Partners in UK offshore wind

MONA OFFSHORE WIND PROJECT

Preliminary Environmental Information Report

Volume 6, annex 10.1: Offshore ornithology baseline characterisation

Image of an offshore wind farm

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Glossary

Term	Meaning
Bootstrapping	Bootstrapping is a statistical procedure that resamples a single dataset to create many simulated samples.
Confidence Interval	A confidence interval displays the probability that a parameter will fall between a pair of values around the mean.
Design-based Abundance Estimates	An estimated total abundance of birds within a given area. The design-based method is based on the premise that the portion of the study area that is surveyed is representative of the remainder of the study area.
MRSea	Statistical package to model spatial count data and predict spatial abundances. Package has been developed by the Centre for Research into Ecological and Environmental Modelling (CREEM) specifically for dealing with data collected for offshore wind farm projects.

Acronyms

Term	Meaning
AON	Apparently Occupied Nest
AOS	Apparently Occupied Site
CCW	Countryside Council for Wales
CMACS	Centre for Marine and Coastal Studies
CV	1) Coefficient of Variation (statistics) 2) Cross-Validation (statistics)
ESAS	European Seabirds at Sea (database)
GAM	Generalised Additive Model (statistics)
GPS	Global Positioning System
GSD	Ground Sampling Distance
JNCC	Joint Nature Conservation Committee
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MRSea	Marine Renewable Strategic environmental assessment
PEIR	Preliminary Environmental Information Report
QAIC	Quasi-Akaike Information Criterion (statistics)
QBIC	Quasi-Bayesian Information Criterion (statistics)
SALSA	Spatially Adaptive Local Smoothing Algorithm (statistics)
SD	Standard Deviation (statistics)
SMP	Seabird Monitoring Programme (database)
SNCB	Statutory Nature Conservation Body
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
UD	Utilisation Distribution
WWT	Wildfowl & Wetlands Trust

Units

Unit	Description
°C	Degrees Centigrade
cm	Centimetres
km	Kilometres
km^2	Square kilometres (area)
m	Metres

1 Offshore ornithology baseline characterisation

1.1 Introduction

1.1.1 Background

1.1.1.1.1 Mona Offshore Wind Limited (the Applicant), a joint venture of bp Alternative Energy investments (hereafter referred to as bp) and Energie Baden-Württemberg AG (hereafter referred to as EnBW) is developing the Mona Offshore Wind Project. The Mona Offshore Wind Project is a proposed offshore wind farm located in the east Irish Sea.

1.1.1.2 The Mona Array Area covers 449.97km^2 and is located 28.2km from the Anglesey coastline, 39.9km from the northwest coast of England, and 42.3km from the Isle of Man.

1.1.1.3 The Mona Offshore Wind Project is within the foraging range of several seabird species nesting at colonies designated as Special Protection Areas (SPAs) (qualifying as an individual species and/or within an assemblage of species). The Mona Offshore Cable Corridor, including landfall, is also within or adjacent to SPAs supporting qualifying individual species or assemblages of waterbirds during the non-breeding season.

1.1.1.4 This technical annex details the findings of the desktop review and site-specific bird digital aerial surveys carried out to date in the Mona Offshore Ornithology Array Area study area and the Mona Offshore Ornithology Offshore Cable Corridor study area. The report describes the methods used to characterise the baseline conditions (i.e. abundance and distribution of seabirds and other bird groups found in the offshore environment) and presents the results of the desk-based studies and the site-specific digital aerial surveys undertaken to date at the Mona Offshore Wind Project, which comprise digital aerial surveys carried out monthly between March 2020 and February 2022 inclusive.

1.1.1.5 The report characterises the baseline distribution and abundance of seabirds seaward of Mean Low Water Springs (MLWS), and thus excludes waterbirds using the intertidal habitats (above MLWS). The baseline characterisation of waterbirds is included in volume 7, annex 24.2: Intertidal ornithology of the PEIR. Waterbirds at the landfall are subject to a monitoring programme of abundance and distribution, with the survey area extending up to 1.5km seaward from Mean High Water Springs (MHWS). For this annex to the PEIR, results from the intertidal waterbird surveys are not available for presentation. For the Environmental Statement, the baseline characterisation report will draw on the nearshore results from the ongoing waterbird surveys once the data collection is completed.

1.1.1.6 For the purpose of this annex, 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, seaducks and divers and grebes are also included because of their additional reliance on marine areas, especially in the non-breeding season.

1.1.2 Study area

1.1.2.1 There are two study areas for the Mona Offshore Ornithology Environmental Impact Assessment (EIA). These are:

- The Mona Offshore Ornithology Array Area study area: this includes the Mona Array Area plus a buffer extending 4km to 10km (Figure 1.1). This area was defined by the extent of the digital aerial bird surveys. Due to the changes in the proposed Mona Array Area since the design of the digital aerial survey in spring 2020, the Mona Offshore Ornithology Array Area study area does not extend fully to 10km in all directions around the current Mona Array Area assessed in this PEIR. However, it mostly covers the 10km buffer and consistently exceeds 4km
- The Mona Offshore Ornithology Offshore Cable Corridor study area: this encompasses the Mona Offshore Cable Corridor running between the landfall area on the Welsh Coast and the Mona Array Area, plus a 4km buffer (Figure 1.1). Part of the Mona Offshore Ornithology Offshore Cable Corridor study area has been covered by the digital aerial bird surveys.

1.1.2.2 There are several protected sites designated for marine and coastal waterbirds with connectivity to the Mona Offshore Wind Project. Nature conservation designations with relevance to birds comprise SPAs within the National site network in the UK and the Natura 2000 network of European sites in the Republic of Ireland, Ramsar sites, and national (e.g. Sites of Special Scientific Interest (SSSIs)) and regional designations.

1.1.2.3 There are no current or proposed designated sites within the Mona Array Area. There are, however, a number of SPAs along the west British coastline and east and north coastlines of Ireland and Northern Ireland that support qualifying species that have been recorded during the site-specific digital aerial surveys for the Mona Offshore Wind Project. Figure 1.2 shows the designated sites (international and national) with relevant ornithology features that are within 100km of the Mona Array Area and likely to be given consideration within the assessment. This is not an exhaustive representation of all designated sites with connectivity to the Mona Offshore Wind Project.

1.1.2.4 It is considered that there is the potential for an impact on breeding seabird colonies if the wind farm is located within the regular foraging range of the species. In the absence of specific information on the foraging patterns of breeding birds, Natural England (2022), in the guidance document: *Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards*, recommends that connectivity is established by the mean maximum (plus one standard deviation (+1 S.D.)) foraging range reported in Woodward *et al*. (2019). Identification of SPAs with breeding seabird interest with potential connectivity to the Mona Array Area is presented in Table 1.7.

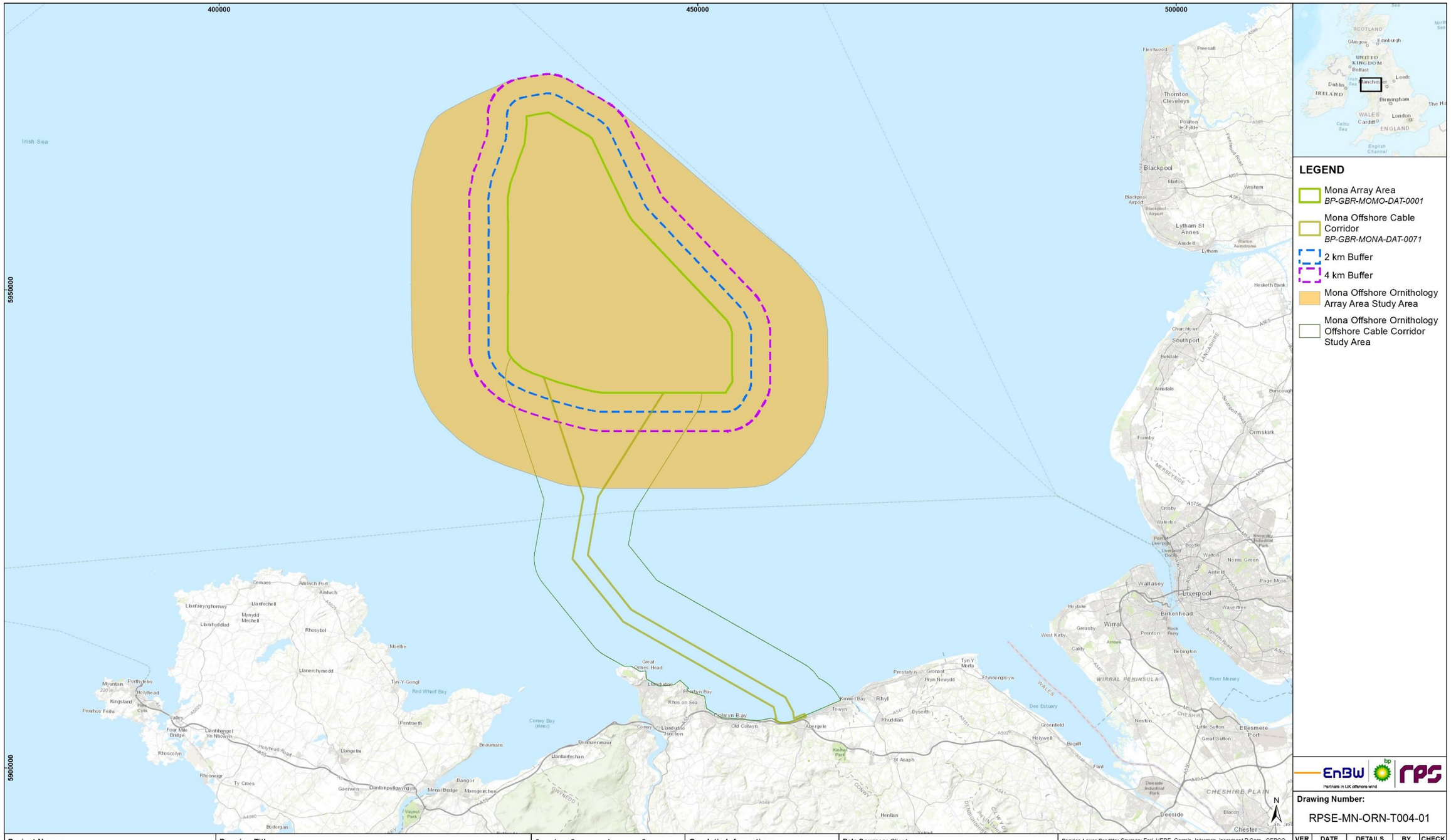

Figure 1.1: Mona Offshore Ornithology Array Area study area and Mona Offshore Ornithology Offshore Cable Corridor study area.

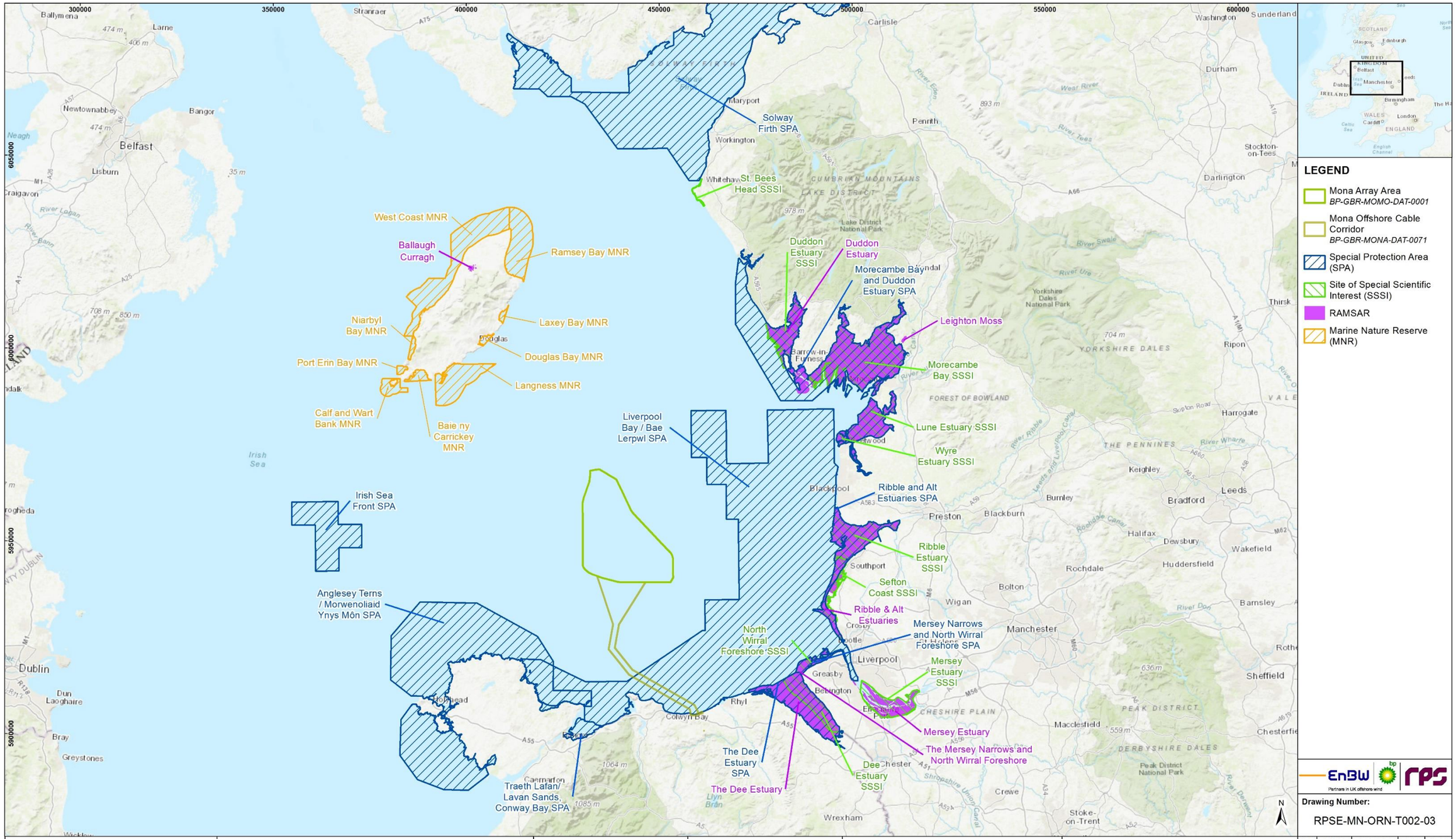

Figure 1.2: Boundaries for protected sites designated for seabirds and coastal birds within 100km of the Mona Array Area.

1.2 Methodology

1.2.1 Desktop review of data sources

1.2.1.1 Evidence sources and existing datasets have been reviewed to define the seabird baseline and support the findings of the site-specific digital aerial surveys. Both scientific and grey literature were reviewed, and the subsequent data sources relevant to the Mona Offshore Wind Project identified. Peer-reviewed scientific literature examining seabird distribution and abundance in UK waters was included and grey literature was searched for unpublished reports documenting seabird distribution and abundance. This included survey data collected as part of offshore renewables developments (searched through Marine Data Exchange website (www.marinedataexchange.co.uk)), and survey data from surveillance monitoring undertaken by the Statutory Nature Conservation Bodies (SNCBs).

1.2.1.2 The data that have been collected and used to inform this baseline characterisation annex are summarised in Table 1.1. This includes a description of the data sources, the spatiotemporal coverage of the dataset across the project area, and any key limitations and assumptions.

Table 1.1: Summary of key desktop datasets and reports.

Source/Reference	Description	Data source	Date	Site Coverage	Limitations & Assumptions	Source/reference
Cleasby *et al*. (2020)	Identifying important at-sea areas for seabirds using species distribution models and hotspot mapping for four seabird species: black-legged kittiwake, common guillemot, razorbill and European shag.	Tracking data	May to July, (2010 to 2014)	Some overlap with the Mona Offshore Ornithology Array Area study area but provides information on birds in the wider context of the site.	Only four species analysed and presented	Cleasby *et al*. (2020)
Waggitt *et al*. (2020)	Distribution maps of cetacean and seabird populations in the northeast Atlantic.	Aerial and vessel survey data	1980 to 2018	Northeast Atlantic wide coverage and complete overlap with the Mona Offshore Ornithology Array Area study area.	10km resolution	Waggitt *et al*. (2020)
Wakefield *et al.* (2017)	Breeding density, fine-scale tracking, and large-scale modelling reveal the regional distribution of four seabird species.	Tagging data	2010 to 2014	Some degree of overlap of predicted density in the Mona Offshore Ornithology Array Area study area and wider Irish Sea.	Coarse scale and restricted to four species during the breeding season	Wakefield *et al.* (2017)
Bradbury *et al.* (2014)	SeaMaST provides evidence on the use of sea areas by seabirds and inshore waterbirds in English territorial waters, mapping their relative sensitivity to offshore wind farm developments.	Boat and aerial surveys	1979 to 2012	Complete overlap with the Mona Offshore Ornithology Array Area study area	English territorial waters at a resolution of 3km	Bradbury *et al.* (2014)
Existing offshore wind farm grey literature	Information obtained from several offshore wind farm applications (Awel y Môr, Rhiannon, Ormonde, Walney, West of Duddon Sands, Gwynt y Môr and Burbo Bank)	Boat-based and aerial surveys	Various dates	Some degree of overlap of predicted density with the Mona Offshore Ornithology Array Area study area and wider east Irish Sea.	Interpretation of the data	Existing offshore wind farm grey literature
JNCC Seabird Monitoring Programme	Seabirds Count and the Seabird Monitoring Programme	Bird counts at breeding colonies	1986 to 2021	Count data at breeding colonies that may have connectivity with the Mona Offshore Ornithology Array Area study area.	Data may be several years old or incomplete for some colonies.	JNCC (2021)
Cranswick *et al.* (2004)	Aerial visual surveys of common scoter. Surveys undertaken by WWT on behalf of the Countryside Council for Wales (CCW).	Visual aerial surveys	2002 to 2003	Coverage limited to inshore areas of the Mona Offshore Ornithology Array Area study area	Common scoter only	Cranswick *et al.* (2004)
Webb *et al.* (2006)	An assessment of the numbers and distributions of inshore aggregations of waterbirds using Liverpool Bay during the non-breeding season in support of possible SPA identification.	Visual aerial surveys	2000 to 2003	Liverpool Bay	Divers and common scoters only	Webb *et al.* (2006)

Source/Reference	Description	Data source	Date	Site Coverage	Limitations & Assumptions	Source/reference
Lawson *et al.* (2016)	Results from eight seasons of aerial observer surveys of the Liverpool Bay region, used to inform the extension to the Liverpool Bay SPA.	Aerial surveys	2001 to 2011	Coverage limited to inshore areas	No coverage of the Mona Array Area.	Lawson *et al.* (2016)
Mackey and Giménez (2006)	Data Report for offshore seabird populations	European Seabirds at Sea (ESAS) dataset	1979 to 2003	Strategic Environmental Assessment (SEA) – Zone 6 (Irish Sea)	Coarse resolution-distribution and density produced for each Strategic Environmental Assessment (SEA).	Mackey and Giménez (2006)
BirdLife International (2022)	Interface to view seabird tracking database	Seabird tracking data	Various dates	Some overlap of seabird tracks with the Mona Array Area.	Download of GPS tracking data subject to approval from data owner.	BirdLife International (2022)

1.2.2 Mapping seabirds at sea data sources

1.2.2.1 Supplementary material from Waggitt et *al.* (2020) and Bradbury *et al.* (2014) was used to produce maps showing the spatial variation in densities across seasons in the Mona Offshore Ornithology Array Area study area and the Mona Offshore Ornithology Offshore Cable Corridor study area. The spatial coverage of both datasets overlapped with the Mona Array Area.

1.2.2.2 Waggitt et *al*. (2020) have developed an approach to produce distribution maps for 12 seabird species at 10km and monthly resolution in the northeast Atlantic. Bradbury *et al*. (2014) analysed offshore boat and aerial observer surveys spanning from 1979 to 2012 to produce predicted bird densities across a grid covering English territorial waters at a resolution of 3×3km. Monthly relative densities were available in raster and shapefile format, for Waggitt *et al.* (2020) and Bradbury *et al*. (2014) respectively. Using the raster files from Waggitt *et al*. (2020), monthly raster displaying number of individuals per km^2 were aggregated into biological season (breeding and non-breeding) as defined by Furness (2015). The seasonal split for each species (breeding and non-breeding) is shown in Table 1.2.

