportionment and correction (this is also the case for the design-based abundance estimates as set out in Section 4.2) and therefore represent the final abundance/density estimates for each species to inform impact assessment. Model outputs prior to apportionment and correction are presented in Annex 14.1.4, Volume 2c.

4.3.1.7 Where model-based abundances were available those were used within Section 4.3 over design-based whenever available in line with NatureScot guidance (NatureScot, 2023a).

4.4 SPECIES PRESENT

4.4.1.1 The site-specific surveys identified the following species as being present in the Study Area, and these species therefore form the basis of the remainder of this appendix:

- Curlew* *Numenius arquata*;
- Kittiwake;
- Black-headed gull;
- Common gull;
- Great black-backed gull;
- Herring gull;
- Common tern;

- Arctic tern;
- Great skua;
- Arctic skua;
- Guillemot;
- Razorbill;
- Black-guillemot;
- Puffin;
- Red-throated diver;
- Great northern diver *Gavia immer*;
- Fulmar;
- Sooty shearwater* *Ardenna grisea*;
- Manx shearwater;
- Gannet;
- Cormorant;
- Shag.

4.4.1.2 Species marked with an asterisk (*) were only recorded in trivial numbers and not considered in detail in this appendix – see Section 7.23. For the purposes of this assessment, “trivial numbers” refers to species that were recorded only infrequently and at abundances so low that they are unlikely to represent regular or meaningful use of the Study Area. These species do not contribute substantially to the overall assemblage recorded and, as such, are not considered further in this appendix.

4.4.1.3 Storm petrel and Leach’s storm petrel were not recorded to species level during the site-specific surveys and are not included in the list. However, as set out in paragraph 8.1.1.2, both storm petrel species will be included separate assessment to consider collision risk on migratory birds.

4.5 SEASONAL DEFINITIONS AND POPULATION IMPORTANCE

4.5.1.1 Seasonal definitions outline different periods of the annual cycle for a species. There are 4 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.

4.5.1.2 Seasonal definitions are required in the first instance to determine the importance (geographic scale) of populations estimated within the Study Area. Seasonal definitions are then used in further assessment to apportion impacts to relevant seasons in order to determine the impact upon

relevant populations. These have been defined using a range of sources including Furness (2015), Kober *et al.* (2010) and NatureScot (2020). Seasonal definitions in this Ornithology Baseline Report are simplified slightly from the NatureScot (2020) guidance because it is necessary to have regards to the assessment approach to be used and the available advice and resources (for example, the approach to assessment does not distinguish between the breeding season and breeding site attendance).

4.5.1.3 Seasonal definitions for species relevant to the Study Area are included in Table 4-2.

4.5.1.4 The seasonal definitions presented in Table 4-2 take account of the seasonal trends in bird populations within the Study Area. Therefore, in the breeding season for example, both local breeding populations that may have connectivity with the Study Area and populations of migrating birds moving through the Study Area. The consideration of all populations that may interact with the Study Area in a given month is important so as not to over- or under-estimate the importance of the Study Area in a given season. It also ensures that the apportioning of birds to relevant populations (e.g. SPA breeding populations or non-breeding populations) is not over- or underestimated.

4.5.1.5 Regional, national and international seabird populations are shown in Table 4-3 and have been defined for every species recorded in the Study Area. These have been derived using a number of sources that are outlined here and referenced in footnotes below Table 4-3. Where possible, these populations have been calculated using data contemporaneous with the Offshore Project DAS.

4.5.1.6 Threshold values for international populations were derived from figures provided in Wetlands International (2014), Mitchell *et al.* (2004), del Hoyo *et al.* (1996) or BirdLife International (2018). National population thresholds were derived from Woodward *et al.* (2020), Burton *et al.* (2012) or Stienen *et al.* (2007).

4.5.1.7 Regional populations for the breeding season are estimated by summing the most recent population counts for all breeding colonies within the mean-maximum foraging range plus 1 standard deviation distance from the Study Area for each species. For consistency with the Offshore Report to Inform Appropriate Assessment (RIAA), the regional population for species considered in Offshore RIAA Appendix D: Offshore Ornithology Apportioning (i.e. kittiwake, guillemot, razorbill, puffin and gannet) has been expanded to also include all colonies within SPAs for which the SPA boundary is within foraging range of the boundary of the Turbine Area, and also any non-SPA colonies that are at least as close as any SPA colonies brought in under that rule. This follows NatureScot's project-specific advice on RIAA Apportionment (NatureScot, 2025. Email sent to the Applicant, 8th May).

4.5.1.8 Population data within the mean-maximum foraging range plus 1 standard deviation has been extracted from the Seabirds Count data (Burnell *et al.*, 2023), which compiles surveys conducted in the period 2015 – 2021. These data are considered contemporaneous with the baseline surveys undertaken for the Offshore Project. A full list of colonies (SPA and non-SPA) is provided in

Annex 14.1.5, Volume 2c. In addition to breeding adult birds, the number of immature birds present in the regional Biologically Defined Minimum Population Scale (BDMPS) has been estimated using the ratio of immatures to adults provided in the relevant species accounts in Furness (2015). This total population is presented separately to the total number of breeding adults present in the regional BDMPS. For most species, count data are provided in the form of breeding pairs (e.g. Apparently Occupied Nests), whilst for guillemot and razorbill, counts are of individuals at the colony. For species counted as breeding pairs, the number of individual adults is calculated as 2x the number of breeding pairs, whilst for guillemot and razorbill it is assumed that each individual counted at the colony represents 0.67 breeding pairs (Walsh *et al*., 1995) and therefore 1.34 individual adults. The breeding adult population 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 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 populations for consideration in each season are presented in Table 4-3.

4.5.1.9 With the exception of guillemot, regional populations for other seasons are defined using the 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 the Offshore Project and those in the post-breeding, non-breeding and pre-breeding seasons obtained from Furness (2015) or other relevant sources. For non-breeding species present in winter or on passage, the relevant regional population was considered to be the Western waters with relevant BDMPS populations taken from Furness (2015).

4.5.1.10 In line with NatureScot guidance (NatureScot, 2023c), the non-breeding regional population for guillemot is assumed to be equal to the regional population in the breeding season, i.e. comprising of breeding adults from colonies within recommended foraging range, plus immature birds associated with that breeding population.

4.5.1.11 National populations listed in Table 4-3 are from Seabirds Count (Burnell *et al*., 2023) unless stated otherwise. The National population refers to the UK total. It should be noted that for some species, the regional population is higher than the national population; this is because the national population only relates to the UK, whilst the regional population includes all colonies within foraging range, including colonies on the Isle of Man and in the Republic of Ireland in some cases. As with the regional populations, 1 breeding pair was assumed to equal 2 breeding adult individuals; for guillemot and razorbill, each individual counted at the colony was assumed to equal 0.67 pairs (Walsh *et al*., 1995). As with regional populations, the number of immatures per adult listed in Furness (2015) is used to calculate the number of immatures associated with the

population, which is then added to the number of adults to produce an estimate of the total number of adults and immatures.

4.5.1.12 Values for international populations were derived from figures provided in Wetlands International (2014), Mitchell *et al*. (2004), del Hoyo *et al*. (1996) or BirdLife International (2018).

4.5.1.13 The regional, national and international population levels presented in Table 4-3 are divided by 100 in order to provide the 1% thresholds against which population estimates calculated for each species in the 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.

4.5.1.14 In some cases, the number of birds present in the Study Area may be below the 1% threshold for Regional Importance, but still be sufficiently high to warrant further consideration. A value of 50 individuals is normally used as a minimum threshold in the BTO's Wetland Bird Survey reports (e.g. Frost *et al.*, 2017) and is considered within this appendix to represent "local" importance.

Table 4-2 Seasonal definitions for species considered within Section 8

Species	Source	Seasonal Definitions			
		Breeding	Post-Breeding	Non-Breeding	Pre-Breeding
Kittiwake	NatureScot (2020); Furness (2015)	Mid-April-August	September-December	N/A	January-Mid-April
Black-headed gull	NatureScot (2020); Kober *et al.* (2010)	April-August	N/A	September-March	N/A
Common gull	NatureScot (2020); Kober *et al.* (2010)	April-August	N/A	September-March	N/A
Great black-backed gull	NatureScot (2020); Furness (2015)	April-August	N/A	September-March	N/A
Herring gull	NatureScot (2020); Furness (2015)	April-August	N/A	September-March	N/A
Common tern	NatureScot (2020); Furness (2015)	May-mid-September	N/A	N/A	April
Arctic tern	NatureScot (2020); Furness (2015)	May-August	September	N/A	April
Great skua	NatureScot (2020); Furness (2015)	Mid-April-mid-September	Mid-September --October	November-February	March-mid-April
Arctic skua	NatureScot (2020); Furness (2015)	May-August	September-October	N/A	April
Guillemot	NatureScot (2020); Furness (2015)	April-mid-August	N/A	Mid-August-March	N/A
Razorbill	NatureScot (2020); Furness (2015)	April-mid-August	Mid-August-October	November-December	January-March
Black guillemot	NatureScot (2020); Furness (2015)	April-August	N/A	September-March	N/A
Puffin	NatureScot (2020); Furness (2015)	April-mid-August	N/A	Mid-August-March	N/A

Species	Source	Seasonal Definitions			
		Breeding	Post-Breeding	Non-Breeding	Pre-Breeding
Red-throated diver	NatureScot (2020); Furness (2015)	April- mid-September	mid-September-November	December-January	February-March
Great northern diver	NatureScot (2020); Furness (2015)	N/A	N/A	September-May	N/A
Fulmar	NatureScot (2020); Furness (2015)	April- mid-September	Mid-September to October	November	December-March
Manx shearwater	NatureScot (2020); Furness (2015)	April- mid-October	N/A	N/A	March
Gannet	NatureScot (2020); Furness (2015)	March-September	October-November	N/A	December-February
Cormorant	NatureScot (2020); Furness (2015)	Mid-February - mid-September	N/A	Mid-September-mid-February	N/A
Shag	NatureScot (2020); Furness (2015)	March-September	N/A	October-February	N/A

Table 4-3 Regional, national and international population sizes for species included in Section 8 (unless stated, all population estimates are for individual birds)

Species	Breeding				Post-Breeding		Non-Breeding		Pre-Breeding	
	Regional (Adults and Immatures)[2]	National (Breeding Pairs)[3]	National (Adults and Immatures)	International [4] (Breeding Pairs)	Regional BDMPS[5]	National[5]	Regional BDMPS[5]	National[6]	Regional BDMPS[5]	National
Kittiwake	221,825	215,913	811,833	3,050,000	911,586	1,741,523	N/A	N/A	691,526	1,319,342
Black-headed gull	62 (adults only)	97,950	195,900 (adults only)	1,250,000-1,700,000	N/A	N/A	N/A	2,200,000		N/A
Common gull	174 (adults only)	23,540	47,080 (adults only)	700,000-1,000,000	N/A	N/A	N/A	705,392	N/A	N/A
Great black-backed gull	1,645	8,021	36,255	120,000-155,000	N/A	N/A	34,380	143,521	N/A	N/A
Herring gull	3,148	237,573	993,055	370,000-390,000	N/A	N/A	173,299	639,810	N/A	N/A
Common tern	324	12,219	40,811	550,000-900,000	64,659	209,570	N/A	N/A	64,659	209,570
Arctic tern	1,814	30,451	96,225	1,300,000-2,200,000	71,398	235,328	N/A	N/A	71,398	235,328

[2] Calculated based on Seabirds Count (Burnell *et al.*, 2023) colony totals within the foraging range of the Study Area.

[3] Sourced from Seabirds Count (Burnell *et al.*, 2023) unless stated otherwise.

[4] Sourced from Wetlands International (2014), Mitchell *et al.* (2004), del Hoyo *et al.* (1996) or Birdlife International (2018).

[5] Sourced from Furness (2015) unless otherwise stated.

[6] Sourced from Woodward *et al.* (2020), Burton *et al.* (2012) or Furness (2015).

Species	Breeding				Post-Breeding		Non-Breeding		Pre-Breeding	
	Regional (Adults and Immatures)[2]	National (Breeding Pairs)[3]	National (Adults and Immatures)	International [4] (Breeding Pairs)	Regional BDMPS[5]	National[5]	Regional BDMPS[5]	National[6]	Regional BDMPS[5]	National
Great skua	53,100	10,937	52,935	19,500-22,500	16,336	35,892	1,398	1,541	25,090	33,575
Arctic skua	N/A	727	2,486	39,900-56,200	5,287	11,714	N/A	N/A	5,111	6,338
Guillemot	278,589	1,265,888 (Individuals at the colony)	2,951,544	2,300-2,850,000	N/A	N/A	278,589[7]	2,756,526	N/A	N/A
Razorbill	55,523	225,015 (individuals at the colony)	527,660	415,000-1,000,000	606,914	1,198,788	341,422	560,044	606,914	1,198,788
Black guillemot	2,227	35,193 (individuals at the colony)	81,648	72,377-142,321	N/A	N/A	2,227[8]	19,500	N/A	N/A
Puffin	1,194,457	474,679	1,936,690	5,500,000-6,000,000	N/A	N/A	304,557	536,514	N/A	N/A
Red-throated diver	Data not available	1,250[9]	2,500 (adults only)	105,000-170,000	4,373	17,650	861	15,371	4,373	17,650

[7] In line with NatureScot guidance (NatureScot, 2023c), the non-breeding regional population for guillemot is assumed to be equal to the regional population in the breeding season,

[8] Furness (2015) defines the BDMPS for black guillemot as being those birds found within 20 km of a specific site. Numbers of breeding adults within 20 km of the Study Area have been extracted from Seabirds Count (Burnell *et al.*, 2023), and immatures added using the number of immatures per adult given in Furness (2015)

[9] Sourced from Woodward *et al.* (2020)

Species	Breeding				Post-Breeding		Non-Breeding		Pre-Breeding	
	Regional (Adults and Immatures)[2]	National (Breeding Pairs)[3]	National (Adults and Immatures)	International [4] (Breeding Pairs)	Regional BDMPS[5]	National[5]	Regional BDMPS[5]	National[6]	Regional BDMPS[5]	National
Great northern diver	N/A	N/A	N/A	430,000	N/A	N/A	2,000	4,400	N/A	N/A
Fulmar	1,142,437	319,508	1,035,206	3,380,000-3,500,000	828,194	1,785,696	556,367	1,125,103	828,194	1,785,696
Manx shearwater	3,391,554	786,743	2,895,214	342,000-393,000	1,580,895	1,589,402	N/A	N/A	1,580,895	1,589,402
Gannet	922,238	304,176	1,101,117	800,000	545,954	1,002,252	N/A	N/A	661,888	910,273
Cormorant	91	8,829	38,318	43,000-55,000	N/A	N/A	7,049	64,500	N/A	N/A
Shag	1,917	20,209	93,366	76,300-78,500	N/A	N/A	37,363	110,000	N/A	N/A

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5 OVERVIEW OF SPECIES SENSITIVITY

5.1.1.1 The Spiorad na Mara Offshore Wind Farm Scoping Report and resulting consultation through the Scoping Opinion (as summarised in Section 14.3 of Chapter 14, Volume 2a) identified the following impacts for consideration in the assessments for the Offshore Project:

- Temporary habitat loss and disturbance;
- Indirect impacts from constructions/decommissioning noise;
- Indirect impacts from Unexploded Ordnance (UXO) clearance;
- Disturbance and displacement from the physical presence of wind turbines and maintenance activities;
- Barrier to movement;
- Collision with wind turbines;
- Changes to prey availability;
- Entanglement;
- Impacts from lighting of the Offshore Project.

5.1.1.2 Consideration of the sensitivity of seabird species to the potential impacts arising from the construction, operation and maintenance, and decommissioning phases of the Offshore Project is provided in Table 5-1. These sensitivity values have been obtained from Wade *et al.* (2016), Bradbury *et al.* (2014) and Maclean *et al.* (2009). These are used to provide context and inform conclusions in relation to the identification of VORs. It should be noted that the identification of VORs relies on professional judgement, and species sensitivity to impacts is one aspect that informs this process.

5.1.1.3 As mentioned above, the majority of the information presented in Table 5-1 is sourced from Wade *et al.* (2016) with this being the most recently published review of the vulnerability of seabirds to OWFs. Wade *et al.* (2016) uses the sensitivity definitions presented in Furness *et al.* (2013) to develop a method to incorporate uncertainty into indices ranking the vulnerability of seabird species. The vulnerability scores given in Wade *et al.* (2016) are used to inform sensitivity to specific impacts as follows:

- Displacement associated with structures: this informs vulnerability to habitat loss (long-term, i.e. duration of the project) and disturbance, indirect impacts from constructions/decommissioning noise, indirect impacts from UXO clearance, disturbance and displacement from the physical presence of wind turbines, presence of offshore substation platforms and maintenance activities;
- Disturbance associated with vessels/helicopters: this informs vulnerability to temporary habitat loss and disturbance, indirect impacts from constructions/decommissioning noise, indirect impacts from UXO clearance, disturbance and displacement from maintenance activities;
- Barrier effects: this informs vulnerability to barriers to movement;

- Collision: this informs vulnerability to bird strike with turbines;
- Habitat flexibility: this informs vulnerability to changes to prey availability;
- Drowning risk: this informs vulnerability to entanglement;
- Proportion of flight activity at night: this informs vulnerability to impacts from lighting of the Offshore Project.

Table 5-1 Summary of seabird sensitivities for species considered within section 8 to impacts associated with OWFs (Wade *et al.* (2016) unless stated otherwise)

Species	Displacement Associated with Structures	Displacement Associated with Vessels/Helicopters	Barrier Effects	Collision	Habitat Flexibility	Drowning Risk	Proportion of Flight Activity at Night
Kittiwake	Low	Low	Low	High	Moderate	Low	Moderate
Black-headed gull	Low	Low	Low	High	Moderate	Low	Low
Common gull	Low	Low	Low	Very High	Moderate	Low	Moderate
Great black-backed gull	Low	Very Low	Low	Very High	Moderate	Low	Moderate
Herring gull	Low	Very Low	Low	Very High	High	Low	Moderate
Common tern	Low	Low	Very Low	Moderate	Moderate	Low	Very Low
Arctic tern	Low	Low	Very Low	Moderate	Moderate	Low	Very Low
Great skua	Very Low	Very Low	Low	High	Moderate	Low	Very Low
Arctic skua	Very Low	Very Low	Low	High	Moderate	Low	Very Low
Guillemot	High	Moderate	High	Very Low	Moderate	High	Low
Razorbill	High	Moderate	High	Very Low	Moderate	High	Very Low
Puffin	Moderate	Moderate	High	Very Low	Moderate	Moderate	Very Low
Red-throated diver	Very High	Very High	High	Moderate	Low	High	Very Low
Great northern diver	Very High	High	High	Moderate	Moderate	High	Very Low
Fulmar	Very Low	Very Low	Low	Very Low	High	Low	High
Manx shearwater	Very Low	Very Low	Low	Very Low	High	Low	Moderate
Gannet	High	Very Low	Very Low	High	High	Moderate	Low
Cormorant	Very Low	High	High	High	Moderate	High	Very Low
Shag	Very low	High	Not available	Moderate	Moderate	High	Very Low

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6 DESIGNATED SITES

6.1.1.1 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.

6.1.1.2 The foraging range of each species was used to infer potential connectivity between the Study Area and important colonies or designated sites. For the purposes of the identification of designated sites in this appendix, the foraging range as recommended by NatureScot (2023b) has been used (as shown in Table 6-1) for each species. In most cases, this is the mean-maximum foraging range plus 1 standard deviation, with some exceptions (such as those for guillemot, razorbill and gannet) (NatureScot, 2023b). For the purposes of the identification of designated sites in this appendix, distances have been measured following an at-sea route from the edge of the Study Area to the coordinates of individual breeding colonies, as provided in the Seabirds Count digital results download (JNCC, 2023).

6.1.1.3 Foraging ranges of seabirds are species-specific and range from a few kilometres from breeding colonies (e.g. little tern) to over 1,000 km (e.g. Manx shearwater) during the breeding season. Several seabirds from colonies on the Scottish coast and from colonies further afield have the potential to use the Study Area during the breeding season.

6.1.1.4 There are several SPAs and Ramsar sites designated for marine and coastal waterbirds with potential connectivity to the Study Area.

6.1.1.5 There are no current or proposed SPAs or Ramsar sites that overlap with the Study Area. There are, however, several SPAs along the British coastline with qualifying species that have been recorded during the site-specific DAS for the Offshore Project. These species and their foraging ranges (as set out in NatureScot, 2023) are listed in Table 6-1. Note that great northern diver has not been listed as was not present within the breeding season, with its non-breeding distribution based on BDMPS region. The list of SPAs within foraging range of the Study Area for the relevant qualifying species is shown in Table 6-2. Connectivity to SPAs has been used as a criteria to inform the identification of VORs.

6.1.1.6 In some cases (e.g. herring gull), species have been included in Table 6-1 to demonstrate that they have been considered, even though no SPAs designated for the species was subsequently identified within the relevant foraging range.

6.1.1.7 As Habitats Regulations Appraisal (HRA) screening is being undertaken as part of a separate assessment process, the approach and methodology for HRA screening are not discussed in this appendix (see Habitats Regulations Appraisal- Screening Report, 2024). The identification of connectivity (or lack thereof) of ornithological receptors to specific SPAs in this section (including Table 6-2) should not be considered as indicative of whether or not those sites/features will be screened in for HRA.

Table 6-1 Foraging ranges used to identify designated sites and important breeding colonies that may have connectivity with the Study Area for species considered within section 7

Species	Recommended Foraging Range (NatureScot, 2023) (km)
Kittiwake	300.6
Black-headed gull	18.5
Common gull	50
Great black-backed gull	73
Herring gull	85.6
Common tern	26.9
Arctic tern	40.5
Great skua	931.2
Arctic skua	2.7
Guillemot	95.2 for sites other than Northern Isles 153.7 for all Northern Isle colonies
Razorbill	122.2 for sites other than Northern Isles 164.6 for all Northern Isle colonies
Black guillemot	9.1
Puffin	265.4
Red-throated diver	9
Fulmar	1,200.2
Manx shearwater	2,365.5
Gannet	509.4 unless stated otherwise 590 for Forth Islands SPA 516.7 for Grassholm SPA 709 for St Kilda/*Hiort* SPA
Cormorant	33.9
Shag	23.7

Table 6-2 SPA colonies (qualifying as an individual species and/or assemblage of species) within individual species' foraging range (as set out in NatureScot, 2023b) from the Study Area for species considered within section 7

SPAD	Kittiwake	Great black-backed gull	Great skua	Guillemot	Razorbill	Puffin	Red-throated diver	Fulmar	Manx shearwater	Gannet
Aberdaron Coast and Bardsey Island SPA									✓	
Ailsa Craig/ *Creag Ealasaid* SPA										✓
Beara Peninsula SPA								✓		
Blasket Islands SPA								✓	✓	
Buchan Ness to Collieston Coast SPA								✓		
Calf of Eday SPA	✓							✓		
Canna and Sanday/ *Canaigh agur Sanndaigh* SPA	✓					✓				
Cape Wrath/ *Am Parbh* SPA	✓				✓	✓		✓		
Clare Island SPA								✓		
Cliffs of Moher SPA								✓		
Copeland Islands SPA									✓	
Copinsay SPA	✓							✓		
Cruagh Island SPA									✓	
Deenish Island and Scariff Island SPA								✓	✓	
Dingle Peninsula SPA								✓		
Duvillaun Islands SPA								✓		
East Caithness Cliffs SPA	✓							✓		
Fair Isle SPA			✓					✓		✓
Fetlar SPA			✓					✓		

SPAD	Kittiwake	Great black-backed gull	Great skua	Guillemot	Razorbill	Puffin	Red-throated diver	Fulmar	Manx shearwater	Gannet
Flamborough and Filey Coast SPA								✓		
Flannan Isles/ *Na h-Eileanan Flannach* SPA	✓			✓	✓	✓		✓		
Forth Islands SPA										✓
Foula/ *Fughlaigh* SPA			✓					✓		
Fowlsheugh SPA								✓		
Handa/ *Shannda* SPA	✓		✓	✓	✓			✓		
Hermaness, Saxa Vord and Valla Field SPA			✓					✓		✓
High Island, Inishshark and Davillaun SPA								✓		
Horn Head to Fanad Head SPA								✓		
Hoy SPA	✓		✓			✓		✓		
Isles of Scilly SPA									✓	
Iveragh Peninsula SPA								✓		
Kerry Head SPA								✓		
Lambay Island SPA								✓		
Lewis Peatlands/ *mòinteach Leòdhais* SPA							✓			
Marwick Head SPA	✓									
Mingulay and Berneray/ *Miughalaigh agur Beàrnaraigh na Hearadh* SPA	✓					✓		✓		
North Caithness Cliffs SPA	✓					✓		✓		
North Colonsay and Western Cliffs SPA	✓									

SPAD	Kittiwake	Great black-backed gull	Great skua	Guillemot	Razorbill	Puffin	Red-throated diver	Fulmar	Manx shearwater	Gannet
North Rona and Sula Sgeir SPA	✓	✓		✓	✓	✓		✓		✓
Noss SPA			✓					✓		✓
Puffin Island SPA								✓	✓	
Rathlin Island SPA								✓		
Ronas Hill - North Roe and Tingon SPA			✓							
Rousay SPA	✓							✓		
Rum SPA	✓								✓	
Saltee Islands SPA								✓		
Shiant Isles/ *Na h-Eileanan Mòra* SPA	✓				✓	✓		✓		
Skelligs SPA								✓	✓	
Skomer, Skokholm and the Seas off Pembrokeshire SPA									✓	
St Kilda/ *Hiort* SPA	✓		✓		✓	✓		✓	✓	✓
Sule Skerry and Sule Stack SPA				✓		✓				✓
Sumburgh Head SPA								✓		
Tory Island SPA								✓		
Troup, Pennan and Lion's Heads SPA								✓		
West Donegal Coast SPA								✓		
West Westray SPA	✓							✓		

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7 IT SPECIES ACCOUNTS

7.1 INTRODUCTION

7.1.1.1 Those seabird species that may occur within the Study Area have been identified using site-specific DAS undertaken between March 2022 and February 2024. 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. Species accounts are used as a screening tool to identify those species which require further assessment, i.e. VORs. Species identified for further assessment are summarised in Section 8 of this appendix.

7.1.1.2 Each species account also includes an overview of species' conservation status and sensitivity to impacts associated with offshore wind developments (e.g. displacement, barrier effects, collision and their ability to adapt to habitat changes). All SPAs on the west coast of Scotland/*Alba* at which the relevant species is a qualifying feature either in its own right or as part of an assemblage have been identified. Behavioural information recorded during baseline surveys relating to flight direction is also presented within individual species accounts.

7.1.1.3 A VOR was identified where the numbers present at the Study Area exceeded the 1% threshold of the regional population in any season or if there is foraging range connectivity with SPA(s) for which that species is a qualifying breeding feature. It is considered that any impacts on species occurring in numbers of less than 1% of the relevant regional population will not be significant. This process is not however, applied as a definitive threshold, with expert judgement 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 Study Area to identify the relevant conservation value for a VOR. These selection criteria were informed by the Chartered Institute of Ecology and Environmental Management's (CIEEM) (2024) guidance and adapted to be relevant for the avifauna present within the Study Area.

7.1.1.4 In some instances the numbers of individuals of a species recorded during the DAS undertaken between March 2022 and February 2024 are so low that there is negligible potential for the species in question to be impacted by the Offshore Project. In this situation, this Ornithology Baseline Report will rule that species out of potential as a VOR, and it will not be taken forward for further assessment unless an alternative justification for including an assessment is identified. For example, migratory species that are not adequately characterised through DAS may not be identified as VORs in this appendix but may still require assessment. Definitions of terms relating to the conservation value of ornithological receptors are shown in Table 7-1.

Table 7-1 Definition of Terms Relating to the Conservation Value of Ornithological Receptors

Conservation Value	Definition[10]
Negligible	Conservation status All species of lowest conservation status (e.g. Green-listed species listed on the Birds of Conservation Concern 5 (Stanbury *et al*., 2021; 2024)). Importance Not recorded during baseline and regional surveys of the 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 in the Study Area in numbers lower than 1% of the regional population.
Regional	Conservation status • Species listed on the Birds of Conservation Concern 5 Red list; and/or • Species that are the subject of a specific action plan within the UK or are listed on the Scottish Biodiversity List[11]. Importance A species which is present at the Offshore Ornithology Study Area 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 1 of the EU Birds Directive; • Bird species that form part of an SSSI that may potentially interact with the Study Area at some stage of their life cycle; • At least 50% of the UK breeding or non-breeding population found in 10 or fewer sites; and/or • An impact on an ecologically sensitive species (<300 breeding pairs or <900 wintering individuals in the UK). Importance A species which is present at the Study Area 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 with the Study Area at some stage of their life cycle including those listed as assemblage features; and/or

[10] A conservation value will be determined based on the higher value associated with the conservation status or the importance of the species.

[11] The Scottish Government and NatureScot have been focused on the development of the final draft of the Scottish Biodiversity Strategy and supporting Delivery Plans, which will be published later this year. The Scottish Biodiversity List remains an important part of this framework and is still considered relevant.

Conservation Value	Definition[10]
	• At least 20% of the European breeding or non-breeding population is found in the UK. Importance A species which is present at the Study Area in numbers of greater than 1% of the international biogeographic population.

7.2 KITTIWAKE

7.2.1 Status Overview

7.2.1.1 Kittiwake is currently red-listed on the UK Birds of Conservation Concern 5 (BoCC5) (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).

7.2.1.2 Kittiwake is one of the most common seabirds in the UK, breeding in large colonies on coastal cliff habitat. Seabirds Count recorded 215,913 pairs in the UK, with the largest numbers on the east coast (Burnell *et al.*, 2023). There are numerous kittiwake colonies in close proximity to the Study Area, with the nearest being approximately 5 km from the Study Area. However, the nearby colonies tend to be relatively small; the closest colony with 500 or more breeding pairs is Handa Island/*Eilean Shannda*, which is 99.3 km from the Study Area (following an at-sea route). Kittiwakes mostly prey on small fish such as sandeels, crustaceans and fishery discards (Coulson, 2011).

7.2.1.3 Between March and July, kittiwakes are found widely around the coast of Britain, with the highest densities located close to large colonies, particularly around Orkney/*Arcaibh*, north and east Scotland/*Alba* and northeast England (Stone *et al.*, 1995, Waggitt *et al.*, 2020). From August-September, kittiwakes begin to disperse, although the predominant distribution still reflects the location of breeding colonies. From October-February, birds are dispersed over much larger areas. The highest numbers within the Study Area typically occur during the period from October-February, with birds evenly distributed within and around the Study Area (Waggitt *et al.*, 2020; Plate 7-1 and Plate 7-2).

Plate 7-1: Kittiwake typical at-sea density, as modelled in Waggitt *et al.* (2020) using European Seabirds At Sea (ESAS) data from 1980 – 2018. January to June.

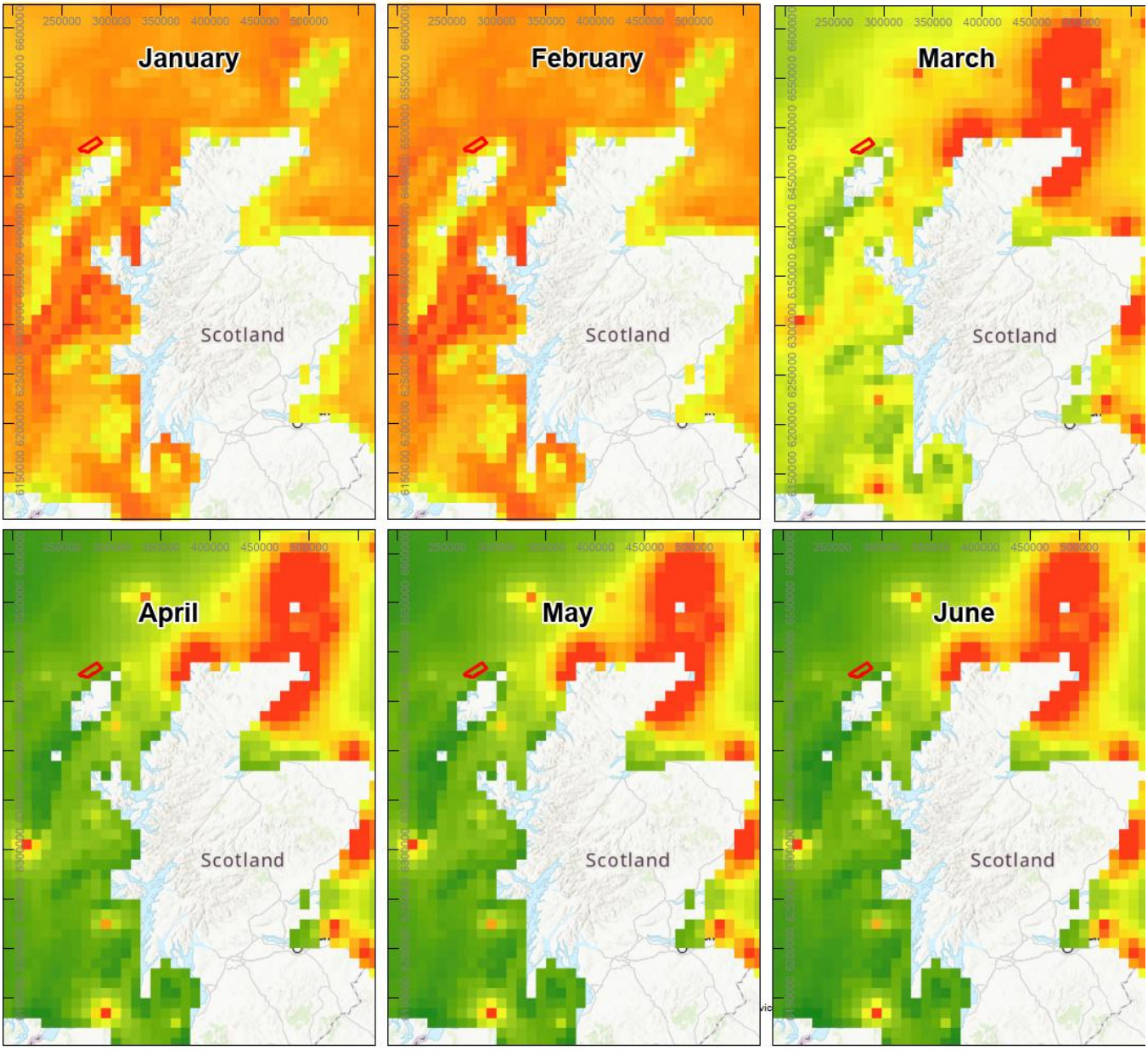
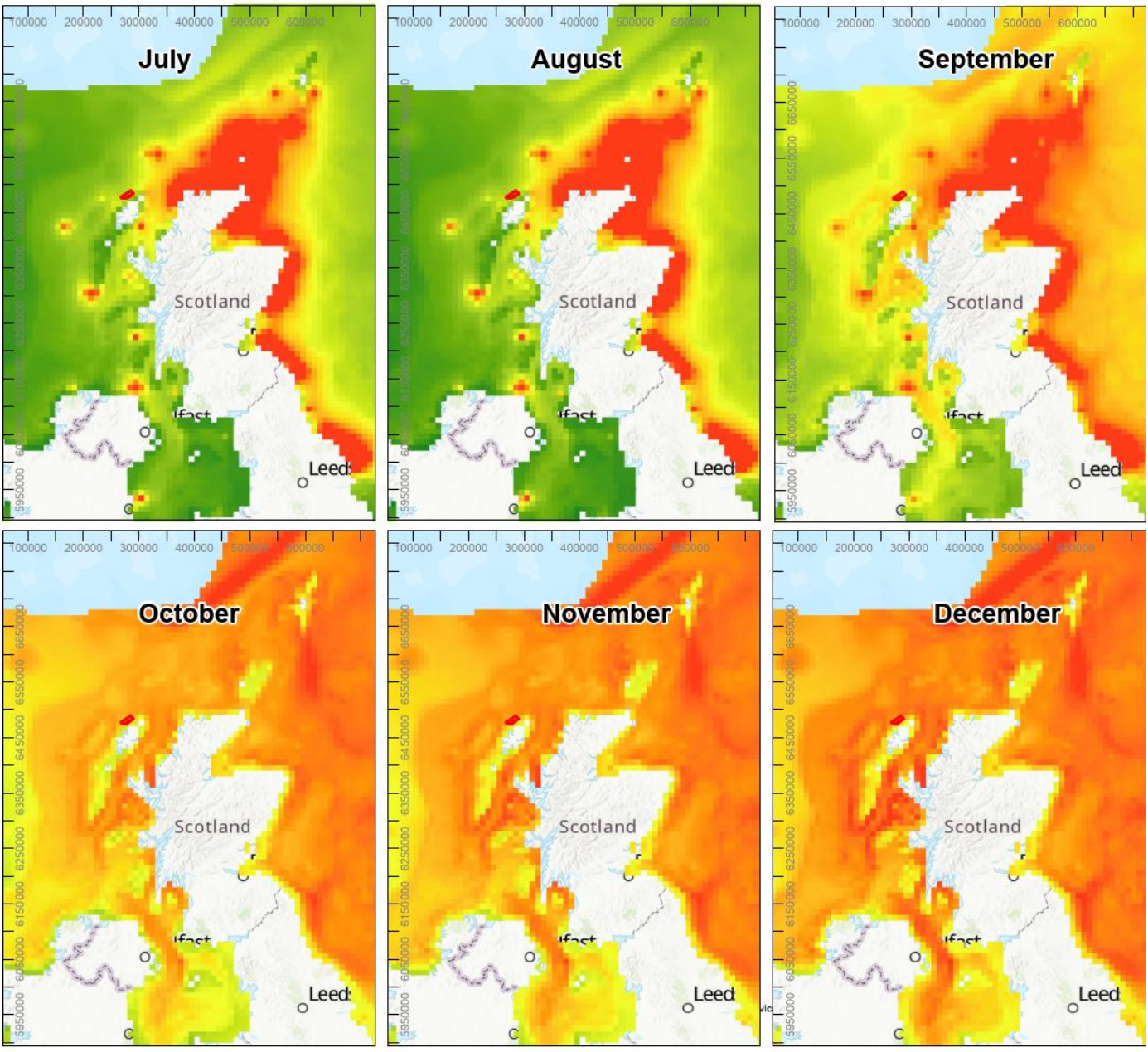


Plate 7-2: Kittiwake typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. July to December.



7.2.1.4 The Study Area is within the foraging range of kittiwake from 18 SPAs (see Table 6-2 and Table 7-2). These SPAs (excluding foraging SPAs) are designated for 53,557 breeding pairs of kittiwakes, representing 25% of the UK breeding population as recorded during Seabirds Count (Burnell *et al*., 2023) (see Table 7-2).

Table 7-2 SPAs with kittiwake as a designated feature or named assemblage component within foraging range of the Study Area.

SPA	Kittiwake breeding population in SPA (AON; Burnell *et al*., 2023)	Distance from Study Area (km)[12]
Calf of Eday SPA	336	256
Canna and Sanday/*Canaigh agur Sanndaigh* SPA	1,421	171
Cape Wrath/*Am Parbh* SPA	3,622	108
Copinsay SPA	955	244
East Caithness Cliffs SPA	24,479	271
Flannan Isles/*Na h-Eileanan Flannach* SPA	825	34
Handa/*Shannda* SPA	3,749	92
Hoy SPA	266	201
Marwick Head SPA	906	198
Mingulay and Berneray/*Miughalaigh agur Beàrnaraigh na Hearadh* SPA	2,088	202
North Caithness Cliffs SPA	5,571	194
North Colonsay and Western Cliffs SPA	3,347	279
North Rona and Sula Sgeir SPA	712	76
Rousay SPA	330	226
Rum SPA	700	187
Shiant Isles/*Na h-Eileanan Mòra* SPA	1,075	100
St Kilda/*Hiort* SPA	420	108
West Westray SPA	2,755	223

7.2.1.5 Wade *et al.* (2016) assessed kittiwake as being at low risk of displacement from wind farms and habitat loss due to the ability of the species to utilise alternative habitats. Kittiwake is, however, considered to be at high risk of collision with wind turbines due to the relatively high proportion of birds flying at wind turbine height. Maclean *et al.* (2009) assessed all gulls, including kittiwake, as being at low risk of barrier effects at OWFs (Table 5-1).

[12] Distances are measured from the edge of the Study Area to individual breeding sites within foraging range (using coordinates provided in the Seabirds Count data download (JNCC, 2023)) and averaged across the SPA. Note that as different species may breed at different sites within an SPA, the distance reported may vary for the same SPA across different species.

7.2.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.2.2.1 Kittiwake were frequently recorded in site-specific DAS, being recorded in 22 surveys in the Study Area (zero kittiwake were recorded within June 2022 and June 2023), and recorded in all 24 surveys in the whole Survey Area. The peak count was in January 2023, with a design-based estimated abundance of 1,394 birds and a model-based estimate of 1,399 birds within the Study Area. Across both years of the survey, kittiwakes were recorded in higher abundance in the non-breeding seasons, particularly in January and February 2023 as well as February 2024. Kittiwake abundances did not reach the threshold for Regional Importance in any season but are considered of Local Importance.

7.2.2.2 The peak model-based abundance estimate in the breeding season was 67 birds in May 2022, which is below the threshold for regional importance, based on a breeding season regional population of 221,787 (Table 4-3). The peak model-based abundance estimate in the post-breeding season was 478 birds in October 2022, which is below the threshold for regional importance, based on a post-breeding season regional population of 911,586 (Table 4-3). The peak model-based abundance estimate in the pre-breeding season was 1,399 birds in January 2023, which is below the threshold for regional importance, based on a pre-breeding season regional population of 691,526 (Table 4-3).

7.2.2.3 In the non-breeding season, distribution was concentrated in the north of the Survey Area in October 2022, February 2023, and February 2024 (see figures in Annex 14.1.3, Volume 2c). During the breeding season, kittiwakes predominantly occurred in the southwest of the 10 km buffer in May 2022 and May to August 2023, in the south and north in June 2022, and across the site in July 2022 (see figures in Annex 14.1.3, Volume 2c). Estimated abundances and densities of kittiwake within the Study Area (including apportioned birds) are presented in Table 7-3 and Table 7-4, with estimates for the Turbine Area, and Turbine Area plus 2 km buffer presented in Annex 14.1.1, Volume 2c, and estimates prior to apportionment presented in Annex 14.1.2, Volume 2c.

Table 7-3 Kittiwake design-based estimated abundance and density within the Study Area. [13]

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	35	9	69	0.09	0.02	0.17
April 2022	26	3	52	0.06	0.01	0.13
May 2022	59	9	130	0.14	0.02	0.32
July 2022	34	1	78	0.08	0.00	0.19
August 2022	8	0	26	0.02	0.00	0.06
September 2022	113	13	301	0.28	0.03	0.74
October 2022	484	313	670	1.18	0.76	1.64
November 2022	303	190	415	0.74	0.46	1.01
December 2022	54	17	113	0.13	0.04	0.28
January 2023	1,394	1,138	1,672	3.41	2.78	4.09
February 2023	912	668	1,181	2.23	1.63	2.89
March 2023	661	120	1,505	1.62	0.29	3.68
April 2023	26	3	61	0.06	0.01	0.15
May 2023	26	3	61	0.06	0.01	0.15
July 2023	37	4	92	0.09	0.01	0.22
August 2023	5	0	15	0.01	0.00	0.04
September 2023	9	1	26	0.02	0.00	0.06
October 2023	76	17	173	0.19	0.04	0.42
November 2023	63	17	118	0.15	0.04	0.29
December 2023	73	27	125	0.18	0.07	0.31
January 2024	18	2	44	0.04	0.00	0.11
February 2024	545	392	716	1.33	0.96	1.75

[13] Estimates are inclusive of apportionment of unidentified species.

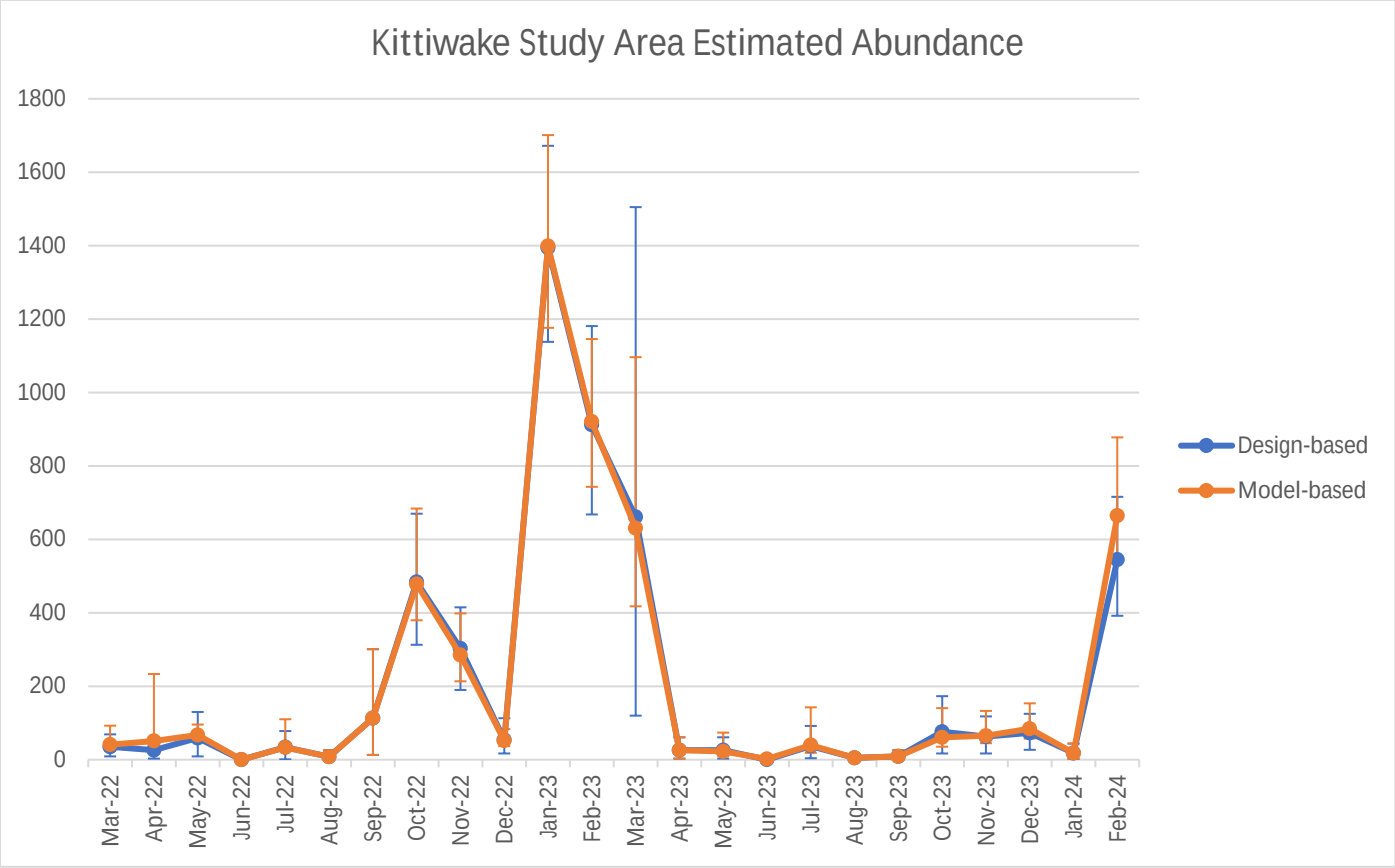
Table 7-4 Kittiwake model-based estimated abundance and density within the Study Area[14].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	41	24	93	0.10	0.06	0.23
April 2022	51	21	233	0.12	0.05	0.57
May 2022	67	52	96	0.16	0.13	0.23
June 2022	0*	0*	0*	0.00*	0.00*	0.00*
July 2022	33	27	110	0.08	0.07	0.27
August 2022*	8*	0*	26*	0.02*	0.00*	0.06*
September 2022*	113*	13*	301*	0.28*	0.03*	0.74*
October 2022	478	380	684	1.17	0.93	1.67
November 2022	285	214	399	0.70	0.52	0.97
December 2022	52	37	84	0.13	0.09	0.20
January 2023	1,399	1,176	1,701	3.42	2.87	4.16
February 2023	921	743	1,146	2.25	1.82	2.80
March 2023	631	418	1,096	1.54	1.02	2.68
April 2023*	26*	3*	61*	0.06*	0.01*	0.15*
May 2023	22	10	74	0.05	0.02	0.18
June 2023	2	1	10	0.00	0.00	0.02
July 2023	40	19	143	0.10	0.05	0.35
August 2023*	5*	0*	15*	0.01*	0.00*	0.04*
September 2023*	9*	1*	26*	0.02*	0.00*	0.06*
October 2023	61	35	140	0.15	0.09	0.34
November 2023	65	45	133	0.16	0.11	0.32
December 2023	84	58	154	0.21	0.14	0.38
January 2024*	18*	2*	44*	0.04*	0.00*	0.11*

[14] Estimates are inclusive of apportionment of unidentified species

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
February 2024	665	541	878	1.62	1.32	2.15
*Survey was not modelled due to low observed raw count and so results are design-based abundance and density estimates but are included to provide a comprehensive baseline.						

Plate 7-3: Kittiwake estimated abundance and confidence limits within the Study Area.[15]



7.2.2.4 Across all surveys in which they were recorded, 73.0% of kittiwake (considering only birds identified to species level) within the Survey Area were recorded flying, whilst the remaining 27.0% were sitting. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

7.2.2.5 Kittiwake age classes can be distinguished during the DAS due to their moult strategy, with juvenile and first winter birds having distinctive markings. This is unlike all other species (with the exception of gannet), for which this level of information cannot be recorded during DAS. Across all surveys in

[15] Estimates are inclusive of apportionment of unidentified birds.

which they were recorded, the majority (93% of birds for which an age was assigned) of kittiwake recorded in the Survey Area were adults (Table 7-5).

Table 7-5 Kittiwake age classes recorded in the Survey Area.

	Adult	Juvenile	First winter	First summer	Unknown
Count	1,059	2	51	25	362

7.2.3 CONCLUSION

7.2.3.1 Kittiwake is considered to have an international conservation status as the foraging ranges reported by Woodward *et al.* (2019) suggest connectivity between the Study Area and SPA breeding colonies. Population estimates of kittiwake at the Study Area do not exceed the 1% importance threshold of the regional population during any season (i.e. 2,217 as 1% of 221,787 in the breeding season, 9,115 as 1% of 911,586 in the post-breeding season or 6,915 as 1% of 691,526 in the pre-breeding season; Table 4-3 and Table 7-2). Overall, based on SPA connectivity, kittiwake is identified as a VOR and considered for further assessment as a receptor with an international conservation value.

7.3 BLACK-HEADED GULL

7.3.1 STATUS OVERVIEW

7.3.1.1 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). Black-headed gull is Amber-listed in BoCC5 (Stanbury *et al.*, 2024). The species is on the Scottish Biodiversity List.

7.3.1.2 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 97,950 pairs recorded in the UK during Seabirds Count (Burnell *et al.*, 2023). The UK wintering population of black-headed gull has been estimated at over 2,200,000 individuals (Woodward *et al.*, 2020).

7.3.1.3 The Study Area is not in the foraging range from any SPA at which black-headed gull is a qualifying feature.

7.3.1.4 Wade *et al.* (2016) assessed black-headed gull as being at low risk of displacement from wind farms and habitat loss due to the species ability to use a wide range of habitats. The species was assessed as being at high risk of collision with wind turbines due to the relatively high proportion of birds flying at wind turbine height. Maclean *et al.* (2009) assessed gulls as being at low risk of barrier effects with OWFs (Table 5-1).

7.3.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.3.2.1 Black-headed gulls were recorded in the Study Area in only a single survey (Table 7-6). The estimated abundance does not meet the threshold for importance at any level. Black-headed gulls were not recorded within the Turbine Area, nor the Turbine Area plus 2 km buffer. Estimated abundance within the Study Area prior to apportionment is presented in Annex 14.1.2, Volume 2c. Black-headed gulls were recorded in 3 surveys within the whole Survey Area, mostly close to the coast (see figures in Annex 14.1.3, Volume 2c).

Table 7-6 Black-headed gull estimated abundance and density within the Study Area.[16].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
October 2022	9	1	26	0.02	0.00	0.06

7.3.2.2 During the 3 surveys in which they were recorded within the Survey Area, 100% of black-headed gulls (considering only birds identified to species level) were recorded flying. Abundances and densities of flying birds in each survey are presented in Annex 14.1.1, Volume 2c(including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment of unidentified birds).

7.3.3 CONCLUSION

7.3.3.1 Due to the species' inclusion on the Amber List in BoCC5, black-headed gull is considered to be of local conservation status. Black-headed gull was only recorded in the Study Area in a single survey, at a level below the thresholds for importance. Although as a species black-headed gulls are considered sensitive to collision risk, as no black-headed gulls were recorded in the Turbine Area in the DAS, this risk is negligible for the Offshore Project. Therefore, it is considered highly unlikely that impacts associated with the Offshore Project will occur on black-headed gull.

7.3.3.2 Black-headed gull is therefore not considered for further assessment in relation to impacts associated with the Project.

[16] Estimates are inclusive of apportionment of unidentified species.

7.4 COMMON GULL

7.4.1 STATUS OVERVIEW

7.4.1.1 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 in BoCC5 (Stanbury *et al.*, 2024).

7.4.1.2 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. Seabirds Count recorded 23,540 pairs of common gulls breeding in the UK (Burnell *et al.*, 2023). 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 (Woodward *et al.*, 2020).

7.4.1.3 The Study Area is not within the foraging range from any SPA at which common gull is a qualifying feature.

7.4.1.4 Wade *et al.* (2016) assessed common gull as being at low risk of displacement from wind farms and habitat loss due to the species ability to use a wide range of habitats. However, the species is assessed as being at very high risk from collision with wind turbines due to the relatively high proportion of birds flying at wind turbine height. Maclean *et al.* (2009) assessed gulls as being at low risk of barrier effects at OWFs (Table 5-1).

7.4.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.4.2.1 Common gulls were recorded in 2 surveys within the Study Area, all in the non-breeding season (Table 7-7). In contrast, they were frequently observed across the wider Survey Area, being recorded in 17 of the 24 surveys during both breeding and non-breeding seasons. Abundance and density estimates for the Turbine Area plus 2 km buffer, the Study Area, and the wider Survey Area are presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment). At no spatial scale did estimated abundance reach the threshold for importance.

7.4.2.2 The majority of common gull observations were concentrated in the landward section of the 10 km buffer, with most recorded within 1 km of the nearest coastline. Only a single individual was observed further offshore, beyond the Turbine Area. (see figures in Annex 14.1.3, Volume 2c).

Table 7-7 Common gull estimated abundance and density within the Study Area[17].

Survey	Design-based estimate					
	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
October 2023	8	1	26	0.02	0.00	0.06
November 2023	18	2	44	0.04	0.00	0.11

7.4.2.3 Across all surveys in which they were recorded, 93.0% of common gulls (considering only birds identified to species level) within the Survey Area were recorded flying, whilst the remaining 7.0% were sitting. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

7.4.3 CONCLUSION

7.4.3.1 Due to the species' inclusion on the Red List in BoCC5, common gull is considered to be of regional conservation status. Common gull was infrequently recorded during aerial surveys of the Study Area, at estimated abundances that fail to meet the threshold for importance at any scale.

7.4.3.2 Common gulls are considered sensitive to collision risk, and NatureScot advice (provided on 8th May 2025) requested that common gull be taken forward for collision risk modelling. However, due to no common gulls being recorded in the Turbine Area in the DAS, collision risk modelling is not possible. Therefore, it is considered highly unlikely that impacts associated with the Offshore Project will occur on common gull. Common gull is therefore not considered for further assessment in relation to impacts associated with the Project.

7.5 GREAT BLACK-BACKED GULL

7.5.1 STATUS OVERVIEW

7.5.1.1 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 in BoCC5 (Stanbury *et al.*, 2024).

7.5.1.2 Great black-backed gull is a common resident species in the UK, occurring in coastal areas. Seabirds Count recorded 8,021 pairs in the UK, with largest numbers on western coasts and the

[17] Estimates are inclusive of apportionment of unidentified species.

Northern Isles (Burnell *et al.*, 2023). Great black-backed gulls are omnivorous, foraging at sea, on estuaries and beaches, and less commonly at rubbish dumps (Forrester *et al.*, 2007).

7.5.1.3 Great black-backed gull is a relatively common breeding species in Great Britain. 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 and sometimes travel long distances in pursuit of discards from fishing vessels (Stone *et al.*, 1995). The UK wintering population of great black-backed gull has been estimated at over 77,000 individuals (Woodward *et al.*, 2020). 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).

7.5.1.4 During March and April, the highest densities within the UK are found in the northern isles of Scotland/*Alba* with overwintering birds in UK waters returning to breeding grounds in Fennoscandia and Iceland during this time (Furness, 2015), leaving lower densities along the east coast.

7.5.1.5 The Study Area is in foraging range from 1 SPA at which great black-backed gull is a qualifying feature (see Table 6-2 and Table 7-8). The breeding population of this SPA is 49 pairs, or approximately 1% of the UK population recorded in Seabirds Count (Burnell *et al.*, 2023).

Table 7-8 SPAs with great black-backed gull as a designated feature or named assemblage component within foraging range of the Study Area.

SPA	Great black-backed gull breeding population in SPA (AON; Burnell *et al.*, 2023)	Distance from Study Area (km)[18]
North Rona and Sula Sgeir SPA	49	70

7.5.1.6 Wade *et al.* (2016) assessed great black-backed gull as being at low risk of displacement from wind farms and very low risk of habitat loss due to the species ability to use a wide range of habitats. The species is considered to be at very high risk of collision with wind turbines due to the relatively high proportion of birds flying at wind turbine height. Maclean *et al.* (2009) assessed gulls as being at low risk of barrier effects at OWFs (Table 5-1).

7.5.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.5.2.1 Great black-backed gulls were recorded in 9 surveys within the Study Area, all in the non-breeding season (see Table 7-9 and Plate 7-4). Abundance and density estimate for the Turbine Area and Turbine Area plus 2 km buffer are presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment). The

[18] Distances are measured from the edge of the Study Area to individual breeding sites within foraging range (using coordinates provided in the Seabirds Count data download (JNCC, 2023) and averaged across the SPA. Note that as different species may breed at different sites within an SPA, the distance reported may vary for the same SPA across different species.

recorded abundances do not meet the threshold for regional population importance (i.e. 16 as 1% of 1,645 in the breeding season, or 343 as 1% of 34,380 in the non-breeding season; Table 4-3) or national population importance (i.e. 80 as 1% of 8,021 in the breeding season, or 1,435 as 1% of 143,521 in the non-breeding season; Table 4-3) in any season.

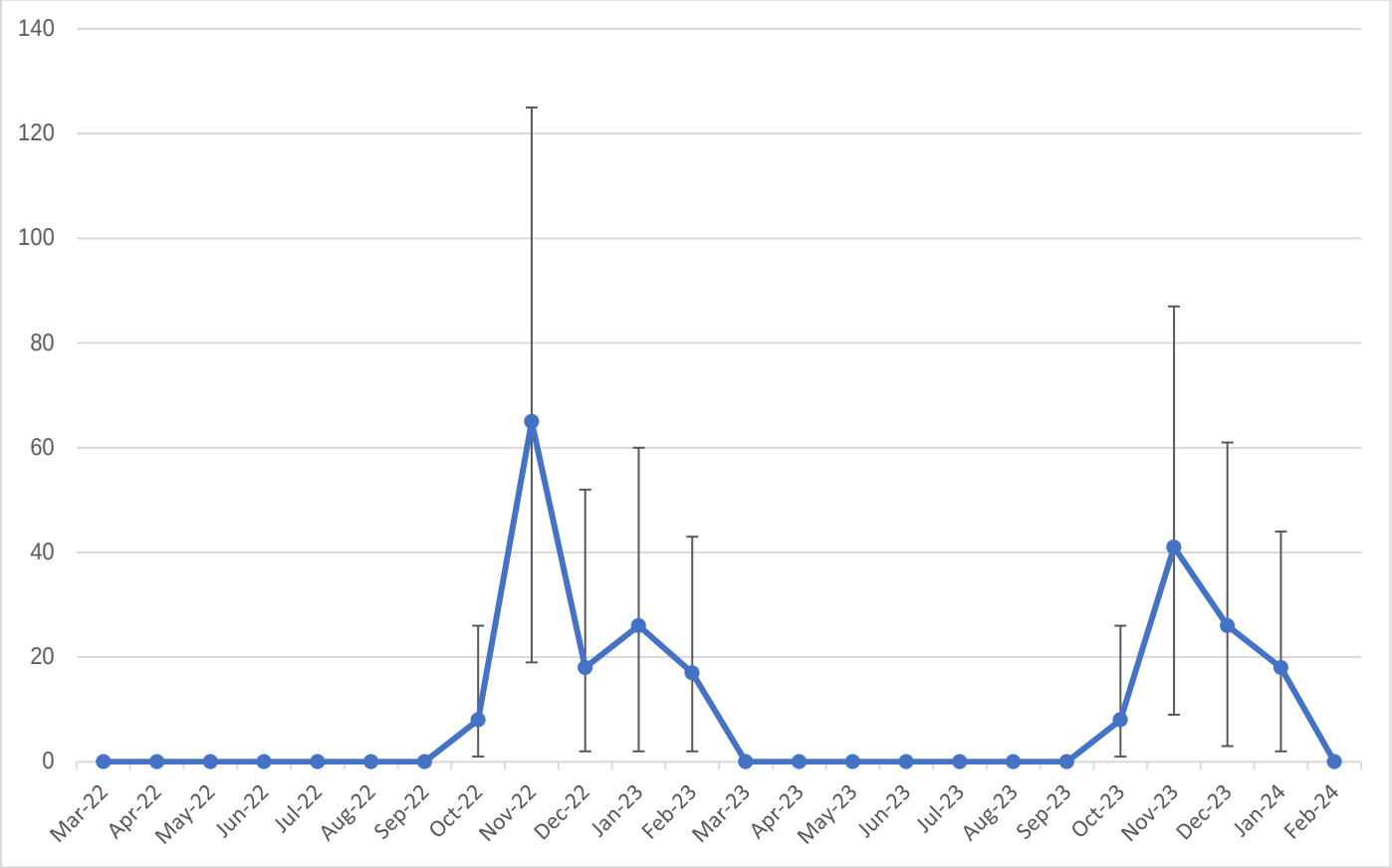
7.5.2.2 Great black-backed gulls were frequently recorded in the wider Survey Area, being recorded in 21 of the 24 surveys, and in both breeding and non-breeding seasons. The majority of great black-backed gulls recorded were in the landward portion of the buffer area, with most observations being within 5 km of the nearest land. However, birds were recorded throughout the Survey Area (see figures in Annex 14.1.3, Volume 2c).

Table 7-9 Great black-backed gull estimated abundance and density within the Study Area[19].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
October 2022	8	1	26	0.02	0.00	0.06
November 2022	65	19	125	0.16	0.05	0.31
December 2022	18	2	52	0.04	0.00	0.13
January 2023	26	2	60	0.06	0.00	0.15
February 2023	17	2	43	0.04	0.00	0.11
October 2023	8	1	26	0.02	0.00	0.06
November 2023	41	9	87	0.10	0.02	0.21
December 2023	26	3	61	0.06	0.01	0.15
January 2024	18	2	44	0.04	0.00	0.11

[19] Estimates are inclusive of apportionment of unidentified species.

Plate 7-4 Great black-backed gull estimated abundance and confidence limits within the Study Area.[20]



7.5.2.3 Across all surveys in which they were recorded, 47.1% of great black-backed gulls (considering only birds identified to species level) within the Survey Area were recorded flying, 50.7% were sitting and the remaining 2.1% displayed other behaviours. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

7.5.3 CONCLUSION

7.5.3.1 Great black-backed gull is considered to have an international conservation status as the foraging ranges reported by Woodward et al. (2019) suggest connectivity between the Study Area and North Rona and Sula Sgeir SPA breeding colony. The abundances recorded in the Study Area do not meet the threshold for Regional or National Importance, but in some months, they reach Local Importance. Great black-backed gull is considered vulnerable to collision risk, and, although only recorded in the Turbine Area in low numbers and in a minority of surveys, (see Table 1-19 within Annex 14.1.1, Volume 2c), it presents in sufficient numbers for this risk to be considered tangible.

[20] Estimates are inclusive of apportionment of unidentified birds.

7.5.3.2 Therefore, great black-backed gull has been identified as a VOR and will be progressed to the next stage of assessment.

7.6 HERRING GULL

7.6.1 STATUS OVERVIEW

7.6.1.1 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 currently red-listed in BoCC5 (Stanbury *et al.*, 2024). The species is on the Scottish Biodiversity List.