1.2.2.3 Average density per season was mapped in QGIS. For several key seabird species, the spatial variation in densities was shown at a 10×10km resolution, for an area which included the Mona Array Area, the 2km, 4km and the 10km buffer zones. Great black-backed gull *Larus marinus* could not be presented given that the species is not included in the analysis carried out by Waggitt *et al.* (2020). For all key species, the monthly abundance for each zone was produced using the 10×10km tiles displaying densities.

1.2.2.4 Seasonal predicted densities were already available in a shapefile format in Bradbury *et al.* (2014) and were mapped using QGIS. The seasonal split in Bradbury *et al*. (2014) differed to the approach that was followed for visualising the Waggitt *et al*. (2020) data. Bradbury *et al.* (2014) split seasons as followed: summer (April to September) and winter (October to March). Therefore, there must be a degree of caution when interpreting and comparing seasonal variation findings between Bradbury *et al.* (2014) and Waggitt *et al*. (2020).

1.2.2.5 In addition to the seasonal split, the Waggitt *et al*. (2020) study is based on data collected from 1980 to 2018, whilst Bradbury *et al.* (2014) included data collected from 1979 to 2012. Furthermore, the spatial resolution differed between the two studies – ranging from 3×3km in Bradbury *et al.* (2014) to 10×10km in Waggitt *et al*. (2020).

Table 1.2: Annual life cycle across months for key species.

Species	J	F	M	A	M	J	J	A	S	O	N	D
Herring gull *Larus argentatus*												
Lesser black-backed gull *Larus fuscus*												
Northern fulmar *Fulmarus glacialis*												
Black-legged kittiwake *Rissa tridactyla*												
Common guillemot *Uria aalge*												
Razorbill *Alca torda*												
Atlantic puffin *Fratercula arctica*												
Manx shearwater *Puffinus puffinus*												
Northern gannet *Morus bassanus*												
Key:	Breeding						Non-breeding					

1.2.3 Site-specific digital aerial survey

Survey summary methodology and survey area

1.2.3.1 Digital aerial surveys for seabirds have been undertaken by APEM in the Mona Offshore Ornithology Array Area study area. There have been changes in the proposed Mona Array Area since the design of the digital aerial survey therefore the buffer does not extend out to 10km from the whole of the Mona Array Area, as explained above in section 1.1.2.1. Digital aerial surveys commenced in March 2020 and concluded in February 2022, completing a suite of 24 monthly surveys spanning two years.

1.2.3.2 The digital aerial survey method was designed to optimise the data collection for ornithology and marine mammals by using a grid-based collection method with 30% of the sea surface collected and at least 12% analysed conforming with current industry best-practice. Studies have been undertaken which suggest that baseline surveys should collect a minimum of 10% coverage (BSH, 2013). It is important to note that this study was in relation to transect-based surveys, and it has been suggested that due to the high number of replicates achieved from grid-based surveys this method requires less coverage compared to transect-based surveys (Coppack *et*

al. 2017; Weidauer *et al*. 2016). Due to the lack of historic data within the survey area, the survey design process relied on similar projects which been previously agreed by statutory nature conservation bodies (SNCBs) as suitable for baseline characterisation. Two examples include Norfolk Boreas which analysed an 8% grid and Gwynt y Môr which analysed a 12% grid. From analysis done so far on the aerial survey data for the Mona Offshore Wind Project, calculations from effort data demonstrate for the Mona Offshore Ornithology Array Area study area, the mean area actually processed was 15.2% (± 0.12%) (figures in parentheses are standard errors). These values are higher than the 10% previous minimum coverage suggested by literature (BSH, 2013) and coverage accepted by previous projects.

1.2.3.3 APEM's bespoke camera system was fitted into a twin-engine aircraft, and custom flight planning software allowed each flight line to be accurately mapped for use before and during the flight. The camera system captured abutting still imagery along 18 survey lines which were spaced approximately 2km apart. The aircraft collected the data at an altitude of approximately 396m, and a speed of approximately 120 knots (kn).

1.2.3.4 The images were reviewed by appropriately experienced/qualified analysts to enumerate birds to species level, where possible. Internal quality assurance was undertaken to check for missed targets and to ensure the correct species were identified. Birds identified from the images were 'snagged' (i.e. located within the images) and categorised to the lowest taxonomic level possible. Images were always viewed by a minimum of two members of staff as part of a comprehensive internal quality assurance (QA) process.

1.2.3.5 The direction of birds in flight were recorded from all digital still images. This was undertaken by measuring the axis of bill to tail, within bespoke image analysis software, taking the bearing relative to the bird's head. This bearing was linked to the geo-referenced image and thus provided an accurate representation of bird orientation at time of image capture. This data can be used to explore the predominant flight direction of each species during a digital aerial survey or during a season by the creation of circular statistic outputs termed 'rose diagrams'.

1.2.3.6 All digital aerial surveys were undertaken in weather conditions that did not compromise the ability to provide data on the identification, distribution and abundance of bird species and marine megafauna within the survey area. Favourable conditions for surveying are defined by APEM as a cloud base of >396m, visibility of >5km, wind speed of <30kn and a sea state of no more than Beaufort force 4 (moderate). For health and safety reasons, no digital aerial surveys were to be undertaken in icing conditions.

1.2.3.7 Measures were taken to minimise glint and glare (strong reflected light off the sea), that makes finding and identifying bird species and marine megafauna more difficult. On days with minimal cloud, digital aerial surveys were avoided for two hours around midday. This reduced the risk of collecting images that are difficult to analyse.

1.2.3.8 The dates, start and end times for each digital aerial survey are provided in Table 1.3 with the corresponding weather conditions reported in Table 1.4.

Table 1.3: Date and start/end times (Coordinated Universal Time) for each flight for the March 2020 to February 2022 digital aerial surveys.

Survey No.	Date	Flight No.	UTC Start Time (HH:MM)	UTC End Time (HH:MM)
1	28/03/2020	1	12:12	15:42
1	28/03/2020	2	17:04	17:14
2	17/04/2020	1	06:32	07:10
2	17/04/2020	2	13:19	17:03
3	05/05/2020	1	07:39	11:12
3	05/05/2020	2	13:23	15:36
4	08/06/2020	1	08:00	09:14
4	08/06/2020	2	14:57	17:49
5	06/07/2020	1	12:40	16:50
6	11/08/2020	1	07:34	11:29
7	01/09/2020	1	09:24	13:16
8	14/10/2020	1	09:55	12:54
8	14/10/2020	2	14:33	15:38
9	04/11/2020	1	09:59	13:18
9	04/11/2020	2	14:47	15:55
10	09/12/2020	1	09:33	13:16
11	04/01/2021	1	11:19	15:04
12	01/02/2021	1	11:00	14:08
13	12/03/2021	1	11:52	16:28
14	01/04/2021	1	13:11	17:40
15	06/05/2021	1	07:20	11:40
16	08/06/2021	1	08:29	11:50
16	08/06/2021	2	13:01	15:25
17	05/07/2021	1	12:30	16:56
18	09/08/2021	1	08:40	13:48
19	02/09/2021	1	09:01	14:15
20	06/10/2021	1	10:32	14:43
21	03/11/2021	1	10:00	14:19
22	02/12/2022	1	08:43	13:32
23	11/01/2022	1	08:56	13:32
24	09/02/2022	1	10:42	15:00

Table 1.4: Weather conditions during all digital aerial surveys from March 2020 to February 2022.

[1] = Calm (Glassy), 1 = Calm (Rippled), 2 = Smooth, 3 = Slightly Moderate, 4 = Moderate

[2] = Clear, 1 = Slightly Turbid, 2 = Moderately Turbid, 3 = Highly Turbid

[3] = Clear, 1 to 10 = Few, 11 to 50 = Scattered, 51 to 95 = Broken, 96 to 100 = Overcast

Survey no.	Date	Visibility (km)	Sea State[1]	Glint / Glare (%)	Turbidity[2]	Cloud (%)[3]	Air Temp (ºC)	Wind Speed (kn)/Direction
01	28/03/2020	10+	0	<10	1	60	0 to 1	10 to 20/NE
02	17/04/2020	10+	2 to 4	0 to 40	1	50 to 100	4 to 7	20 to 25/E–SE
03	05/05/2020	10+	2 to 4	0 to30	1	0 to 50	8 to 15	15 to 20/SE
04	08/06/2020	10+	1 to 2	0 to 20	0 to 1	0 to 100	9 to 10	5 to 10/SE to W
05	06/07/2020	10+	1 to 3	<10	0.5	10	11	12 to 25/NW
06	11/08/2020	7 to 10+	0	0 to 10	0	100	20	8 to 20/SE
07	01/09/2020	10+	1	-	1	1 to 50	13	6 /SE
08	14/10/2020	10+	1	0 to 10	1 to 2	5 to 40	10 to 12	10 to 20/NE to E
09	04/11/2020	10+	1	-	1	11 to 95	8 to 10	15 to 25/NW
10	09/12/2020	10+	1 to 2	0 to 5	2	90 to 100	2 to 4	14 to 16/SW
11	04/01/2021	10+	2 to 3	0	1	30 to 100	4	10 to 18/N to NNE
12	01/02/2021	10+	1	0	1	75 to 100	1	15 to 20/ESE
13	12/03/2021	10+	2 to 3	0	2	50 to 100	11	35/W
14	01/04/2021	10+	2	5	0	0 to 100	6 to 16	17 to 23/SE
15	06/05/2021	10+	1.5	0	1 to 2	20	3	22 to NNW
16	08/06/2021	10+	1	0 to 30	2	50 to 75	16 to 22	5 to 10/SW
17	05/07/2021	10+	1 to 2	0 to 40	1	20 to 40	10	10/SW
18	09/08/2021	10+	2 to 3	0 to 100	1 to 2	30 to 100	8	10/WNW
19	02/09/2021	10+	1	0 to 30	1	100	11	15 to 19/ENE
20	6/10/2021	5 to 10+	1	0	1.5	0	10 to 12	15/NW
21	3/11/2021	15+	3	0 to 25	1	45 to 80	6 to 7	15 to 22/N to NNE
22	02/12/2021	10+	2 to 3	0 to 10	1 to 2	10 to 40	2 to 3	15 to 20/N
23	11/01/2022	10+	1	0	2	20 to 60	2	10/NNW
24	09/02/2022	10+	1	0 to 20	2	10 to 50	4	15 to 26/SW

Abundance estimates

Model-based approach

1.2.3.9 All available digital stills high resolution data collected between March 2020 and February 2022 were utilised in the initial model building stage. The MRSea package was used to predict numbers across the survey area alongside 95% confidence intervals derived from 1,000 bootstraps to provide a range of uncertainty predicted by the model.

1.2.3.10 MRSea is a modelling package executable in the R environment (R Core Team, 2021) based on the generalised additive model framework (GAM), fitting splines through 1- and 2-dimensional data. MRSea was specifically developed to provide a robust tool for estimating the impact of infrastructural developments on bird populations. The advantage of using MRSea over design-based approaches is two-fold: MRSea can handle missing segments and transects better than design-based approaches by using a 2-dimensional Spatially Adaptive Local Smoothing Algorithm (SALSA) (Scott-Hayward *et al.*, 2014); Other environmental covariates (e.g. bathymetric data) can be implemented in the model to further enhance the precision of the abundance and density estimates.

1.2.3.11 The basic model to explain bird abundance had the following form: *Species Count ~ Month + offset(log(area)), family=quasipoisson.*

1.2.3.12 In the first (1-dimensional) stage, the basic model was expanded to include water depth, distance to coast, and bathymetric slope as both linear and smoothed explanatory variables. To reduce autocorrelation, the transects within each survey were used as a blocking structure in the model. In the second (2-dimensional) stage, the x-y coordinates were fitted to the best model from stage 1 using SALSA, and with "Survey date" as an interaction term, allowing for different density surfaces to be estimated for each digital aerial survey. For the model to run properly, a minimum number of birds is required in each month, and it was determined that a minimum of 50 was required to produce sensible outputs. This means that for some species in some months, no distribution maps were generated. These are in grey in section 1.3.3.

1.2.3.13 The best models were selected using tenfold Cross Validation (CV), as this method is considered the gold standard compared to using information criteria like the QAIC and QBIC.

1.2.3.14 All bird behaviours (flying and sitting) were included in this analysis. Therefore, an assumption is made that flying and sitting birds do not differ in their distributions within the survey area. Because a staged approach was used, the model also made certain assumptions about the data in the second stage. The most important assumption was that the effects of environmental covariates was common to all months of data. Note that this does not imply that the relative distribution of birds is the same across all months, because the density landscape is altered for each month in stage 2 by the 2-dimensional model by using month as an interaction term.

1.2.3.15 The final model for each species was used to predict the numbers and densities of birds across an environmental grid within the Mona Offshore Ornithology Array Area study area, which spanned the Mona Array Area with associated 2km and 4km boundaries, as well as the entire digital aerial survey area. Each grid cell in the environmental grid contained an area of 0.1276km^2, which was the smallest resolution available from the bathymetric data. Results are presented in the form of density maps

and monthly tables (population size with confidence interval), the latter of which were compared to design-based estimates to further validate the MRSea models.

1.2.3.16 It was only possible to run MRSea for five focal species (Table 1.5), because the spatial model can run into issues when data is too sparse. It was found that when there were at least 50 observations in a single survey, models tended to perform well (Table 1.5). Below this threshold, design-based abundance estimates were produced for all species observed between March 2020 and February 2022.

Table 1.5: Number of sightings within the survey area per month for species modelled using MRSea.

Month	Common guillemot	Manx shearwater	Black-legged kittiwake	Razorbill	Northern gannet
28/03/2020	1,806	7	355	540	38
17/04/2020	202	0	63	18	19
05/05/2020	42	0	10	22	8
08/06/2020	262	19	121	15	13
06/07/2020	138	465	60	35	101
11/08/2020	219	22	21	20	78
01/09/2020	90	10	20	70	43
14/10/2020	64	0	6	15	41
04/11/2020	44	0	171	6	23
09/12/2020	0	0	102	0	1
04/01/2021	38	0	133	8	5
01/02/2021	284	0	99	226	0
12/03/2021	315	2	614	180	126
01/04/2021	991	15	213	68	88
06/05/2021	84	0	54	3	28
08/06/2021	262	1,269	91	8	38
05/07/2021	412	552	307	12	53
09/08/2021	85	138	2	22	67
02/09/2021	27	54	4	3	113
06/10/2021	355	0	22	8	58
03/11/2021	51	0	78	6	11
02/12/2021	512	0	353	89	2
11/01/2022	812	0	276	81	3
09/02/2022	330	0	334	88	6

Apportioning of unidentified species

1.2.3.17 For the majority of digital aerial surveys, there was a proportion of seabirds that were recorded, but not identified to species level. In the case of 'unidentified' seabirds within similar species groups, seabirds are apportioned to the individual species that make up that group. For example, in the case of unidentified common guillemot/razorbill, they were apportioned to razorbill and common guillemot recorded during the digital aerial surveys and apportioning was based on the proportion of seabirds identified to species level within the same survey.

1.2.3.18 There was a total of five broader groups that needed to be apportioned to known species. Explained verbally, the basic idea is that the known (relative) species estimates for each survey month need to increase by proportionally assigning the numbers of the unknown species groups to each of the relevant known species. In formula form, for each known species i and month j, this additional proportion can be written as: $\sum(\text{Proportion})ij = \sum(\text{Unknown})ij / \sum(\text{Known})ij$.

1.2.3.19 The elegance of this analysis lies in the fact that each species will have a single proportional increase assigned to it for each survey month across all unapportioned groups that it belongs to. These proportions can simply be summed to get the total proportional increase. For example, both common guillemot and razorbill numbers are increased by apportioning 'auk/shearwater species', 'auk species' and 'common guillemot/razorbill' to them. Because common guillemot and razorbill belong to the exact same unknown groups, their proportional increase from the apportioning analysis will be the same.

1.2.3.20 For example, a month with 1,200 'common guillemot/razorbill', 200 of which are unknown, 900 identified common guillemot, and 100 identified razorbill. Applying the formula leads to a proportion of: 200 (unknown)/(900 common guillemot + 100 razorbill) = 0.20. Thus, both razorbill and common guillemot need to be increased by 0.20 (or multiplied by 1.20), which leads to an absolute estimate of 900*1.20=1,080 common guillemot and 100*1.2=120 razorbill. The 200 unknown birds have thus been apportioned to razorbill and common guillemot.

1.2.3.21 If the same month had a total of 1,700 auks, comprising the 1,200 birds mentioned above, plus 300 individuals of an unknown species (i.e. common guillemot, razorbill, or Atlantic puffin) and 200 Atlantic puffin, applying the formula again this leads to a proportion of: 300 (unknown)/(900 common guillemot + 100 razorbill + 200 Atlantic puffin) = 0.25.

1.2.3.22 Following the original formula, the proportions from 'common guillemot/razorbill' and 'auk species' can now be summed, leading to a proportional increase of 0.20+0.25=0.45 (or multiply by 1.45) for guillemot and razorbill, and 0+0.25 for Atlantic puffin. This results in 900*1.45=1,305 common guillemot, 100*1.45=145 razorbill, and 200*1.25=250 puffin. Both 'common guillemot/razorbill' and 'auk species' have now been apportioned, as 1,305+145+250=1,700.

1.2.3.23 This process is repeated for each of the five unknown groups.

Correction factors to account for availability bias

1.2.3.24 There is an assumption that all seabirds, above the water, are detected during the aerial survey. However, some seabirds (e.g. auks) are not always visible as they spend time foraging beneath the water surface. To account for this, the proportion of

time spent on the sea surface needs to be measured and estimates corrected accordingly (Thaxter and Burton, 2009). This is known as availability bias, which can be accounted for by applying a correction factor based on known times spent under water. To calculate the absolute estimate from the relative estimates, the numbers of seabirds observed in the digital aerial surveys are divided by the proportion of time that a bird is expected to be visible at the surface.

1.2.3.25 Availability bias is not known for every species, but is negligible for gulls and terns, as these species spend little time under water. For Northern gannet, although there is no availability bias, there is good information on their foraging patterns. From the available literature (Garthe *et al*., 2000, 2003, 2007, 2014; Grémillet *et al*., 2006), Northern gannet dive on average 2.71 to 4.63 times per hour spent flying, with a mean time spend under water ranging from 6.0 to 10.9 seconds among studies. Therefore, gannets are likely to spend <1% of their foraging time submerged, meaning availability bias is limited for this species. As such, it was not considered necessary to adjust the relative numbers of Northern gannet for availability bias in this report.

1.2.3.26 The correction factors applied to sitting common guillemot, razorbill, and puffin were based on JNCC (2013), which assumed that 24.3% of common guillemot, 17.4% of razorbill, and 14.2% of puffin are underwater when digital aerial imagery is captured, leading to correction factors of 1.311, 1.211, and 1.165 respectively. Availability bias correction factors were only applied to estimates of abundance of birds sitting on the sea surface and were not applied to seabirds in flight.

1.2.3.27 Availability bias is corrected for by applying the above correction factors to sitting auks (excluding other behaviours) using the following formula: (Absolute birds) = (Relative birds * pr(sitting) / pr(visible)) + (Relative birds * (1-pr(sitting))).

1.2.3.28 For example, if it was estimated from the visible data (relative number) that there were 1,000 guillemots in an area, 900 of which were sitting, it would result in an adjusted absolute number of: (1,000 * 0.90 * 1.311) + (1,000 * (1-0.90)) = (900 * 1.311) + (1,000 * 0.10) = 1,180 + 100 = 1,280.

Design-based approach

1.2.3.29 Design-based estimates for bird numbers and densities in each month were generated and compared to the MRSea estimates to provide additional validation of the MRSea outputs. Furthermore, design-based estimates were produced for all species recorded during the digital aerial surveys.