7.6.1.2 Herring gulls are resident, common and widespread, breeding in colonies in coastal and inland locations. Seabirds Count recorded 237,573 pairs in the UK (Burnell *et al.*, 2023). There is a general movement southward in winter months (Forrester *et al.*, 2007) with the UK wintering population estimated at over 740,000 individuals (Woodward *et al.*, 2020). Herring gulls exploit a wide range of food sources, including scraps and offal from trawlers, as well as on land at refuse dumps and farmland (Forrester *et al.*, 2007).

7.6.1.3 In the breeding season, herring gulls are strongly associated with coastal areas, especially in the vicinity of large breeding colonies. Densities are highest along the east coast of Scotland/*Alba* and England, and very low densities would be typically expected in the Study Area (see Waggitt *et al.*, 2020; Plate 7-5 and Plate 7-6). In the non-breeding season, herring gulls are more widely distributed, although densities are still highest in coastal areas and near large breeding colonies (see Waggitt *et al.*, 2020; Plate 7-5 and Plate 7-6).

Plate 7-5 Herring gull typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. January to June.

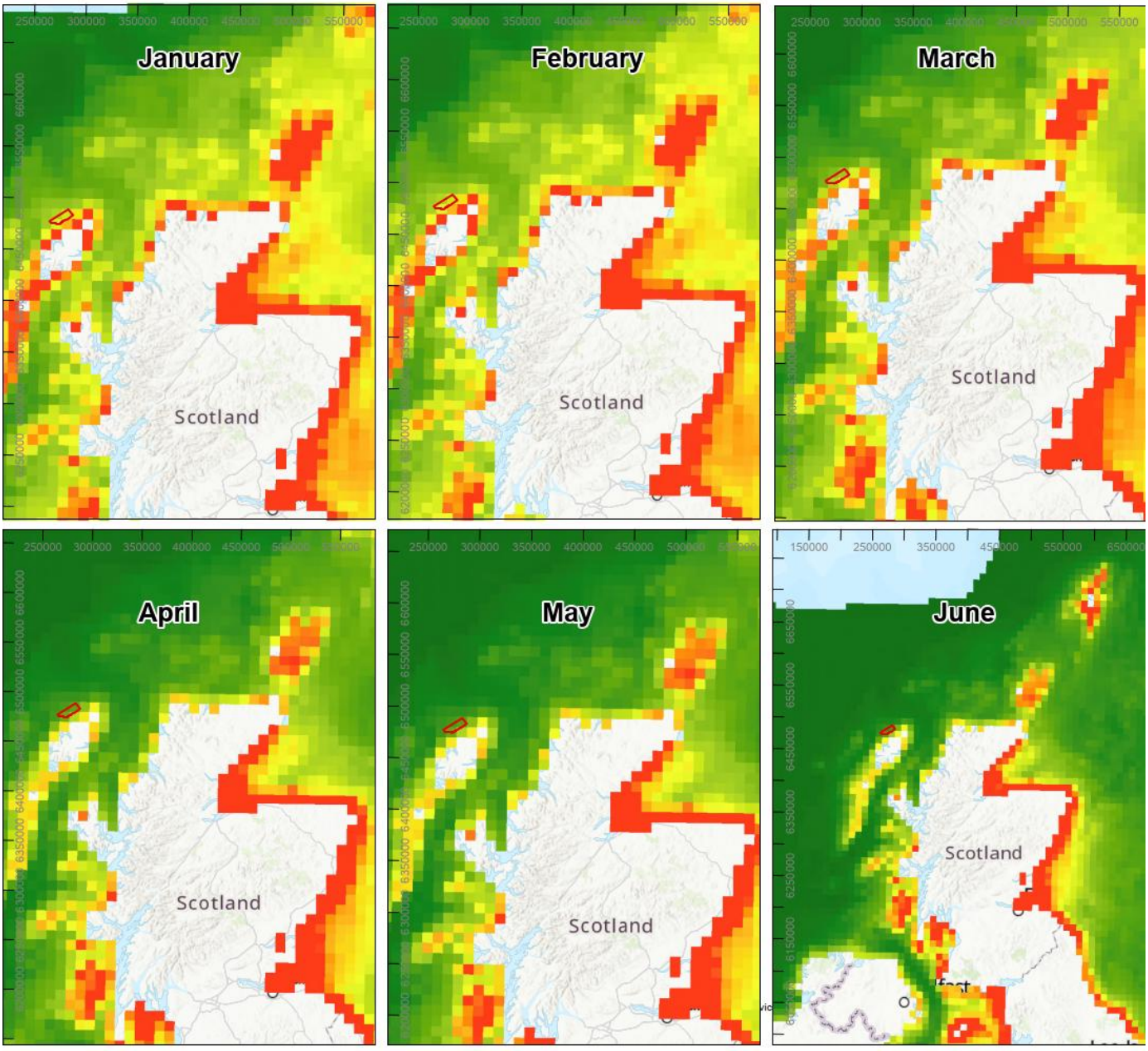
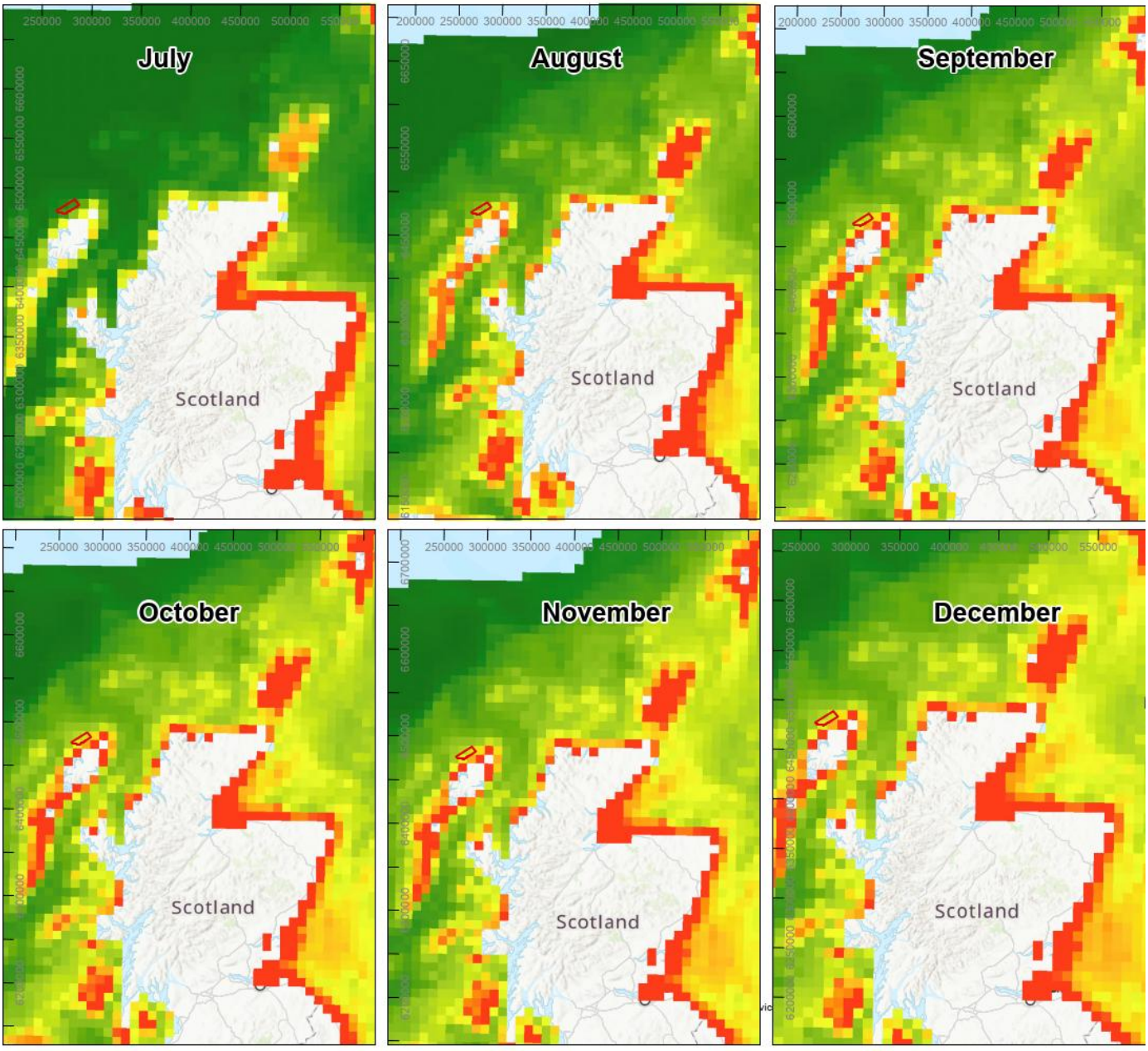
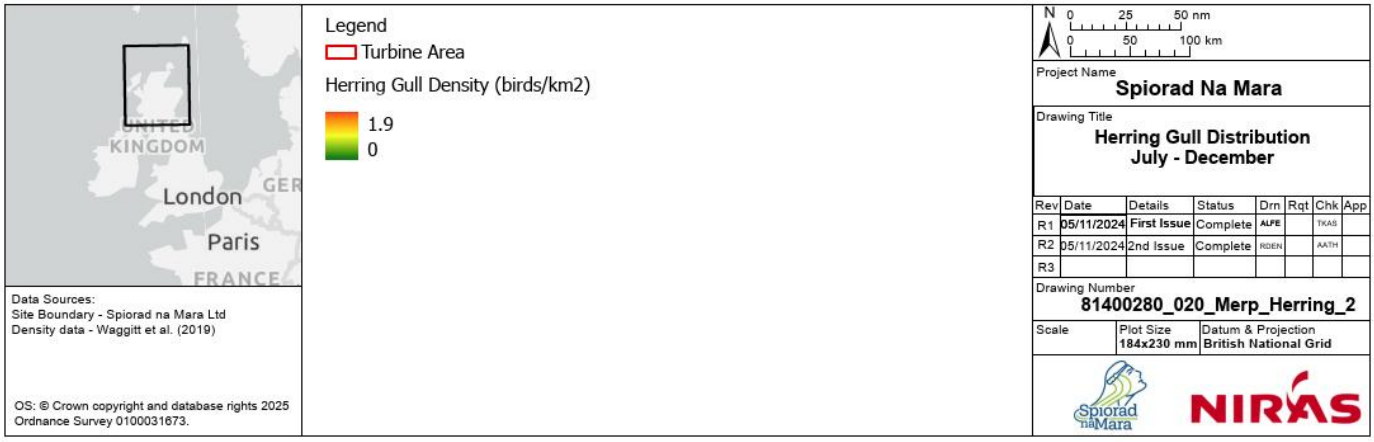


Plate 7-6 Herring gull typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. July to December.





7.6.1.4 The Study Area is not in the foraging range from any SPA at which herring gull is a qualifying feature.

7.6.1.5 Wade *et al.* (2016) has assessed herring gull as being at low risk from displacement from wind farms and very low risk of habitat loss due to the species ability to use a wide range of habitats. The species is considered to be at very high risk of collision with wind turbines due to the relatively high proportion of birds flying at wind turbine height. Maclean *et al.* (2009) assessed gulls as being at low risk of barrier effects at OWFs (Table 5-1).

7.6.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.6.2.1 Herring gulls were recorded in 3 surveys within the Study Area, all in the non-breeding season (see Table 7-10 and Plate 7-7). Abundance and density estimate for the Turbine Area and Turbine Area plus 2 km buffer are presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment). The abundances recorded in the Study Area do not meet the threshold for importance at any scale.

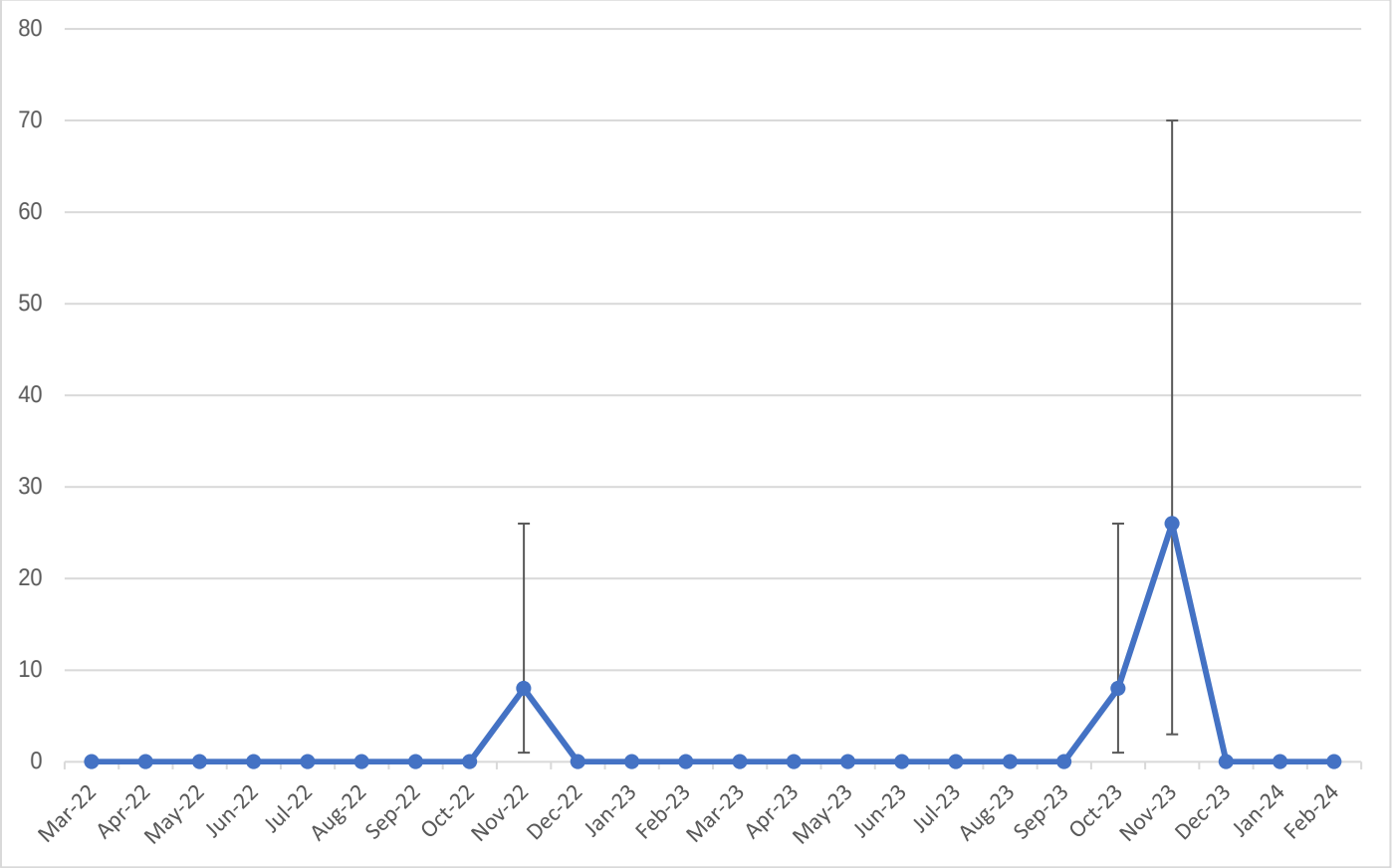
7.6.2.2 In addition, herring gulls were frequently recorded in the wider Survey Area, being recorded in 23 of the 24 surveys, and in both breeding and non-breeding seasons. The majority of herring gulls recorded were in the landward portion of the buffer area, with most observations being within 5 km of the nearest land. However, birds were recorded throughout the Offshore Ornithology Survey Area (see figures in Annex 14.1.3, Volume 2c).

Table 7-10 Herring gull estimated abundance and density within the Study Area[21].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
November 2022	8	1	26	0.02	0.00	0.06
October 2023	8	1	26	0.02	0.00	0.06
November 2023	26	3	70	0.06	0.01	0.17

[21] Estimates are inclusive of apportionment of unidentified species.

Plate 7-7: Herring gull estimated abundance and confidence limits within the Study Area.[22]



7.6.2.3 Across all surveys in which they were recorded, 35.1% of herring gulls (considering only birds identified to species level) within the Survey Area were recorded flying, 64.2% were sitting and the remaining 0.7% were displaying other behaviours. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

7.6.3 CONCLUSION

7.6.3.1 Due to the species' inclusion on the Red List in BoCC5, herring gull is considered to be of regional conservation status. The abundances recorded in the Study Area are below the thresholds for importance at any scale. Herring gull is a species that is considered to be vulnerable to collision risk. However, herring gulls were only recorded in 1 survey in the Turbine Area, and at a low density (see Table 1-25 within Annex 14.1.1, Volume 2c),, so it is considered that there is no material risk from collision at this site. Herring gulls are not considered to be sensitive to displacement or barrier effects. Therefore, it is considered highly unlikely that impacts associated with the Offshore Project

[22] Estimates are inclusive of apportionment of unidentified birds.

will occur on herring gull. However, inclusion of herring gull for collision risk modelling was requested by NatureScot (NatureScot advice provided on 8th May 2025).

7.6.3.2 Therefore, herring gull is taken forward as a VOR, with regards to collision risk modelling.

7.7 COMMON TERN

7.7.1 STATUS OVERVIEW

7.7.1.1 Common tern is listed under Annex I of the EU Birds Directive (2009/147/EEC). Common tern is not listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Common tern is Amber listed in BoCC5 (Stanbury *et al.*, 2024).

7.7.1.2 Common terns are summer visitors to Britain, breeding in colonies at coastal sites and also inland. Seabird 2000 recorded 12,219 pairs in the UK (Burnell *et al.*, 2023). In autumn, common terns migrate south to the west coast of Africa, returning the following spring (Wernham *et al.*, 2002). Common terns have a broad diet compared to other terns that includes sandeels, clupeid and gadoid fish (Mitchell *et al.*, 2004).

7.7.1.3 The Study Area is not in the foraging range from any SPA at which common tern is a qualifying feature.

7.7.1.4 Wade *et al.* (2016) assessed common tern as being at low risk of displacement from wind farms (with a low level of associated uncertainty) and moderate risk of habitat loss due to the species moderate ability to utilise alternative habitats. Common tern is considered to be at low risk of disturbance from vessels although this conclusion has a high degree of associated uncertainty. The species was considered to be at moderate risk of collision with wind turbines due to the high proportion of time the species spends in flight. Maclean *et al.* (2009) assessed terns as being at very low risk of barrier effects at OWFs (Table 5-1).

7.7.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.7.2.1 Common terns were not recorded in the Study Area in any survey. Within the wider Survey Area, only “commic” tern were recorded in 3 of the 24 surveys (see Table 1-151 within Annex 14.1.2, Volume 2c).

7.7.2.2 Due to difficulty in distinguishing common terns from Arctic terns from DAS imagery, the majority of records of “commic” terns (i.e. birds that may have been either common or Arctic terns) were not apportioned to species. Survey results for “commic” terns are provided separately below.

7.7.2.3 Across the 3 surveys in which they were recorded, all “commic terns’ within the Survey Area were recorded flying.

7.7.3 CONCLUSION

7.7.3.1 Due to the species' inclusion under Annex I of the EU Birds Directive (2009/147/EEC), common tern is considered to be of National conservation status. Common terns were not recorded in the Study Area in any survey. Whilst common terns are considered moderately vulnerable to collision, common terns were not recorded in the Turbine Area, and "commic" terns were only recorded in the Turbine Area in a single survey (see Table 1-151 in Annex 14.1.2, Volume 2c). Common terns are considered to have low vulnerability to displacement or barrier effects. Therefore, it is considered highly unlikely that impacts associated with the Offshore Project will occur on common tern.

7.7.3.2 Common terns are therefore not considered for further assessment in relation to impacts associated with the Offshore Project.

7.8 ARCTIC TERN

7.8.1 STATUS OVERVIEW

7.8.1.1 Arctic terns are listed under Annex I of the EU Birds Directive (2009/147/EEC). Arctic terns are not listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Arctic terns are Amber listed in BoCC5 (Stanbury *et al.*, 2024).

7.8.1.2 Arctic terns are summer visitors to Britain, breeding in coastal colonies, predominantly in the north. Seabirds Count recorded 30,451 pairs in the UK (Burnell *et al.*, 2023). 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). Sandeels are the major prey species (Mitchell *et al.*, 2004). The highest predicted densities of the species in the summer (April-September) correlate with the location of breeding colonies and, due to the generic seasons used in the modelling process, also likely capture passage movements of the species along the east coast of Scotland/*Alba*.

7.8.1.3 The Study Area is not in the foraging range from any SPA at which Arctic terns are a qualifying feature.

7.8.1.4 Wade *et al.* (2016) assessed Arctic tern as being at low risk of displacement from wind farms and moderate risk of habitat loss due to the species moderate ability to utilise alternative habitats. The species was also considered to be at moderate risk of collision with wind turbines due to the high proportion of time the species spends in flight. Maclean *et al.* (2009) assessed terns as being at very low risk of barrier effects at OWFs (Table 5-1).

7.8.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.8.2.1 Arctic terns were recorded in the Study Area in 6 of the 24 surveys, all within the breeding season (see Table 7-11 and Plate 7-8). The peak abundance within the Study Area exceeds the threshold

for Regional Importance during the breeding season (i.e. exceeds 18 as 1% of the regional population of 1,814; Table 4-3). Abundance and density estimate for the Turbine Area and Turbine Area plus 2 km buffer are presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment). Within the wider Survey Area, Arctic tern was recorded in 7 of the 24 surveys.

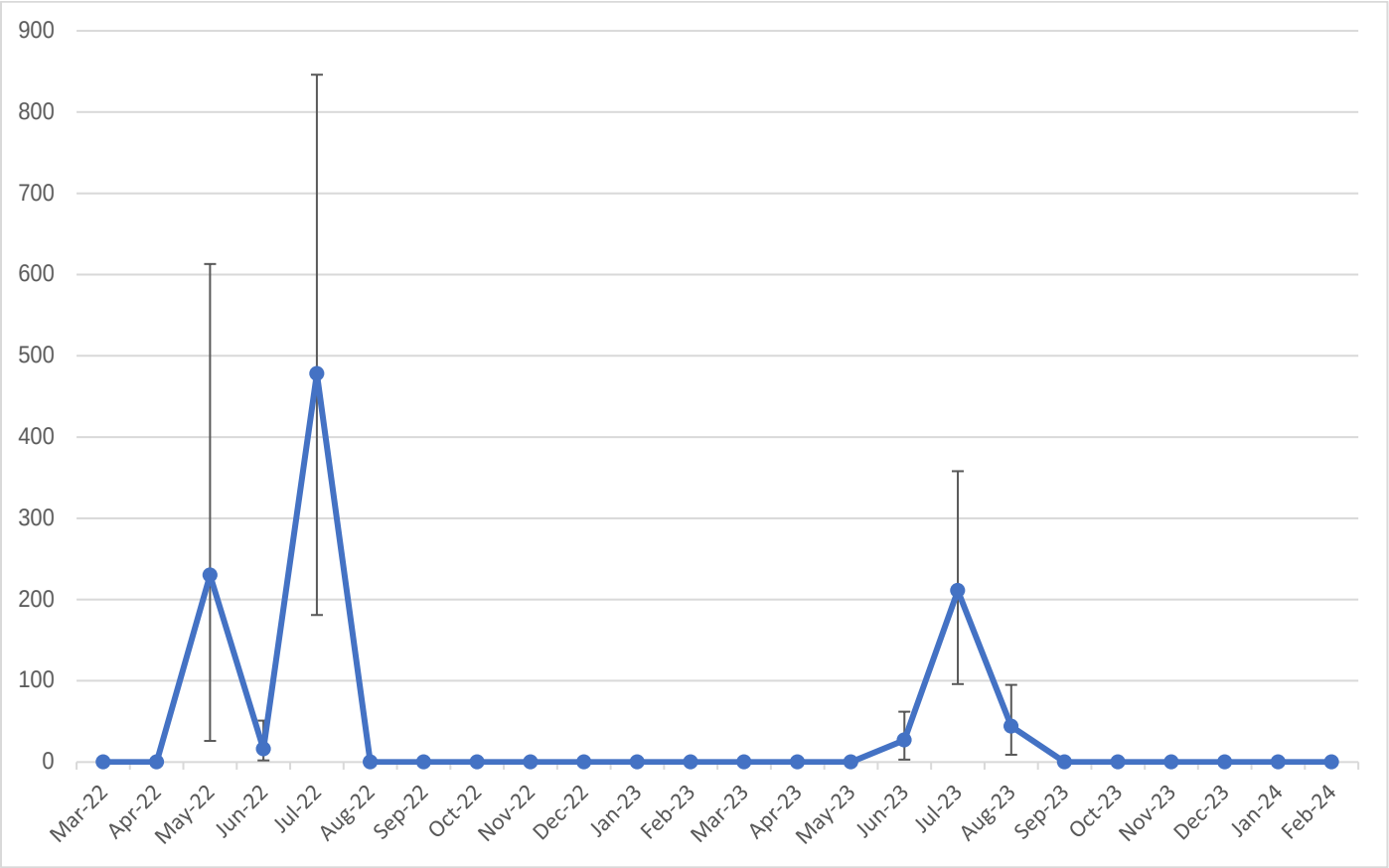
7.8.2.2 Due to difficulty in distinguishing common terns from Arctic terns from DAS imagery, the majority of records of "commic" terns (i.e. birds that may have been either common or Arctic terns) were not apportioned to species. Survey results for "commic" terns are provided separately below.

Table 7-11 Arctic tern estimated abundance and density within the Study Area[23].

Survey	Design-based estimate					
	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
May 2022	230	26	613	0.56	0.06	1.50
June 2022	16	2	51	0.04	0.00	0.12
July 2022	478	181	846	1.17	0.44	2.07
June 2023	27	3	62	0.07	0.01	0.15
July 2023	211	96	358	0.52	0.23	0.87
August 2023	44	9	95	0.11	0.02	0.23

[23] Estimates are inclusive of apportionment of unidentified species where possible, although not all "commic" terns were apportioned and so are considered separately (see below).

Plate 7-8 Arctic tern estimated abundance and confidence limits within the Study Area.[24]



7.8.2.3 Across all surveys in which they were recorded, 100% of Arctic terns (considering only birds identified to species level) within the Survey Area were recorded flying. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c

7.8.3 CONCLUSION

7.8.3.1 Due to the species' inclusion on the Red List in BoCC5, Arctic terns are considered to be of regional conservation status. The abundances present in the breeding season are of Regional Importance. Arctic terns are considered moderately vulnerable to collision risk and, although only recorded in the Turbine Area (see Table 1-31 in Annex 14.1.1, Volume 2c) during 4 surveys (considering both birds identified as Arctic terns and birds identified as "commic" terns), Arctic terns are present in sufficient numbers for this risk to be considered tangible.

7.8.3.2 Therefore, Arctic terns have been identified as a VOR and will be progressed to the next stage of assessment.

[24] Estimates are inclusive of apportionment of unidentified birds.

7.9 "COMMIC" TERN

7.9.1 STATUS OVERVIEW

7.9.1.1 "Commic" tern refers to common or Arctic terns. These species are frequently indistinguishable from DAS imagery and therefore not all records of "commic" terns were apportioned to species. In order to fully consider the impact on common and/or Arctic terns, it is therefore necessary to also consider "commic" terns.

7.9.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.9.2.1 "Commic" terns were recorded in the Study Area in 4 of the 24 surveys, all within the breeding season for both common and Arctic terns (Table 7-12). Within the wider Survey Area, "commic" terns were recorded in 8 of the 24 surveys. Abundance and density estimate for the Turbine Area and Turbine Area plus 2 km buffer are presented in Annex 14.1.2, Volume 2c

Table 7-12 "Commic" tern estimated abundance and density within the Study Area.[25]

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
July 2022	96	26	190	0.23	0.06	0.46
June 2023	47	5	177	0.11	0.01	0.43
July 2023	26	3	61	0.06	0.01	0.15
August 2023	9	1	26	0.02	0.00	0.06

7.9.3 CONCLUSION

7.9.3.1 No separate conclusion is provided for "commic" tern; refer to conclusions for common terns and Arctic terns (above) which take into account records of "commic" terns.

7.10 GREAT SKUA

7.10.1 STATUS OVERVIEW

7.10.1.1 Great skuas are 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 skuas are currently red-listed in BoCC5 (Stanbury *et al.*, 2024).

[25] Estimates are not apportioned.

7.10.1.2 Great skuas breed on Shetland/*Sealtainn*, Orkney/*Arcaibh* and the Western Isles/*Na h-Eileanan Siar* (Balmer *et al.*, 2013), with an estimated population of 10,937 pairs recorded in the UK in Seabirds Count (Burnell *et al.*, 2023). Great skuas breed mostly on offshore islands in Scotland/*Alba* (Mitchell *et al.*, 2004). The UK breeding population of great skuas has shown increases of 26% between 1985-88 and 1998-2002 and 18% between 1998-2002 and 2015. 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.

7.10.1.3 The models of Waggitt *et al.* (2020) indicate that the expected density of great skuas in the vicinity of the Turbine Area is negligible through most of the year. In the months of August-November, the density increases slightly but remains low. This is shown in the great skuas distribution maps in Plate 7-9 and Plate 7-10.

Plate 7-9 Great skua's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. January to June.