1.2.3.30 Design-based estimates and confidence intervals were produced using a non-parametric bootstrapping procedure with 1,000 iterations in the R environment (R Core Team, 2021). Each iteration resampled the full dataset with replacement to create a new dataset that was the same length as the original. In each iteration, the data was subsetted three times to cover each of the four area boundaries (Mona Array Area + 2km, +4km, and + whole survey area (Mona Offshore Ornithology Array Area study area)). In each iteration, the number of birds and area covered by the digital aerial surveys were summed for each boundary area and month. From this, the estimated relative bird population for each boundary area could be calculated using the following formula: Relative population estimate = (Birds observed) / (Area covered by digital aerial survey) * (Total area of boundary).

1.2.3.31 A variance for each of the population estimates was derived from the 1,000 iterations of the non-parametric bootstrap. Upper and lower estimates of the 95% confidence intervals were calculated from the variability in the 1,000 values generated.

1.2.3.32 As per the model-based approach, apportioning of unidentified species and correction factors to account for availability bias were applied to the design-based estimates.

1.3 Baseline characterisation of the Mona Offshore Ornithology Array Area study area

1.3.1 Review of data sources and desk-based studies

Irish Sea utilisation and seabird colonies within range of the Mona Offshore Wind Project

1.3.1.1 The Irish Sea separates the islands of Ireland and Great Britain; linked to the Celtic Sea in the south by St George's Channel, and to the Inner Seas off the west coast of Scotland in the north by the North Channel, also known as the Straits of Moyle. Twenty-one species of seabird have been reported as regularly nesting on beaches or cliffs around the Irish Sea (Mitchell *et al.,* 2004) and a large proportion of the Manx shearwater biogeographic population is found breeding on offshore islands around the Irish Sea. During the non-breeding season, large populations of common scoter *Melanitta nigra* and red-throated diver *Gavia stellata* use the shallow waters of Liverpool Bay (Lawson *et al*., 2016).

1.3.1.2 Analysis of European Seabird Survey at Sea surveys (ESAS) conducted in the Irish Sea from 1980 to 2003 was undertaken for strategic environmental assessments (SEAs) (Mackey and Giménez, 2006). In Area 6 which covers the Irish Sea, Manx shearwater were recorded in high densities of up to eight birds per km^2 during the breeding and post breeding seasons. Northern gannet have also been recorded in high densities in the Irish Sea (up to 2.5 birds per km^2), with concentrations found around the Grassholm colony during the breeding and post-breeding seasons. Common guillemot were abundant (>5 per km^2) in the east part of the Irish Sea whilst black-legged kittiwake were recorded in high densities across all seasons (up to 2 birds per km^2). Lesser black-backed gull and herring gull had similar nearshore distribution in the Irish Sea (Area 6), with the highest concentrations found along the English coast of the Irish Sea.

1.3.1.3 Cleasby *et al*. (2020) showed how a combination of GPS tracking technology and predictive species distribution modelling can be used to identify seabird hotspots at UK-wide scale. The analysis was limited to common guillemot, razorbill, black-legged kittiwake and European shag *Gulosus aristotelis*. For black-legged kittiwake, the hotspots of activities were along the entire east coast of Scotland and off the coast of Yorkshire, where some of the largest black-legged kittiwake colonies are located. Whilst no hotspots of black-legged kittiwake were identified in the Irish Sea, there were common guillemot hotspots in the Irish Sea, including off the Pembrokeshire coast (Cleasby *et al.,* 2020). The analysis also identified hotspots along the Northern Irish coast and around the Pembrokeshire coast. For European shag, the area covered by hotspots was small and the distribution of hotspots reflected the location of the larger shag colonies and relatively small foraging range. Overall, the findings indicated that during the breeding season, the density of breeding birds was the greatest in close vicinity to the largest colonies, which is typical of central-place foragers.

1.3.1.4 The work by Cleasby *et al.* (2020) was built on earlier work by Wakefield *et al.* (2017) which tracked and modelled the space use (i.e. utilisation distribution (UD)) of black-legged kittiwake, common guillemot, razorbill and European shag at UK-wide level. Composite usage maps predicted that these species forage mainly within 100km of the coast of Scotland. 90% of the UK regional population's UDs also included waters in Dublin Bay and the North Channel of the Irish Sea. In addition to core areas mentioned above, usage hotspots included a large area of the central Irish Sea for black-legged kittiwake. This latter species was more pelagic, with activity more patchily distributed offshore.

1.3.1.5 There have been several consented and planned offshore developments in the vicinity of the Mona Offshore Wind Project, which have examined seabird distribution and abundance. For example, boat-based surveys were carried out to the southwest of the Mona Offshore Ornithology Array Area study area from March 2010 to April 2012 for the Rhiannon offshore wind farm. The species assemblage recorded was primarily composed of petrel *Procellariiformes*, shearwater *Procellariidae*, Northern gannet, skua *Stercorarius*, gull *Laridae*, tern *Sternidae* and auk *Alcidae*. Manx shearwater dominated the recorded individuals, making up 44% of all birds recorded. Common guillemot and razorbill were the second and third most common species recorded. Seasonal variation was also recorded with many of the more numerous species recorded in higher numbers throughout the spring and summer months (Centrica Array Ltd, 2012). Furthermore, boat-based seabird surveys were carried out within the Irish Sea (to the east of the Mona Offshore Ornithology Array Area study area) in 2014 for the west of Duddon Sands pre-construction and the Walney offshore wind farm year three monitoring. Manx shearwater, and common guillemot were the most frequently recorded species and were recorded in all the surveys. Black-legged kittiwake, lesser black-backed gull, and Northern gannet were also recorded frequently. The abundance of birds recorded within the offshore wind farms peaked in June and July. There were low numbers of birds in May and August across both survey campaigns (CMACS, 2012; 2014).

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

1.3.1.7 For the most widespread and abundant seabirds of the central Irish Sea (Northern gannet, common guillemot, herring gull, black-legged kittiwake, lesserblack-backed gull, Manx shearwater and razorbill), SPA colonies within the species-specific foraging ranges from the Mona Array Area were identified. The mean-maximum foraging ranges compiled by Woodward *et al*. (2019) (Table 1.6) were used.

1.3.1.8 The locations of the breeding sites were sourced from data.gov.uk (Seabird Nesting Counts (British Isles)). The latest colony counts were sourced from the Seabird Monitoring Programme (SMP) online database (https://app.bto.org/seabirds/public/index.jsp). In the Seabird Monitoring Programme (SMP) online database, the 'Master Site' can be made up of several sites along the coastline. Where a 'Master Site' in the SMP was made up of several nesting sites (i.e. sub-colonies), a centroid was generated for each 'Master Site' and the distance to the Mona Array Area was calculated. The list of SPAs within range of the Mona Array Area is shown in Table 1.7. Additional non-SPA colonies located within individual foraging ranges from the Mona Array Area are listed in Appendix A.

Table 1.6: Mean-maximum foraging ranges with standard deviation (SD) for seabird species (Woodward *et al*., 2019). Sample sizes are shown in parentheses (i.e. no. of individuals tracked).

Species	Mean Max foraging range + SD
Arctic tern	25.7±14.8 (9)
Black-headed gull	18.5 (1)
Common gull	50 (1)
Common tern	18.0±8.9 (16)
Great cormorant	25.6±8.3 (4)
Northern fulmar	542.3±657.9 (16)
Northern gannet	315.2±194.2 (21)
Common guillemot	73.2±80.5 (16)
Herring gull	58.8±26.8 (10)
Black-legged kittiwake	156.1±144.5 (37)
Lesser black-backed gull	127±109 (18)
Little tern	5 (1)
Manx shearwater	1,346.8±1,018.7 (6)
Atlantic puffin	137.1±128.3 (7)
Razorbill	88.7±75.9 (16)
Roseate tern	12.6±10.6 (3)
Sandwich tern	34.3±23.2 (9)
European shag	13.2±10.5 (17)

Table 1.7: SPA colonies (qualifying as an individual species and/or assemblage of species) within individual species range (mean-max foraging range + SD) from the Mona Array Area.

SPA colonies	Northern gannet	Common guillemot	Herring gull	Black-legged kittiwake	Lesser black-backed gull	Manx shearwater	Razorbill
Ailsa Craig SPA	✓	x	x	✓	x	x	x
Blasket Islands SPA	x	x	x	x	X	✓	x
Copeland Islands SPA	x	x	x	x	x	✓	x
Cruagh Island SPA	x	x	x	x	x	✓	x
Deenish Island and Scariff Island SPA	x	x	x	x	x	✓	x
Aberdaron Coast and Bardsey Island SPA	x	x	x	x	x	✓	x
Grassholm SPA	✓	x	x	x	x	x	x
Helvick Head to Ballyquin SPA	x	X	x	✓	x	x	x
High Island, Inishshark and Davillaun SPA	x	x	x	x	x	✓	x
Howth Head Coast SPA	x	✓	✓	✓	x	x	✓
Inishtrahull Island SPA	x	x	x	x	x	x	x
Ireland's Eye SPA	✓	✓	✓	✓	✓	x	✓
Lambay Island SPA	x	✓	✓	✓	✓	x	✓
Morecambe Bay and Duddon Estuary SPA	x	x	✓	x	x	x	x
North Colonsay and Western Cliffs SPA	x	x	x	✓	x	x	x
Puffin Island SPA, Kerry	x	x	x	x	x	✓	x
Rathlin Island SPA	x	x	x	✓	✓	x	x
Rum SPA	x	x	x	x	x	✓	x
Saltee Islands SPA	✓	x	x	✓	x	✓	x
Skelligs SPA	x	x	x	x	x	✓	x
Skerries Islands SPA	x	x	✓	x	x	x	x
Skomer, Skokholm and the Seas off Pembrokeshire SPA	x	x	x	✓	x	✓	x
St Kilda SPA	x	x	x	x	x	✓	x
Wicklow Head SPA	x	x	x	✓	x	x	✓

Seabirds at sea distribution and abundance in the Mona Array Area plus buffer zones

Black-legged kittiwake

1.3.1.9 Ship-based and aerial survey data analysed by Waggitt *et al*. (2020) and Bradbury *et al*. (2014) showed black-legged kittiwake to have a patchy seasonal distribution, an overall lower abundance during the breeding season (March to August) and relative low densities. There were however marked differences between the two studies during the non-breeding season.

1.3.1.10 In Waggitt *et al*. (2020), the lowest abundance estimates were recorded during the breeding season (March to August), with population estimates ranging from 163.87 in March to 69.96 in August within the Mona Array Area (Table 1.8). Although distribution was similar during the non-breeding season, there was a net increase in densities across the area (Figure 1.3), with the greatest densities found further offshore. In contrast, Bradbury *et al*. (2014) found the highest densities to be further inshore during the non-breeding season (Figure 1.4).

Table 1.8: Black-legged kittiwake population estimates (data extracted from Waggitt *et al*. (2020)).

Month	Mona Array Area	Mona Array Area + 2km	Mona Array Area + 4km
Jan	226.11	321.63	430.17
Feb	234.66	333.78	446.41
Mar	163.87	233.30	312.23
Apr	105.40	150.20	201.17
May	97.00	138.24	185.16
Jun	85.57	121.96	163.37
Jul	75.73	107.95	144.62
Aug	69.96	99.73	133.62
Sept	109.42	155.82	208.61
Oct	176.89	251.65	336.66
Nov	176.89	277.54	371.26
Dec	212.69	302.56	404.69

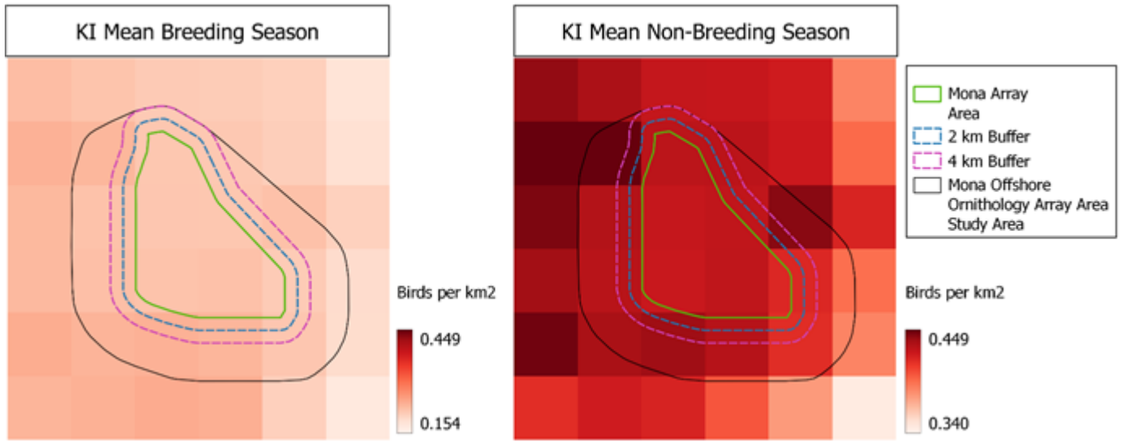

Figure 1.3: Spatial variation in predicted densities (animals per km^2) of black-legged kittiwake per season (data extracted from Waggitt *et al.* (2020)).

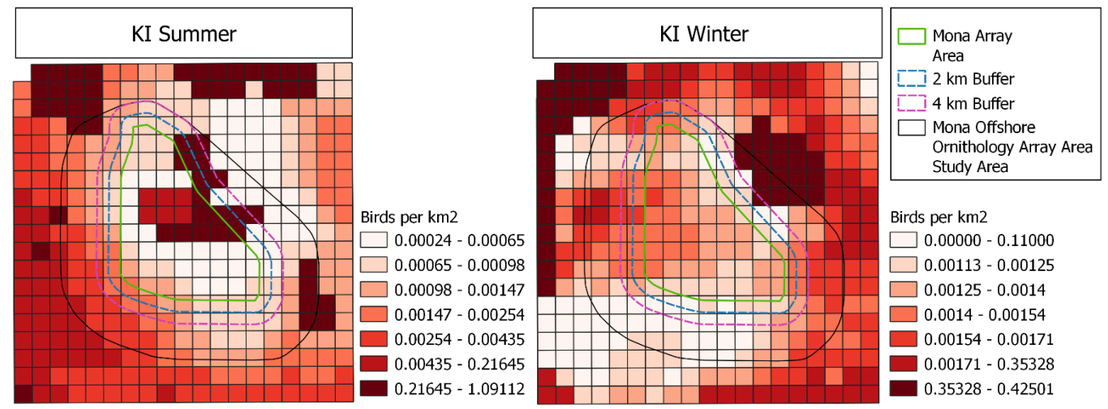

Figure 1.4: Spatial variation in predicted densities (animals per km^2) of black-legged kittiwake per season (data extracted from Bradbury *et al.* (2014)).

Herring gull

1.3.1.11 Herring gull had a very coastal distribution. In both the breeding (March to August) and the non-breeding season (September to February), Waggitt *et al*. (2020) found very low densities and no overlap of hotspot of activities with the Mona Array Area (Figure 1.5). Population estimates were below 100 individuals in the Mona Array Area (Table 1.9). Bradbury *et al.* (2014) reported the absence of the species during the breeding season and increasing densities towards the coast during the non-breeding season (Figure 1.6).

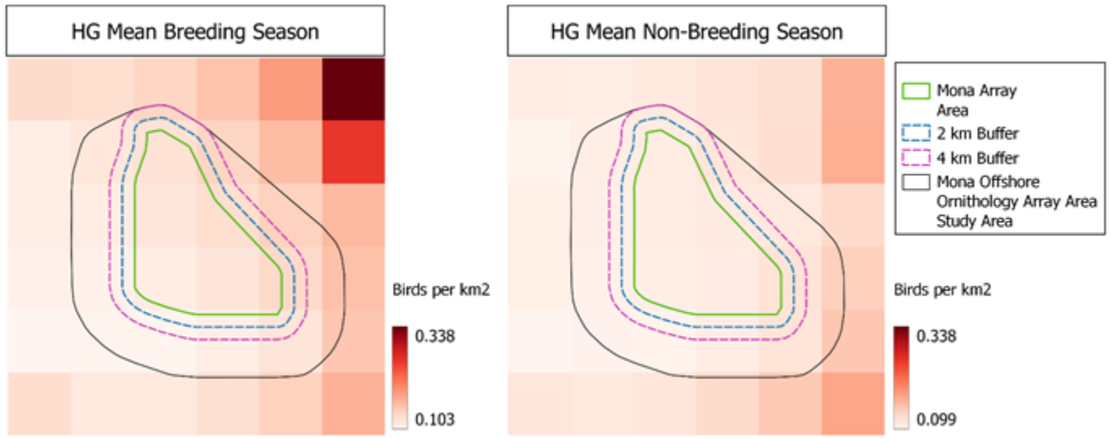

Figure 1.5: Spatial variation in predicted densities (animals per km^2) of herring gull per season (data extracted from Waggitt *et al*. (2020)).

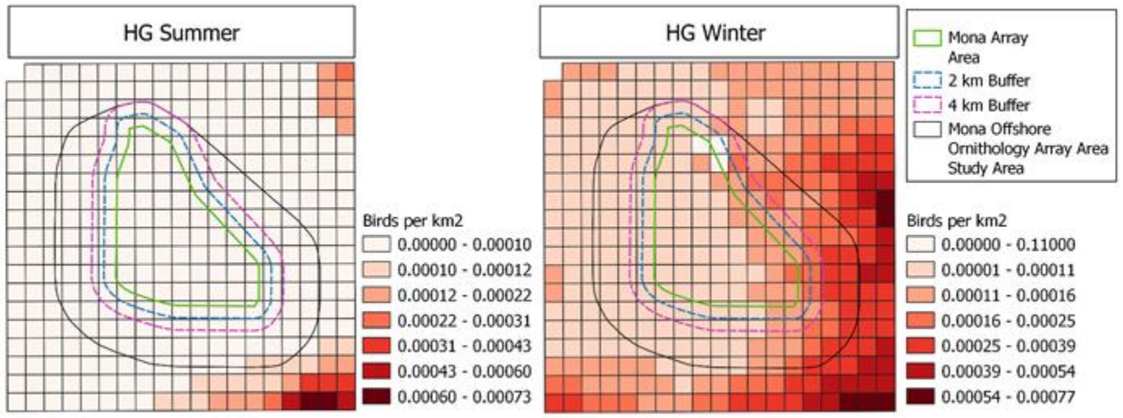

Figure 1.6: Spatial variation in predicted densities (animals per km^2) of herring gull per season (data extracted from Bradbury *et al*. (2014)).

Table 1.9: Herring gull population estimates (data extracted from Waggitt *et al*. (2020)).

Month	Mona Array Area	Mona Array Area + 2km	Mona Array Area + 4km
Jan	65.24	92.72	123.85
Feb	71.88	102.17	136.48
Mar	77.59	110.21	147.30
Apr	76.13	108.06	144.55
May	63.79	90.54	121.10
Jun	48.87	69.35	92.76
Jul	37.69	53.49	71.53
Aug	30.18	42.85	57.26
Sept	29.30	41.64	55.60
Oct	34.99	49.73	66.42
Nov	44.78	63.64	85.00
Dec	55.74	79.23	105.83

Lesser black-backed gull

1.3.1.12 It is evident from Waggitt *et al.* (2020) and Bradbury *et al.* (2014) that lesser black-backed gull has a very restricted coastal distribution during the breeding season (April to August) owing to their small foraging range (Woodward *et al.,* 2019).

1.3.1.13 Abundance across the Mona Array Area peaked at 111.65 in July (Table 1.10) with birds found predominantly in the east part of the Irish Sea and inshore of the Mona Array Area (Figure 1.7 and Figure 1.8).

Table 1.10: Lesser black-backed gull population estimates (data extracted from Waggitt *et al*. (2020)).