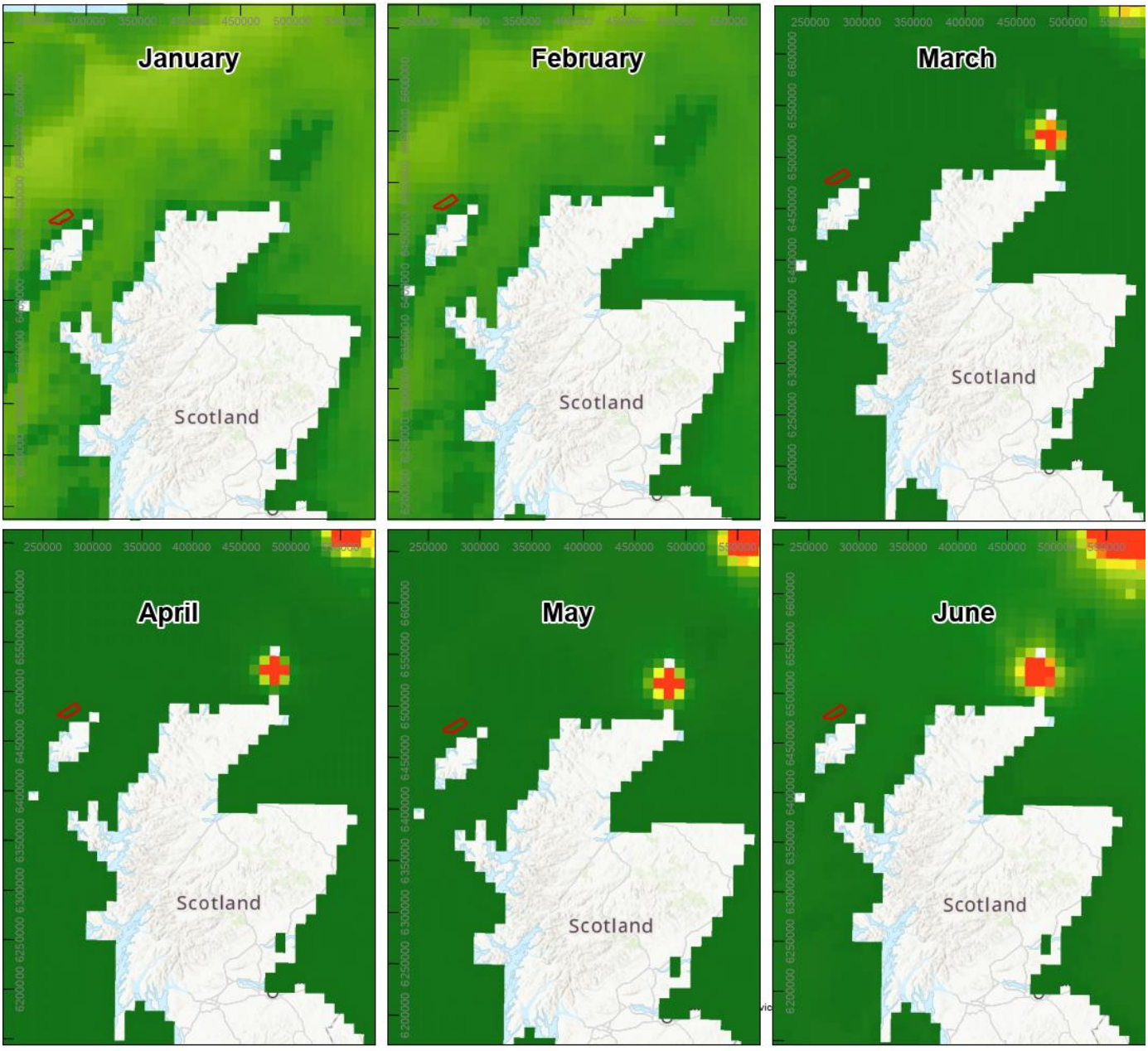
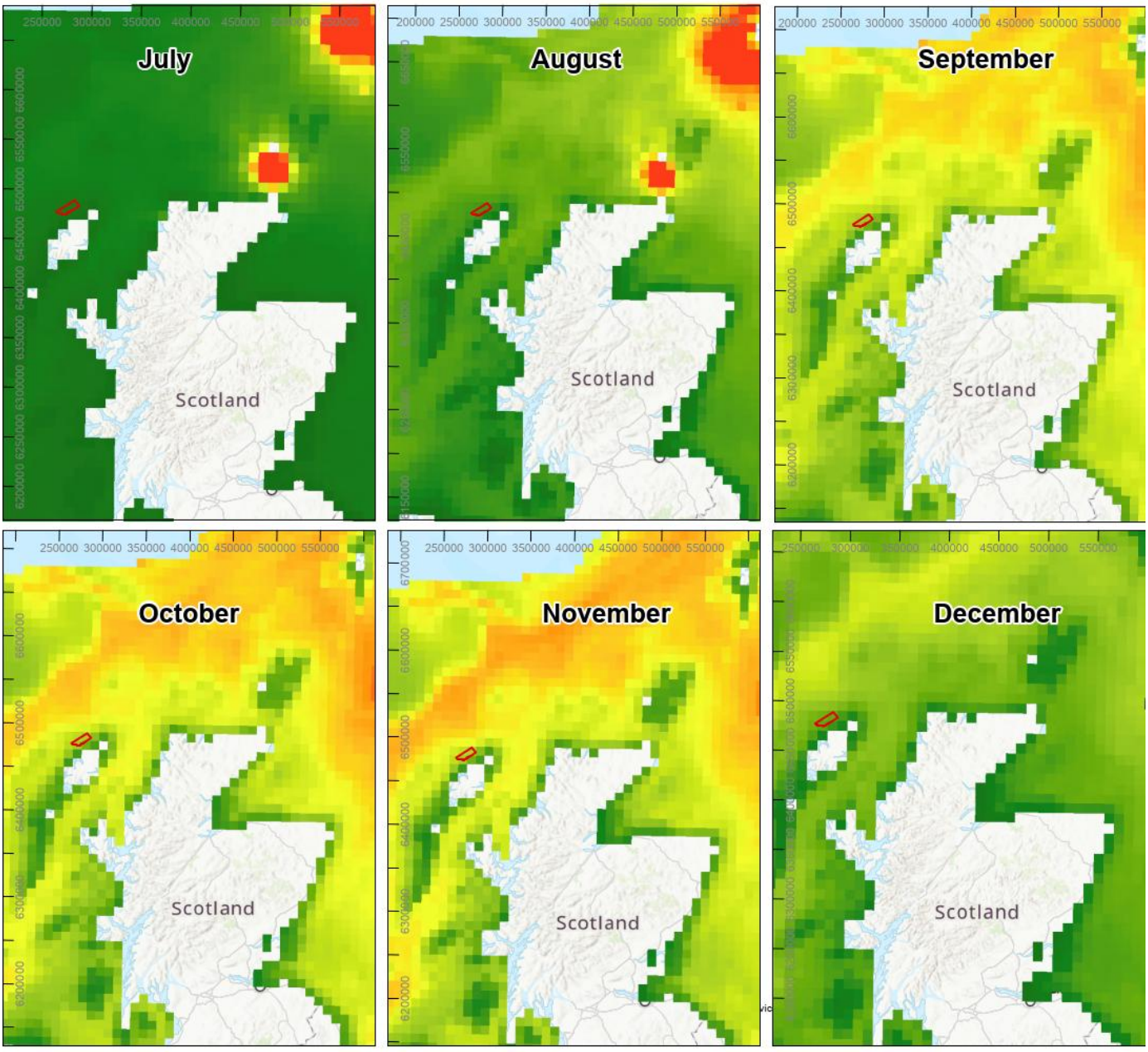
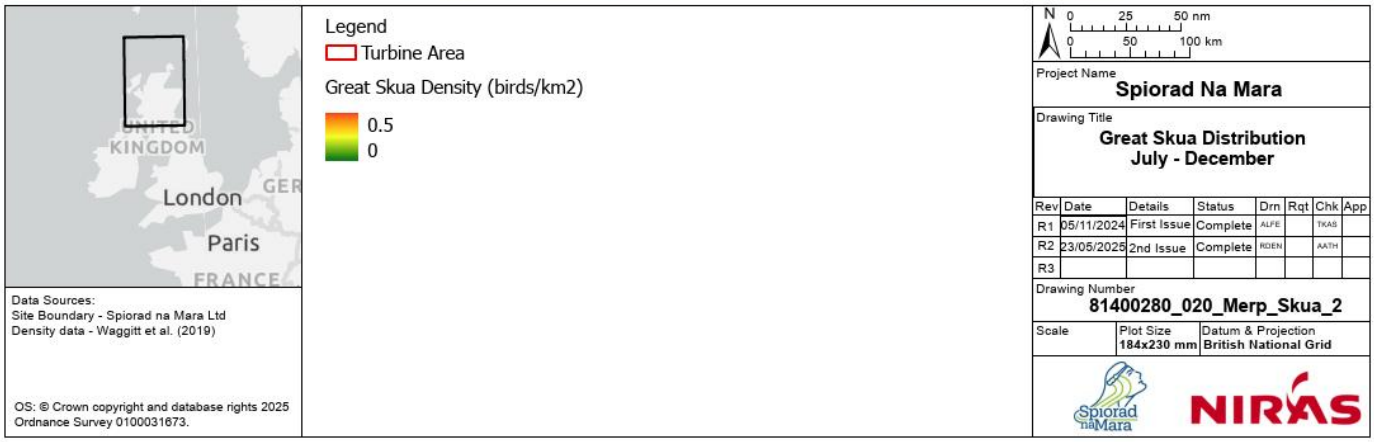


Plate 7-10 Great skua's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. July to December.





7.10.1.4 Due to the extensive foraging range of great skuas (931.2 km) (Woodward *et al.*, 2019), the Study Area is within foraging range of 9 SPAs which include great skuas as a designated feature (see Table 6-2 and Table 7-13). The latest breeding population of these 9 SPAs is 6,725 pairs in total, or approximately 61% of the British breeding population (Burnell *et al.*, 2023).

Table 7-13 SPAs with great skuas as a designated feature or named assemblage component within foraging range of the Study Area

SPA	Great skua breeding population in SPA (AOT; Burnell *et al.*, 2023)	Distance from Study Area (km)[26]
Fair Isle SPA	430	329
Fetlar SPA	854	426
Foula SPA	1,846	316
Handa/*Shannda* SPA	283	92
Hermaness, Saxa Vord and Valla Field SPA	1,030	412
Hoy SPA	1,405	206
Noss SPA	476	396
Ronas Hill - North Roe and Tingon SPA	190	384
St Kilda/*Hiort* SPA	211	107

7.10.1.5 Wade *et al.* (2016) assessed great skuas as being at very high risk of collision with wind turbines due to a high proportion of time spent in flight. Risk of displacement and habitat loss resulting from OWFs were considered to be very low and moderate, respectively, due to the species ability to use a wide range of habitats, although the species' sensitivity to displacement reported by Wade *et al.* (2016) has an associated high degree of uncertainty. Maclean *et al.* (2009) assessed great skuas as being at low risk of barrier effects from OWFs (Table 5-1).

7.10.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.10.2.1 Great skuas were recorded in 2 surveys in the Study Area, in the breeding and non-breeding seasons (Table 7-14). Abundance and density estimate for the Turbine Area and Turbine Area plus 2 km buffer are presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment). Abundances of great skuas do not reach the threshold of importance at any scale.

7.10.2.2 In the wider Survey Area, great skuas were recorded in 3 surveys, in the breeding and non-breeding season. Great skua records were widely distributed across the Survey Area (see figures in Annex 14.1.3, Volume 2c).

[26] Distances are measured from the edge of the Study Area to individual breeding sites within foraging range (using coordinates provided in the Seabirds Count data download (JNCC, 2023) and averaged across the SPA. Note that as different species may breed at different sites within an SPA, the distance reported may vary for the same SPA across different species.

Table 7-14 Great skua's estimated abundance and density within the Study Area.

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
August 2022	9	1	34	0.02	0.00	0.08
October 2022	8	1	26	0.02	0.00	0.06

7.10.2.3 Across the 3 surveys in which they were recorded, 80.0% of great skuas (considering only birds identified to species level) within the Survey Area were recorded flying, whilst the remaining 20.0% were sitting. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

7.10.3 CONCLUSION

7.10.3.1 Great skua is considered to have an international conservation status as the foraging ranges reported by Woodward *et al.* (2019) suggest connectivity between the Study Area and 9 SPA breeding colonies. Great skuas are considered to have low vulnerability to displacement or barrier effects. Great skuas are considered highly vulnerable to collision risk but were only recorded in the Turbine Area in a single survey (see Table 1-37 within Annex 14.1.1, Volume 2c) and so collision impacts are expected to be negligible. Therefore, on the basis of the information presented in this baseline, great skuas have not been identified as a VOR. However, it is acknowledged that great skuas are migratory, and migratory movements may be inadequately captured by DAS results; therefore, despite not being identified as a VOR, great skuas will be considered within the migratory collision risk assessment.

7.11 ARCTIC SKUA

7.11.1 STATUS OVERVIEW

7.11.1.1 Arctic skuas are 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). Arctic skuas are currently red-listed in BoCC5 (Stanbury *et al.*, 2024).

7.11.1.2 Arctic skuas have a circumpolar breeding distribution, with Scotland/*Alba* at the southern edge of its range. There were 727 breeding pairs recorded in the UK in Seabirds Count (Burnell *et al.*, 2023). Arctic skuas breed mostly on offshore islands in Scotland/*Alba* (Mitchell *et al.*, 2004). The UK

breeding population of Arctic skuas increased between Operation Seafarer (1969-70) and the SCR Census (1985-88), peaking at 3,400 pairs, but has since declined.

7.11.1.3 The Study Area is not within foraging range of any breeding location of Arctic skuas recorded in Seabirds Count (Burnell *et al.*, 2023).

7.11.1.4 Wade *et al.* (2016) assessed Arctic skuas as being at high risk of collision with wind turbines due to a high proportion of time spent in flight. Risk of displacement and habitat loss resulting from OWFs were considered to be very low and moderate, respectively, due to the species' ability to use a wide range of habitats, although the species' sensitivity to displacement reported by Wade *et al.* (2016) has an associated very high degree of uncertainty (Table 5-1).

7.11.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.11.2.1 Arctic skuas were recorded in a single survey in the Study Area, in the non-breeding season (Table 7-15). This was also the sole record of Arctic skuas in the wider Survey Area. Arctic skuas were not recorded in the Turbine Area or Turbine Area plus 2 km Buffer.

Table 7-15 Arctic skua's estimated abundance and density within the Study Area.

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
September 2023	8	1	26	0.02	0.00	0.06

7.11.2.2 Across the single survey in which they were recorded, 100% of Arctic skuas (considering only birds identified to species level) within the Survey Area were recorded flying. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

7.11.3 CONCLUSION

7.11.3.1 Due to the species' inclusion on the Red List in BoCC5, Arctic skuas are considered to be of regional conservation status. Arctic skuas are considered to have low vulnerability to displacement or barrier effects. Arctic skuas are considered highly vulnerable to collision risk but were not recorded in the Turbine Area so collision impacts are expected to be negligible. Therefore, on the basis of the information presented in this baseline, Arctic skuas have not been identified as a VOR. However, it is acknowledged that Arctic skuas are migratory and migratory movements may be inadequately captured by DAS results; therefore, despite not being identified as a VOR, Arctic skuas will be considered within the migratory collision risk assessment.

7.12 GUILLEMOT

7.12.1 STATUS OVERVIEW

7.12.1.1 Guillemots are 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 in BoCC5 (Stanbury *et al.*, 2024).

7.12.1.2 Guillemots are one of the most abundant seabird species in Britain, breeding in large colonies on suitable coastal cliff habitat. Seabirds Count recorded 1,265,888 individuals at breeding colonies in the UK (Burnell *et al.*, 2023). Guillemots mostly prey on small fish species such as lesser sandeels (*Ammodytes tobianus)*, sprat and gadoid fish (Mitchell *et al.*, 2004).

7.12.1.3 Guillemots breed in coastal locations throughout Scotland/*Alba*, including on Scottish islands, whilst in the winter the distribution extends further offshore (Mitchell *et al.*, 2004). Distribution modelling by Waggitt *et al.* (2020) suggests that the Study Area is of relatively low importance for guillemots throughout the year. Typical densities in the Study Area are lowest in the breeding season, when guillemots are more closely associated with large colonies (particularly around the Northern Isles and north coast of Scotland/*Alba*). Outside of the breeding season, densities are slightly higher, due to the dispersal of birds away from breeding colonies (see Waggitt *et al.*, 2020; Plate 7-11 and Plate 7-12).

Plate 7-11 Guillemot's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. January to June.

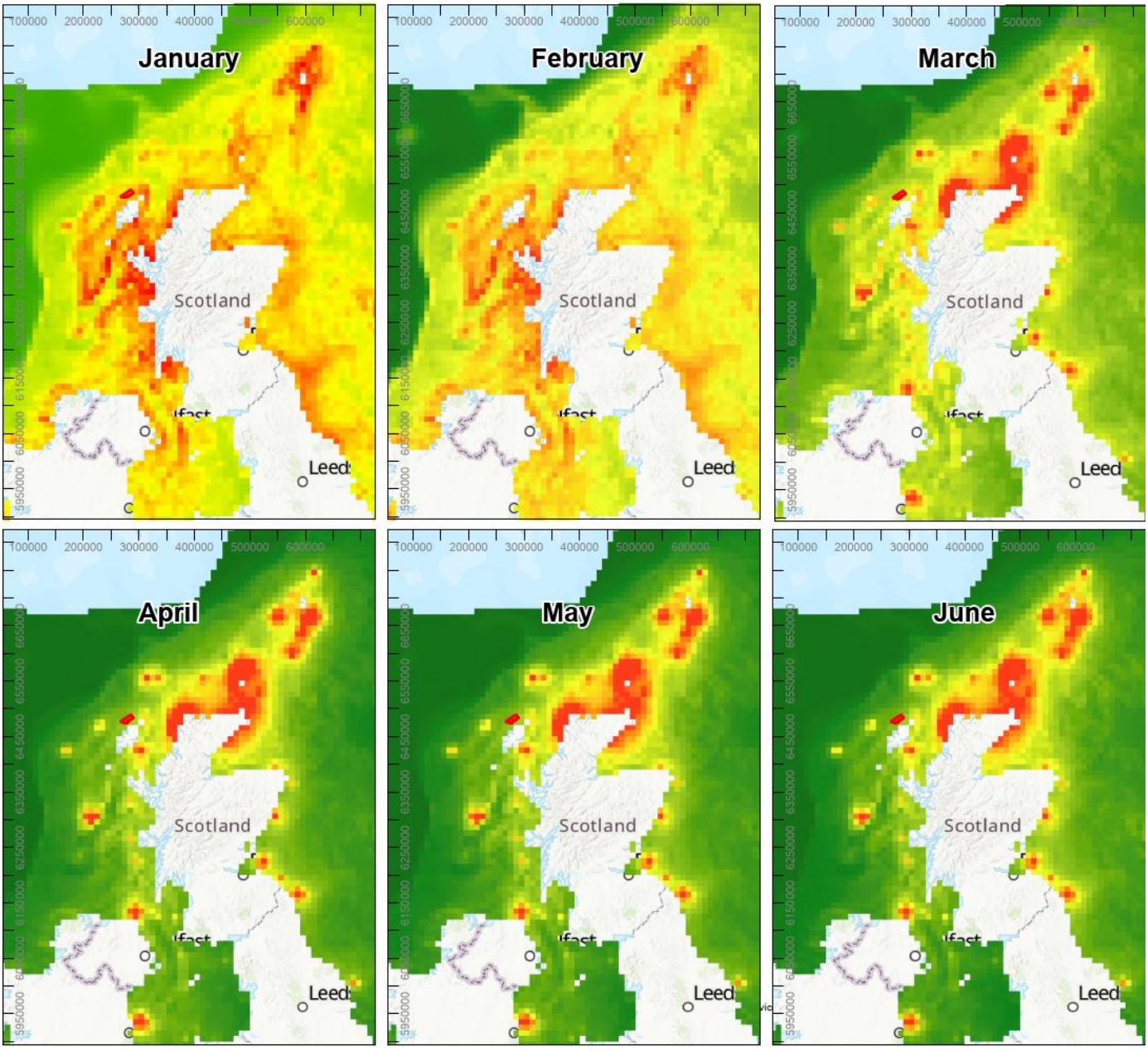
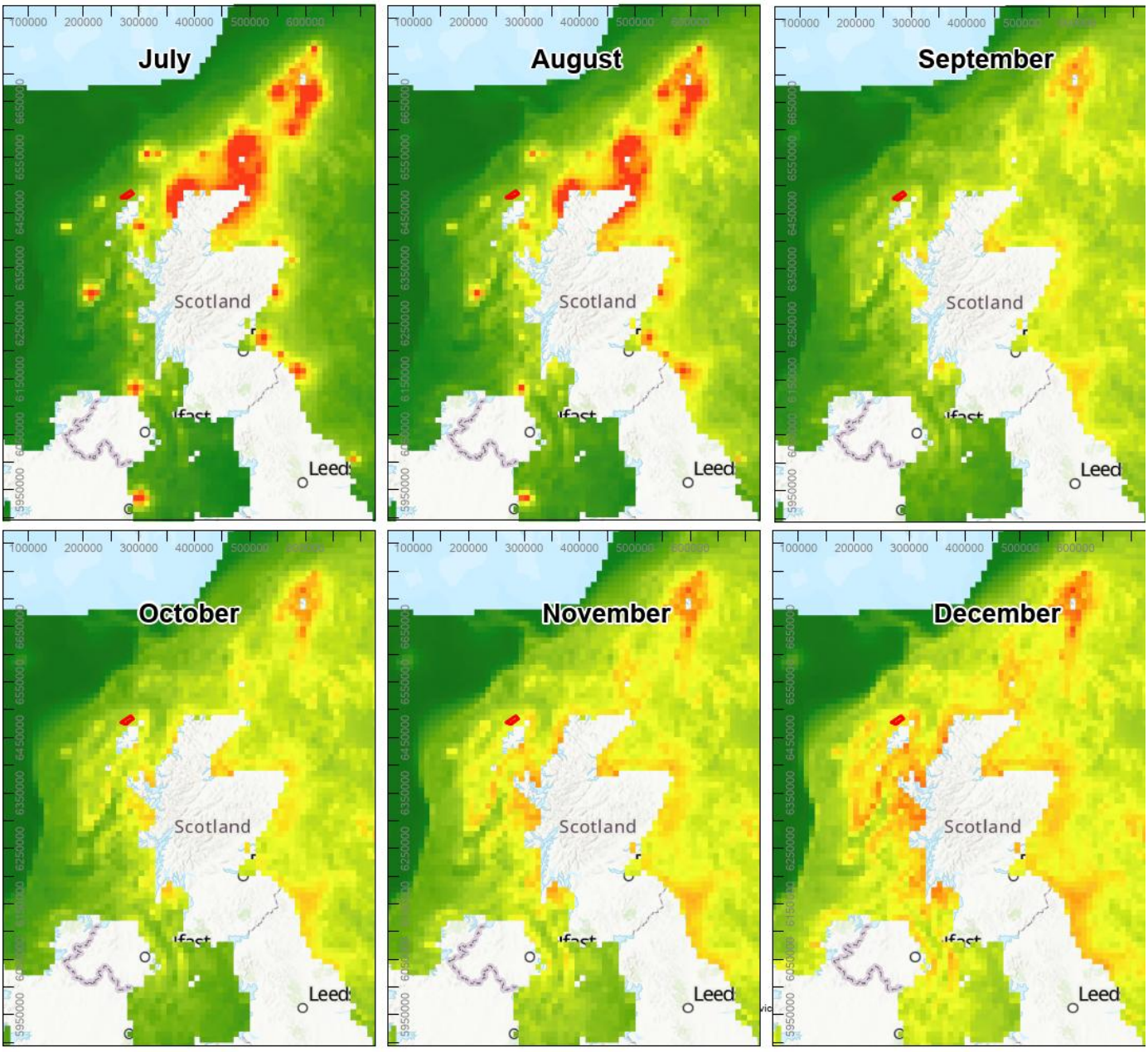


Plate 7-12 Guillemot's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. July to December.



7.12.1.5 The Study Area is within the foraging range of guillemots from four SPAs for which guillemots are a designated feature (see Table 6-2 and Table 7-16). Seabirds Count recorded 107,259 individuals at the colony at these SPAs, or approximately 0.8% of the UK breeding population.

Table 7-16 SPAs with guillemot as a designated feature or named assemblage component within foraging range of the Study Area

SPA	Guillemot breeding population in SPA (IND; Burnell *et al.*, 2023)	Distance from Study Area (km)[27]
Flannan Isles/*Na h-Eileanan Flannach* SPA	5,632	34
Handa/*Shannda* SPA	26,510	92
North Rona and Sula Sgeir SPA	5,289	76
Sule Skerry and Sule Stack SPA	69,828	142

7.12.1.6 Wade *et al.* (2016) assessed guillemots as being at high risk of displacement from wind farms, at high risk of barrier effects and moderate risk from habitat loss due to the limited ability of the species to utilise alternative habitats. The species is considered to be at very low risk of collision with wind turbines due to a very low proportion of birds flying at wind turbine height. Maclean *et al.* (2009) assessed auks as being at high risk of barrier effects at OWFs (Table 5-1).

7.12.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.12.2.1 Guillemots were recorded in the Study Area in all 24 surveys (see Table 7-17 and Plate 7-13). Using the design-based abundance estimates, the highest abundance occurred in September 2022 when there was an estimated abundance of 5,759 birds in the Study Area, which is below the threshold for Regional Importance in the non-breeding season (i.e. 1,816 as 1% of the regional non-breeding population of 181,646; Table 4-3). Under the model-based approach, the highest estimated abundance occurred in September 2023 with an estimated abundance of 2,708. The highest model-based estimate in the breeding season occurred in August 2023, with an estimated abundance of 1,058 birds in the Study Area, which is below the threshold for Regional Importance in the breeding season (i.e. 1,816 as 1% of the regional breeding population of 181,646; Table 4-3) but may be considered of Local Importance. Under both design-based and model-based approaches, the estimated abundance in September 2023 was the highest estimated abundance within the second year of survey (March 2023 – February 2024). The high abundances in both September 2022 and September 2023 may be indicative of post-breeding dispersal. There were no other clear patterns in the DAS results, with estimated abundance varying significantly within seasons. Abundance and density estimate for the Turbine Area and Turbine Area plus 2 km buffer are presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds and

[27] Distances are measured from the edge of the Study Area to individual breeding sites within foraging range (using coordinates provided in the Seabirds Count data download (JNCC, 2023)) and averaged across the SPA. Note that as different species may breed at different sites within an SPA, the distance reported may vary for the same SPA across different species.

correction for availability bias) and Annex 14.1.2, Volume 2c (prior to apportionment or correction).

7.12.2.2 Guillemots were recorded in all 24 surveys in the wider Survey Area. Guillemot densities tended to be higher in the south and southwest of the survey zone, although guillemots were recorded widely across the Survey Area (see figures in Annex 14.1.3, Volume 2c).

Table 7-17 Guillemot's estimated abundance and density within the Study Area[28].

Survey	Design-based estimate					
	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	2,169	1,618	2,829	5.30	3.95	6.91
April 2022	511	296	783	1.25	0.72	1.91
May 2022	597	374	838	1.46	0.91	2.05
June 2022	33	2	78	0.08	0.00	0.19
July 2022	460	253	715	1.12	0.62	1.75
August 2022	352	178	546	0.86	0.43	1.33
September 2022	5,759	4,899	6,653	14.07	11.97	16.26
October 2022	452	308	613	1.10	0.75	1.50
November 2022	144	46	269	0.35	0.11	0.66
December 2022	126	57	217	0.31	0.14	0.53
January 2023	402	267	588	0.98	0.65	1.44
February 2023	367	238	511	0.90	0.58	1.25
March 2023	996	715	1,311	2.43	1.75	3.20
April 2023	707	512	915	1.73	1.25	2.24
May 2023	187	99	286	0.46	0.24	0.70
June 2023	314	173	489	0.77	0.42	1.19
July 2023	392	204	592	0.96	0.50	1.45
August 2023	1,058	763	1,370	2.59	1.86	3.35
September 2023	2,708	2,009	3,472	6.62	4.91	8.48
October 2023	108	27	201	0.26	0.07	0.49
November 2023	86	23	149	0.21	0.06	0.36
December 2023	143	65	228	0.35	0.16	0.56
January 2024	666	441	903	1.63	1.08	2.21
February 2024	486	319	685	1.19	0.78	1.67

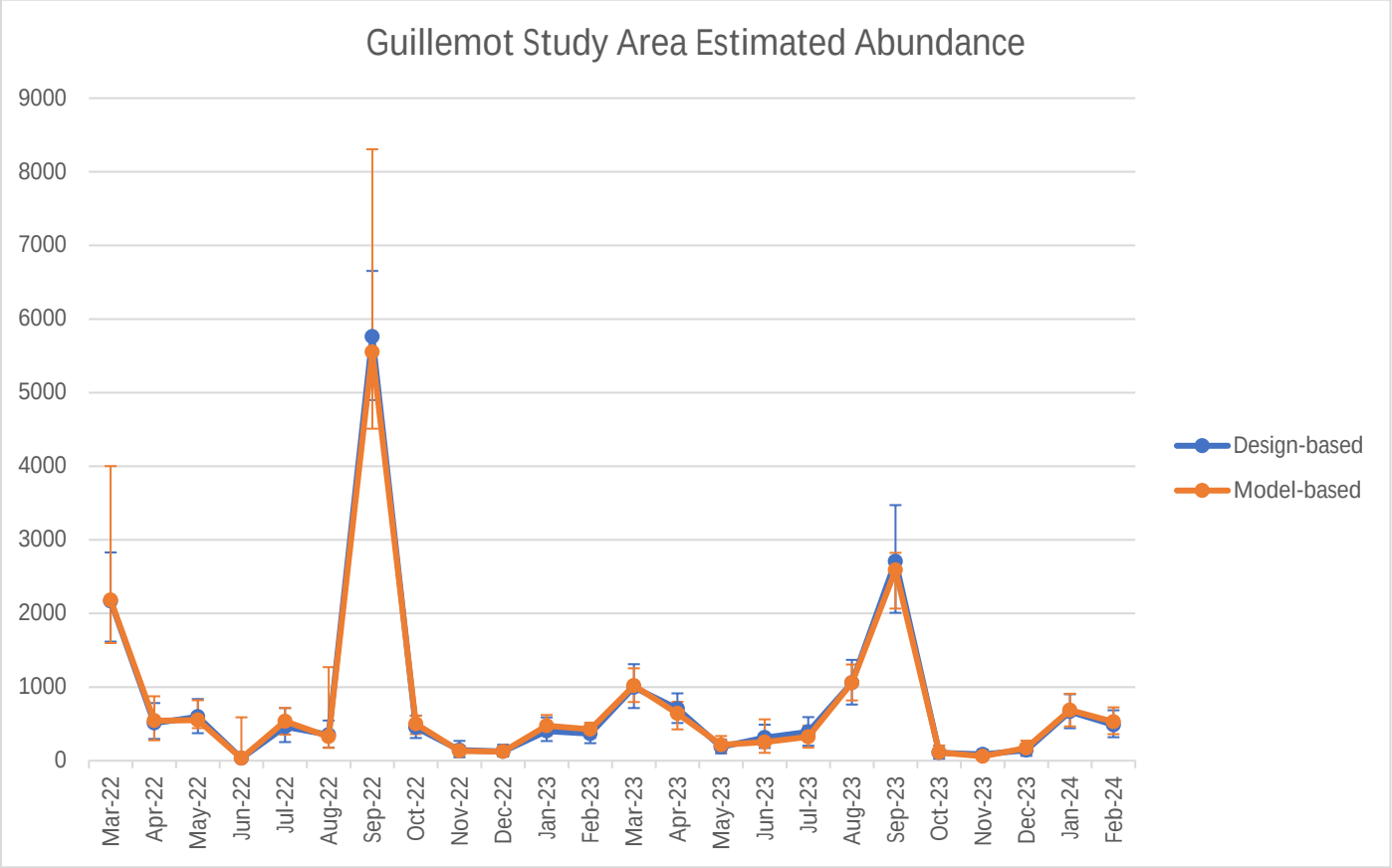
[28] Estimates are inclusive of apportionment of unidentified species and correction for availability bias.

Table 7-18 Guillemot's model-based estimated abundance and density within the Study Area[29].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	2,181	1,598	4,002	5.33	3.91	9.78
April 2022	543	278	875	1.33	0.68	2.14
May 2022	552	442	822	1.35	1.08	2.01
June 2022	33	9	590	0.08	0.02	1.44
July 2022	535	354	717	1.31	0.87	1.75
August 2022	327	175	1,271	0.80	0.43	3.11
September 2022	5,552	4,510	8,306	13.57	11.02	20.30
October 2022	501	362	612	1.22	0.88	1.50
November 2022	132	73	200	0.32	0.18	0.49
December 2022	123	66	192	0.30	0.16	0.47
January 2023	475	345	621	1.16	0.84	1.52
February 2023	426	311	514	1.04	0.76	1.26
March 2023	1,021	797	1,255	2.49	1.95	3.07
April 2023	640	425	800	1.57	1.04	1.96
May 2023	215	118	335	0.53	0.29	0.82
June 2023	252	107	562	0.62	0.26	1.37
July 2023	323	176	477	0.79	0.43	1.17
August 2023	1,058	819	1,307	2.59	2.00	3.19
September 2023	2,590	2,066	2,824	6.33	5.05	6.90
October 2023	112	51	206	0.27	0.12	0.50
November 2023	59	37	123	0.15	0.09	0.30
December 2023	172	86	272	0.42	0.21	0.67
January 2024	687	466	909	1.68	1.14	2.22
February 2024	528	361	725	1.29	0.88	1.77

[29] Estimates are inclusive of apportionment of unidentified species.

Plate 7-13: Guillemot's estimated abundance and confidence limits within the Study Area.[30]



7.12.2.3 Across all surveys in which they were recorded, 6.5% of guillemots (considering only birds identified to species level) within the Survey Area were recorded flying, whilst the remaining 93.5% were sitting. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

[30] Estimates are inclusive of apportionment of unidentified birds and correction for availability bias.

7.12.3 CONCLUSION

7.12.3.1 Guillemots are considered to have an international conservation status as the foraging ranges reported by Woodward *et al.* (2019) suggest connectivity between the Study Area and SPA breeding colonies. Population estimates of guillemots at the Study Area do not exceed the 1% importance threshold of the regional population (i.e. 1,816 as 1% of the regional breeding population of 181,646) during any season but are of Local Importance. Therefore, based on SPA connectivity and the Local Importance of guillemot populations at the Study Area, guillemots are identified as a VOR and considered for further assessment as a receptor with an international conservation value.

7.13 RAZORBILL

7.13.1 STATUS OVERVIEW

7.13.1.1 Razorbills are 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 in BoCC5 (Stanbury *et al.*, 2024).

7.13.1.2 Razorbills are one of the most common seabirds in Britain, breeding in large colonies with other seabirds on suitable coastal cliffs. Seabirds Count recorded 225,015 individuals at breeding colonies around the UK (Burnell *et al.*, 2023).

7.13.1.3 Razorbills breed in coastal locations throughout Scotland/*Alba*, including on Scottish islands, whilst in the winter the distribution extends further offshore (Mitchell *et al.*, 2004). Distribution modelling by Waggitt *et al.* (2020) suggests that the Study Area is of relatively low importance for razorbills throughout the year. Typical densities in the Study Area are lowest in the breeding season, when razorbills are more closely associated with large colonies. Outside of the breeding season, densities are slightly higher, due to the dispersal of birds away from breeding colonies (see Waggitt *et al.*, 2020; Plate 7-14 and Plate 7-15.

Plate 7-14 Razorbill's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. January to June.

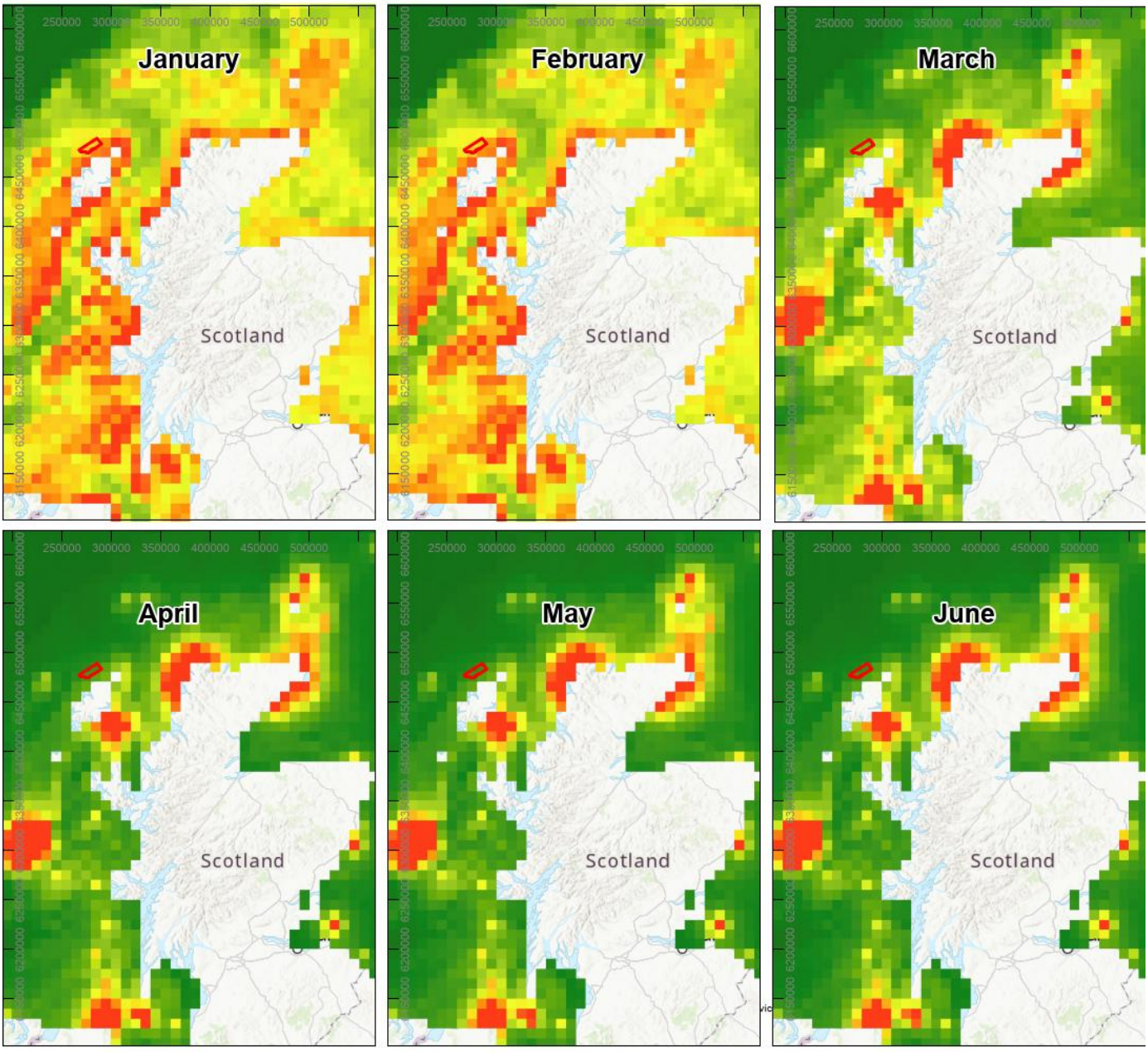
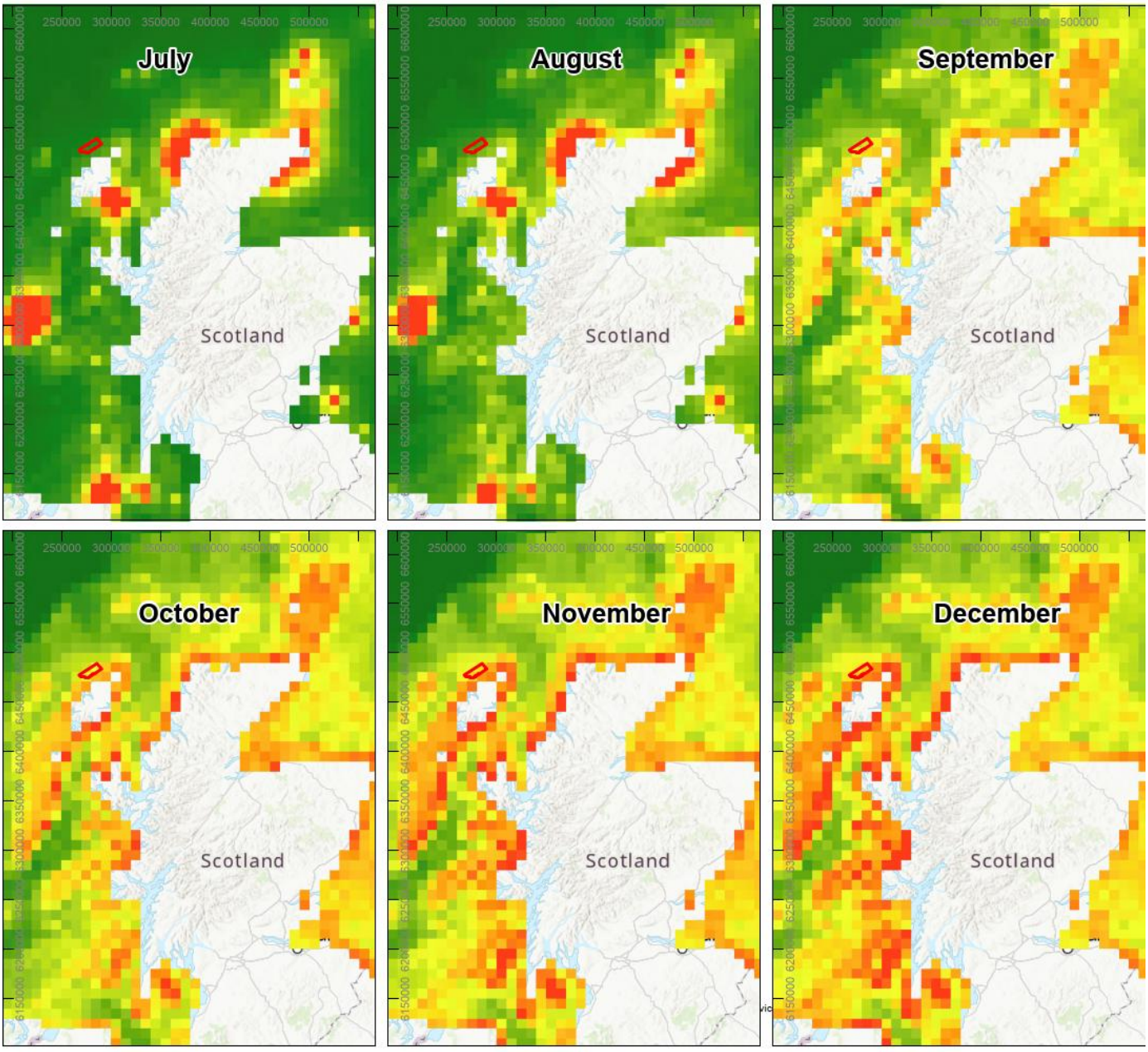
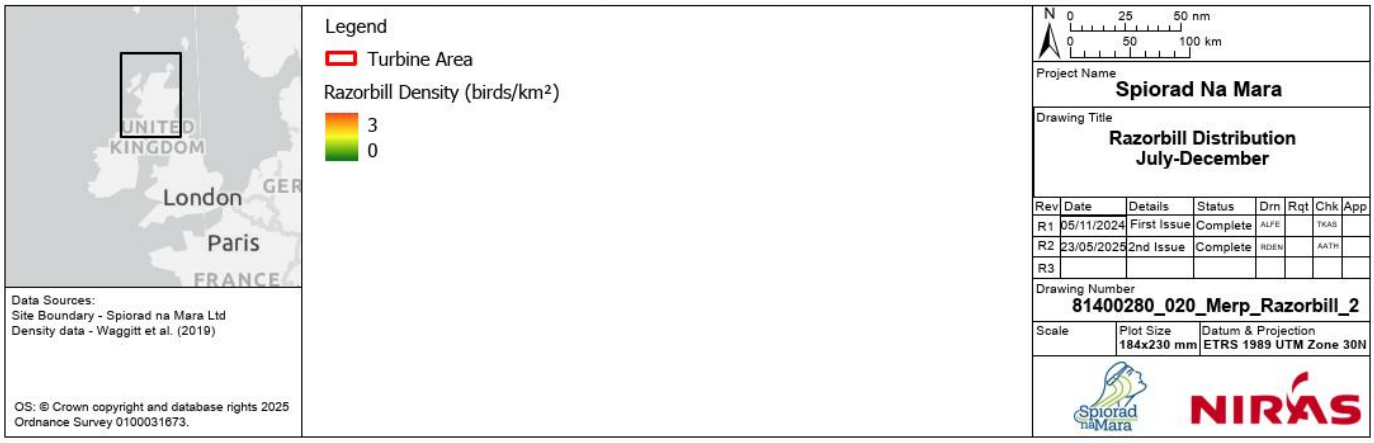


Plate 7-15 Razorbill's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. July to December.





7.13.1.4 Razorbills are listed as a qualifying interest species in the breeding season for 6 SPAs within foraging range of the Study Area (see Table 6-2 and Table 7-19). Seabirds Count recorded 21,841 individuals at the colony at these SPAs, or approximately 10% of the UK breeding population (Burnell *et al.*, 2023).

Table 7-19 SPAs with razorbills as a designated feature or named assemblage component within foraging range of the Study Area.

SPA	Razorbill breeding population in SPA (IND; Burnell *et al.*, 2023)	Distance from Study Area (km)[31]
Cape Wrath SPA	3,246	108
Flannan Isles/*Na h-Eileanan Flannach* SPA	1,143	34
Handa/*Shannda* SPA	8,207	92
North Rona and Sula Sgeir SPA	396	76
Shiant Isles/*Na h-Eileanan Mòra* SPA	8,029	100
St Kilda/*Hiort* SPA	820	108

7.13.1.5 Wade *et al.* (2016) assessed razorbills as being at high risk of displacement from wind farms at high risk of barrier effects and moderate risk of habitat loss due to the limited ability of the species to utilise alternative habitats. The species is considered to be at very low risk of collision with wind turbines due to a low proportion of birds flying at wind turbine height. Maclean *et al.* (2009) assessed auks as being at high risk of barrier effects at OWFs (Table 5-1).

7.13.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.13.2.1 Razorbills were recorded in the Study Area in 21 of the 24 surveys (see Table 7-20 and Plate 7-16), across all seasons. Under the design-based approach, the highest abundance occurred in March 2022 when there was an estimated abundance of 1,157 birds in the Study Area. Under the model-based approach, the highest abundance occurred in August 2023 when there was an estimated abundance of 1,221 birds in the Study Area, which exceeds the threshold for Regional Importance in the breeding season (i.e. 553 as 1% of 55,349; Table 4-3). There were generally few razorbills recorded in the non-breeding bio-season (November–December; Table 7-20). Numbers in the breeding, pre-breeding and post-breeding bio-seasons varied with no clear seasonal patterns. Abundance and density estimate for the Turbine Area plus 2 km buffer, Study Area and Survey Area are presented in Annex 14.1.1, Volume 2c. (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c. (prior to apportionment).

[31] Distances are measured from the edge of the Study Area to individual breeding sites within foraging range (using coordinates provided in the Seabirds Count data download (JNCC, 2023) and averaged across the SPA. Note that as different species may breed at different sites within an SPA, the distance reported may vary for the same SPA across different species.

7.13.2.2 The peak model-based abundance estimate in the breeding season was 1,221 birds in August 2023, which is above the threshold for regional importance, based on a breeding season regional population of 55,349 (Table 4-3). The peak model-based abundance estimate in the post-breeding season was 899 birds in September 2022, which is below the threshold for regional importance, based on a post-breeding season regional population of 606,914 (Table 4-3). The peak design-based abundance estimate in the non-breeding season was 28 birds in November 2022, which is below the threshold for regional importance, based on a non-breeding season regional population of 341,422 (Table 4-3) (no model-based abundance estimates are available for the non-breeding season due to low abundances). The peak model-based abundance estimate in the pre-breeding season was 1,065 birds in March 2022, which is below the threshold for regional importance, based on a pre-breeding season regional population of 606,914 (Table 4-3).

7.13.2.3 In the wider Survey Area, razorbills were recorded in 22 of the 24 surveys. Razorbill densities tended to be higher in the south and south-west of the survey zone, although razorbills were recorded across the whole Survey Area (see figures in Annex 14.1.3, Volume 2c).

Table 7-20 Razorbill's estimated abundance and density within the Study Area[32].

Survey	Design-based estimate					
	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	1,157	740	1,666	2.83	1.81	4.07
April 2022	367	96	669	0.90	0.23	1.63
May 2022	53	5	126	0.13	0.01	0.31
June 2022	0	0	0	0.00	0.00	0.00
July 2022	246	84	427	0.60	0.21	1.04
August 2022	77	3	183	0.19	0.01	0.45
September 2022	894	594	1,259	2.18	1.45	3.08
November 2022	28	2	71	0.07	0.00	0.17
January 2022	2	0	6	0.00	0.00	0.01
February 2023	156	58	273	0.38	0.14	0.67
March 2023	44	11	90	0.11	0.03	0.22
April 2023	37	3	81	0.09	0.01	0.20
May 2023	31	2	78	0.08	0.00	0.19
June 2023	72	13	147	0.18	0.03	0.36
July 2023	14	1	46	0.03	0.00	0.11
August 2023	1,062	714	1,455	2.60	1.74	3.56
September 2023	625	403	887	1.53	0.98	2.17

[32] Estimates are inclusive of apportionment of unidentified species and correction for availability bias.

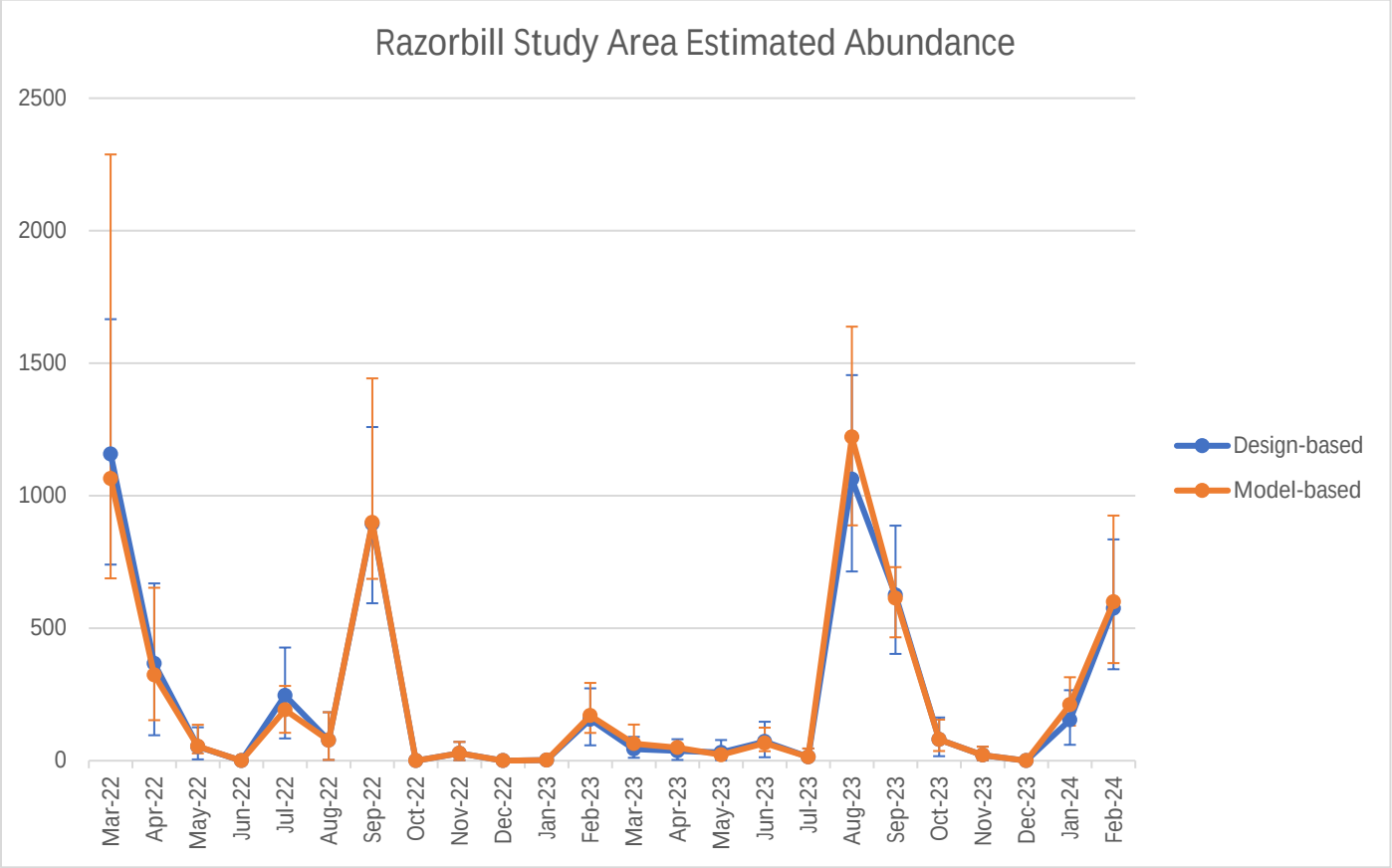
Survey	Design-based estimate					
	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
October 2023	80	17	163	0.20	0.04	0.40
November 2023	21	2	53	0.05	0.00	0.13
January 2024	154	60	266	0.38	0.15	0.65
February 2024	575	345	835	1.41	0.84	2.04

Table 7-21 Razorbill's model-based estimated abundance and density within the Study Area[33]

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	1,065	688	2,288	2.60	1.68	5.59
April 2022	323	153	653	0.79	0.37	1.59
May 2022	54	28	136	0.13	0.07	0.33
June 2022*	0*	0*	0*	0.00*	0.00*	0.00*
July 2022	192	105	282	0.47	0.26	0.69
August 2022*	77*	3*	183*	0.19*	0.01*	0.45*
September 2022	899	686	1,443	2.20	1.68	3.53
October 2022*	0*	0*	0*	0.00*	0.00*	0.00*
November 2022	28*	2*	71*	0.07*	0.00*	0.17*
December 2022	0*	0*	0*	0.00*	0.00*	0.00*
January 2023	2*	0*	6*	0.00*	0.00*	0.01*
February 2023	170	105	294	0.42	0.26	0.72
March 2023	64	38	136	0.16	0.09	0.33
April 2023	49	38	61	0.12	0.09	0.15
May 2023	22	10	45	0.05	0.02	0.11
June 2023	66	36	125	0.16	0.09	0.30
July 2023*	14*	1*	46*	0.03*	0.00*	0.11*
August 2023	1,221	888	1,638	2.98	2.17	4.00
September 2023	613	466	730	1.50	1.14	1.78
October 2023	80	37	155	0.20	0.09	0.38
November 2023*	21*	2*	53*	0.05*	0.00*	0.13*
December 2023*	0*	0*	0*	0.00*	0.00*	0.00*
January 2024	211	132	315	0.52	0.32	0.77
February 2024	599	368	925	1.46	0.90	2.26
*Survey was not modelled and so results are design-based abundance and density estimates, but are included in this table to provide a comprehensive baseline						

[33] Estimates are inclusive of apportionment of unidentified species.

Plate 7-16 Razorbill's estimated abundance and confidence limits within the Study Area.[34]



7.13.2.4 Across all surveys in which they were recorded, 1.8% of razorbills (considering only birds identified to species level) within the Survey Area were recorded flying, whilst the remaining 98.2% were sitting. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

7.13.3 CONCLUSION

7.13.3.1 Razorbills are considered to have an international conservation status as the foraging ranges reported by Woodward *et al.* (2019) suggest connectivity between the Study Area and SPA breeding colonies. Population estimates of razorbills at the Study Area exceed the 1% importance threshold of the regional population (i.e. 53 as 1% of 55,349) during the breeding season (Table 7-21). Therefore, based on SPA connectivity and the Regional Importance of the razorbill populations at the Study Area, razorbills are identified as a VOR and considered for further assessment as a receptor with an international conservation value.

[34] Estimates are inclusive of apportionment of unidentified birds and correction for availability bias.

7.14 BLACK GUILLEMOT

7.14.1 STATUS OVERVIEW

7.14.1.1 Black guillemots are 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 in BoCC5 (Stanbury *et al.*, 2024).

7.14.1.2 Black guillemots are one of the less common seabirds in Britain. Unlike other auks, it does not breed in large colonies, but instead individually or in small groups, in crevices or gaps among boulders. Seabirds Count recorded 35,193 individuals at breeding colonies around the UK (Burnell *et al.*, 2023). Around Britain, the majority of black guillemots occur around the Scottish west and north coasts, and the northern isles (Burnell *et al.*, 2023).

7.14.1.3 Black guillemots are not a qualifying feature of any UK SPA. Based on Seabirds Count data (Burnell *et al.*, 2023) there are 3 colonies within foraging range of the Study Area (using a foraging range of 9.1 km; Woodward *et al.*, 2019) which are listed in Annex 14.1.5, Volume 2c.

7.14.1.4 Wade *et al.* (2016) assessed black guillemots as being at moderate risk of displacement from wind farms and high risk of habitat loss due to the limited ability of the species to utilise alternative habitats. The species is considered to be at very low risk of collision with wind turbines due to a low proportion of birds flying at wind turbine height (Table 5-1).

7.14.2 SEASONAL ABUNDANCE AND DISTRIBUTION

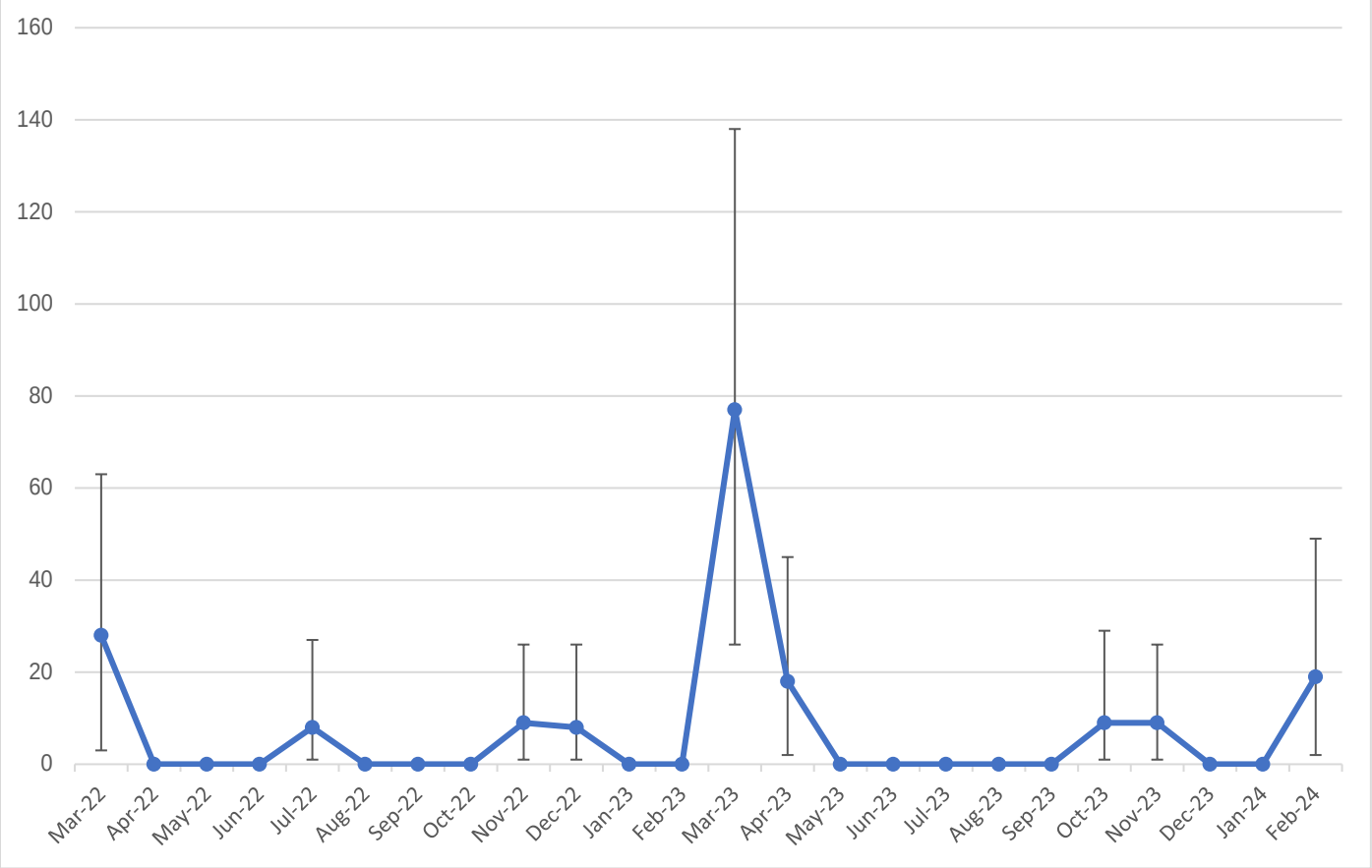
7.14.2.1 Black guillemots were recorded in the Study Area in 9 of the 24 surveys (see Table 7-22 and Plate 7-17). The highest abundance occurred in March 2023 when there was an estimated abundance of 77 birds in the Study Area, which exceeds the threshold for Regional Importance in the non-breeding season, using the BDMPS defined in Furness (2015) as the population of birds associated with breeding sites within 20 km of the Study Area (i.e. a regional population of 2,227; Table 4-3). The maximum abundance recorded in the breeding season was an estimated abundance of 18 birds in April 2023, which does not exceed the threshold for Regional Importance (i.e. 22 as 1% of 2,227; Table 4-3). Abundance and density estimate for the Turbine Area and Turbine Area plus 2 km buffer are presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment).

7.14.2.2 In the wider Survey Area, black guillemots were present in 20 of the 24 surveys. Black guillemot observations were primarily located at the edge of the Survey Area near the coast (see figures in Annex 14.1.3, Volume 2c).

Table 7-22 Black guillemot's estimated abundance and density within the Study Area[35].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	28	3	63	0.07	0.01	0.15
July 2022	8	1	27	0.02	0.00	0.07
November 2022	9	1	26	0.02	0.00	0.06
December 2022	8	1	26	0.02	0.00	0.06
March 2023	77	26	138	0.19	0.06	0.34
April 2023	18	2	45	0.04	0.00	0.11
October 2023	9	1	29	0.02	0.00	0.07
November 2023	9	1	26	0.02	0.00	0.06
February 2024	19	2	49	0.05	0.00	0.12

Plate 7-17 Black guillemot's estimated abundance and confidence limits within the Study Area.[36]



[35] Estimates are inclusive of apportionment of unidentified species.

[36] Estimates are inclusive of apportionment of unidentified birds.

CONCLUSION

7.14.2.3 Black guillemots are considered to have a local conservation status, given they are not a feature of any SPA and are Green listed in BoCC5. Black guillemot numbers recorded in the Study Area surpass the threshold for Regional Importance in the non-breeding season. Black guillemots are identified as being moderately vulnerable to displacement effects. Therefore, black guillemots are identified as a VOR and considered for further assessment.

7.15 PUFFIN

7.15.1 STATUS OVERVIEW

7.15.1.1 Puffins are 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 however currently red-listed in BoCC5 (Stanbury *et al.*, 2024).

7.15.1.2 Puffins are one of the most abundant seabird species in Britain, breeding in coastal colonies. Seabirds Count recorded 474,679 pairs at breeding colonies around the UK (Burnell *et al.*, 2023). Lesser sandeel is the most common prey item for puffins, but they also eat sprat, herring and a wide range of young gadoid fish (Harris, 1984).

7.15.1.3 Puffins breed in coastal locations throughout Scotland/*Alba*, including on Scottish islands, whilst in the winter the distribution extends further offshore (Mitchell *et al.*, 2004). Distribution modelling by Waggitt *et al.* (2020) suggests that the Study Area is of relatively low importance for puffins throughout the year. Typical densities in the Study Area are lowest in the breeding season, when puffins are more closely associated with large colonies, with noticeable hotspots around the Shiant Isles/*Na h-Eileanan Mòra*, Orkney/*Arcaibh* and the Firth of Forth/*Linne Foirthe*. Outside of the breeding season, densities are slightly higher in the Study Area due to the dispersal of birds away from breeding colonies, although the Study Area still appears to be of relatively low importance compared to The Minch or further out into the North Atlantic (see Waggitt *et al.*, 2020; Plate 7-18 and Plate 7-19).

Plate 7-18 Puffin's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. January to June.