Month	Mona Array Area	Mona Array Area + 2km	Mona Array Area + 4km
Jan	10.05	14.33	19.16
Feb	9.28	13.23	17.68
Mar	24.28	34.57	46.21
Apr	66.52	94.63	126.46
May	76.22	108.41	144.85
Jun	92.86	132.04	176.38
Jul	111.65	158.71	211.95
Aug	50.90	72.46	96.84
Sept	19.09	27.21	36.37
Oct	16.60	23.67	31.64
Nov	13.66	19.47	26.03
Dec	11.44	16.31	21.80

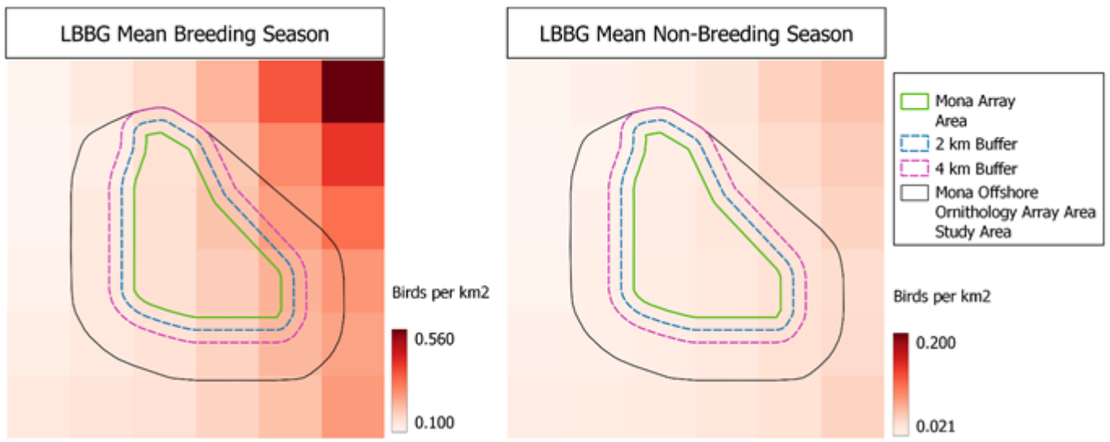

Figure 1.7: Spatial variation in predicted densities (animals per km^2) of lesser black-backed gull per season (data extracted from Waggitt *et al*. (2020)).

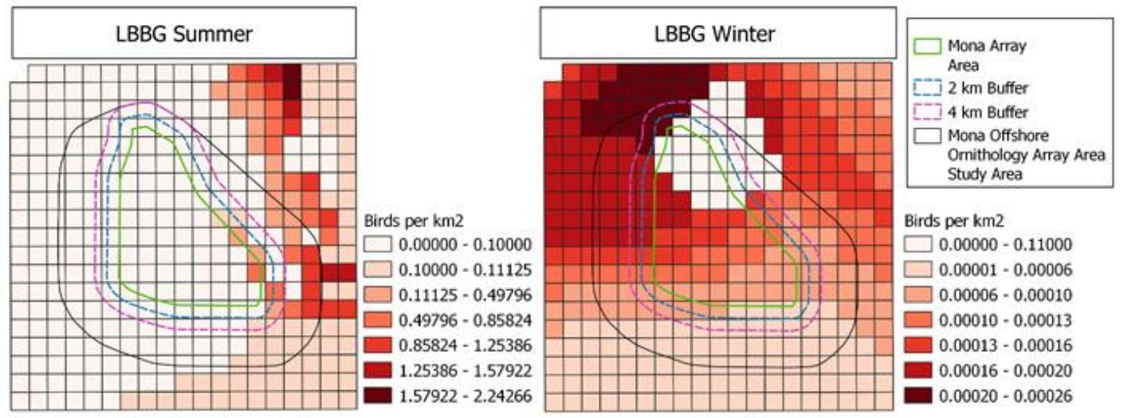

Figure 1.8: Spatial variation in predicted densities (animals per km^2) of lesser-black-backed gull per season (data extracted from Bradbury *et al.* (2014)).

Common guillemot

1.3.1.14 Whilst the distribution of common guillemot was similar between the breeding (March to July) and the non-breeding season (August to February) in Waggitt *et al*. (2020), abundance was greater during the non-breeding season, with over one bird per km^2 predicted to the northwest of the Mona Array Area (Figure 1.9). Population estimates produced from Waggitt *et al*. (2020) showed the highest abundance from December to February (Table 1.11).

1.3.1.15 The work from Bradbury *et al.* (2014) which examined densities at a much higher spatial resolution showed the distribution of common guillemot along the English coastline with densities exceeding one bird per km^2 (Figure 1.10). During the breeding season, there were hotspots of activity to the southwest of the Mona Array Area, presumably by foraging birds associated with the Welsh colonies. It is apparent from both studies that the Mona Array Area did not overlap with hotspots of abundance, which were located further inshore or offshore during the non-breeding and breeding seasons respectively.

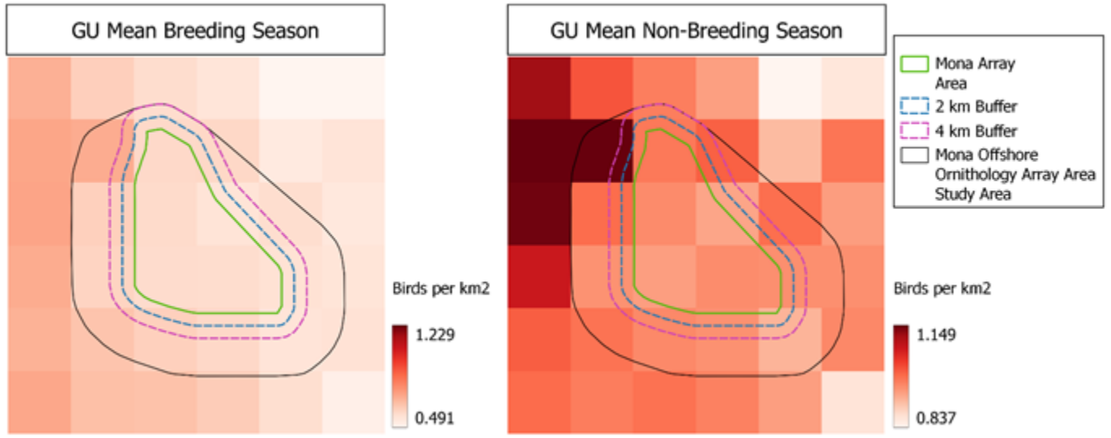

Figure 1.9: Spatial variation in predicted densities (animals per km^2) of common guillemot per season (data extracted from Waggitt *et al.* (2020)).

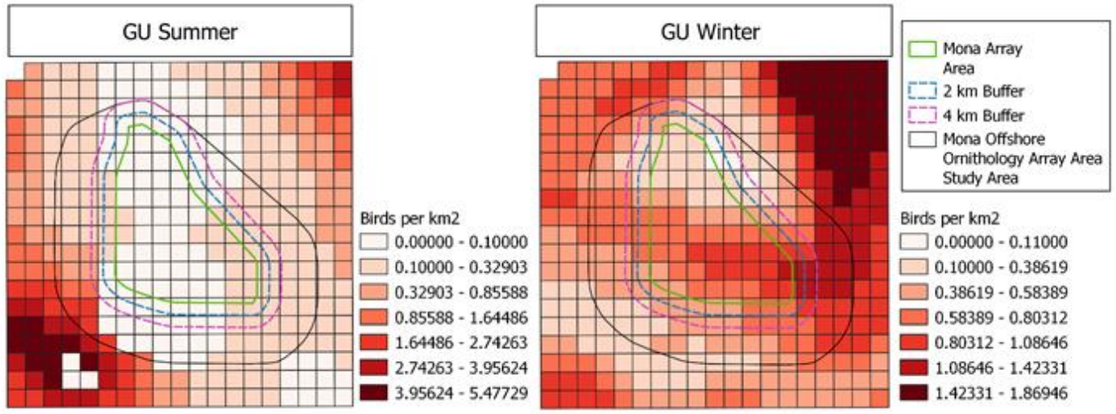

Figure 1.10: Spatial variation in predicted densities (animals per km^2) of common guillemot per season (data extracted from Bradbury *et al*. (2014)).

Table 1.11: Common guillemot population estimates (data extracted from Waggitt *et al.* (2020)).

Month	Mona Array Area	Mona Array Area + 2km	Mona Array Area + 4km
Jan	560.26	798.54	1,071.51
Feb	593.45	845.81	1,134.88
Mar	437.35	623.69	837.25
Apr	286.78	409.31	549.88
May	249.69	356.42	478.92
Jun	202.02	288.40	387.63
Jul	163.87	233.98	314.55
Aug	218.68	312.00	419.19
Sept	330.76	471.57	633.16
Oct	374.50	533.87	716.68
Nov	441.83	629.81	845.32
Dec	508.68	725.04	972.98

Razorbill

1.3.1.16 Waggitt *et al*. (2020) showed that Razorbill had a similar seasonal distribution to that of common guillemot (Figure 1.11), although abundance was much lower (Table 1.12). Bradbury *et al*. (2014) corroborated the findings in summer (April to September), whilst in winter (October to March), birds were distributed inshore of the Mona Array Area (Figure 1.12).

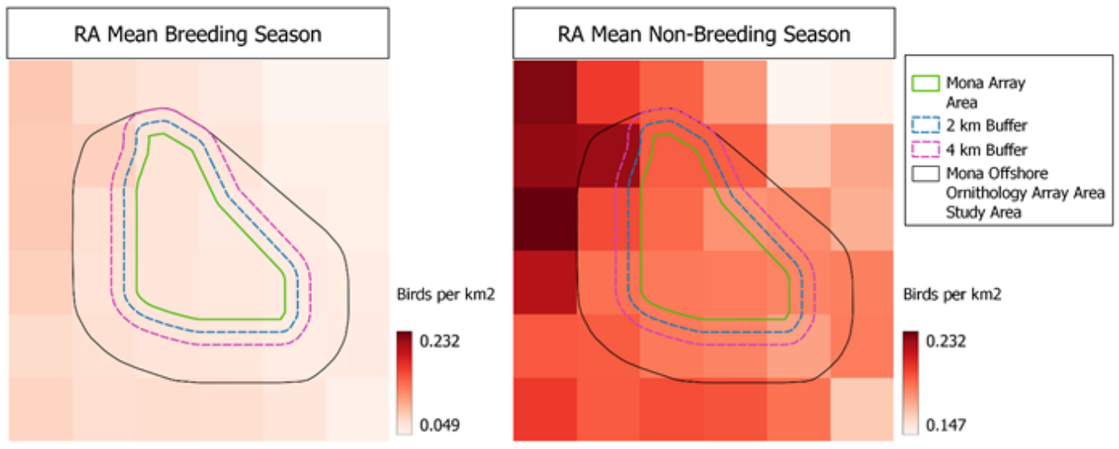

Figure 1.11: Spatial variation in predicted densities (animals per km^2) of razorbill per season (data extracted from Waggitt *et al.* (2020)).

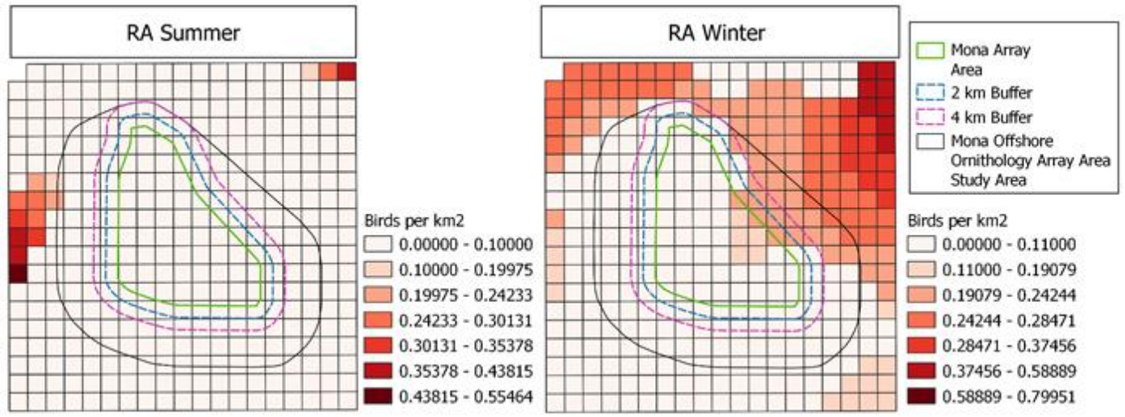

Figure 1.12: Spatial variation in predicted densities (animals per km^2) of razorbill per season (extracted from Bradbury *et al*. (2020)).

Table 1.12: Razorbill population estimates (data extracted from Waggitt *et al.* (2020)).

Month	Mona Array Area	Mona Array Area + 2km	Mona Array Area + 4km
Jan	107.27	152.65	204.50
Feb	115.54	164.41	220.26
Mar	70.17	99.92	133.95
Apr	37.91	54.05	72.52
May	32.48	46.31	62.15
Jun	25.78	36.76	49.34
Jul	20.61	29.38	39.45
Aug	31.88	45.42	60.93
Sept	57.15	81.34	109.02
Oct	65.89	93.77	125.66
Nov	79.98	113.82	152.51
Dec	95.00	135.19	181.13

Atlantic puffin

1.3.1.17 Waggitt *et al*. (2020) found the species in very low densities across the area (Figure 1.13), whilst Bradbury *et al.* (2014) predicted absence of puffin in the area. Predicted abundance very rarely exceeded double figures during the breeding season (April to August) and non-breeding season (September to March) within the Mona Array Area (Waggitt *et al.*, 2020) (Table 1.13).

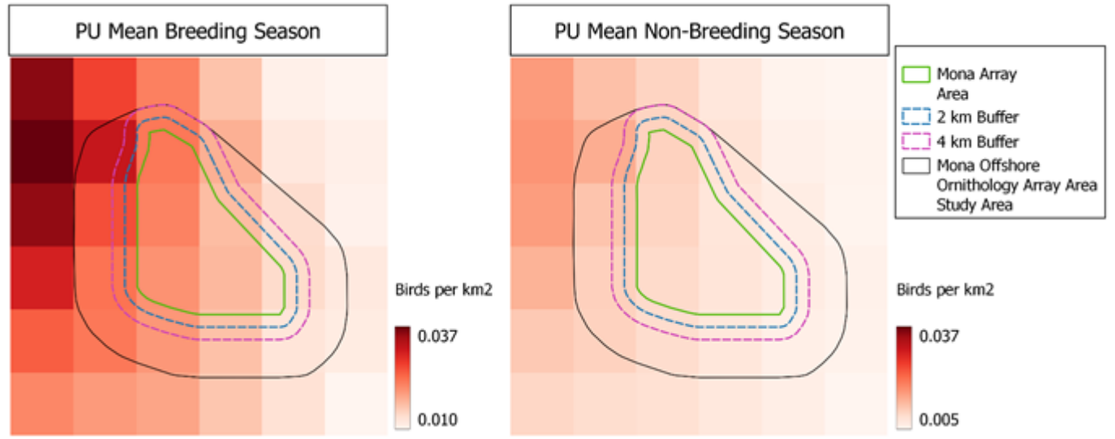

Figure 1.13: Spatial variation in predicted densities (animals per km^2) of Atlantic puffin per season (extracted from Waggitt *et al*. (2020)).

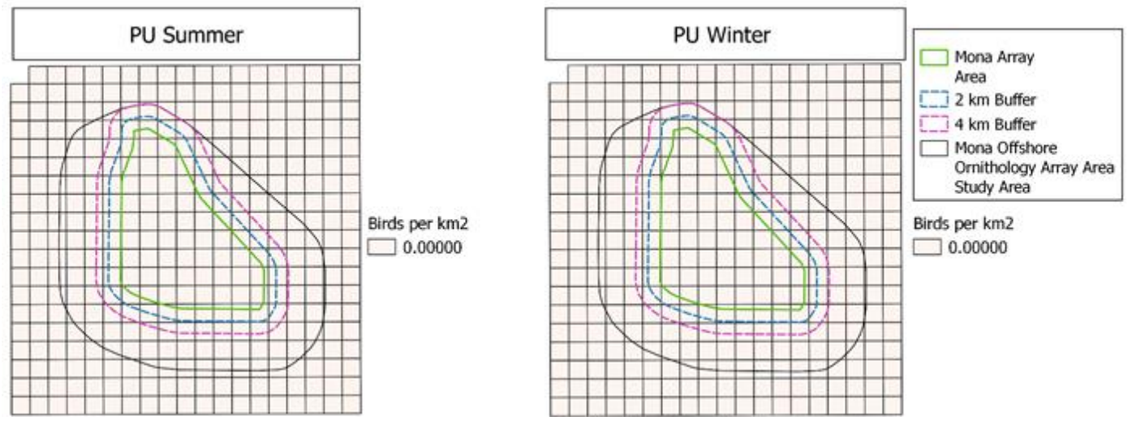

Figure 1.14: Spatial variation in predicted densities (animals per km^2) of Atlantic Puffin per season (extracted from Bradbury et al. (2014)).

Table 1.13: Atlantic puffin population estimates (data extracted from Waggitt *et al*. (2020)).

Month	Mona Array Area	Mona Array Area + 2km	Mona Array Area + 4km
Jan	3.04	4.33	5.82
Feb	2.90	4.12	5.54
Mar	4.34	6.18	8.30
Apr	6.83	9.73	13.06
May	7.48	10.65	14.30
Jun	8.52	12.13	16.29
Jul	9.67	13.77	18.50
Aug	10.51	14.96	20.10
Sept	6.87	9.78	13.14
Oct	4.16	5.92	7.96
Nov	3.68	5.24	7.04
Dec	3.29	4.69	6.30

Northern fulmar

1.3.1.18 The species has a very protracted breeding season (January to August). Both studies reviewed predicted the species to be widespread during the breeding and non-breeding season (Figure 1.15 and Figure 1.16).

1.3.1.19 Abundance steadily increased throughout the breeding season in the Mona Array Area and peaked in August with a mean of 162.30 birds (Table 1.14). Waggitt *et al* (2020) showed densities to increase with increasing distance from the coast (Figure 1.15). However, Bradbury *et al.* (2014) showed densities to be low and distribution to be widespread from September to December (non-breeding season); the highest densities were found at the south part of the site, with up to 0.5 birds per km^2 recorded in some squares (Figure 1.16).

Table 1.14: Northern fulmar population estimates (data extracted from Waggitt *et al.* (2020)).

Month	Mona Array Area	Mona Array Area + 2km	Mona Array Area + 4km
Jan	102.47	146.07	196.24
Feb	99.73	142.17	191.00
Mar	112.20	159.95	214.88
Apr	129.43	184.50	247.85
May	135.76	193.53	259.99
Jun	145.66	207.64	278.96
Jul	155.58	221.80	298.01
Aug	162.30	231.37	310.88
Sept	143.30	204.30	274.52
Oct	121.17	172.75	232.12
Nov	113.51	161.82	217.42
Dec	106.96	152.49	204.87

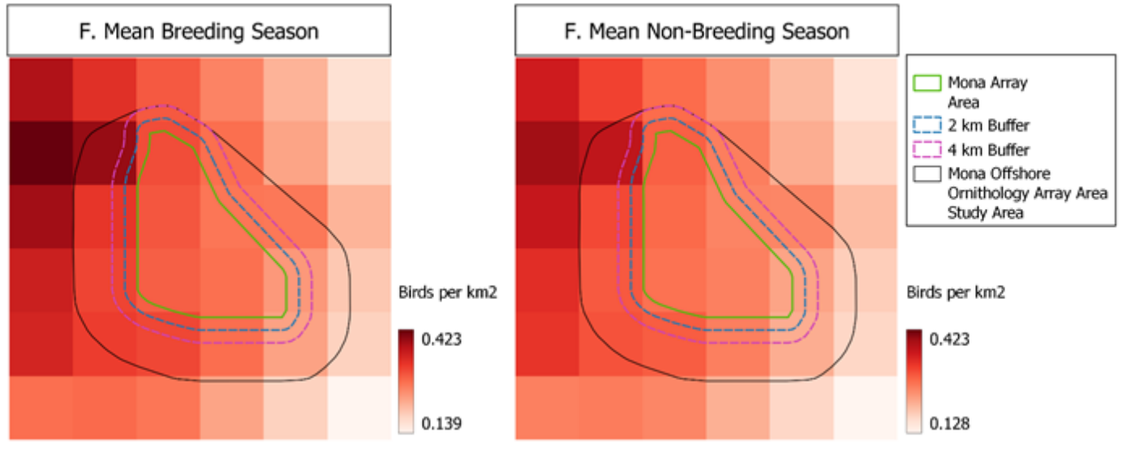

Figure 1.15: Spatial variation in predicted densities (animals per km^2) of Northern fulmar per season (extracted from Waggitt *et al.* (2020)).