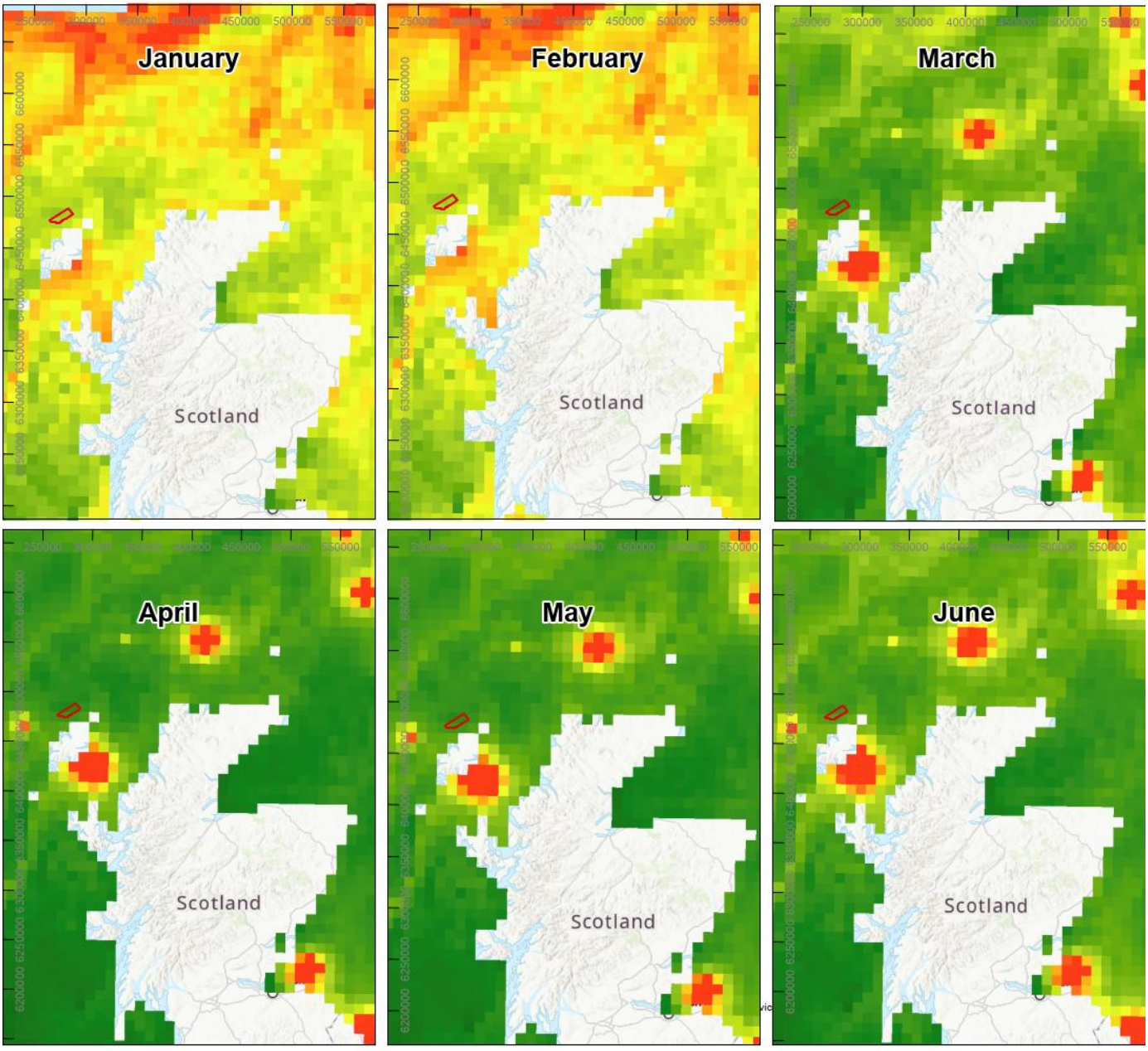
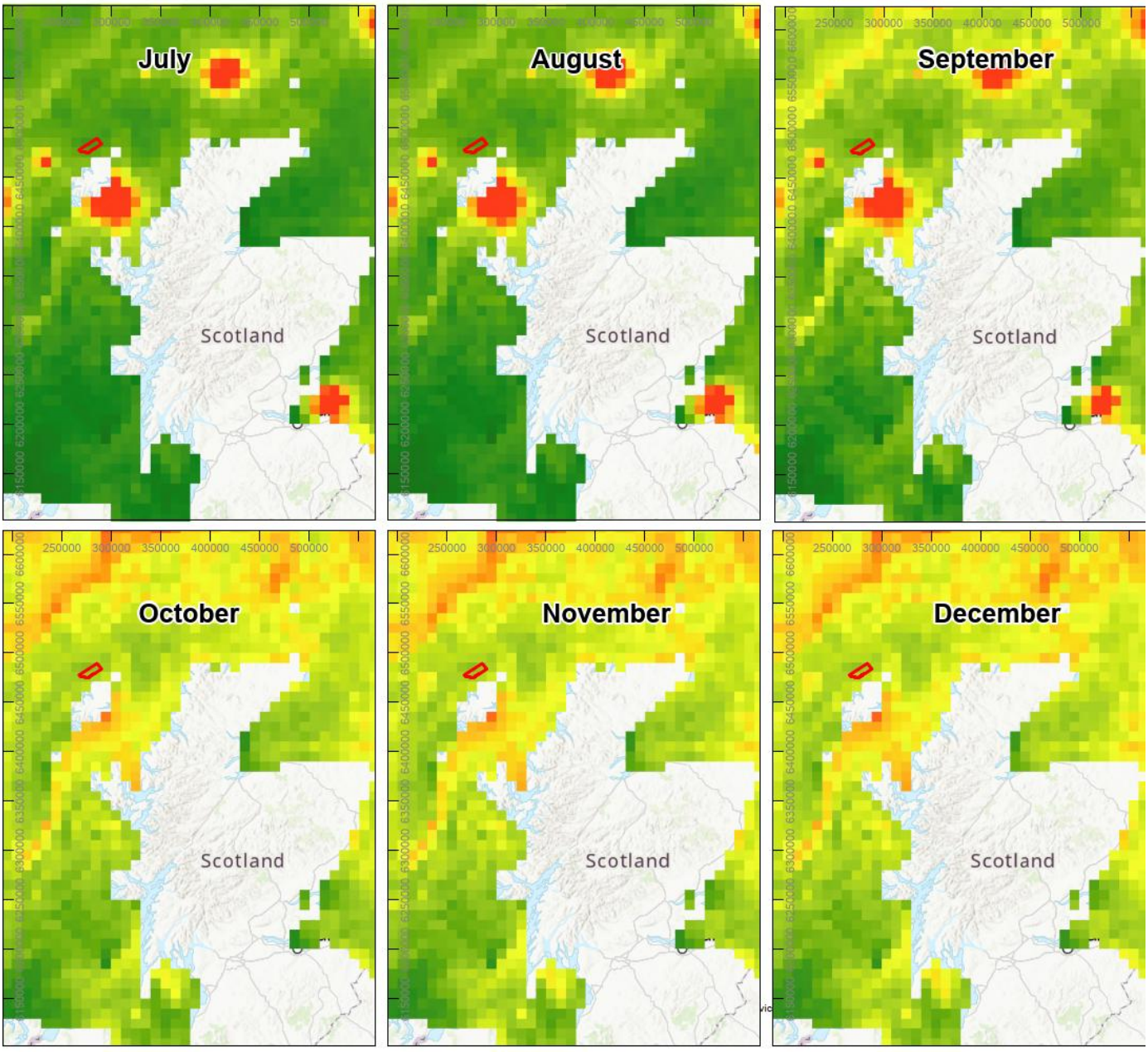
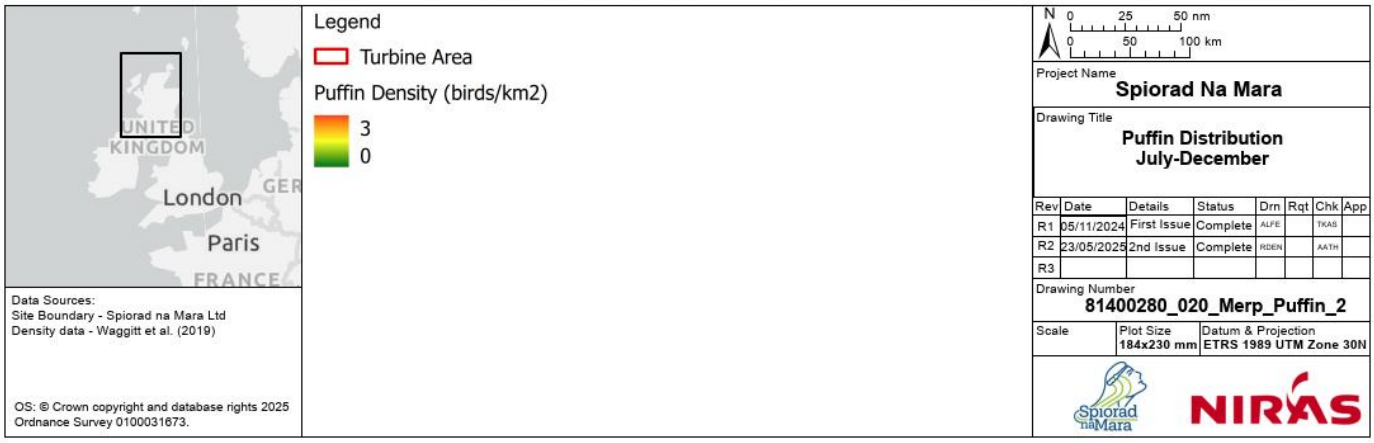


Plate 7-19 Puffin's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. July to December.





7.15.1.4 The Study Area is within the foraging range of puffins from 10 UK SPAs (Table 7-23). Seabirds Count recorded 277,000 pairs at these SPAs, or approximately 58% of the British breeding population (Burnell *et al.*, 2023).

Table 7-23 SPAs with puffins as a designated feature or named assemblage component within foraging range of the Study Area.

SPA	Puffin breeding population in SPA (AOB; Burnell *et al.*, 2023)	Distance from Study Area (km)[37]
Canna and Sanday SPA	4,963	171
Cape Wrath SPA	2,244	107
Flannan Isles/*Na h-Eileanan Flannach* SPA	49,472	34
Hoy SPA	430	206
Mingulay and Berneray/*Miughalaigh agur Beàrnaraigh na Hearadh* SPA	2,321	202
North Caithness Cliffs SPA	3,039	192
North Rona and Sula Sgeir SPA	3,301	76
Shiant Isles/*Na h-Eileanan Mòra* SPA	64,695	100
St Kilda/*Hiort* SPA	98,793	108
Sule Skerry and Sule Stack SPA	47,742	142

7.15.1.5 Wade *et al.* (2016) assessed puffins as being at high risk to barrier effects and a moderate risk of displacement and habitat loss from OWFs due to the limited ability of the species to utilise alternative habitats. The species is considered to be at very low risk of collision with wind turbines due to a very low proportion of birds flying at wind turbine height. Maclean *et al.* (2009) assessed auks as being at high risk of barrier effects at OWFs (Table 5-1).

7.15.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.15.2.1 Puffins were recorded in the Study Area in 17 of the 24 surveys see (Table 7-24 and Plate 7-20). The highest abundance occurred in July 2022 when there was an estimated abundance of 10,456 birds in the Study Area using the design-based approach, or 9,065 birds using the model-based approach. This is below the 1% threshold for Regional Importance in the breeding season (i.e. 11,938 as 1% of 1,193,845; Table 4-3) but considered of Local Importance. The peak design-based abundance estimate in the non-breeding season is 767 in September 2022, which does not reach the threshold for Regional Importance (i.e. 3,045 as 1% of 304,557; Table 4-3) but are also of Local Importance. Abundance and density estimate for the Turbine Area and Turbine Area plus 2 km buffer is presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment).

[37] Distances are measured from the edge of the Study Area to individual breeding sites within foraging range (using coordinates provided in the Seabirds Count data download (JNCC, 2023)) and averaged across the SPA. Note that as different species may breed at different sites within an SPA, the distance reported may vary for the same SPA across different species.

7.15.2.2 In the wider Survey Area, puffins were recorded in 20 of the 24 surveys. Puffin observations were widely distributed throughout the Survey Area (see figures in Annex 14.1.3, Volume 2c).

Table 7-24 Puffins estimated abundance and density within the Study Area[38].

Survey	Design-based estimate					
	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	11	1	42	0.03	0.00	0.10
April 2022	191	69	333	0.47	0.17	0.81
July 2022	10,456	7,425	13,799	25.55	18.14	33.72
August 2022	67	20	130	0.16	0.05	0.32
September 2022	767	475	1,134	1.87	1.16	2.77
October 2022	97	30	178	0.24	0.07	0.43
March 2023	10	1	30	0.02	0.00	0.07
April 2023	333	158	532	0.81	0.39	1.30
May 2023	65	20	129	0.16	0.05	0.32
June 2023	217	78	382	0.53	0.19	0.93
July 2023	456	256	690	1.11	0.63	1.69
August 2023	887	624	1,191	2.17	1.52	2.91
September 2023	540	375	726	1.32	0.92	1.77
October 2023	368	228	542	0.90	0.56	1.32
November 2023	51	10	102	0.12	0.02	0.25
January 2024	22	2	58	0.05	0.00	0.14
February 2024	11	1	35	0.03	0.00	0.09

[38] Estimates are inclusive of apportionment of unidentified species.

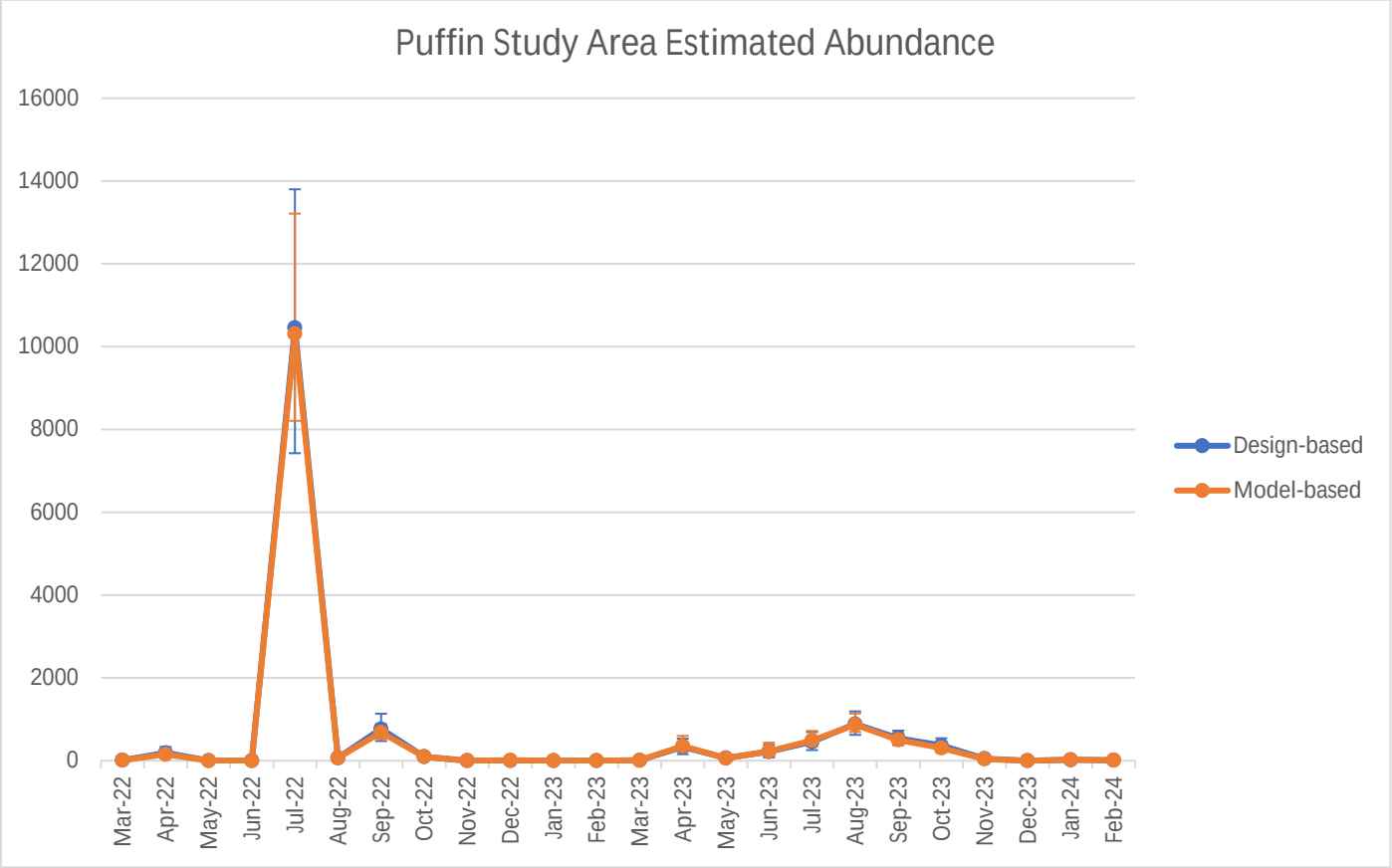
Table 7-25 Puffin's model-based estimated abundance and density within the Study Area[39].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022*	11*	1*	42*	0.03*	0.00*	0.10*
April 2022	152	82	267	0.37	0.20	0.65
May 2022*	0*	0*	0*	0.00*	0.00*	0.00*
June 2022*	0*	0*	0*	0.00*	0.00*	0.00*
July 2022	10,308	8,209	13,212	25.19	20.06	32.29
August 2022	67	41	118	0.16	0.10	0.29
September 2022	683	524	887	1.67	1.28	2.17
October 2022*	97*	30*	178*	0.24*	0.07*	0.43*
November 2022*	0*	0*	0*	0.00*	0.00*	0.00*
December 2022	10	7	18	0.03	0.02	0.04
January 2023*	0*	0*	0*	0.00*	0.00*	0.00*
February 2023*	0*	0*	0*	0.00*	0.00*	0.00*
March 2023*	10*	1*	30*	0.02*	0.00*	0.07*
April 2023	354	231	599	0.86	0.57	1.46
May 2023	59	39	94	0.15	0.09	0.23
June 2023	225	135	435	0.55	0.33	1.06
July 2023	488	347	719	1.19	0.85	1.76
August 2023	870	694	1,140	2.13	1.70	2.79
September 2023	501	385	674	1.22	0.94	1.65
October 2023	305	203	434	0.75	0.50	1.06
November 2023	39	25	78	0.10	0.06	0.19
December 2023*	0*	0*	0*	0.00*	0.00*	0.00*
January 2024*	22*	2*	58*	0.05*	0.00*	0.14*
February 2024*	11*	1*	35*	0.03*	0.00*	0.09*

*Survey was not modelled and so results are design-based abundance and density estimates but are included to provide a comprehensive baseline

[39] Estimates are inclusive of apportionment of unidentified species.

Plate 7-20 Puffin's estimated abundance and confidence limits within the Study Area.[40]



7.15.2.3 Across all surveys in which they were recorded, 15.0% of puffins (considering only birds identified to species level) within the Survey Area were recorded flying, whilst the remaining 85.0% were sitting. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

7.15.3 CONCLUSION

7.15.3.1 Puffins are considered to have an international conservation status as the foraging ranges reported by Woodward *et al.* (2019) suggest connectivity between the Study Area and breeding colonies. Population estimates of puffins at the Study Area do not exceed the 1% importance threshold of the regional population during either the breeding season (i.e. 11,938 as 1% of 1,193,845) or non-breeding season (i.e. 3,045 as 1% of 304,557), although are large enough to be considered of Local Importance (Table 7-25). Therefore, based on SPA connectivity and the Local Importance of puffin populations at the Study Area, puffins identified as a VOR and considered for further assessment as a receptor with an international conservation value.

[40] Estimates are inclusive of apportionment of unidentified birds and correction for availability bias.

7.16 RED-THROATED DIVER

7.16.1 STATUS OVERVIEW

7.16.1.1 Red-throated divers only breed in small numbers in the UK, with the breeding population restricted largely to lochs and other freshwater bodies in Scotland/*Alba*. In winter, red-throated divers are found around the UK coast, with UK breeding birds also joined by birds breeding in Scandinavia, Iceland and Greenland.

7.16.1.2 Red-throated divers are listed under 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 currently Green listed in BoCC5 (Stanbury *et al.*, 2021).

7.16.1.3 The Study Area is within foraging range of 1 SPA for which red-throated divers are a designated feature, the Lewis Peatlands SPA.

7.16.1.4 Wade *et al.* (2016) assessed red-throated divers as being at high risk of displacement and habitat loss due to OWFs due high sensitivity to displacement and the limited ability of the species to utilise alternative habitats. The species is considered to be at moderate risk of collision with wind turbines due to a low proportion of birds flying at wind turbine height (Wade *et al.*, 2016).

7.16.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.16.2.1 Red-throated divers were recorded in the Study Area in 3 of the 24 surveys, with a maximum estimated abundance of 8 birds in July 2022, March 2023 and October 2023 (Plate 7-26). The estimated abundance does not reach the threshold for importance at any scale in any season. Abundance and density estimate for the Turbine Area plus 2 km buffer are presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment). No red-throated divers were recorded in the Turbine Area.

7.16.2.2 Red-throated divers were recorded in the wider Survey Area in 16 of the 24 surveys. Most observations of red-throated divers were close to the coast, towards the edge of the Survey Area (see figures in Annex 14.1.3, Volume 2c).

Table 7-26: Red-throated diver's estimated abundance and density within the Study Area[41].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
July 2022	8	1	26	0.02	0.00	0.06
March 2023	8	1	26	0.02	0.00	0.06
October 2023	8	1	26	0.02	0.00	0.06

7.16.2.3 Across all surveys in which they were recorded, 8.1% of red-throated divers (considering only birds identified to species level) within the Survey Area were recorded flying, whilst the remaining 91.9% were sitting. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

7.16.3 CONCLUSION

7.16.3.1 Red-throated divers are considered to have an international conservation status as the foraging ranges reported by Woodward *et al*. (2019) suggest connectivity between the Study Area and an SPA breeding colony.

7.16.3.2 Although only small numbers of birds were recorded in the Study Area, due to their presence in the surrounding buffer zone and high sensitivity to displacement impacts, red-throated divers have been identified as a VOR and will be considered for further assessment as a receptor with an international conservation value.

7.17 GREAT NORTHERN DIVER

7.17.1 STATUS OVERVIEW

7.17.1.1 Great northern divers do not breed in the UK but overwinter in coastal waters of the UK and Ireland.

7.17.1.2 Great northern divers are not listed under Annex I of the EU Birds Directive (2009/147/EEC), but are listed under and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The species is currently Amber listed in BoCC5 (Stanbury *et al.*, 2021).

7.17.1.3 Wade *et al.* (2016) assessed great northern divers as being at high risk of displacement and habitat loss from OWFs due high sensitivity to displacement and the limited ability of the species to utilise

[41] Estimates are inclusive of apportionment of unidentified species.

alternative habitats. The species is considered to be at moderate risk of collision with wind turbines due to a low proportion of birds flying at wind turbine height (Wade *et al.*, 2016).

7.17.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.17.2.1 Great northern divers were recorded in the Study Area in 9 of the 24 surveys, all within the non-breeding season (see Table 7-27 and Plate 7-21). The non-breeding season for this species within Scottish waters is September to May (Table 4-2). The abundances recorded do not meet the threshold for importance at any scale.

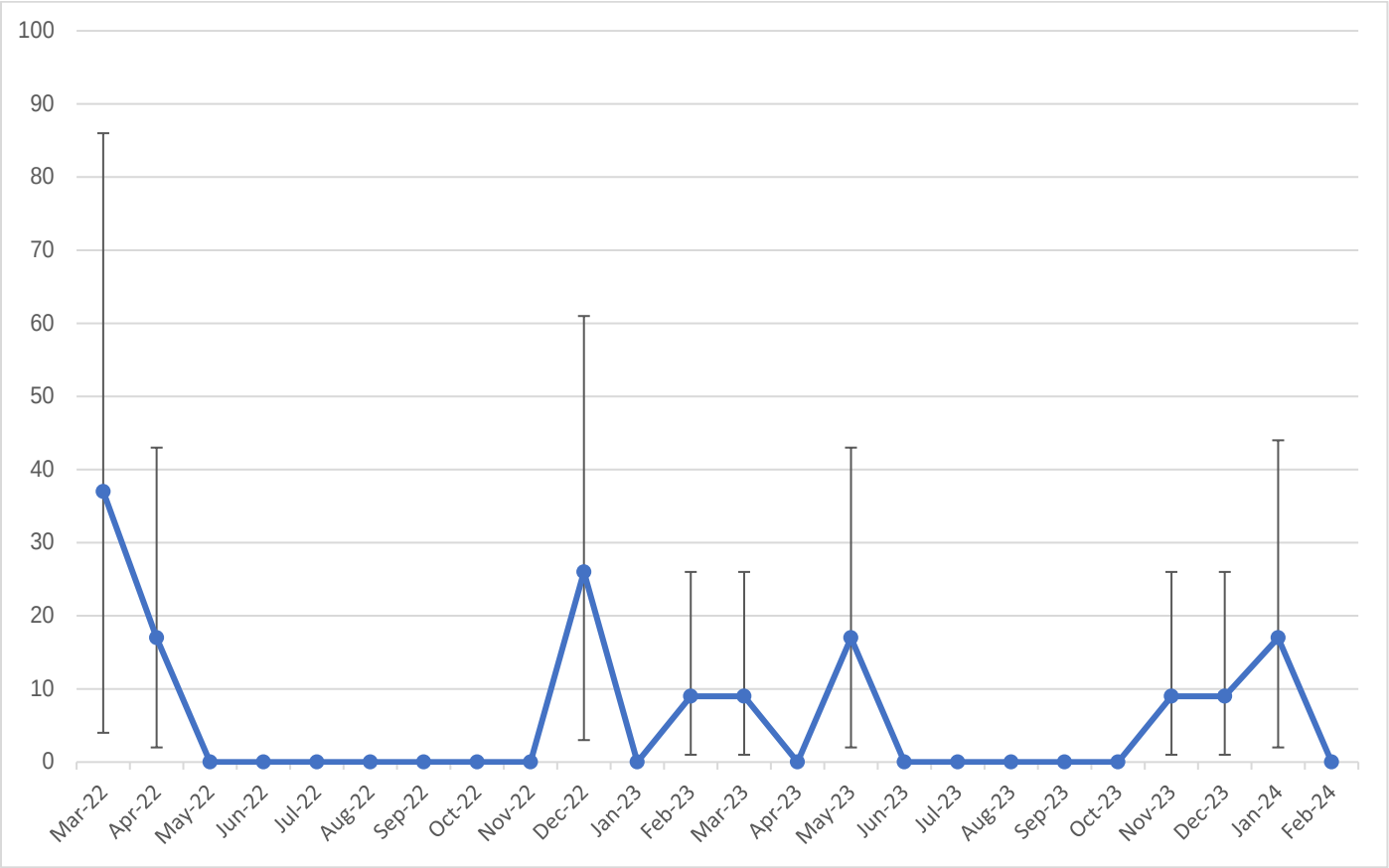
7.17.2.2 In the wider Survey Area, great northern divers were recorded in 18 of the 24 surveys. Great northern divers were only recorded predominately in the non-breeding season with 2 birds recorded in July 2022 and 1 bird in August 2022 but these are still considered to be non-breeding individuals as breeding does not occur in Britain regularly. The non-breeding season within Scottish waters for this species is September to May (Table 4-2). Most records of great northern divers were located near the coast, towards the edge of the Survey Area (see figures in Section 13 of Annex 14.1.3, Volume 2c).

Table 7-27 Great northern diver's estimated abundance and density within the Study Area[42].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	37	4	86	0.09	0.01	0.21
April 2022	17	2	43	0.04	0.00	0.11
December 2022	26	3	61	0.06	0.01	0.15
February 2023	9	1	26	0.02	0.00	0.06
March 2023	9	1	26	0.02	0.00	0.06
May 2023	17	2	43	0.04	0.00	0.11
November 2023	9	1	26	0.02	0.00	0.06
December 2023	9	1	26	0.02	0.00	0.06
January 2024	17	2	44	0.04	0.00	0.11

[42] Estimates are inclusive of apportionment of unidentified species.

Plate 7-21 Great northern diver's estimated abundance and confidence limits within the Study Area.[43]



7.17.2.3 Across all surveys in which they were recorded, 0.6% of great northern diver (considering only birds identified to species level) within the Survey Area were recorded flying, whilst the remaining 99.4% were sitting. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

7.17.3 CONCLUSION

7.17.3.1 Due to the species' inclusion under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), great northern divers are considered to be of national conservation status. Great northern divers were recorded in the Study Areas in low numbers, that fell below the thresholds for importance at any scale. However, due to their presence in the surrounding buffer zone (Table 7-27) and high sensitivity to displacement impacts, great northern divers have been identified as a VOR and will be considered for further assessment as a receptor with a national conservation value.

[43] Estimates are inclusive of apportionment of unidentified birds.

7.18 FULMAR

7.18.1 STATUS OVERVIEW

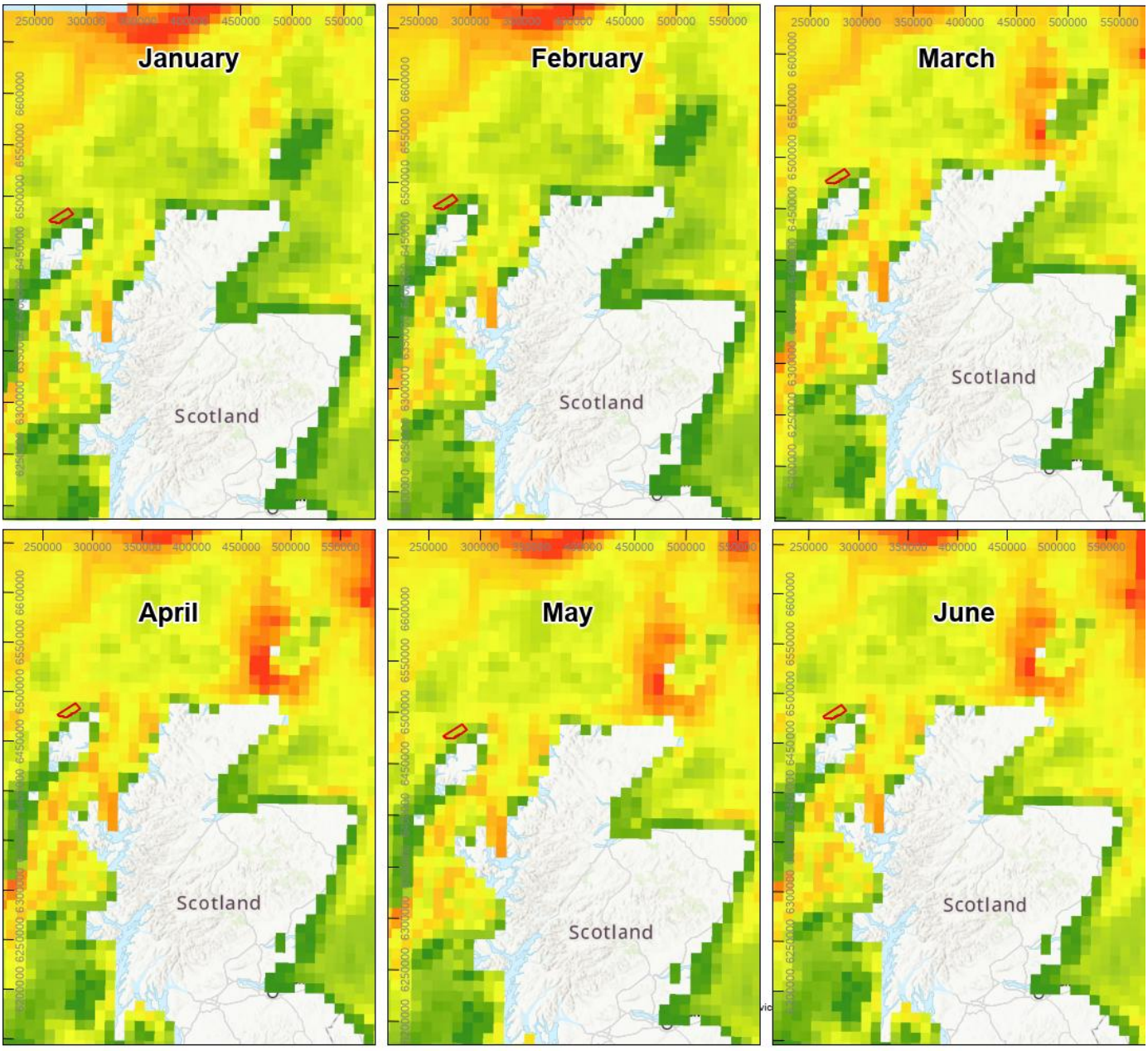
7.18.1.1 Fulmars are not listed under Annex I of the EU Birds Directive (2009/147/EEC) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Fulmars are, however, currently Amber-listed in BoCC5 (Stanbury *et al.*, 2024).

7.18.1.2 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 more common seabirds in the UK, with an estimated breeding population of 319,508 pairs (Burnell *et al.*, 2023). The largest breeding colonies are located off the north and west coasts of Scotland/*Alba*, with birds often present at these colonies outside of the breeding season.

7.18.1.3 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).

7.18.1.4 Modelling by Waggitt *et al.* (2020) suggests fulmar densities in the vicinity of the Study Area are low to medium for much of the year. Fulmars are found widely in the waters around Scotland/*Alba*, and indeed there is a general trend for densities to be lowest relatively near the coast (including the region where the Project will be located). Whilst there are seasonal patterns in the modelled data (particular an area of high density is evident near Orkney/*Arcaibh* in the breeding season), the density patterns in the waters around the Study Area show relatively little seasonal variation. This is shown in Plate 7-22 and Plate 7-23.

Plate 7-22 Fulmar's typical at-sea density, as modelled in Waggitt *et al*. (2020) using ESAS data from 1980 – 2018. January to June.