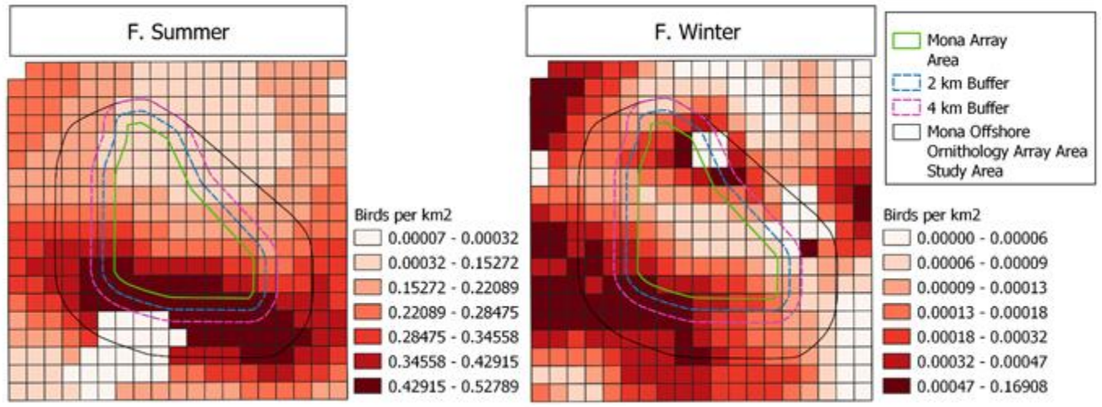

Figure 1.16: Spatial variation in predicted densities (animals per km^2) of Northern fulmar per season (extracted from Bradbury *et al.* (2014)).

Manx shearwater

1.3.1.20 Both Bradbury *et al*. (2014) and Waggitt *et al*. (2020) showed densities to be relatively low during the breeding season (April to August) with less than one bird per km^2 to the west of the Mona Array Area (Figure 1.17 and Figure 1.18).

1.3.1.21 Monthly population estimates extracted from Waggitt et al. (2020) were very low and ranged from 1 to 50 individuals in the Mona Array Area (Table 1.15). As expected, densities were low during the non-breeding season (September to March) as Manx shearwater overwinter off the coast of South America.

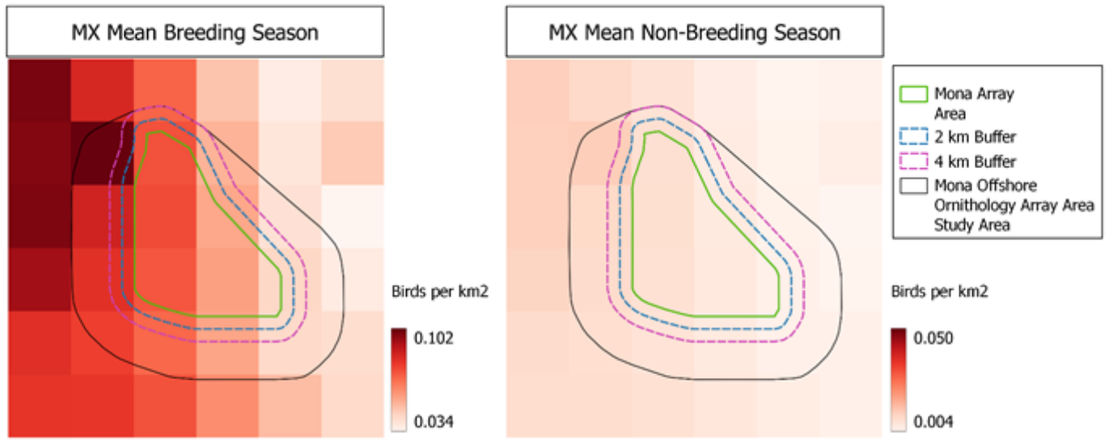

Figure 1.17: Spatial variation in predicted densities (animals per km^2) of Manx shearwater per season (extracted from Waggitt *et al*. (2020)).

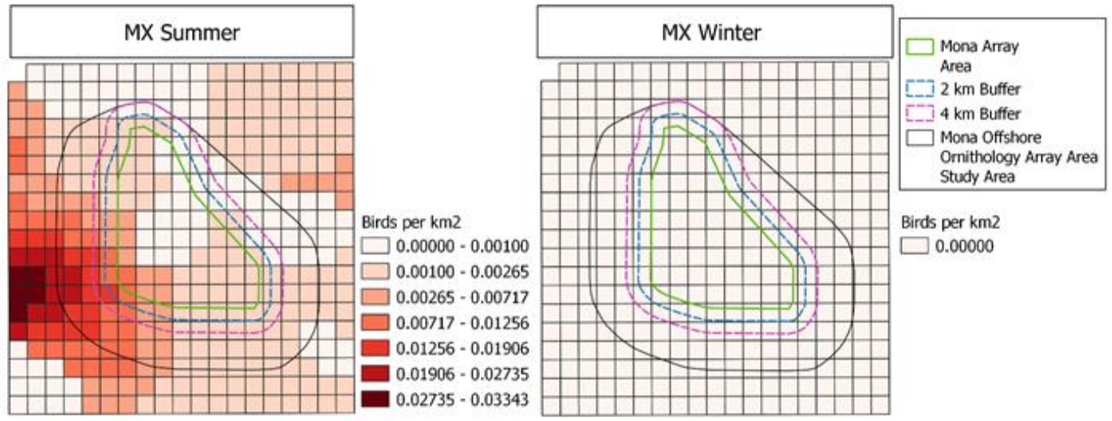

Figure 1.18: Spatial variation in predicted densities (animals per km^2) of Manx shearwater per season (extracted from Bradbury *et al*. (2014)).

Table 1.15: Manx shearwater population estimates (extracted from Waggitt *et al.* (2020)).

Month	Mona Array Area	Mona Array Area + 2km	Mona Array Area + 4km
Jan	1.18	1.66	2.22
Feb	1.01	1.43	1.91
Mar	3.46	4.90	6.54
Apr	13.74	19.43	25.93
May	18.08	25.57	34.14
Jun	27.07	38.30	51.15
Jul	39.60	56.04	74.86
Aug	50.30	71.20	95.12
Sept	14.17	20.05	26.79
Oct	3.06	4.32	5.78
Nov	2.10	2.97	3.97
Dec	1.50	2.12	2.83

Northern gannet

1.3.1.22 The work by Waggitt *et al*. (2020), based on aerial and boat-based survey data collected between 1980 to 2018, indicated that Northern gannet were found in the highest densities to the west of the Mona Array Area during the breeding (March to September) and the non-breeding seasons (October to February) (Figure 1.19 and Figure 1.20).

1.3.1.23 As expected, the highest densities were greater during the breeding season as birds from the UK and Irish Western colonies forage in the Irish Sea. The highest abundances were recorded in August (Figure 1.20) in the Mona Array Area and buffers. Waggitt *et al*. (2020) found the highest densities to the west of the Mona Array Area (Figure 1.19). In contrast, Bradbury *et al*. (2014) found the highest densities to be southeast of the Mona Array Area during the breeding season. There were also hotspots of activities (albeit at very low densities) inshore of the Mona Array Area along the Welsh and Irish coastlines during the non-breeding season (Figure 1.20).

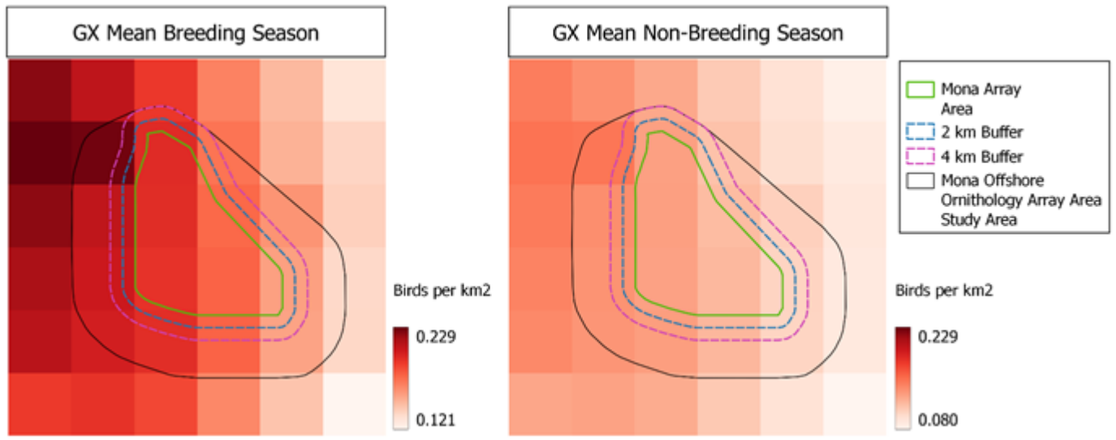

Figure 1.19: Spatial variation in predicted densities (animals per km^2) of Northern gannet per season (data extracted from Waggitt *et al.* (2020)).

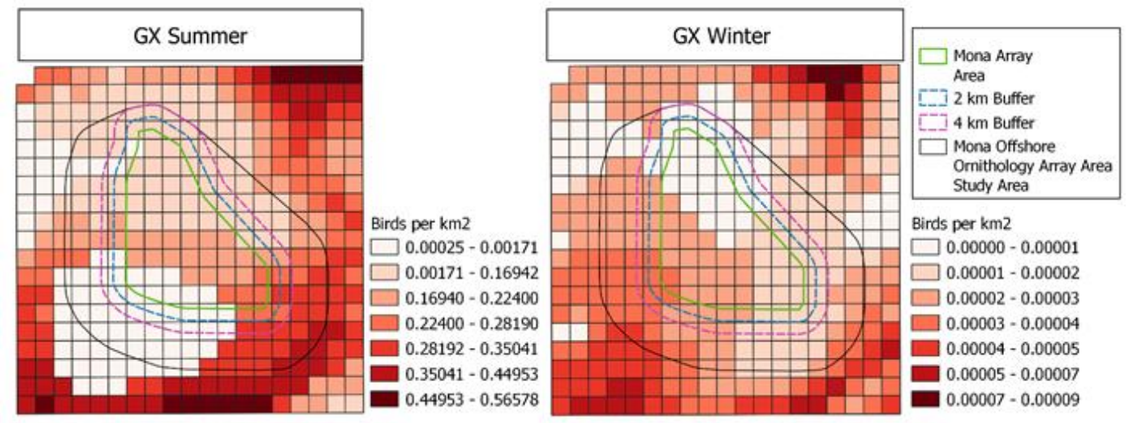

Figure 1.20: Spatial variation in predicted densities (animals per km^2) of Northern gannet per season (extracted from Bradbury *et al*. (2014)).

Table 1.16: Northern gannet population estimates (data extracted from Waggitt *et al.* (2020)).

Month	Mona Array Area	Mona Array Area + 2km	Mona Array Area + 4km
Jan	46.17	65.48	87.39
Feb	43.26	61.35	81.88
Mar	51.36	72.83	97.22
Apr	64.64	91.69	122.40
May	72.41	102.72	137.14
Jun	85.30	121.00	161.56
Jul	99.33	140.91	188.15
Aug	109.19	154.90	206.84
Sept	107.76	152.88	204.14
Oct	82.06	116.40	155.40
Nov	58.98	83.65	111.66
Dec	51.22	72.63	96.95

1.3.2 Availability of modern telemetry data and use of the Mona Array Area by GPS tracked seabirds

Black-legged kittiwake

1.3.2.1 There is evidence that black-legged kittiwake (equipped with geolocators) from the Skomer Island Colony (Wales) use the Mona Array Area and adjacent waters (BirdLife International, 2022). There must be however a degree of caution when interpreting the data given the low spatial accuracy of geolocators (~200km). Tracked individuals from the Puffin Island colony (Anglesey, Wales) have also shown use of the Mona Array Area. These birds were equipped with GPS tags which have a much higher spatial accuracy. This latter data set has been used by Wakefield *et al*. (2017) to examine regional distribution whilst Cleasby *et al*. (2020) used it to identify important areas for seabirds at sea around the UK coastline.

Great black-backed gull

1.3.2.2 There is no data available from GPS tracking studies within the species' breeding home range of the Mona Array Area.

Lesser black-backed gull

1.3.2.3 Over the 2016-2019 breeding seasons, individuals were tracked at the South Walney colony (a large but declining coastal colony within the Morecambe Bay and Duddon Estuary SPA, England) and an urban colony in Barrow-in-Furness (Cumbria, England). The majority of individuals tracked from both the South Walney and Barrow

colonies made relatively limited use of the marine environment through the 2016-2019 breeding seasons (Clewley *et al*., 2021).

Herring gull

1.3.2.4 There is no data available from tracking studies within the species' breeding home range of the Mona Array Area.

Common guillemot

1.3.2.5 GPS tracking of 15 individuals from the Puffin Island (Anglesey, Wales) and seven individuals from Middle Mouse (Isle of Anglesey, Wales) revealed that tracked birds made use of the nearshore waters. Some tracks however extended further offshore in the Liverpool Bay (BirdLife International, 2022). Across the Irish Sea, GPS tracking of four individuals at Lambay Island (Ireland) showed that the birds remained in the west part of the Irish Sea, and there was no overlap of tracks with the Mona Array Area. Some of the tracking data has been used by Wakefield *et al*. (2017) and Cleasby *et al*. (2020) in an analysis of distribution of seabirds at sea around the UK coastline.

Razorbill

1.3.2.6 34 individuals from the nearest colony to the Mona Array Area, Puffin Island (Anglesey, Wales), were GPS tracked between 2011 and 2013 (BirdLife International, 2022). The data presented in the Seabird Tracking Database (BirdLife International, 2022) showed some tracks to overlap with the Mona Array Area during the breeding season. GPS tracking has also been carried out at other colonies within the species' breeding home range of the Mona Array Area: five individuals at Lambay Island (Ireland) and 21 individuals at Bardsey (Wales). The tracks however revealed no connectivity between these colonies and the Mona Array Area.

Northern fulmar

1.3.2.7 There is no data available from tracking studies within the species' breeding home range of the Mona Array Area.

Manx shearwater

1.3.2.8 Tracking of individuals at the Bardsey Colony (Wales) in 2017 showed a widespread utilisation of the Irish Sea during the breeding season, including the Mona Array Area (BirdLife International, 2022). There has also been tracking work of individuals breeding at Lundy Island in 2009 to 2010 (Dean *et al*., 2013), with the data used as evidence for the designation of the Irish Sea Front (ISF) as an SPA. There was however no use of the Mona Array Area by the Lundy birds. A larger GPS tracking study of 117 individuals captured at the Skomer Island (Wales) and Lighthouse Island in the Copelands group (Northern Ireland) in 2009 to 2011 revealed that birds from the two different colonies foraged in local waters that were exclusive, but overlapped in one key area: the Irish Sea Front (Dean *et al*., 2013). The tracking illustrated little use of the east part of the Irish Sea by the Skomer birds. At the Skomer Island colony, earlier work (2004-2006) showed again the utilisation of the west and north sides of the Irish Sea, whilst few movements were observed eastwards (Guilford *et al*., 2008).

Northern gannet

1.3.2.9 There is a long-term tracking study (2006 to date) of Northern gannet at the Grassholm Colony (Pembrokshire, Wales) whilst short term studies have been carried out at other colonies in the Irish Sea and the west coast of England e.g. Ailsa Craig (Scotland), Great Saltee (County Wexford, Ireland), Irelands Eye (County Dublin, Ireland) (BirdLife International, 2022). According to Wakefield *et al*. (2013), Northern gannet tracked from colonies around the British Isles forage in largely mutually exclusive areas. In the Irish Sea, Wakefield *et al*. (2013) showed that individuals from the Ailsa Craig colony were the most likely to be connected to the Mona Array Area.

1.3.3 Digital Aerial Survey results

Black-legged kittiwake

1.3.3.1 The species was the most abundant in March at the start of the breeding season. Thereafter, the predicted abundance varied greatly for the rest of the breeding season (April to August) (Table 1.17) and the predicted distribution within the Mona Array Area appeared to be variable, with high inter-month variability recorded (Figure 1.21). Black-legged kittiwake were also present in moderate numbers throughout the non-breeding season, in particular in Year two of the digital aerial survey (Table 1.17).

1.3.3.2 MRSea estimates for monthly black-legged kittiwake numbers in the Mona Offshore Ornithology Array Area study area peaked at 4,066 individuals (95% CI range: 2,675 to 5,843) in March 2021. This figure was validated by the design-based estimate of 4,006 individuals (95% CI range: 3,201 to 4,866) (Table 1.17). MRSea estimates for each boundary area can be found in Appendix B.

1.3.3.3 Design-based estimates produced by behaviour (sitting, flying, and all behaviour) are given for each boundary (Table 1.18; Table 1.19; Table 1.20).

1.3.3.4 Ship-based and aerial survey data analysed by Waggitt *et al.* (2020) and Bradbury *et al.* (2014) showed black-legged kittiwake to have a patchy seasonal distribution, and overall lower abundance during the breeding season (March to August). The results from the digital aeiral surveys corroborated these findings.

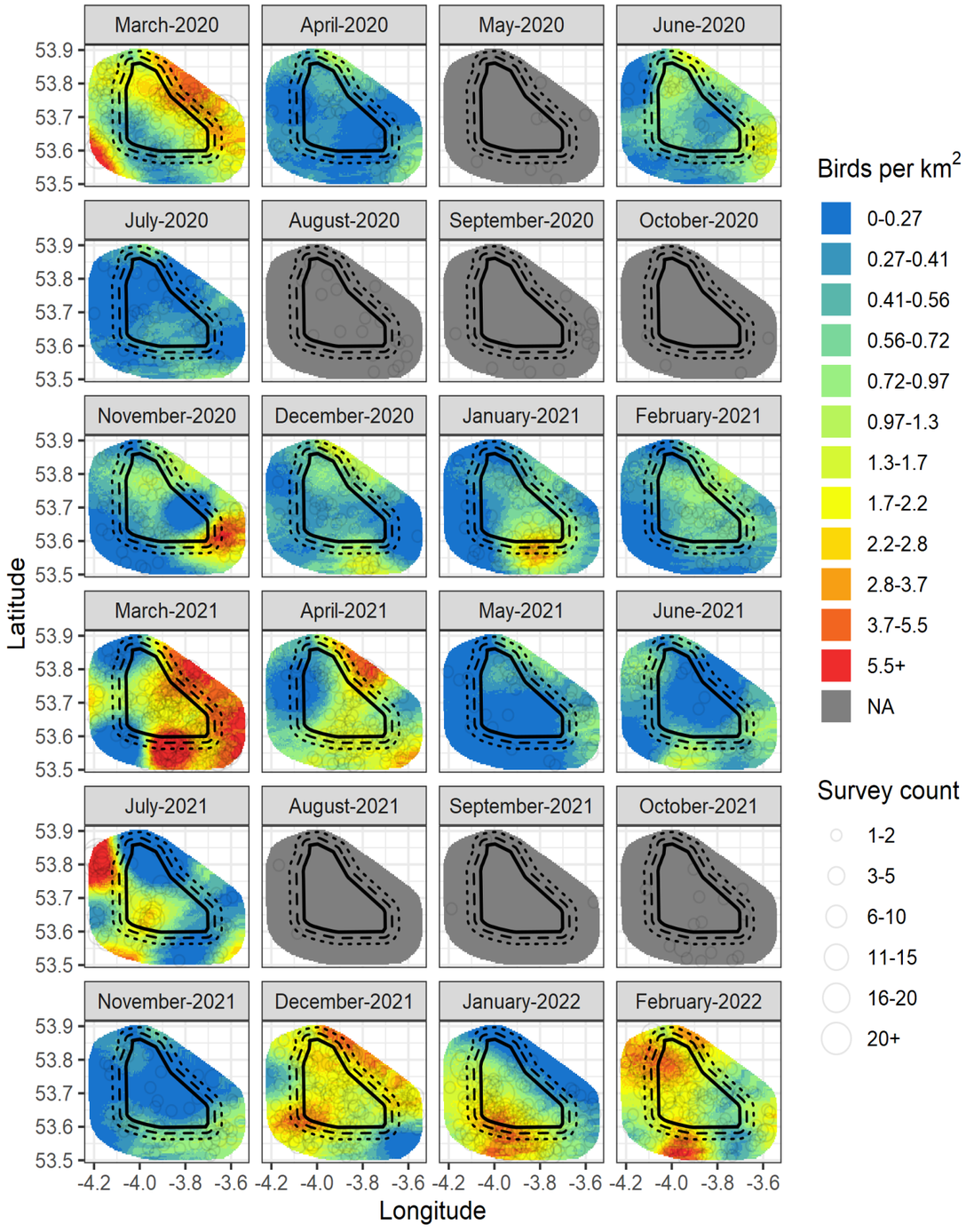

Figure 1.21: Black-legged kittiwake monthly densities (birds per km^2) and raw counts. Estimates are based on the MRSea model outputs.

Table 1.17: Black-legged kittiwake (all behaviour) design-based and MRSea population estimates (Pop) and Density (D) for the Mona Array Area plus 4 to 10km buffer.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	2,235 (1,381 to 3,351)	1.57 (0.97 to 2.36)	2,228 (1,738 to 2,742)	1.57 (1.22 to 1.93)
1	Apr	450 (254 to 721)	0.32 (0.18 to 0.51)	449 (312 to 605)	0.32 (0.22 to 0.43)
1	May	n/a	n/a	50 (22 to 86)	0.04 (0.02 to 0.06)
1	Jun	853 (539 to 1,272)	0.60 (0.38 to 0.89)	852 (670 to 1,072)	0.60 (0.47 to 0.75)
1	Jul	402 (237 to 623)	0.28 (0.17 to 0.44)	386 (292 to 510)	0.27 (0.21 to 0.36)
1	Aug	n/a	n/a	145 (81 to 207)	0.10 (0.06 to 0.15)
1	Sep	n/a	n/a	147 (86 to 225)	0.10 (0.06 to 0.16)
1	Oct	n/a	n/a	39 (13 to 73)	0.03 (0.01 to 0.05)
1	Nov	1,129 (697 to 1,669)	0.79 (0.49 to 1.17)	1,109 (891 to 1,370)	0.78 (0.63 to 0.96)
1	Dec	715 (394 to 1152)	0.50 (0.28 to 0.81)	693 (545 to 866)	0.49 (0.38 to 0.61)
1	Jan	899 (615 to 1,241)	0.63 (0.43 to 0.87)	862 (691 to 1,054)	0.61 (0.49 to 0.74)
1	Feb	666 (444 to 938)	0.47 (0.31 to 0.66)	658 (519 to 808)	0.46 (0.37 to 0.57)
2	Mar	4,066 (,2675 to 5,843)	2.86 (1.88 to 4.11)	4,006 (3,201 to 4,866)	2.82 (2.25 to 3.43)
2	Apr	1,450 (987 to 2,018)	1.02 (0.69 to 1.42)	1,410 (1,157 to 1,693)	0.99 (0.81 to 1.19)
2	May	360 (189 to 628)	0.25 (0.13 to 0.44)	358 (251 to 481)	0.25 (0.18 to 0.34)
2	Jun	600 (304 to 1,016)	0.42 (0.21 to 0.71)	603 (389 to 812)	0.42 (0.27 to 0.57)
2	Jul	1,897 (735 to 3,854)	1.33 (0.52 to 2.71)	1851 (1,160 to 2,708)	1.30 (0.82 to 1.91)
2	Aug	n/a	n/a	14 (0 to 37)	0.01 (0.00 to 0.03)
2	Sep	n/a	n/a	26 (0 to 61)	0.02 (0.00 to 0.04)
2	Oct	n/a	n/a	152 (75 to 243)	0.11 (0.05 to 0.17)
2	Nov	517 (304 to 823)	0.36 (0.21 to 0.58)	512 (380 to 668)	0.36 (0.27 to 0.47)
2	Dec	2,337 (1,481 to 3,506)	1.64 (1.04 to 2.46)	2,287 (1,911 to 2,732)	1.61 (1.35 to 1.92)
2	Jan	1,841 (1,184 to 2,747)	1.29 (0.83 to 1.93)	1,846 (1,525 to 2,183)	1.30 (1.07 to 1.54)
2	Feb	2,517 (1,543 to 3,822)	1.77 (1.08 to 2.69)	2,371 (1,945 to 2,847)	1.67 (1.37 to 2.00)

Table 1.18: Design-based black-legged kittiwake (flying) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1), and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	253 (177 to 336)	0.56 (0.39 to 0.75)	538 (394 to 692)	0.84 (0.62 to 1.08)	640 (495 to 792)	0.75 (0.58 to 0.93)	1,167 (910 to 1,437)	0.82 (0.64 to 1.01)
1	Apr	37 (18 to 62)	0.08 (0.04 to 0.14)	72 (41 to 106)	0.11 (0.06 to 0.17)	94 (60 to 133)	0.11 (0.07 to 0.16)	171 (119 to 230)	0.12 (0.08 to 0.16)
1	May	10 (0 to 20)	0.02 (0.00 to 0.05)	15 (0 to 30)	0.02 (0.00 to 0.05)	15 (0 to 31)	0.02 (0.00 to 0.04)	45 (20 to 77)	0.03 (0.01 to 0.05)
1	Jun	149 (93 to 220)	0.33 (0.21 to 0.49)	221 (153 to 309)	0.35 (0.24 to 0.48)	327 (230 to 449)	0.38 (0.27 to 0.53)	634 (498 to 797)	0.45 (0.35 to 0.56)
1	Jul	137 (80 to 206)	0.30 (0.18 to 0.46)	184 (115 to 259)	0.29 (0.18 to 0.41)	204 (140 to 297)	0.24 (0.16 to 0.35)	348 (263 to 459)	0.24 (0.19 to 0.32)
1	Aug	38 (16 to 66)	0.08 (0.04 to 0.15)	43 (20 to 70)	0.07 (0.03 to 0.11)	56 (29 to 88)	0.07 (0.03 to 0.10)	90 (50 to 128)	0.06 (0.04 to 0.09)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	5 (0 to 16)	0.01 (0.00 to 0.02)	20 (0 to 42)	0.02 (0.00 to 0.05)	103 (60 to 158)	0.07 (0.04 to 0.11)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	11 (0 to 28)	0.01 (0.00 to 0.03)	32 (10 to 61)	0.02 (0.01 to 0.04)
1	Nov	190 (125 to 269)	0.42 (0.28 to 0.60)	315 (221 to 412)	0.49 (0.35 to 0.64)	490 (375 to 639)	0.57 (0.44 to 0.75)	877 (705 to 1,083)	0.62 (0.50 to 0.76)
1	Dec	136 (77 to 203)	0.30 (0.17 to 0.45)	249 (177 to 349)	0.39 (0.28 to 0.55)	365 (264 to 473)	0.43 (0.31 to 0.55)	557 (438 to 696)	0.39 (0.31 to 0.49)
1	Jan	304 (209 to 403)	0.68 (0.47 to 0.90)	377 (277 to 500)	0.59 (0.43 to 0.78)	496 (382 to 630)	0.58 (0.45 to 0.74)	674 (541 to 824)	0.47 (0.38 to 0.58)
1	Feb	229 (153 to 311)	0.51 (0.34 to 0.69)	298 (211 to 392)	0.47 (0.33 to 0.61)	376 (283 to 485)	0.44 (0.33 to 0.57)	532 (420 to 653)	0.37 (0.30 to 0.46)
2	Mar	578 (437 to 732)	1.28 (0.97 to 1.63)	786 (611 to 964)	1.23 (0.96 to 1.51)	1,432 (1,052 to 1,873)	1.68 (1.23 to 2.19)	2,466 (1,970 to 2,995)	1.74 (1.39 to 2.11)
2	Apr	226 (160 to 296)	0.50 (0.36 to 0.66)	320 (232 to 410)	0.50 (0.36 to 0.64)	475 (360 to 594)	0.56 (0.42 to 0.70)	834 (684 to 1,001)	0.59 (0.48 to 0.71)
2	May	74 (30 to 136)	0.16 (0.07 to 0.30)	104 (42 to 173)	0.16 (0.07 to 0.27)	142 (78 to 231)	0.17 (0.09 to 0.27)	338 (237 to 454)	0.24 (0.17 to 0.32)
2	Jun	30 (13 to 52)	0.07 (0.03 to 0.11)	55 (29 to 89)	0.09 (0.04 to 0.14)	139 (88 to 210)	0.16 (0.10 to 0.25)	305 (197 to 410)	0.21 (0.14 to 0.29)
2	Jul	199 (112 to 318)	0.44 (0.25 to 0.71)	231 (140 to 344)	0.36 (0.22 to 0.54)	347 (240 to 484)	0.41 (0.28 to 0.57)	983 (616 to 1,438)	0.69 (0.43 to 1.01)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	14 (0 to 37)	0.01 (0.00 to 0.03)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	5 (0 to 15)	0.01 (0.00 to 0.02)	5 (0 to 15)	0.01 (0.00 to 0.02)	20 (0 to 46)	0.01 (0.00 to 0.03)
2	Oct	26 (5 to 50)	0.06 (0.01 to 0.11)	31 (10 to 61)	0.05 (0.02 to 0.09)	48 (16 to 89)	0.06 (0.02 to 0.10)	118 (58 to 188)	0.08 (0.04 to 0.13)
2	Nov	68 (32 to 117)	0.15 (0.07 to 0.26)	119 (65 to 175)	0.19 (0.10 to 0.27)	183 (121 to 264)	0.21 (0.14 to 0.31)	433 (322 to 565)	0.31 (0.23 to 0.40)
2	Dec	718 (529 to 962)	1.60 (1.18 to 2.14)	1,110 (856 to 1,420)	1.74 (1.34 to 2.22)	1,397 (1074 to 1,697)	1.64 (1.26 to 1.99)	1,963 (1,640 to 2,345)	1.38 (1.16 to 1.65)
2	Jan	337 (248 to 449)	0.75 (0.55 to 1.00)	408 (313 to 523)	0.64 (0.49 to 0.82)	483 (384 to 599)	0.57 (0.45 to 0.70)	883 (729 to 1,044)	0.62 (0.51 to 0.74)
2	Feb	671 (487 to 910)	1.49 (1.08 to 2.02)	810 (598 to 1,033)	1.27 (0.94 to 1.62)	1,044 (805 to 1,278)	1.22 (0.94 to 1.50)	1,455 (1,194 to 1,747)	1.02 (0.84 to 1.23)

Table 1.19: Design-based black-legged kittiwake (sitting) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	230 (161 to 306)	0.51 (0.36 to 0.68)	489 (358 to 629)	0.77 (0.56 to 0.98)	582 (449 to 720)	0.68 (0.53 to 0.84)	1,061 (827 to 1,305)	0.75 (0.58 to 0.92)
1	Apr	61 (29 to 100)	0.13 (0.06 to 0.22)	117 (67 to 172)	0.18 (0.11 to 0.27)	153 (98 to 217)	0.18 (0.11 to 0.25)	278 (193 to 374)	0.20 (0.14 to 0.26)
1	May	1 (0 to 2)	0.00 (0.00 to 0.01)	2 (0 to 3)	0.00 (0.00 to 0.01)	2 (0 to 3)	0.00 (0.00 to 0.00)	5 (2 to 9)	0.00 (0.00 to 0.01)
1	Jun	51 (32 to 76)	0.11 (0.07 to 0.17)	76 (53 to 107)	0.12 (0.08 to 0.17)	113 (79 to 155)	0.13 (0.09 to 0.18)	218 (172 to 275)	0.15 (0.12 to 0.19)
1	Jul	15 (9 to 23)	0.03 (0.02 to 0.05)	20 (13 to 29)	0.03 (0.02 to 0.05)	23 (16 to 33)	0.03 (0.02 to 0.04)	39 (29 to 51)	0.03 (0.02 to 0.04)
1	Aug	23 (10 to 41)	0.05 (0.02 to 0.09)	26 (13 to 43)	0.04 (0.02 to 0.07)	34 (18 to 54)	0.04 (0.02 to 0.06)	55 (31 to 79)	0.04 (0.02 to 0.06)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	2 (0 to 7)	0.00 (0.00 to 0.01)	9 (0 to 18)	0.01 (0.00 to 0.02)	44 (26 to 68)	0.03 (0.02 to 0.05)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	2 (0 to 6)	0.00 (0.00 to 0.01)	6 (2 to 12)	0.00 (0.00 to 0.01)
1	Nov	50 (33 to 71)	0.11 (0.07 to 0.16)	83 (59 to 109)	0.13 (0.09 to 0.17)	130 (99 to 169)	0.15 (0.12 to 0.20)	232 (187 to 287)	0.16 (0.13 to 0.20)
1	Dec	33 (19 to 50)	0.07 (0.04 to 0.11)	61 (43 to 85)	0.10 (0.07 to 0.13)	89 (64 to 115)	0.10 (0.08 to 0.14)	136 (107 to 170)	0.10 (0.08 to 0.12)
1	Jan	85 (58 to 112)	0.19 (0.13 to 0.25)	105 (77 to 139)	0.16 (0.12 to 0.22)	138 (107 to 176)	0.16 (0.12 to 0.21)	188 (151 to 230)	0.13 (0.11 to 0.16)
1	Feb	54 (36 to 74)	0.12 (0.08 to 0.16)	71 (50 to 93)	0.11 (0.08 to 0.15)	89 (67 to 115)	0.10 (0.08 to 0.13)	126 (100 to 155)	0.09 (0.07 to 0.11)
1	Mar	361 (273 to 457)	0.80 (0.61 to 1.02)	491 (382 to 602)	0.77 (0.60 to 0.94)	894 (657 to 1,169)	1.05 (0.77 to 1.37)	1,540 (1,230 to 1,870)	1.08 (0.87 to 1.32)
2	Apr	156 (111 to 205)	0.35 (0.25 to 0.45)	221 (160 to 283)	0.35 (0.25 to 0.44)	328 (249 to 410)	0.38 (0.29 to 0.48)	576 (472 to 691)	0.41 (0.33 to 0.49)
2	May	4 (2 to 8)	0.01 (0.00 to 0.02)	6 (2 to 10)	0.01 (0.00 to 0.02)	8 (5 to 14)	0.01 (0.01 to 0.02)	20 (14 to 27)	0.01 (0.01 to 0.02)
2	Jun	29 (12 to 51)	0.06 (0.03 to 0.11)	54 (28 to 87)	0.08 (0.04 to 0.14)	135 (87 to 205)	0.16 (0.10 to 0.24)	298 (193 to 401)	0.21 (0.14 to 0.28)
2	Jul	176 (99 to 281)	0.39 (0.22 to 0.62)	204 (123 to 304)	0.32 (0.19 to 0.48)	306 (212 to 427)	0.36 (0.25 to 0.50)	868 (544 to 1,270)	0.61 (0.38 to 0.89)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	2 (0 to 5)	0.00 (0.00 to 0.01)	2 (0 to 5)	0.00 (0.00 to 0.01)	7 (0 to 15)	0.00 (0.00 to 0.01)
2	Oct	8 (1 to 15)	0.02 (0.00 to 0.03)	9 (3 to 18)	0.01 (0.00 to 0.03)	14 (5 to 26)	0.02 (0.01 to 0.03)	35 (17 to 55)	0.02 (0.01 to 0.04)
2	Nov	12 (6 to 21)	0.03 (0.01 to 0.05)	22 (12 to 32)	0.03 (0.02 to 0.05)	33 (22 to 48)	0.04 (0.03 to 0.06)	79 (59 to 103)	0.06 (0.04 to 0.07)
2	Dec	119 (87 to 159)	0.26 (0.19 to 0.35)	183 (141 to 234)	0.29 (0.22 to 0.37)	230 (177 to 280)	0.27 (0.21 to 0.33)	324 (271 to 387)	0.23 (0.19 to 0.27)
2	Jan	368 (271 to 490)	0.82 (0.60 to 1.09)	445 (341 to 570)	0.70 (0.53 to 0.89)	527 (418 to 654)	0.62 (0.49 to 0.77)	963 (796 to 1,139)	0.68 (0.56 to 0.80)
2	Feb	422 (306 to 572)	0.94 (0.68 to 1.27)	510 (377 to 650)	0.80 (0.59 to 1.02)	657 (506 to 804)	0.77 (0.59 to 0.94)	916 (751 to 1,099)	0.64 (0.53 to 0.77)

Table 1.20: Design-based black-legged kittiwake (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	482 (338 to 642)	1.07 (0.75 to 1.43)	1,028 (752 to 1,321)	1.61 (1.18 to 2.07)	1222 (944 to 1,513)	1.43 (1.11 to 1.77)	2,228 (1,738 to 2,742)	1.57 (1.22 to 1.93)
1	Apr	98 (47 to 162)	0.22 (0.10 to 0.36)	189 (109 to 277)	0.30 (0.17 to 0.43)	247 (158 to 350)	0.29 (0.18 to 0.41)	449 (312 to 605)	0.32 (0.22 to 0.43)
1	May	11 (0 to 23)	0.02 (0.00 to 0.05)	16 (0 to 34)	0.03 (0.00 to 0.05)	17 (0 to 34)	0.02 (0.00 to 0.04)	50 (22 to 86)	0.04 (0.02 to 0.06)
1	Jun	200 (125 to 296)	0.45 (0.28 to 0.66)	297 (206 to 416)	0.46 (0.32 to 0.65)	440 (310 to 603)	0.51 (0.36 to 0.71)	852 (670 to 1,072)	0.60 (0.47 to 0.75)
1	Jul	152 (89 to 229)	0.34 (0.20 to 0.51)	204 (127 to 288)	0.32 (0.20 to 0.45)	227 (155 to 329)	0.27 (0.18 to 0.39)	386 (292 to 510)	0.27 (0.21 to 0.36)
1	Aug	62 (26 to 107)	0.14 (0.06 to 0.24)	69 (33 to 114)	0.11 (0.05 to 0.18)	90 (47 to 143)	0.11 (0.05 to 0.17)	145 (81 to 207)	0.10 (0.06 to 0.15)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	8 (0 to 22)	0.01 (0.00 to 0.04)	29 (0 to 60)	0.03 (0.00 to 0.07)	147 (86 to 225)	0.10 (0.06 to 0.16)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 33)	0.02 (0.00 to 0.04)	39 (13 to 73)	0.03 (0.01 to 0.05)
1	Nov	240 (158 to 340)	0.53 (0.35 to 0.75)	398 (280 to 521)	0.62 (0.44 to 0.82)	620 (474 to 808)	0.73 (0.56 to 0.95)	1,109 (891 to 1,370)	0.78 (0.63 to 0.96)
1	Dec	169 (96 to 253)	0.38 (0.21 to 0.56)	310 (220 to 434)	0.49 (0.34 to 0.68)	454 (328 to 588)	0.53 (0.38 to 0.69)	693 (545 to 866)	0.49 (0.38 to 0.61)
1	Jan	388 (268 to 515)	0.86 (0.60 to 1.15)	482 (355 to 639)	0.75 (0.56 to 1.00)	635 (489 to 806)	0.74 (0.57 to 0.94)	862 (691 to 1,054)	0.61 (0.49 to 0.74)
1	Feb	283 (189 to 385)	0.63 (0.42 to 0.86)	369 (261 to 485)	0.58 (0.41 to 0.76)	466 (350 to 600)	0.55 (0.41 to 0.70)	658 (519 to 808)	0.46 (0.37 to 0.57)
1	Mar	939 (709 to 1,189)	2.09 (1.58 to 2.64)	1,276 (993 to 1,565)	2.00 (1.55 to 2.45)	2,326 (1,709 to 3,042)	2.73 (2.00 to 3.56)	4,006 (3,201 to 4,866)	2.82 (2.25 to 3.43)
2	Apr	382 (271 to 501)	0.85 (0.60 to 1.11)	540 (392 to 694)	0.85 (0.61 to 1.08)	803 (608 to 1,005)	0.94 (0.71 to 1.18)	1,410 (1,157 to 1,693)	0.99 (0.81 to 1.19)
2	May	78 (31 to 144)	0.17 (0.07 to 0.32)	110 (44 to 184)	0.17 (0.07 to 0.29)	151 (83 to 245)	0.18 (0.10 to 0.29)	358 (251 to 481)	0.25 (0.18 to 0.34)
2	Jun	58 (25 to 102)	0.13 (0.06 to 0.23)	109 (56 to 176)	0.17 (0.09 to 0.28)	274 (175 to 415)	0.32 (0.21 to 0.49)	603 (389 to 812)	0.42 (0.27 to 0.57)
2	Jul	375 (210 to 599)	0.83 (0.47 to 1.33)	434 (263 to 648)	0.68 (0.41 to 1.01)	653 (453 to 911)	0.76 (0.53 to 1.07)	1,851 (1,160 to 2,708)	1.30 (0.82 to 1.91)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	14 (0 to 37)	0.01 (0.00 to 0.03)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.01 (0.00 to 0.03)	6 (0 to 20)	0.01 (0.00 to 0.02)	26 (0 to 61)	0.02 (0.00 to 0.04)
2	Oct	34 (7 to 65)	0.08 (0.01 to 0.14)	41 (13 to 79)	0.06 (0.02 to 0.12)	62 (20 to 115)	0.07 (0.02 to 0.13)	152 (75 to 243)	0.11 (0.05 to 0.17)
2	Nov	80 (38 to 138)	0.18 (0.08 to 0.31)	140 (77 to 207)	0.22 (0.12 to 0.32)	216 (143 to 313)	0.25 (0.17 to 0.37)	512 (380 to 668)	0.36 (0.27 to 0.47)
2	Dec	837 (616 to 1,120)	1.86 (1.37 to 2.49)	1,293 (997 to 1,654)	2.02 (1.56 to 2.59)	1,627 (1,251 to 1,977)	1.91 (1.47 to 2.32)	2,287 (1,911 to 2,732)	1.61 (1.35 to 1.92)
2	Jan	704 (520 to 940)	1.57 (1.15 to 2.09)	852 (654 to 1,093)	1.33 (1.02 to 1.71)	1,010 (802 to 1,253)	1.18 (0.94 to 1.47)	1,846 (1,525 to 2,183)	1.30 (1.07 to 1.54)
2	Feb	1,094 (793 to 1,482)	2.43 (1.76 to 3.29)	1,319 (975 to 1,684)	2.06 (1.53 to 2.63)	1,700 (1,311 to 2,082)	1.99 (1.54 to 2.44)	2,371 (1,945 to 2,847)	1.67 (1.37 to 2.00)

Great black-backed gull

1.3.3.5 Design-based estimates were produced despite the very low total sample size (128 sightings recorded between March 2020 and February 2022).