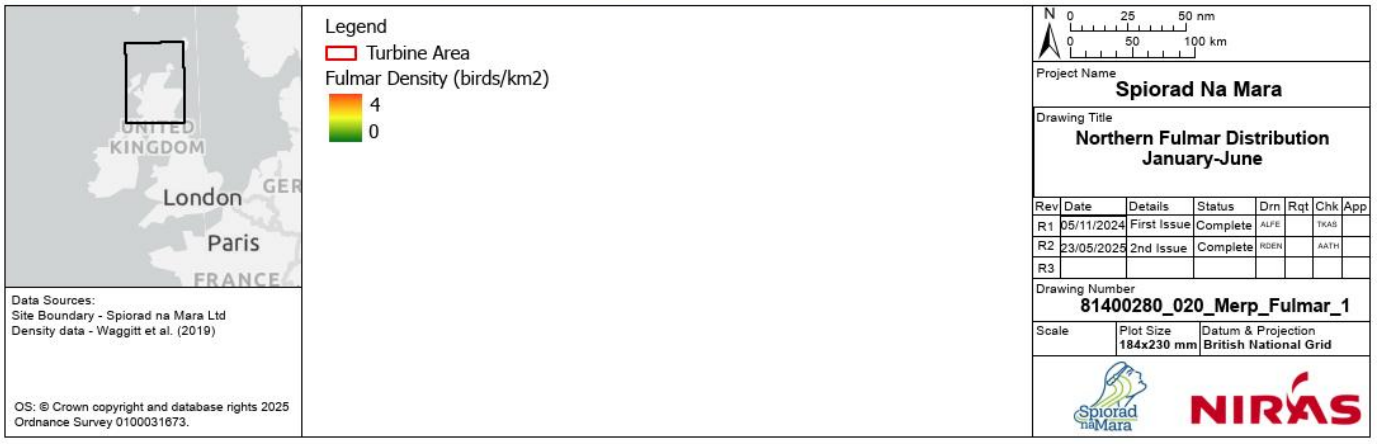
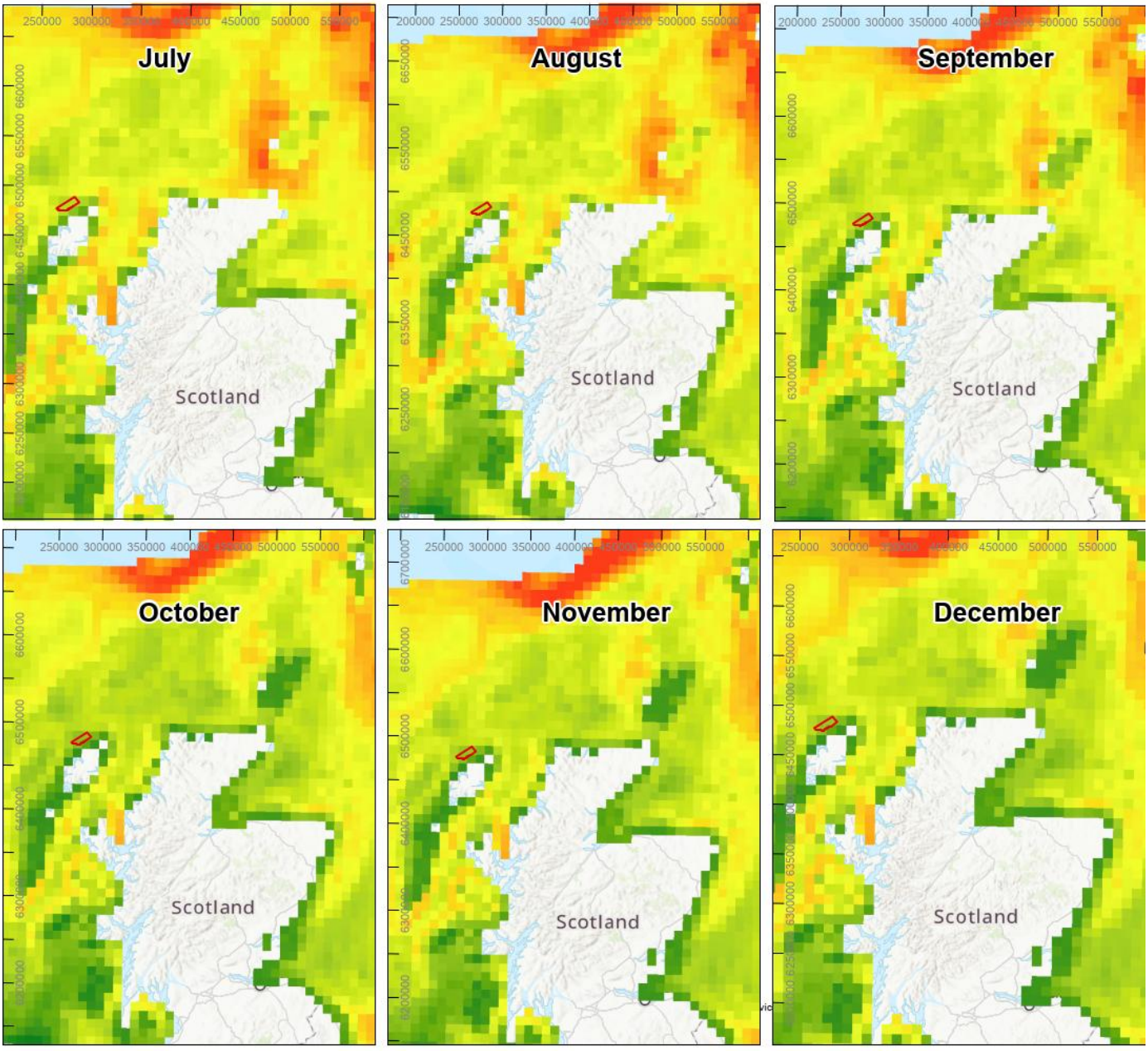


Plate 7-23 Fulmar's typical at-sea density, as modelled in Waggitt *et al*. (2020) using ESAS data from 1980 – 2018. July to December.



7.18.1.5 Due to its extensive foraging range, fulmars are currently listed as a qualifying interest species in the breeding season for 42 UK and Irish SPAs within foraging range of the Study Area (see Table 7-28). Seabirds Count recorded 203,698 individuals at the colony at these SPAs, or approximately 58% of the British, Irish, Isle of Man and Channel Island breeding population (Burnell *et al.*, 2023).

Table 7-28 SPAs with fulmars as a designated feature or named assemblage component within foraging range of the Study Area.

SPA	Fulmar breeding population in SPA (AOS; Burnell *et al.*, 2023)	Distance from Study Area (km)[44]
Beara Peninsula SPA	44	844
Blasket Islands SPA	1,884	780
Buchan Ness to Collieston Coast SPA	826	375
Calf of Eday SPA	2,324	256
Cape Wrath/*Am Parbh* SPA	1,477	107
Clare Island SPA	2,647	582
Cliffs of Moher SPA	4,801	697
Copinsay SPA	1,618	244
Deenish Island and Scariff Island SPA	401	824
Dingle Peninsula SPA	385	772
Duvillaun Islands SPA	547	550
East Caithness Cliffs SPA	13,964	270
Fair Isle SPA	32,491	329
Fetlar SPA	9,177	427
Flamborough and Filey Coast SPA	846	774
Flannan Isles/*Na h-Eileanan Flannach* SPA	3,066	34
Foula/*Fughlaigh* SPA	10,253	316
Fowlsheugh SPA	525	442
Handa/*Shannda* SPA	723	95
Hermaness, Saxa Vord and Valla Field SPA	13,208	415
High Island, Inishshark and Davillaun SPA	1,561	606
Horn Head to Fanad Head SPA	558	381
Hoy SPA	20,541	205
Iveragh Peninsula SPA	320	804
Kerry Head SPA	107	742
Lambay Island SPA	375	583
Mingulay and Berneray/*Miughalaigh agur Beàrnaraigh na Hearadh* SPA	7,048	200
North Caithness Cliffs SPA	15,370	198
North Rona and Sula Sgeir SPA	2,210	76
Noss SPA	5,092	396

[44] Distances are measured from the edge of the Study Area to individual breeding sites within foraging range (using coordinates provided in the Seabirds Count data download (JNCC, 2023)) and averaged across the SPA. Note that as different species may breed at different sites within an SPA, the distance reported may vary for the same SPA across different species.

SPA	Fulmar breeding population in SPA (AOS; Burnell *et al.*, 2023)	Distance from Study Area (km)[44]
Puffin Island SPA (Ireland)	670	809
Rathlin Island SPA	1,038	372
Rousay SPA	2,192	227
Saltee Islands SPA	357	751
Shiant Isles/*Na h-Eileanan Mòra* SPA	1,506	100
Skelligs SPA	917	816
St Kilda/*Hiort* SPA	29,186	108
Sumburgh Head SPA	5,950	340
Tory Island SPA	507	377
Troup, Pennan and Lion's Heads SPA	1,894	339
West Donegal Coast SPA	41	449
West Westray SPA	1,214	223

7.18.1.6 Wade *et al.* (2016) assessed fulmars as being at very low risk of displacement from wind farms although this is associated with a high degree of uncertainty. A similar conclusion was also drawn for collision with wind turbines due to a limited proportion of flights occurring at wind turbine height. Fulmars are considered to be at very low risk of habitat loss (Wade *et al.*, 2016) and low risk of barrier effects (Maclean *et al.*, 2009) (Table 5-1). It is noted that NatureScot advised (NatureScot, 2025. Email sent to the Applicant, 8th May) that fulmar is assessed for barrier effects due to the potential for birds from breeding colonies in the immediate vicinity of the Project facing this pressure.

7.18.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.18.2.1 Fulmars were recorded in the Study Area in 22 of the 24 surveys (see Table 7-29 and Plate 7-24). The highest abundance occurred in April 2023 when there was an estimated abundance of 748 birds in the Study Area. Fulmars were recorded in all seasons, but always at levels below the threshold for Regional or National Importance (i.e. below 11,424 or 10,352 as 1% of 1,142,437 or 1,035,206 respectively in the breeding season, 8,281 or 17,856 as 1% of 828,194 or 1,785,696 respectively in the post-breeding season, 5,563 or 11,251 as 1% of 556,367 or 1,125,103 in the non-breeding season, and 8,281 or 17,856 as 1% of 828,194 or 1,785,696 respectively in the pre-breeding season, for regional or national populations, respectively; Table 4-3). Abundance and density estimate for the Turbine Area and Turbine Area plus 2 km buffer are presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment).

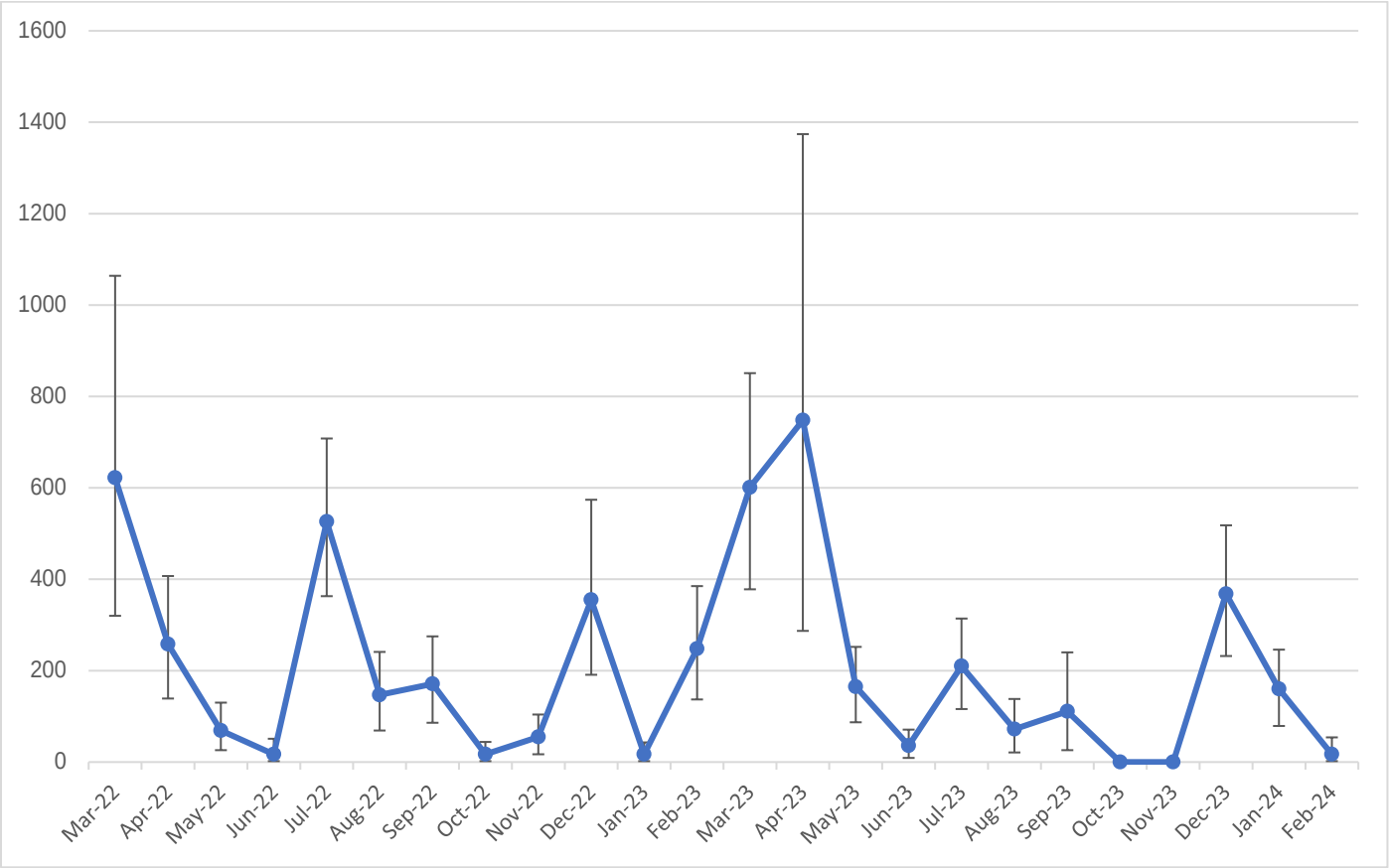
7.18.2.2 Across the whole Survey Area, fulmars were recorded in 22 of the 24 surveys. Fulmar observations were widely distributed throughout the Survey Area, with no clear seasonal patterns (see figures in Annex 14.1.3, Volume 2c).

Table 7-29 Fulmar's estimated abundance and density within the Study Area[45].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	622	320	1,064	1.52	0.78	2.60
April 2022	258	139	407	0.63	0.34	0.99
May 2022	69	26	130	0.17	0.06	0.32
June 2022	17	2	51	0.04	0.00	0.12
July 2022	526	363	708	1.29	0.89	1.73
August 2022	147	69	241	0.36	0.17	0.59
September 2022	171	86	275	0.42	0.21	0.67
October 2022	17	2	44	0.04	0.00	0.11
November 2022	55	17	104	0.13	0.04	0.25
December 2022	355	191	574	0.87	0.47	1.40
January 2023	17	2	43	0.04	0.00	0.11
February 2023	248	137	385	0.61	0.33	0.94
March 2023	601	378	851	1.47	0.92	2.08
April 2023	748	287	1374	1.83	0.70	3.36
May 2023	165	87	252	0.40	0.21	0.62
June 2023	36	9	71	0.09	0.02	0.17
July 2023	210	116	314	0.51	0.28	0.77
August 2023	72	21	138	0.18	0.05	0.34
September 2023	111	26	240	0.27	0.06	0.59
December 2023	368	232	518	0.90	0.57	1.27
January 2024	160	79	246	0.39	0.19	0.60
February 2024	17	2	54	0.04	0.00	0.13

[45] Estimates are inclusive of apportionment of unidentified species.

Plate 7-24 Fulmar's estimated abundance and confidence limits within the Study Area.[46]



7.18.2.3 Across all surveys in which they were recorded, 88.3% of fulmars (considering only birds identified to species level) within the Survey Area were recorded flying, and the remaining 11.7% were sitting. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

7.18.3 CONCLUSION

7.18.3.1 Fulmars are considered to have an international conservation status as the foraging ranges reported by Woodward *et al.* (2019) suggest connectivity between the Study Area and SPA breeding colonies. Population estimates of fulmars at the Study Area do not exceed the 1% importance threshold of the regional population during the breeding season (i.e. below 11,424 as 1% of 1,142,437), although are large enough to be considered of Local Importance. Therefore, based on SPA connectivity and the Local Importance of fulmar populations at the Study Area, fulmars are identified as a VOR and considered for further assessment as a receptor with a national conservation value.

[46] Estimates are inclusive of apportionment of unidentified birds.

7.19 MANX SHEARWATER

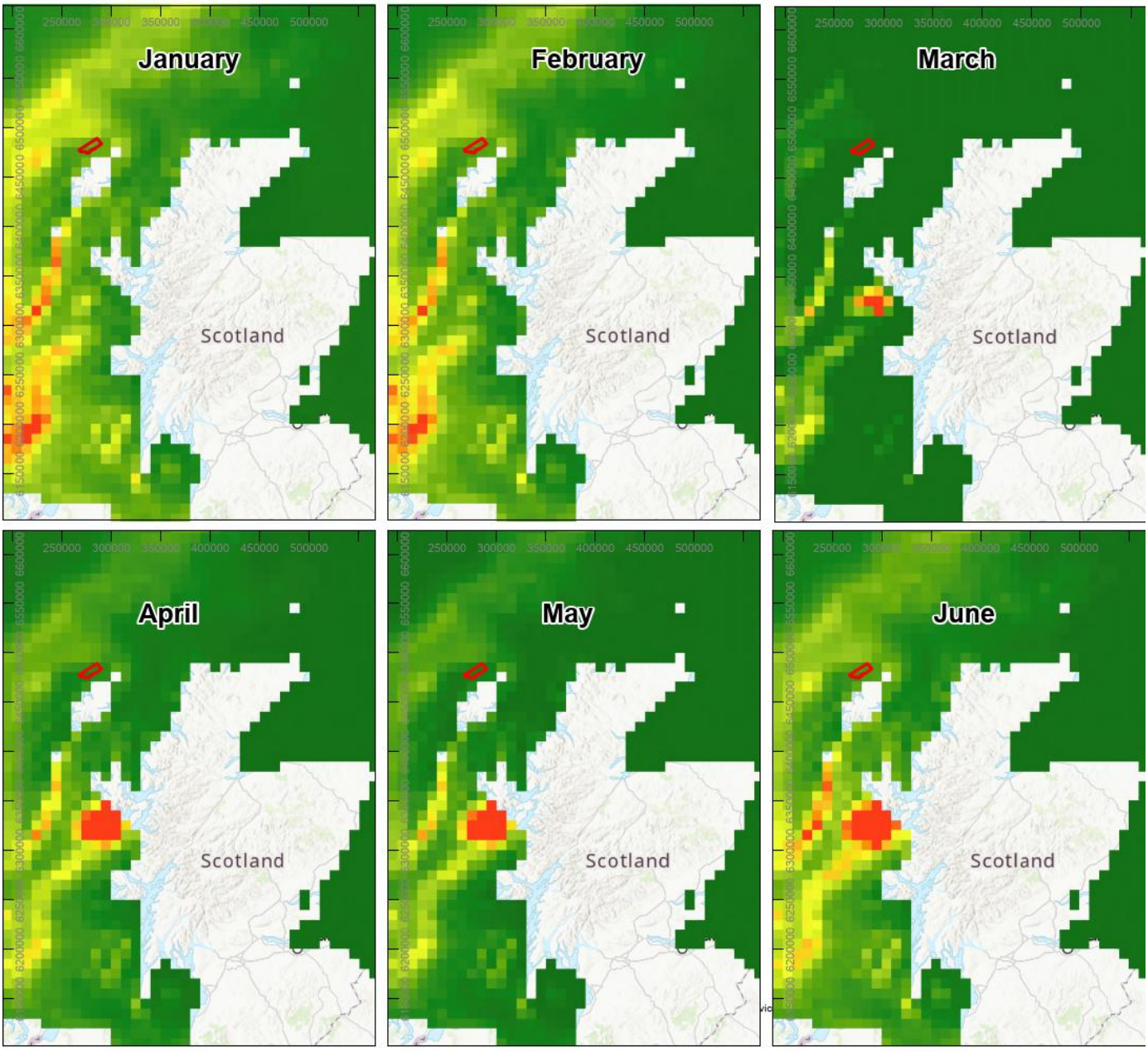
7.19.1 STATUS OVERVIEW

7.19.1.1 Manx shearwaters are 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). Manx shearwaters are currently amber listed in BoCC5 (Stanbury *et al.*, 2024). The species is on the Scottish Biodiversity List.

7.19.1.2 Manx shearwaters are a summer visitor to UK waters, occurring at breeding colonies between March and September. Seabirds Count estimated the UK breeding population at 786,743 breeding pairs, with large colonies on the west coast of Scotland/*Alba* and off south-west Wales (e.g. Rum, Skomer and Skokholm) (Burnell *et al.*, 2023). The majority of Manx shearwater breeding colonies are found on the western coast of the UK, with only 1 potential small colony, on the Isle of May, found on the eastern coast of Britain (Balmer *et al.*, 2013). Manx shearwaters breed in coastal colonies and islands off the west of England and Scotland/*Alba*, and around Ireland (Mitchell *et al.*, 2004).

7.19.1.3 The density layers for Manx shearwaters associated with Waggitt *et al.* (2020) show that the Study Area is of relatively low importance for Manx shearwaters throughout the year. Whilst there is some seasonal variation, in all months the areas of highest Manx shearwater density tend to be further south and west, with a distinct hotspot in the vicinity of the Isle of Rum from March through to September, and widespread foraging in the North Atlantic to the south and west of the Study Area for much of the year (see Plate 7-25 and Plate 7-26).

Plate 7-25 Manx shearwater's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. January to June.



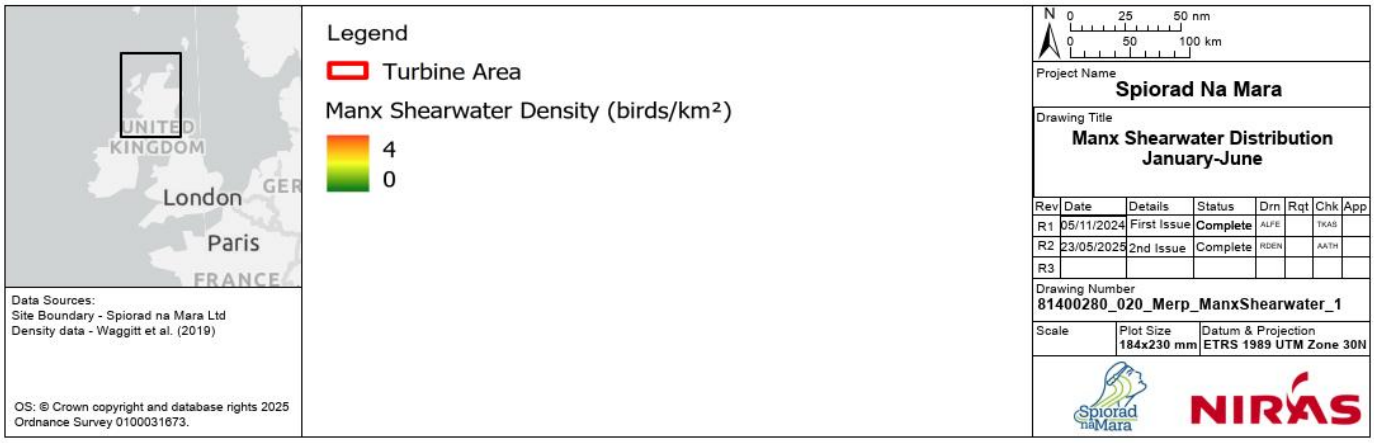
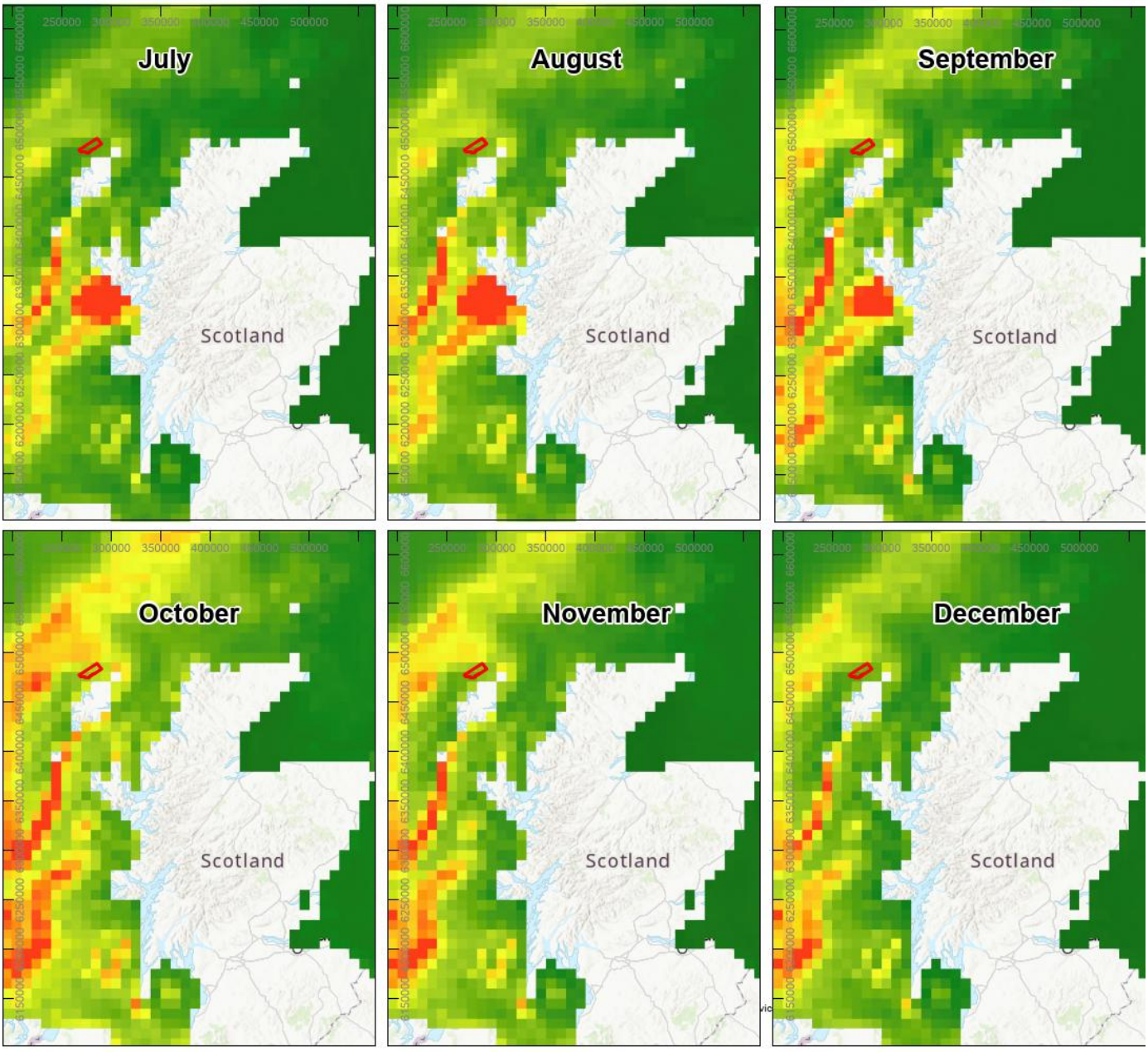
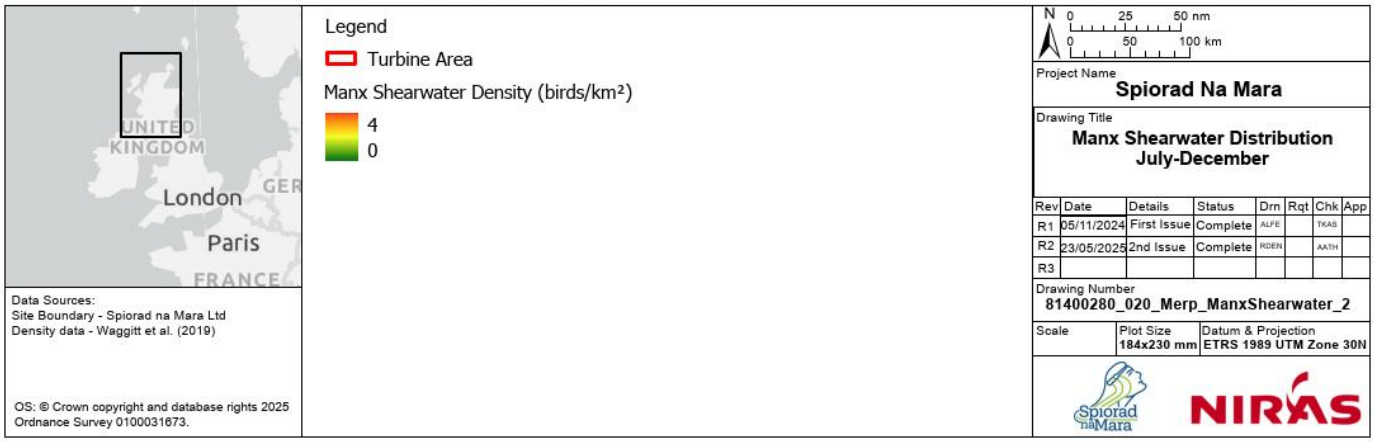


Plate 7-26 Manx shearwater's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. July to December.





7.19.1.4 The Study Area is within the foraging range of Manx shearwaters from 11 UK and Irish SPAs for which it is a designated feature (see Table 6-2 and Table 7-30 SPAs with Manx shearwaters as a designated feature or named assemblage component within foraging range of the Study Area Table 7-30). At the latest count, these SPAs supported 697,411 breeding pairs, representing approximately 76% of the British, Irish, Isle of Man and Channel Island breeding population as reported during Seabirds Count (Burnell *et al.*, 2023). The most recent counts, where available, indicate that the population at the majority of these SPAs has increased.

Table 7-30 SPAs with Manx shearwaters as a designated feature or named assemblage component within foraging range of the Study Area

SPA	Manx shearwater breeding population in SPA (AOS; Burnell *et al.*, 2023)	Distance from Study Area (km)[47]
Aberdaron Coast and Bardsey Island SPA	20,675	668
Blasket Islands SPA	109,390	781
Copeland Islands SPA	4,850	443
Cruagh Island SPA	3,285	613
Deenish Island and Scariff Island SPA	15,508	824
Isles of Scilly SPA	456	994
Puffin Island SPA (Ireland)	3,381	809
Rum SPA	288,894	187
Skelligs SPA	573	818
Skomer, Skokholm and the Seas off Pembrokeshire SPA	455,156	785
St Kilda/*Hiort* SPA	3,731	110

7.19.1.5 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).

7.19.1.6 Wade *et al.* (2016) assessed Manx shearwaters as being at very low risk of collision with wind turbines due to a limited proportion of birds flying at wind turbine height although this was associated with a high level of uncertainty. The species is also considered at very low risk of displacement although this also has a high associated level of uncertainty. A similar conclusion was also drawn for habitat loss associated with wind farms due to the high flexibility of Manx shearwaters in terms of habitat use. The species is not assessed in terms of barrier effects in Maclean *et al.* (2009) or Langston (2010) however, the species is not considered likely to be

[47] Distances are measured from the edge of the Study Area to individual breeding sites within foraging range (using coordinates provided in the Seabirds Count data download (JNCC, 2023)) and averaged across the SPA. Note that as different species may breed at different sites within an SPA, the distance reported may vary for the same SPA across different species.

exposed due to their notable wide ranging pelagic nature. Overall, Manx shearwaters are assessed as being at low risk from offshore wind developments (Table 5-1).

7.19.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.19.2.1 Manx shearwaters were recorded in the Study Area in 4 of the 24 surveys (see Table 7-31 and Plate 7-27). The highest abundance occurred in July 2022 when there was an estimated abundance of 3,289 birds in the Study Area. It should be noted that this count was exceptional, with no birds recorded in the Study Area in the majority of surveys, and only small numbers in the other surveys in which Manx shearwater were recorded (the second highest estimated abundance was 55 birds). The high count in July 2022 may have been the result of weather conditions or movements of prey species leading to an unusual aggregation of Manx shearwater in the Study Area. All records of Manx shearwaters from the Study Area are from the breeding season and are below the threshold for Regional or National Importance in the breeding season (i.e. below 33,915 as 1% of 3,391,554 or 786,743 for regional or national populations, respectively; Table 4-3). Abundance and density estimate for the Turbine Area, and Turbine Area plus 2 km buffer are presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment).

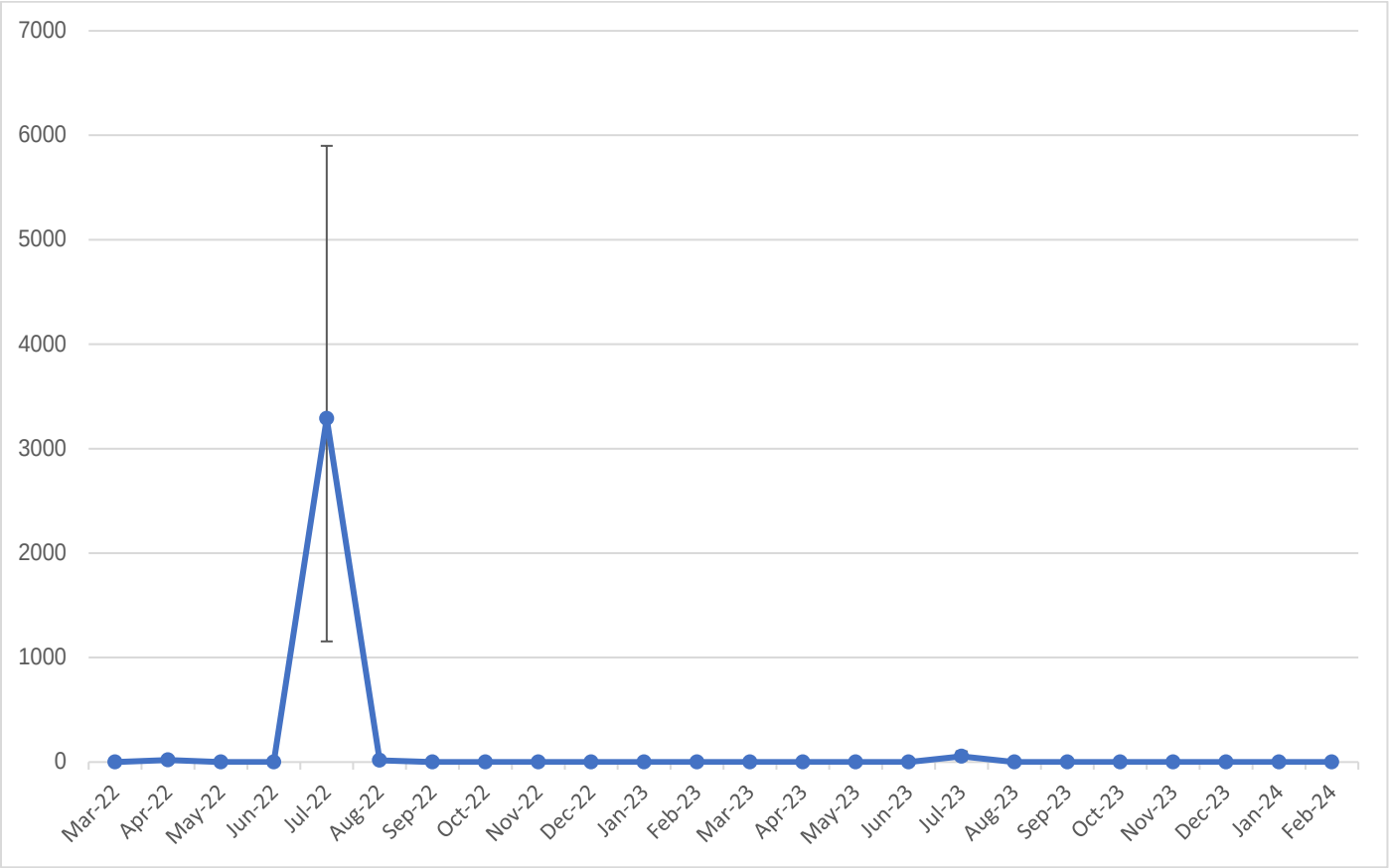
7.19.2.2 In the wider Survey Area, Manx shearwaters were recorded in 10 of the 24 surveys, always within the breeding season. Manx shearwaters were recorded throughout the Survey Area (see figures in Annex 14.1.3, Volume 2c).