1.3.3.6 Design-based estimates produced by behaviour (sitting, flying, and all behaviour) are given for each boundary (Table 1.21; Table 1.22; Table 1.23). The highest population estimate was recorded in February 2022 with 213 individuals (95% CI range: 85 to 398) for the Mona Offshore Ornithology Array Area study area (Table 1.23). The species was most frequently recorded during the non-breeding period (Table 1.23).

Herring gull

1.3.3.7 Herring gull has a very coastal distribution. In both the breeding (March to August) and the non-breeding season (September to February), Waggitt *et al.* (2020) found very low densities within the Mona Array Area.

1.3.3.1 The digital aerial survey results confirmed this patten of usage, with only 72 confirmed sightings of herring gull recorded between March 2020 and February 2022. Despite the small sample size, design-based estimates were produced by behaviour (sitting, flying, and all behaviour) and given for each boundary (Table 1.24; Table 1.25; Table 1.26).

1.3.3.2 As expected, the species was most frequently recorded outside the breeding season. Within the Mona Offshore Ornithology Array Area study area, the highest population estimate (all behaviour) was recorded in February in Year 1 and 2, with respectively 146 individuals (95% CI range: 61 to 255) and 74 individuals (95% CI range: 23 to 154).

Lesser black-backed gull

1.3.3.3 Similarly to herring gull, lesser black-backed gull has a very restricted coastal distribution during the breeding season (April to August) (Waggitt *et al*., 2020; Bradbury *et al*., 2014); the review of desk-based studies showed a low utilisation of the Mona Array Area.

1.3.3.4 There were 55 sightings of lesser black-backed gull recorded during the March 2020 to February 2022 digital aerial surveys. The relative paucity of sightings during the surveys validated the findings of the desk-based studies reviewed in this report (Waggitt *et al*., 2020; Bradbury *et al.,* 2014).

1.3.3.5 Despite the low sample size (55 sightings) design-based estimates produced by behaviour (sitting, flying, and all behaviour) are given for each boundary (Table 1.27; Table 1.28; Table 1.29).

1.3.3.6 The species was most frequently recorded during the breeding season. Within the Mona Offshore Ornithology Array Area study area, the highest population estimate (all behaviour) was recorded in June 2021 with 93 individuals (95% CI range: 40 to 152).

Table 1.21: Design-based great black-backed gull (flying) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	1 (0 to 3)	0.00 (0.00 to 0.01)	1 (0 to 3)	0.00 (0.00 to 0.00)	1 (0 to 3)	0.00 (0.00 to 0.00)	7 (0 to 16)	0.01 (0.00 to 0.01)
1	Jun	7 (0 to 22)	0.02 (0.00 to 0.05)	7 (0 to 22)	0.01 (0.00 to 0.03)	7 (0 to 22)	0.01 (0.00 to 0.03)	7 (0 to 22)	0.00 (0.00 to 0.02)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	3 (0 to 8)	0.00 (0.00 to 0.01)	8 (0 to 16)	0.01 (0.00 to 0.02)	13 (3 to 24)	0.01 (0.00 to 0.02)
1	Aug	65 (0 to 134)	0.14 (0.00 to 0.30)	65 (0 to 132)	0.10 (0.00 to 0.21)	66 (0 to 133)	0.08 (0.00 to 0.16)	66 (0 to 134)	0.05 (0.00 to 0.09)
1	Sep	35 (17 to 63)	0.08 (0.04 to 0.14)	39 (17 to 62)	0.06 (0.03 to 0.10)	56 (28 to 88)	0.07 (0.03 to 0.10)	82 (49 to 125)	0.06 (0.03 to 0.09)
1	Oct	34 (8 to 67)	0.08 (0.02 to 0.15)	42 (13 to 79)	0.07 (0.02 to 0.12)	45 (17 to 84)	0.05 (0.02 to 0.10)	47 (19 to 88)	0.03 (0.01 to 0.06)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	3 (0 to 8)	0.00 (0.00 to 0.01)	8 (0 to 16)	0.01 (0.00 to 0.01)
1	Dec	12 (5 to 23)	0.03 (0.01 to 0.05)	12 (5 to 23)	0.02 (0.01 to 0.04)	14 (7 to 24)	0.02 (0.01 to 0.03)	22 (10 to 36)	0.02 (0.01 to 0.03)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)
1	Mar	54 (10 to 122)	0.12 (0.02 to 0.27)	59 (10 to 120)	0.09 (0.02 to 0.19)	75 (26 to 143)	0.09 (0.03 to 0.17)	108 (47 to 182)	0.08 (0.03 to 0.13)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	3 (0 to 6)	0.01 (0.00 to 0.01)	3 (0 to 6)	0.00 (0.00 to 0.01)	10 (2 to 18)	0.01 (0.00 to 0.02)	13 (5 to 22)	0.01 (0.00 to 0.02)
2	Jun	7 (0 to 20)	0.02 (0.00 to 0.05)	7 (0 to 20)	0.01 (0.00 to 0.03)	14 (0 to 34)	0.02 (0.00 to 0.04)	20 (0 to 40)	0.01 (0.00 to 0.03)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	5 (0 to 17)	0.00 (0.00 to 0.01)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	4 (0 to 11)	0.01 (0.00 to 0.03)	4 (0 to 11)	0.01 (0.00 to 0.02)	6 (0 to 14)	0.01 (0.00 to 0.02)	6 (0 to 14)	0.00 (0.00 to 0.01)
2	Oct	3 (0 to 7)	0.01 (0.00 to 0.01)	3 (0 to 7)	0.01 (0.00 to 0.01)	3 (0 to 7)	0.00 (0.00 to 0.01)	7 (2 to 13)	0.00 (0.00 to 0.01)
2	Nov	4 (0 to 13)	0.01 (0.00 to 0.03)	4 (0 to 13)	0.01 (0.00 to 0.02)	4 (0 to 13)	0.00 (0.00 to 0.02)	6 (0 to 15)	0.00 (0.00 to 0.01)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)
2	Jan	7 (0 to 22)	0.02 (0.00 to 0.05)	7 (0 to 21)	0.01 (0.00 to 0.03)	7 (0 to 22)	0.01 (0.00 to 0.03)	7 (0 to 22)	0.00 (0.00 to 0.02)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.22: Design-based great black-backed gull (sitting) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	10 (0 to 26)	0.02 (0.00 to 0.06)	10 (0 to 26)	0.02 (0.00 to 0.04)	41 (10 to 72)	0.05 (0.01 to 0.08)	51 (20 to 88)	0.04 (0.01 to 0.06)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	29 (5 to 65)	0.06 (0.01 to 0.15)	32 (5 to 65)	0.05 (0.01 to 0.10)	41 (14 to 77)	0.05 (0.02 to 0.09)	58 (25 to 98)	0.04 (0.02 to 0.07)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	6 (0 to 19)	0.01 (0.00 to 0.04)	6 (0 to 19)	0.01 (0.00 to 0.03)	6 (0 to 19)	0.01 (0.00 to 0.02)	43 (0 to 96)	0.03 (0.00 to 0.07)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	8 (0 to 27)	0.02 (0.00 to 0.06)	8 (0 to 26)	0.01 (0.00 to 0.04)	8 (0 to 27)	0.01 (0.00 to 0.03)	13 (0 to 31)	0.01 (0.00 to 0.02)
1	Nov	9 (0 to 23)	0.02 (0.00 to 0.05)	9 (0 to 23)	0.01 (0.00 to 0.04)	13 (0 to 27)	0.02 (0.00 to 0.03)	13 (0 to 27)	0.01 (0.00 to 0.02)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	4 (0 to 12)	0.01 (0.00 to 0.02)	11 (0 to 24)	0.01 (0.00 to 0.03)	19 (4 to 36)	0.01 (0.00 to 0.03)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	5 (0 to 16)	0.01 (0.00 to 0.02)	16 (0 to 32)	0.01 (0.00 to 0.02)
1	Feb	32 (15 to 57)	0.07 (0.03 to 0.13)	35 (16 to 57)	0.06 (0.02 to 0.09)	52 (25 to 81)	0.06 (0.03 to 0.09)	75 (45 to 115)	0.05 (0.03 to 0.08)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	10 (0 to 20)	0.02 (0.00 to 0.04)	10 (0 to 20)	0.02 (0.00 to 0.03)	10 (0 to 20)	0.01 (0.00 to 0.02)	20 (5 to 40)	0.01 (0.00 to 0.03)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	40 (16 to 76)	0.09 (0.04 to 0.17)	40 (16 to 75)	0.06 (0.03 to 0.12)	45 (22 to 81)	0.05 (0.03 to 0.10)	74 (33 to 122)	0.05 (0.02 to 0.09)
2	Feb	120 (29 to 234)	0.27 (0.06 to 0.52)	145 (46 to 275)	0.23 (0.07 to 0.43)	158 (59 to 295)	0.19 (0.07 to 0.35)	166 (66 to 309)	0.12 (0.05 to 0.22)

Table 1.23: Design-based great black-backed gull (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	13 (0 to 32)	0.03 (0.00 to 0.07)	13 (0 to 32)	0.02 (0.00 to 0.05)	51 (12 to 90)	0.06 (0.01 to 0.11)	64 (24 to 109)	0.04 (0.02 to 0.08)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	5 (0 to 17)	0.00 (0.00 to 0.01)
1	Jun	83 (16 to 187)	0.18 (0.03 to 0.42)	90 (16 to 185)	0.14 (0.02 to 0.29)	116 (40 to 220)	0.14 (0.05 to 0.26)	166 (73 to 279)	0.12 (0.05 to 0.20)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	7 (0 to 22)	0.02 (0.00 to 0.05)	7 (0 to 22)	0.01 (0.00 to 0.03)	7 (0 to 22)	0.01 (0.00 to 0.03)	50 (0 to 111)	0.04 (0.00 to 0.08)
1	Sep	7 (0 to 22)	0.02 (0.00 to 0.05)	7 (0 to 21)	0.01 (0.00 to 0.03)	7 (0 to 22)	0.01 (0.00 to 0.03)	7 (0 to 22)	0.00 (0.00 to 0.02)
1	Oct	12 (0 to 40)	0.03 (0.00 to 0.09)	12 (0 to 40)	0.02 (0.00 to 0.06)	12 (0 to 40)	0.01 (0.00 to 0.05)	19 (0 to 46)	0.01 (0.00 to 0.03)
1	Nov	13 (0 to 34)	0.03 (0.00 to 0.08)	13 (0 to 34)	0.02 (0.00 to 0.05)	19 (0 to 41)	0.02 (0.00 to 0.05)	19 (0 to 41)	0.01 (0.00 to 0.03)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	19 (0 to 41)	0.02 (0.00 to 0.05)	32 (6 to 61)	0.02 (0.00 to 0.04)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	8 (0 to 24)	0.01 (0.00 to 0.03)	23 (0 to 48)	0.02 (0.00 to 0.03)
1	Feb	67 (32 to 120)	0.15 (0.07 to 0.27)	74 (32 to 119)	0.12 (0.05 to 0.19)	108 (53 to 169)	0.13 (0.06 to 0.20)	157 (94 to 240)	0.11 (0.07 to 0.17)
1	Mar	7 (0 to 20)	0.02 (0.00 to 0.05)	7 (0 to 20)	0.01 (0.00 to 0.03)	14 (0 to 34)	0.02 (0.00 to 0.04)	20 (0 to 40)	0.01 (0.00 to 0.03)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)
2	Aug	7 (0 to 22)	0.02 (0.00 to 0.05)	7 (0 to 22)	0.01 (0.00 to 0.03)	7 (0 to 22)	0.01 (0.00 to 0.03)	7 (0 to 22)	0.00 (0.00 to 0.02)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)
2	Nov	13 (0 to 27)	0.03 (0.00 to 0.06)	13 (0 to 27)	0.02 (0.00 to 0.04)	13 (0 to 27)	0.02 (0.00 to 0.03)	26 (6 to 54)	0.02 (0.00 to 0.04)
2	Dec	65 (0 to 134)	0.14 (0.00 to 0.30)	65 (0 to 132)	0.10 (0.00 to 0.21)	66 (0 to 133)	0.08 (0.00 to 0.16)	66 (0 to 134)	0.05 (0.00 to 0.09)
2	Jan	51 (21 to 99)	0.11 (0.05 to 0.22)	52 (21 to 98)	0.08 (0.03 to 0.15)	59 (28 to 106)	0.07 (0.03 to 0.12)	97 (43 to 158)	0.07 (0.03 to 0.11)
2	Feb	154 (37 to 300)	0.34 (0.08 to 0.67)	187 (60 to 354)	0.29 (0.09 to 0.55)	203 (76 to 380)	0.24 (0.09 to 0.44)	213 (85 to 398)	0.15 (0.06 to 0.28)

Table 1.24: Design-based herring gull (flying) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	3 (0 to 7)	0.01 (0.00 to 0.02)	3 (0 to 7)	0.00 (0.00 to 0.01)	4 (1 to 9)	0.00 (0.00 to 0.01)	6 (2 to 11)	0.00 (0.00 to 0.01)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	10 (0 to 20)	0.01 (0.00 to 0.01)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	8 (0 to 21)	0.01 (0.00 to 0.01)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	15 (0 to 32)	0.03 (0.00 to 0.07)	15 (0 to 32)	0.02 (0.00 to 0.05)	15 (0 to 32)	0.02 (0.00 to 0.04)	21 (5 to 43)	0.01 (0.00 to 0.03)
1	Oct	7 (0 to 20)	0.01 (0.00 to 0.04)	7 (0 to 20)	0.01 (0.00 to 0.03)	7 (0 to 20)	0.01 (0.00 to 0.02)	26 (6 to 53)	0.02 (0.00 to 0.04)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.01 (0.00 to 0.02)	13 (0 to 34)	0.01 (0.00 to 0.02)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	5 (0 to 16)	0.01 (0.00 to 0.04)	5 (0 to 16)	0.01 (0.00 to 0.03)	10 (0 to 22)	0.01 (0.00 to 0.03)	15 (0 to 32)	0.01 (0.00 to 0.02)
1	Feb	6 (0 to 12)	0.01 (0.00 to 0.03)	12 (4 to 24)	0.02 (0.01 to 0.04)	16 (6 to 28)	0.02 (0.01 to 0.03)	42 (17 to 73)	0.03 (0.01 to 0.05)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	4 (0 to 12)	0.01 (0.00 to 0.03)	4 (0 to 12)	0.01 (0.00 to 0.02)	4 (0 to 12)	0.00 (0.00 to 0.01)	20 (4 to 41)	0.01 (0.00 to 0.03)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	9 (0 to 31)	0.01 (0.00 to 0.02)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 34)	0.01 (0.00 to 0.02)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	22 (0 to 45)	0.05 (0.00 to 0.10)	29 (7 to 60)	0.05 (0.01 to 0.09)	30 (7 to 60)	0.03 (0.01 to 0.07)	37 (7 to 68)	0.03 (0.01 to 0.05)
2	Feb	24 (7 to 51)	0.05 (0.02 to 0.11)	24 (8 to 51)	0.04 (0.01 to 0.08)	24 (8 to 51)	0.03 (0.01 to 0.06)	25 (8 to 51)	0.02 (0.01 to 0.04)

Table 1.25: Design-based herring gull (sitting) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	22 (0 to 51)	0.05 (0.00 to 0.11)	22 (0 to 51)	0.03 (0.00 to 0.08)	27 (5 to 62)	0.03 (0.01 to 0.07)	44 (11 to 79)	0.03 (0.01 to 0.06)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	10 (0 to 20)	0.01 (0.00 to 0.01)
1	May	5 (0 to 17)	0.01 (0.00 to 0.04)	5 (0 to 17)	0.01 (0.00 to 0.03)	5 (0 to 17)	0.01 (0.00 to 0.02)	6 (0 to 17)	0.00 (0.00 to 0.01)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	8 (0 to 21)	0.01 (0.00 to 0.01)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 22)	0.01 (0.00 to 0.02)
1	Sep	5 (0 to 11)	0.01 (0.00 to 0.02)	5 (0 to 11)	0.01 (0.00 to 0.02)	5 (0 to 11)	0.01 (0.00 to 0.01)	7 (2 to 14)	0.00 (0.00 to 0.01)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	3 (0 to 8)	0.01 (0.00 to 0.02)	3 (0 to 8)	0.00 (0.00 to 0.01)	5 (0 to 11)	0.01 (0.00 to 0.01)	8 (0 to 16)	0.01 (0.00 to 0.01)
1	Feb	15 (0 to 30)	0.03 (0.00 to 0.07)	30 (9 to 60)	0.05 (0.01 to 0.09)	40 (14 to 70)	0.05 (0.02 to 0.08)	104 (43 to 182)	0.07 (0.03 to 0.13)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	3 (0 to 8)	0.01 (0.00 to 0.02)	3 (0 to 8)	0.00 (0.00 to 0.01)	3 (0 to 8)	0.00 (0.00 to 0.01)	14 (3 to 27)	0.01 (0.00 to 0.02)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	48 (15 to 103)	0.11 (0.03 to 0.23)	48 (15 to 103)	0.08 (0.02 to 0.16)	49 (15 to 102)	0.06 (0.02 to 0.12)	49 (15 to 103)	0.03 (0.01 to 0.07)