Table 7-31 Manx shearwater's estimated abundance and density within the Study Area[48].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
April 2022	20	2	52	0.05	0.00	0.13
July 2022	3,289	1,155	5,899	8.04	2.82	14.42
August 2022	17	0	42	0.04	0.00	0.10
July 2023	55	18	102	0.13	0.04	0.25

[48] Estimates are inclusive of apportionment of unidentified species.

Plate 7-27 Manx shearwater's estimated abundance and confidence limits within the Study Area.[49]



7.19.2.3 Across all surveys in which they were recorded, 40.0% of Manx shearwaters (considering only birds identified to species level) within the Survey Area were recorded flying, whilst the remaining 60.0% were sitting. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c.

[49] Estimates are inclusive of apportionment of unidentified birds.

7.19.3 CONCLUSION

7.19.3.1 Manx shearwaters are considered to have an international conservation status and the foraging ranges reported by Woodward *et al.* (2019) suggest connectivity between the Study Area and SPA breeding colonies. Population estimates of Manx shearwaters at the Study Area do not exceed the 1% importance threshold of the regional population during the breeding season (i.e. below 33,915 as 1% of 3,391,554), although are large enough to be considered of Local Importance. Therefore, based on SPA connectivity and the Local Importance of Manx shearwater populations at the Study Area (see Table 1-83 within Annex 14.1.1, Volume 2c), Manx shearwaters are identified as a VOR and considered for further assessment as a receptor with an international conservation value.

7.20 GANNET

7.20.1 STATUS OVERVIEW

7.20.1.1 Gannets are 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). Gannets are currently Amber listed in BoCC5 (Stanbury *et al.*, 2024).

7.20.1.2 The UK breeding population of gannets has been estimated at 304,176 pairs (Burnell *et al.*, 2023). Gannets breed in a small number of coastal colonies and Scottish islands, with the closest colony to the Study Area being Rockall (Burnell *et al.*, 2023). The area in which the Study Area is located is of limited importance for the species in both the summer and winter, as shown in the modelled density maps produced by Waggitt *et al.* (2020) and shown in Plate 7-28 and Plate 7-29.

Plate 7-28 Gannet's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. January to June.

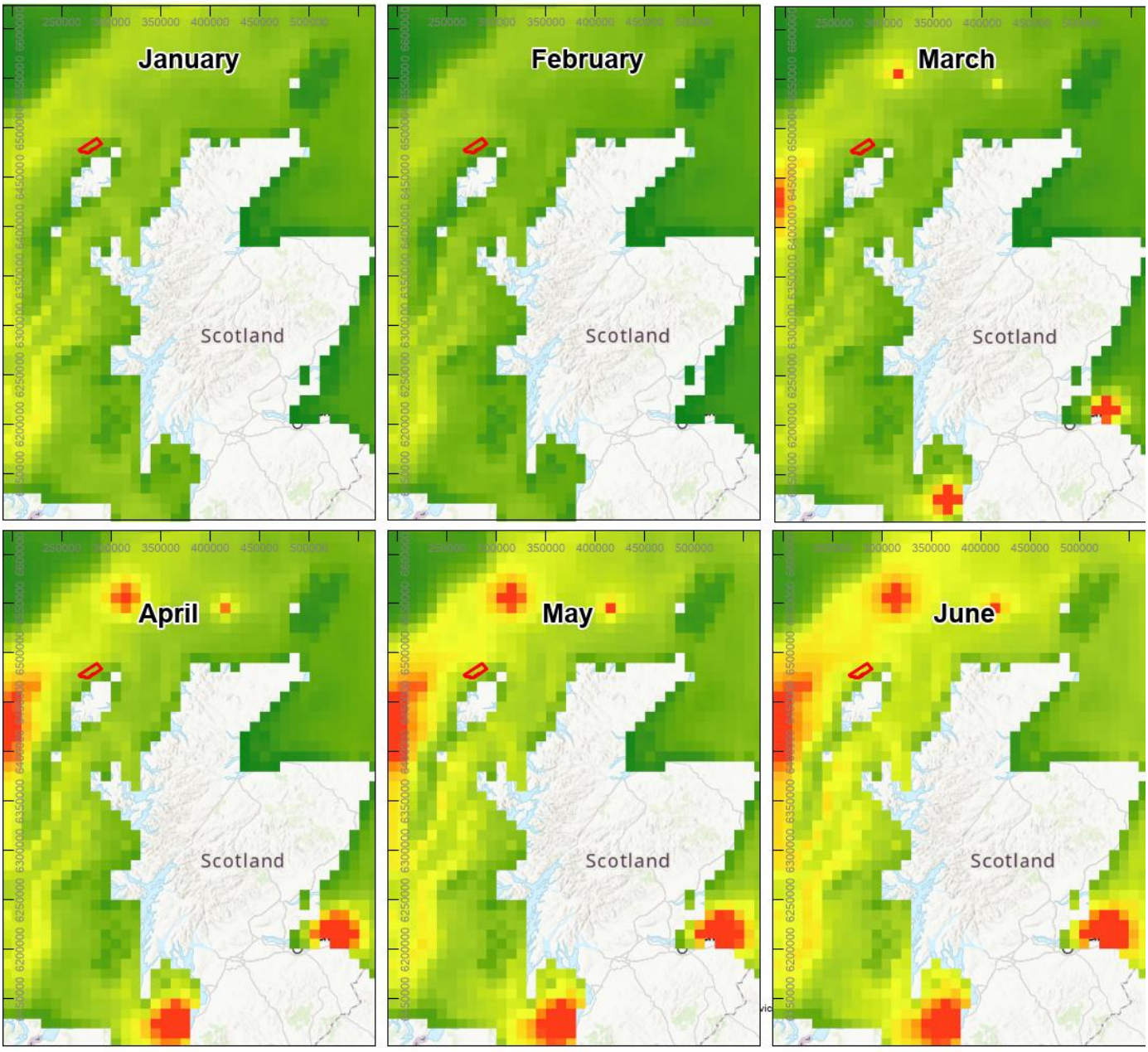
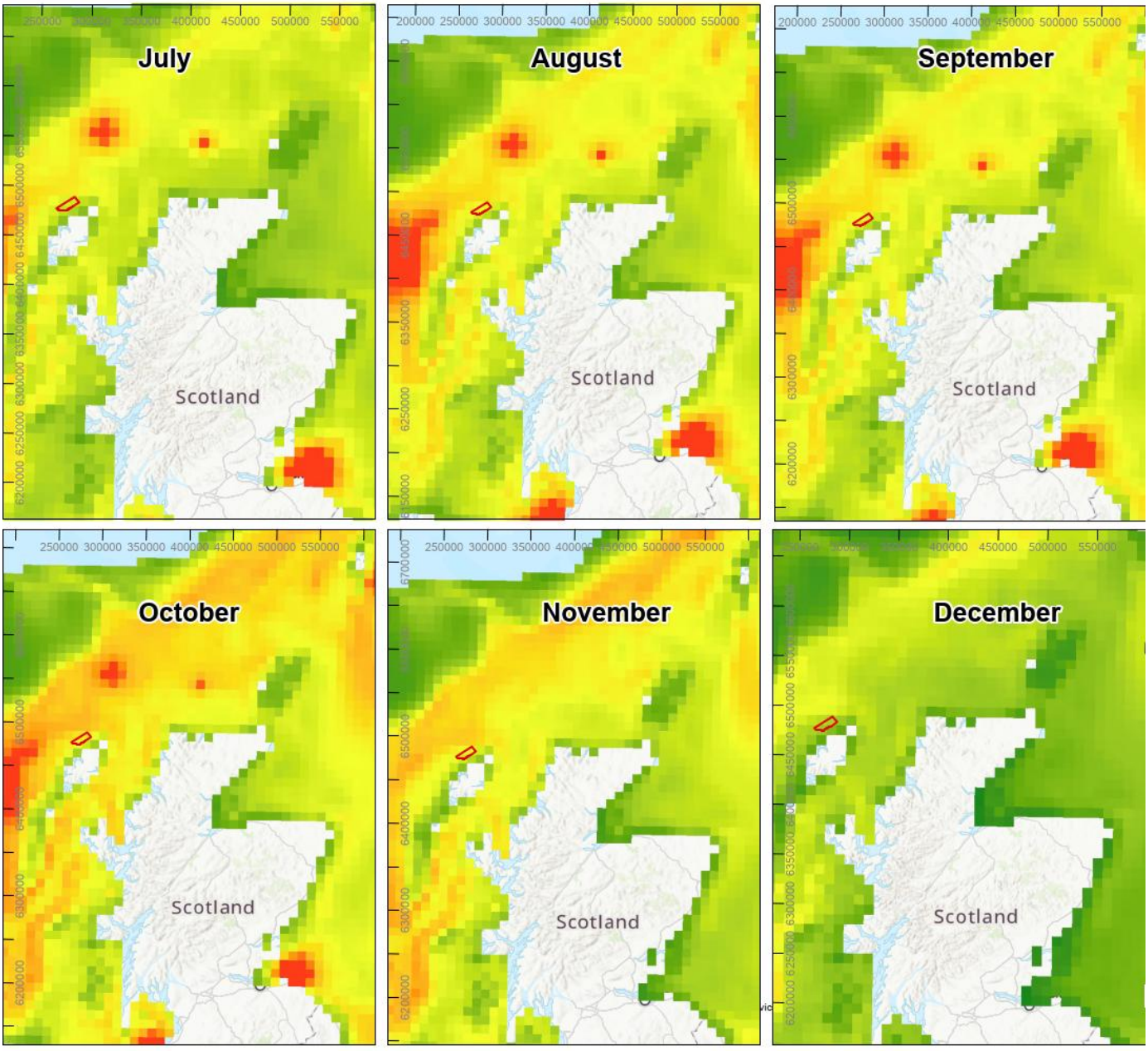


Plate 7-29 Gannet's typical at-sea density, as modelled in Waggitt *et al.* (2020) using ESAS data from 1980 – 2018. July to December.



7.20.1.3 Gannets are listed as a qualifying interest species in the breeding season for 8 UK SPAs within foraging range of the Study Area (see Table 6-2 and Table 7-32). According to Seabirds Count, these SPAs have a breeding population of 238,409 pairs, representing approximately 78% of the UK population of gannets (Burnell *et al.*, 2023). The breeding population of gannets has increased at all 8 of these SPAs since their designation, with an increase in the UK gannet population of 39% between 1984/85 and 2004/05 and a further increase of 34% between 2004/05 and 2013-15 (JNCC, 2021).

Table 7-32 SPAs with gannet as a designated feature or named assemblage component within foraging range of the Study Area

SPA	Gannet breeding population in SPA (AOS/AON; Burnell *et al.*, 2023)	Distance from Study Area (km)[50]
Ailsa Craig/*Creag Ealasaid* SPA	33,226	411
Fair Isle SPA	4,971	329
Forth Islands SPA	75,259	540
Hermaness, Saxa Vord and Valla Field SPA	29,562	416
North Rona and Sula Sgeir SPA	12,271	70
Noss SPA	13,765	396
St Kilda/*Hiort* SPA	60,290	102
Sule Skerry and Sule Stack SPA	9,065	138

7.20.1.4 Wade *et al.* (2016) assessed gannets as being at high risk of collision with wind turbines due to a moderate proportion of birds flying at collision height, a moderate flight agility and moderate proportion of time spent in flight. Gannets are also considered to be at high risk of displacement associated with OWFs. Maclean *et al.* (2009) assessed gannets as being at very low risk of barrier effects (Table 5-1).

7.20.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.20.2.1 Gannets were recorded in the Study Area in 23 of the 24 surveys (see Table 7-33 and Plate 7-30). Under the design-based approach, the highest abundance occurred in August 2022 when there was an estimated abundance of 858 birds in the Study Area. Under the model-based approach, the highest abundance occurred in August 2022 when there was an estimated abundance of 872 birds in the Study Area. Abundance and density estimate for the Turbine Area and Turbine Area plus 2 km buffer are presented in Annex 14.1.1, Volume 2c (inclusive of apportionment of unidentified birds) and Annex 14.1.2, Volume 2c (prior to apportionment).

[50] Distances are measured from the edge of the Study Area to individual breeding sites within foraging range (using coordinates provided in the Seabirds Count data download (JNCC, 2023)) and averaged across the SPA. Note that as different species may breed at different sites within an SPA, the distance reported may vary for the same SPA across different species.

7.20.2.2 The peak model-based abundance estimate in the breeding season was 872 birds in August 2022, which is below the threshold for regional importance, based on a breeding season regional population of 922,328 (Table 4-3). The peak model-based abundance estimate in the post-breeding season was 360 birds in October 2022, which is below the threshold for regional importance, based on a post-breeding season regional population of 545,954 (Table 4-3). The peak model-based abundance estimate in the pre-breeding season was 82 birds in January 2023, which is below the threshold for regional importance, based on a pre-breeding season regional population of 661,888 (Table 4-3).

7.20.2.3 Gannets were present in the wider Survey Area in 23 of the 24 surveys. Gannet observations were widely distributed throughout the Survey Area (see figures in Annex 14.1.3, Volume 2c).

Table 7-33 Gannet's estimated abundance and density within the Study Area[51].

Survey	Design-based estimate					
	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	25	3	61	0.06	0.01	0.15
April 2022	476	329	624	1.16	0.80	1.52
May 2022	43	9	78	0.11	0.02	0.19
June 2022	163	94	247	0.40	0.23	0.60
July 2022	411	276	570	1.00	0.67	1.39
August 2022	858	319	1,645	2.10	0.78	4.02
September 2022	173	95	258	0.42	0.23	0.63
October 2022	350	200	522	0.86	0.49	1.28
November 2022	35	9	78	0.09	0.02	0.19
January 2023	59	26	112	0.14	0.06	0.27
February 2023	9	1	26	0.02	0.00	0.06
March 2023	58	7	155	0.14	0.02	0.38
April 2023	149	78	226	0.36	0.19	0.55
May 2023	131	69	200	0.32	0.17	0.49
June 2023	242	142	355	0.59	0.35	0.87
July 2023	226	113	358	0.55	0.28	0.87
August 2023	163	52	310	0.40	0.13	0.76
September 2023	320	137	609	0.78	0.33	1.49

[51] Estimates are inclusive of apportionment of unidentified species

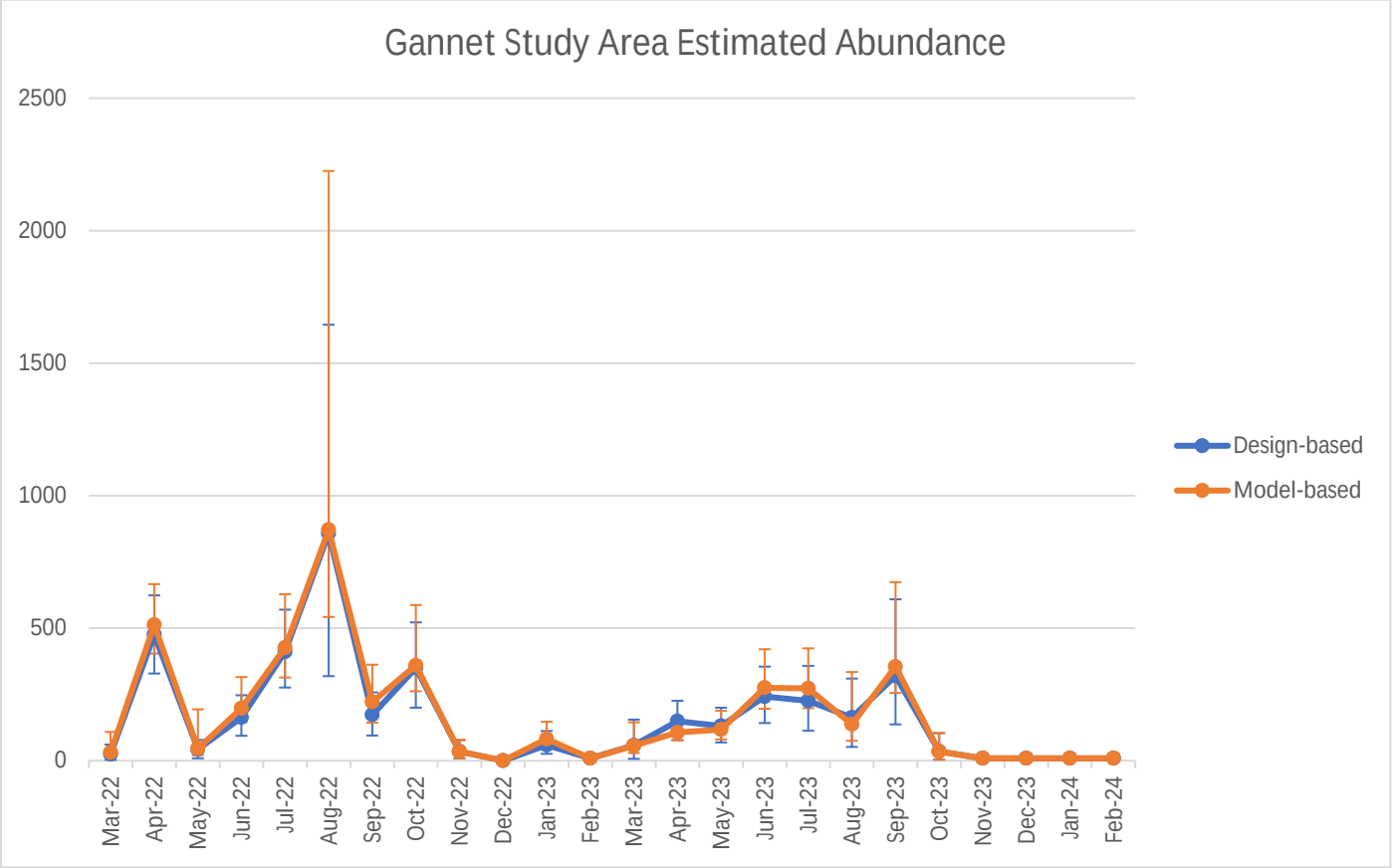
Survey	Design-based estimate					
	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
October 2023	35	4	104	0.09	0.01	0.25
November 2023	9	1	26	0.02	0.00	0.06
December 2023	9	1	26	0.02	0.00	0.06
January 2024	9	1	26	0.02	0.00	0.06
February 2024	9	1	26	0.02	0.00	0.06

Table 7-34 Gannet's model-based estimated abundance and density within the Study Area[52].

Survey	Population estimates (number of birds)			Density estimate (birds/km^2)		
	Estimate	Lower Confidence Limit	Upper Confidence Limit	Estimate	Lower Confidence Limit	Upper Confidence Limit
March 2022	32	19	109	0.08	0.05	0.27
April 2022	513	404	666	1.25	0.99	1.63
May 2022	45	21	194	0.11	0.05	0.47
June 2022	198	146	316	0.48	0.36	0.77
July 2022	426	314	628	1.04	0.77	1.53
August 2022	872	542	2,225	2.13	1.33	5.44
September 2022	222	143	362	0.54	0.35	0.89
October 2022	360	262	588	0.88	0.64	1.44
November 2022*	35*	9*	78*	0.09*	0.02*	0.19*
December 2022*	0*	0*	0*	0.00*	0.00*	0.00*
January 2023	82	55	147	0.20	0.13	0.36
February 2023*	9*	1*	26*	0.02*	0.00*	0.06*
March 2023	56	29	145	0.14	0.07	0.35
April 2023	107	77	162	0.26	0.19	0.40
May 2023	117	80	188	0.29	0.20	0.46
June 2023	275	196	420	0.67	0.48	1.03
July 2023	273	198	424	0.67	0.48	1.04
August 2023	137	75	334	0.33	0.18	0.82
September 2023	355	256	674	0.87	0.62	1.65
October 2023*	35*	4*	104*	0.09*	0.01*	0.25*
November 2023*	9*	1*	26*	0.02*	0.00*	0.06*
December 2023*	9*	1*	26*	0.02*	0.00*	0.06*
January 2024*	9*	1*	26*	0.02*	0.00*	0.06*
February 2024*	9*	1*	26*	0.02*	0.00*	0.06*
*Survey was not modelled and so results are design-based abundance and density estimates, but are included to provide a comprehensive baseline						

[52] Estimates are inclusive of apportionment of unidentified species.

Plate 7-30 Gannet's estimated abundance and confidence limits within the Study Area.[53]



7.20.2.4 Gannet age classes can be distinguished during the DAS due to their moult strategy, with juvenile and first winter birds having distinctive markings. This is unlike all other species (with the exception of kittiwake), for which this level of information cannot be recorded during DAS. Across all surveys in which they were recorded, the majority (94% of birds for which an age was assigned) of gannets recorded in the Survey Area were adults (Table 7-35).

Table 7-35 Gannet age classes recorded in the Survey Area

	Adult	Juvenile	1st winter	1st summer	2nd winter	2nd summer	3rd winter	3rd summer	4th summer	Unknown
Count	1,088	2	2	2	6	16	2	26	8	9

7.20.2.5 Across all surveys in which they were recorded, 76.7% of gannets (considering only birds identified to species level) within the Survey Area were recorded flying, and the remaining 23.3% were sitting. Abundances and densities of flying and sitting birds in each survey are presented in Annex 14.1.1, Volume 2c (including apportionment of unidentified birds) and Annex 14.1.2, Volume 2c .

[53] Estimates are inclusive of apportionment of unidentified birds.

7.20.3 CONCLUSION

7.20.3.1 Gannets are considered to have an international conservation status as the foraging ranges reported by Woodward *et al.* (2019) suggest connectivity between the Study Area and SPA breeding colonies. Population estimates of gannets at the Study Area do not exceed the 1% importance threshold of the regional population during any season (i.e. 9,223 as 1% of 922,328 in the breeding season, or 5,459 as 1% of 545,954 in the post-breeding season), although are large enough to be considered of Local Importance. Therefore, based on SPA connectivity and the Local Importance of gannet populations at the Study Area, gannets are identified as a VOR and considered for further assessment as a receptor with an international conservation value.

7.21 CORMORANT

7.21.1 STATUS OVERVIEW

7.21.1.1 Cormorants are a globally widespread species, breeding in every continent except South America and Antarctica. In Britain, cormorants breed in colonies both along the coast and inland, and may nest on cliffs, stacks, offshore islands, or trees. Seabirds Count estimated 8,829 pairs breeding in the UK, the majority of which are at coastal colonies and the remainder at inland colonies (Burnell *et al.*, 2023).

7.21.1.2 Cormorants are 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 in BoCC5 (Stanbury *et al.*, 2024).

7.21.1.3 The Study Area is not within foraging range of any SPA for which cormorants are a designated feature.

7.21.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.21.2.1 Cormorants were not recorded in the Study Area in any survey. There were records of unidentified cormorant/shag in the Study Area in 5 of the 24 surveys, but these were unable to be apportioned to species following the approach set out in Section 4. These data are presented in Annex 14.1.2, Volume 2c. All abundances are below the threshold for importance at any scale, even if all birds are assumed to be cormorants.

7.21.2.2 Cormorants were recorded in the wider Survey Area in 11 of the 24 surveys. Cormorant records were closely restricted to coastal regions, towards the edge of the Survey Area (see figures in Annex 14.1.3, Volume 2c).

7.21.2.3 Across all surveys in which they were recorded, 66.7% of cormorants (considering only birds identified to species level) within the Survey Area were recorded flying, and the remaining 33.3% were sitting.

7.21.3 CONCLUSION

7.21.3.1 Cormorants were not recorded in the Study Area, with all confirmed cormorant records being close to the coast at the edge of the Survey Area (see figures in Section 17 of Annex 14.1.3, Volume 2c), and with very low numbers (1-2 birds per survey) of cormorant recorded. Cormorants are green listed, and not a feature of any SPA within foraging range of the Study Area. Therefore, it is considered highly unlikely that impacts associated with the Offshore Project will occur on cormorant.

7.21.3.2 Cormorants are therefore not considered for further assessment in relation to impacts associated with the Offshore Project.

7.22 SHAG

7.22.1 STATUS OVERVIEW

7.22.1.1 Shags breed on rocky shorelines and islands, in colonies typically consisting of tens to hundreds or pairs. Seabirds Count recorded 20,209 pairs breeding in the UK (Burnell *et al.*, 2023).

7.22.1.2 Shags are 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 in BoCC5 (Stanbury *et al.*, 2024).

7.22.1.3 The Study Area is not within foraging range of any SPA for which shag is a designated feature.

7.22.2 SEASONAL ABUNDANCE AND DISTRIBUTION

7.22.2.1 Shags were not recorded in the Study Area in any survey. There were records of unidentified cormorant/shag in the Study Area in 5 of the 24 surveys, but these were unable to be apportioned to species following the approach set out in Section 4. These data are presented in Annex 14.1.2, Volume 2c. All abundances are below the threshold for importance at any scale, even if all birds are assumed to be shags.

7.22.2.2 Shags were recorded in the wider Survey Area in 15 of the 24 surveys. Shag records were closely restricted to coastal regions, towards the edge of the Survey Area (see figures in Annex 14.1.3, Volume 2c).

7.22.2.3 Across all surveys in which they were recorded, 8.3% of shags (considering only birds identified to species level) within the Survey Area were recorded flying, and the remaining 91.7% were sitting. Abundances and densities of flying and sitting birds in each survey in the Study Area are presented in Annex 14.1.2, Volume 2c.

7.22.3 CONCLUSION

7.22.3.1 Shags were not recorded in the Study Area, with all shag records being close to the coast at the edge of the Survey Area. Shags are amber listed in BoCC5, and not a feature of any SPA within foraging range of the Study Area (see figures in Section 18 of Annex 14.1.3, Volume 2c), with only low numbers (less than 10 birds per survey) recorded. Therefore, it is considered highly unlikely that impacts associated with the Offshore Project will occur on Shags.

7.22.3.2 Shags are therefore not considered for further assessment in relation to impacts associated with the Offshore Project.

7.23 OTHER SPECIES

7.23.1.1 A small number of other species were observed in small numbers in the Study Area. These observations are summarised in Table 7-36. Given the infrequency of these observations and the small numbers involved, these species are not considered to be VORs as defined within this report. However, it should be noted that this appendix relies primarily on DAS data and other similar surveys.

7.23.1.2 Unidentified storm petrel species were recorded in the Study Area (Table 7-36). These records are assumed to represent either European storm petrel or Leach's storm petrel; however, as no individuals were identified to species level, apportionment to a particular species was not possible. For this reason, and consistent with the treatment of other species observed only occasionally and in small numbers, storm petrels have not been identified as VORs within this assessment.

Table 7-36 Summary of other species observed in study area.

Species	Survey(s) Detected	Study Area Estimated Abundance	Turbine Area Estimated Abundance
Curlew	May 2023	17	18
Sooty shearwater	September 2022	9	9
	August 2023	9	9
	September 2023	9	9
Storm petrel spp.	July 2022	8	0
	September 2022	102	17
	August 2023	9	9

8 IDENTIFICATION OF VALUED ORNITHOLOGICAL RECEPTORS

8.1.1.1 Section 7.1 outlines the criteria used to determine the conservation value of all species relevant to the Study Area. Based on the information in Table 5-1 regarding the sensitivity of different species to recognised OWF impacts, and the results presented in each species account in Section 7, a group of key species, listed below, has been identified as VORs and will be taken forward for further assessment within Chapter 14, Volume 2a:

- Kittiwake;
- Great black-backed gull;
- Herring gull;
- Arctic tern;
- Guillemot
- Razorbill;
- Black guillemot;
- Puffin;
- Red-throated diver;
- Great northern diver;
- Fulmar;
- Manx shearwater;
- Gannet.

8.1.1.2 All other species of ornithological receptor are not classified as a VOR within this appendix. However, as noted in Section 7.1, species that are not identified as a VOR in this appendix will still be considered for impact assessment where appropriate. In particular, a separate assessment has been carried out to consider collision risk on migratory birds (Appendix 14.3, Volume 2c), noting that many migratory birds travel in pulses or at night, and therefore are likely to be poorly represented by DAS data. It is anticipated that this approach will include further consideration of petrels, skuas and migratory waterbirds.

9 GLOSSARY OF TERMS AND ABBREVIATIONS

9.1.1.1 A list of key terms and acronyms used in this appendix are provided in Table 9-1 and Table 9-2.

Table 9-1 Acronyms and abbreviations

Term	Definition
BDMPS	Biologically Defined Minimum Population Scale
BoCC5	The 5th Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man
BTO	British Trust for Ornithology
CIEEM	Chartered Institute of Ecology and Environmental Management
CV	Coefficient of Variation
DAS	Digital Aerial Surveys
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ESAS	European Seabirds At Sea
GIS	Geographic Information System
HPAI	Highly Pathogenic Avian Influenza
HRA	Habitats Regulations Appraisal
JNCC	Joint Nature Conservation Committee
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MRSea	Marine Renewables Strategic Environmental Assessment (R package)
OCAS	Offshore Cable Area of Search
OSP	Offshore Substations Platform
OWF	Offshore Wind Farm
RIAA	Report to Inform Appropriate Assessment
SALSA	Spatially Adaptive Local Smoothing Algorithm
SNCBs	Statutory Nature Conservation Bodies
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
UK	United Kingdom
UXO	Unexploded Ordnance
VOR	Valued Ornithological Receptors
WTG	Wind Turbine Generator

Table 9-2 Glossary

Term	Meaning
Array Area	The offshore area within which the offshore wind turbine generators (WTGs), associated foundations, Offshore Cables, and Offshore Substation Platform (OSP) (if required), will be located. This area encompasses the Turbine Area that will contain all above water surface infrastructure (WTGs/OSP) and an additional area within which further below water infrastructure (foundations and cables) may also be located.
'Commic' tern	Either a common tern or an Arctic tern.
Distance sampling	A general statistical approach that aims to estimate the true density/abundance of a species from survey data where that data is known to have imperfect detection.
Landfall	This consists of works from offshore Horizontal Directional Drill (HDD) exit pits (located below MLWS) to onshore at the Transition Joint Bays (TJB) (located above MHWS). The infrastructure and installation methods associated with the Landfall involves both onshore and offshore components.
MRSea	An R package used to model the abundance of species from survey data.
Non-parametric bootstrap	A statistical technique that resamples raw data points to estimate variability parameters.
Parametric bootstrap	A statistical technique that resamples model parameters to estimate variability parameters.
Offshore Cable Area of Search	The area within which the offshore electrical and communication cables between the Array Area and Landfall up to Mean High Water Springs (MHWS) will be located.
Offshore Ornithology Study Area	The area over which potentially significant impacts from the Offshore Project have the most potential to occur to ornithological receptors, consisting of the Turbine Area plus a 4 km buffer (excluding land).
Offshore Ornithology Survey Area	The area covered by DAS, consisting of the ScotWind N4 site plus a 10 km buffer (excluding land).
Offshore Project	The components of the Spiorad na Mara offshore wind farm (the Project) located seaward of Mean High Water Springs (MHWS).
SALSA	An algorithm for fitting a spline-based regression to two-dimensional data using an adaptive knot-selection.
Turbine Area	A reduced area within the Array Area where above water surface infrastructure would be located i.e. wind turbine generators (WTG) and Offshore Substation Platform (OSP) (if required). This area has been developed and refined through stakeholder engagement and environmental assessment.

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