Table 1.26: Design-based herring gull (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	25 (0 to 58)	0.06 (0.00 to 0.13)	25 (0 to 58)	0.04 (0.00 to 0.09)	31 (6 to 71)	0.04 (0.01 to 0.08)	51 (12 to 90)	0.04 (0.01 to 0.06)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	19 (0 to 41)	0.01 (0.00 to 0.03)
1	May	5 (0 to 17)	0.01 (0.00 to 0.04)	5 (0 to 17)	0.01 (0.00 to 0.03)	5 (0 to 17)	0.01 (0.00 to 0.02)	6 (0 to 17)	0.00 (0.00 to 0.01)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	17 (0 to 42)	0.01 (0.00 to 0.03)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 22)	0.01 (0.00 to 0.02)
1	Sep	20 (0 to 43)	0.04 (0.00 to 0.10)	20 (0 to 43)	0.03 (0.00 to 0.07)	20 (0 to 43)	0.02 (0.00 to 0.05)	28 (7 to 57)	0.02 (0.00 to 0.04)
1	Oct	7 (0 to 20)	0.01 (0.00 to 0.04)	7 (0 to 20)	0.01 (0.00 to 0.03)	7 (0 to 20)	0.01 (0.00 to 0.02)	26 (6 to 53)	0.02 (0.00 to 0.04)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.01 (0.00 to 0.02)	13 (0 to 34)	0.01 (0.00 to 0.02)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	8 (0 to 24)	0.02 (0.00 to 0.05)	8 (0 to 24)	0.01 (0.00 to 0.04)	15 (0 to 32)	0.02 (0.00 to 0.04)	23 (0 to 48)	0.02 (0.00 to 0.03)
1	Feb	21 (0 to 42)	0.05 (0.00 to 0.09)	42 (13 to 84)	0.07 (0.02 to 0.13)	55 (20 to 99)	0.06 (0.02 to 0.12)	146 (61 to 255)	0.10 (0.04 to 0.18)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	7 (0 to 21)	0.01 (0.00 to 0.05)	7 (0 to 20)	0.01 (0.00 to 0.03)	7 (0 to 21)	0.01 (0.00 to 0.02)	34 (6 to 68)	0.02 (0.00 to 0.05)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	9 (0 to 31)	0.01 (0.00 to 0.02)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 34)	0.01 (0.00 to 0.02)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	22 (0 to 45)	0.05 (0.00 to 0.10)	29 (7 to 60)	0.05 (0.01 to 0.09)	30 (7 to 60)	0.03 (0.01 to 0.07)	37 (7 to 68)	0.03 (0.01 to 0.05)
2	Feb	73 (22 to 154)	0.16 (0.05 to 0.34)	73 (23 to 154)	0.11 (0.04 to 0.24)	73 (23 to 154)	0.09 (0.03 to 0.18)	74 (23 to 154)	0.05 (0.02 to 0.11)

Table 1.27: Design-based lesser black-backed gull (flying) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	6 (0 to 12)	0.01 (0.00 to 0.03)	6 (0 to 12)	0.01 (0.00 to 0.02)	15 (2 to 29)	0.02 (0.00 to 0.03)	19 (6 to 37)	0.01 (0.00 to 0.03)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	9 (0 to 22)	0.02 (0.00 to 0.05)	9 (0 to 21)	0.01 (0.00 to 0.03)	15 (3 to 31)	0.02 (0.00 to 0.04)	34 (15 to 55)	0.02 (0.01 to 0.04)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.01 (0.00 to 0.02)	7 (0 to 20)	0.00 (0.00 to 0.01)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 17)	0.00 (0.00 to 0.01)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	6 (0 to 21)	0.01 (0.00 to 0.05)	6 (0 to 20)	0.01 (0.00 to 0.03)	6 (0 to 21)	0.01 (0.00 to 0.02)	13 (0 to 34)	0.01 (0.00 to 0.02)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	26 (0 to 55)	0.06 (0.00 to 0.12)	33 (6 to 74)	0.05 (0.01 to 0.12)	39 (13 to 81)	0.05 (0.01 to 0.09)	46 (13 to 81)	0.03 (0.01 to 0.06)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	7 (0 to 21)	0.01 (0.00 to 0.02)	7 (0 to 21)	0.00 (0.00 to 0.01)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 34)	0.01 (0.00 to 0.02)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	37 (0 to 81)	0.03 (0.00 to 0.06)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	21 (0 to 54)	0.05 (0.00 to 0.12)	21 (0 to 54)	0.03 (0.00 to 0.08)	21 (0 to 54)	0.03 (0.00 to 0.06)	27 (0 to 59)	0.02 (0.00 to 0.04)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	6 (0 to 12)	0.01 (0.00 to 0.03)	6 (0 to 12)	0.01 (0.00 to 0.02)	8 (2 to 16)	0.01 (0.00 to 0.02)	8 (2 to 16)	0.01 (0.00 to 0.01)

Table 1.28: Design-based lesser black-backed gull (sitting) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	13 (0 to 27)	0.03 (0.00 to 0.06)	13 (0 to 27)	0.02 (0.00 to 0.04)	35 (4 to 68)	0.04 (0.00 to 0.08)	44 (13 to 85)	0.03 (0.01 to 0.06)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	16 (0 to 38)	0.04 (0.00 to 0.08)	16 (0 to 38)	0.02 (0.00 to 0.06)	27 (5 to 54)	0.03 (0.01 to 0.06)	59 (26 to 97)	0.04 (0.02 to 0.07)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	14 (0 to 35)	0.01 (0.00 to 0.02)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	10 (0 to 30)	0.01 (0.00 to 0.05)	10 (0 to 31)	0.01 (0.00 to 0.04)	10 (0 to 31)	0.01 (0.00 to 0.02)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	5 (0 to 14)	0.01 (0.00 to 0.03)	5 (0 to 13)	0.01 (0.00 to 0.02)	5 (0 to 14)	0.01 (0.00 to 0.02)	7 (0 to 15)	0.00 (0.00 to 0.01)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	17 (0 to 37)	0.04 (0.00 to 0.08)	17 (0 to 36)	0.03 (0.00 to 0.06)	23 (6 to 49)	0.03 (0.01 to 0.06)	23 (6 to 49)	0.02 (0.00 to 0.03)

Table 1.29: Design-based lesser black-backed gull (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	19 (0 to 39)	0.04 (0.00 to 0.09)	19 (0 to 39)	0.03 (0.00 to 0.06)	50 (6 to 97)	0.06 (0.01 to 0.11)	63 (18 to 122)	0.04 (0.01 to 0.09)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	25 (0 to 60)	0.06 (0.00 to 0.13)	25 (0 to 59)	0.04 (0.00 to 0.09)	42 (8 to 85)	0.05 (0.01 to 0.10)	93 (40 to 152)	0.07 (0.03 to 0.11)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.01 (0.00 to 0.02)	7 (0 to 20)	0.00 (0.00 to 0.01)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	21 (0 to 52)	0.01 (0.00 to 0.04)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	6 (0 to 21)	0.01 (0.00 to 0.05)	6 (0 to 20)	0.01 (0.00 to 0.03)	6 (0 to 21)	0.01 (0.00 to 0.02)	13 (0 to 34)	0.01 (0.00 to 0.02)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	26 (0 to 55)	0.06 (0.00 to 0.12)	33 (6 to 74)	0.05 (0.01 to 0.12)	39 (13 to 81)	0.05 (0.01 to 0.09)	46 (13 to 81)	0.03 (0.01 to 0.06)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	7 (0 to 21)	0.01 (0.00 to 0.02)	7 (0 to 21)	0.00 (0.00 to 0.01)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 34)	0.01 (0.00 to 0.02)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	10 (0 to 30)	0.01 (0.00 to 0.05)	10 (0 to 31)	0.01 (0.00 to 0.04)	10 (0 to 31)	0.01 (0.00 to 0.02)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	37 (0 to 81)	0.03 (0.00 to 0.06)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	26 (0 to 68)	0.06 (0.00 to 0.15)	26 (0 to 67)	0.04 (0.00 to 0.10)	27 (0 to 68)	0.03 (0.00 to 0.08)	33 (0 to 74)	0.02 (0.00 to 0.05)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	23 (0 to 49)	0.05 (0.00 to 0.11)	23 (0 to 49)	0.04 (0.00 to 0.08)	31 (8 to 65)	0.04 (0.01 to 0.08)	31 (8 to 65)	0.02 (0.01 to 0.05)

Common guillemot

1.3.3.7 Common guillemot was the most abundant seabird species recorded during the digital aerial surveys, with most birds found on the sea. Common guillemot distribution was heterogeneous depending on year and month. Whilst birds were widespread across the Mona Array Area plus 4 to 10km buffer in March 2020, the birds were distributed to the south and southeast of the Mona Array Area in March 2021 and April 2022, where densities upwards of 18 birds per km^2 were recorded (Figure 1.22).

1.3.3.8 Within the Mona Array Area plus 4 to 10km buffer, the highest estimates were recorded in March in Year 1 and in Year 2, with 17,177 (95% CI range: 9,723 to 27,481) and 11,786 (95% CI range: 6,325 to 20,451) respectively (Table 1.30). Numbers remained high in April 2021 (Year 2) with 9,433 individuals (95% CI range: 5,062 to 15,805). The March 2020 survey was carried out on 28 March whilst the April 2021 survey was carried out on 1 April. This time of the year coincides with the pre-season gathering of individuals returning to breeding colonies. Thereafter, abundance declined into the breeding season in both years suggesting that the area was of lower importance for common guillemot during the breeding season.

1.3.3.9 When comparing the sum of all behaviour, density estimates were similar between design-based and MRSea predictions in the Mona Array Area plus 4 to 10km buffer zone. Design-based estimates produced by behaviour (sitting, flying, and all behaviour) are given for each boundary (Table 1.31; Table 1.32; Table 1.33). MRSea estimates for each boundary area can be found in Appendix B.

1.3.3.10 During the breeding season, Bradbury *et al.* (2014) showed hotspots of activity to the southwest of the Mona Array Area, presumably by birds associated with the Welsh colonies. Our findings confirmed the pattern of usage during the early part of breeding season, although there was high inter-annual variability in the spatial distribution.

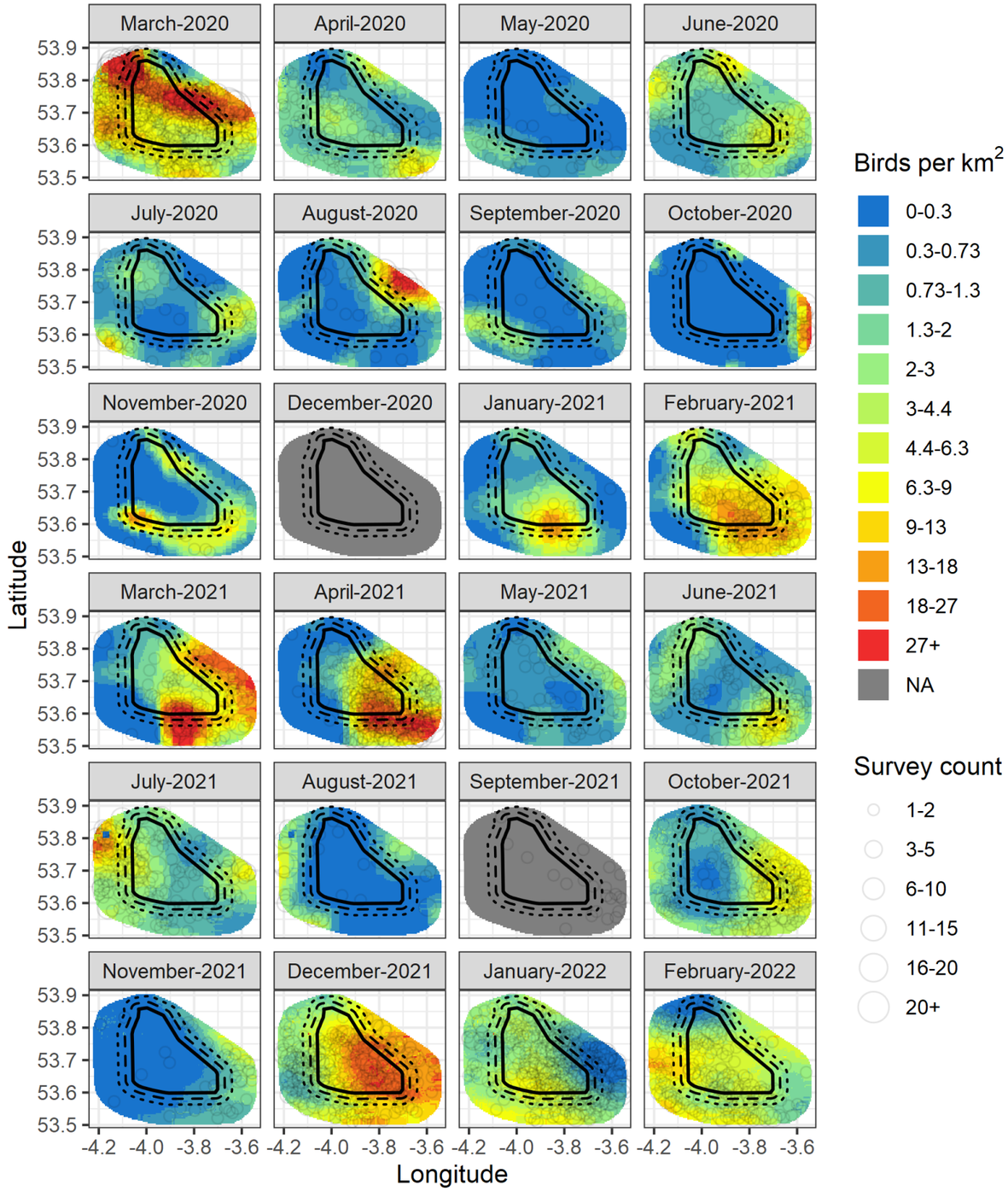

Figure 1.22: Common guillemot monthly densities (birds per km^2) and raw counts. Estimates are based on the MRSea model outputs.

Table 1.30: Common guillemot (all behaviour) design-based and MRSea population estimates for the Mona Array Area plus 4 to 10km buffer zone.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	17,177 (9,723 to 27,481)	12.09 (6.85 to 19.35)	17,396 (15,187 to 19,516)	12.25 (10.69 to 13.74)
1	Apr	2,293 (1,218 to 3,782)	1.61 (0.86 to 2.66)	2,245 (1,861 to 2,698)	1.58 (1.31 to 1.90)
1	May	512 (1,69 to 1,419)	0.36 (0.12 to 1)	505 (351 to 690)	0.36 (0.25 to 0.49)
1	Jun	3,153 (1,584 to 5,740)	2.22 (1.12 to 4.04)	3,135 (2,595 to 3,735)	2.21 (1.83 to 2.63)
1	Jul	1,687 (673 to 3,583)	1.19 (0.47 to 2.52)	1,660 (1,217 to 2,117)	1.17 (0.86 to 1.49)
1	Aug	2,247 (1,119 to 4,409)	1.58 (0.79 to 3.1)	1,992 (1,386 to 2,608)	1.40 (0.98 to 1.84)
1	Sep	849 (282 to 2,238)	0.6 (0.2 to 1.58)	837 (577 to 1,134)	0.59 (0.41 to 0.80)
1	Oct	847 (350 to 5,288)	0.6 (0.25 to 3.72)	798 (497 to 1,119)	0.56 (0.35 to 0.79)
1	Nov	2,749 (814 to 7,713)	1.94 (0.57 to 5.43)	2,812 (1,989 to 3,903)	1.98 (1.40 to 2.75)
1	Dec	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	3,394 (1,075 to 10,203)	2.39 (0.76 to 7.18)	3,405 (2,285 to 4,887)	2.40 (1.61 to 3.44)
1	Feb	9,063 (5,396 to 14,181)	6.38 (3.8 to 9.99)	9,164 (7,739 to 11,120)	6.45 (5.45 to 7.83)
2	Mar	11,786 (6,325 to 20,451)	8.3 (4.45 to 14.4)	11,668 (9,199 to 14,371)	8.22 (6.48 to 10.12)
2	Apr	9,433 (5,062 to 15,805)	6.64 (3.56 to 11.13)	9,399 (7,921 to 10,860)	6.62 (5.58 to 7.65)
2	May	905 (394 to 1,810)	0.64 (0.28 to 1.27)	888 (669 to 1,124)	0.63 (0.47 to 0.79)
2	Jun	2,466 (1,203 to 4,608)	1.74 (0.85 to 3.24)	2,446 (1,888 to 2,990)	1.72 (1.33 to 2.11)
2	Jul	3,699 (1,935 to 6,305)	2.6 (1.36 to 4.44)	3,698 (2,954 to 4,441)	2.60 (2.08 to 3.13)
2	Aug	763 (180 to 2,415)	0.54 (0.13 to 1.7)	745 (424 to 1,100)	0.52 (0.30 to 0.77)
2	Sep	n/a	n/a	415 (255 to 630)	0.29 (0.18 to 0.44)
2	Oct	3,552 (2,549 to 4,753)	2.50 (1.79 to 3.34)	3,481 (2,935 to 4,043)	2.45 (2.07 to 2.85)
2	Nov	738 (360 to 1320)	0.52 (0.25 to 0.93)	703 (475 to 986)	0.50 (0.33 to 0.69)
2	Dec	7,015 (4,828 to 9,734)	4.93 (3.39 to 6.84)	6,950 (6,040 to 7,920)	4.89 (4.25 to 5.58)
2	Jan	10,960 (8,311 to 14,119)	7.70 (5.84 to 9.92)	10,683 (9,538 to 11,854)	7.52 (6.72 to 8.35)
2	Feb	5,370 (3,845 to 7,319)	3.77 (2.70 to 5.14)	5,368 (4,539 to 6,254)	3.78 (3.20 to 4.40)

Table 1.31: Design-based common guillemot (flying) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	72 (57 to 89)	0.16 (0.13 to 0.20)	122 (102 to 147)	0.19 (0.16 to 0.23)	155 (133 to 181)	0.18 (0.16 to 0.21)	235 (205 to 264)	0.17 (0.14 to 0.19)
1	Apr	29 (20 to 40)	0.06 (0.05 to 0.09)	45 (33 to 59)	0.07 (0.05 to 0.09)	55 (42 to 70)	0.06 (0.05 to 0.08)	103 (85 to 123)	0.07 (0.06 to 0.09)
1	May	7 (2 to 12)	0.02 (0.01 to 0.03)	9 (4 to 15)	0.01 (0.01 to 0.02)	14 (8 to 22)	0.02 (0.01 to 0.03)	37 (26 to 51)	0.03 (0.02 to 0.04)
1	Jun	65 (46 to 88)	0.14 (0.10 to 0.20)	95 (70 to 121)	0.15 (0.11 to 0.19)	132 (100 to 162)	0.15 (0.12 to 0.19)	214 (177 to 254)	0.15 (0.12 to 0.18)
1	Jul	12 (7 to 18)	0.03 (0.02 to 0.04)	16 (10 to 23)	0.02 (0.02 to 0.04)	24 (15 to 33)	0.03 (0.02 to 0.04)	55 (41 to 71)	0.04 (0.03 to 0.05)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 1)	0.00 (0.00 to 0.00)	1 (0 to 1)	0.00 (0.00 to 0.00)	10 (6 to 13)	0.01 (0.00 to 0.01)
1	Nov	34 (9 to 60)	0.07 (0.02 to 0.13)	101 (60 to 154)	0.16 (0.09 to 0.24)	140 (84 to 198)	0.16 (0.10 to 0.23)	198 (140 to 275)	0.14 (0.10 to 0.19)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	69 (35 to 113)	0.15 (0.08 to 0.25)	94 (56 to 143)	0.15 (0.09 to 0.22)	105 (64 to 155)	0.12 (0.07 to 0.18)	138 (92 to 198)	0.10 (0.07 to 0.14)
1	Feb	233 (171 to 305)	0.52 (0.38 to 0.68)	296 (225 to 375)	0.46 (0.35 to 0.59)	374 (300 to 465)	0.44 (0.35 to 0.54)	549 (464 to 667)	0.39 (0.33 to 0.47)
1	Mar	36 (25 to 49)	0.08 (0.06 to 0.11)	56 (40 to 74)	0.09 (0.06 to 0.12)	103 (74 to 134)	0.12 (0.09 to 0.16)	170 (134 to 209)	0.12 (0.09 to 0.15)
2	Apr	140 (107 to 178)	0.31 (0.24 to 0.39)	195 (153 to 242)	0.31 (0.24 to 0.38)	241 (194 to 293)	0.28 (0.23 to 0.34)	394 (332 to 455)	0.28 (0.23 to 0.32)
2	May	15 (8 to 22)	0.03 (0.02 to 0.05)	24 (16 to 35)	0.04 (0.03 to 0.06)	34 (24 to 46)	0.04 (0.03 to 0.05)	66 (49 to 83)	0.05 (0.03 to 0.06)
2	Jun	12 (8 to 16)	0.03 (0.02 to 0.04)	18 (14 to 25)	0.03 (0.02 to 0.04)	39 (28 to 50)	0.05 (0.03 to 0.06)	64 (50 to 79)	0.05 (0.03 to 0.06)
2	Jul	3 (2 to 4)	0.01 (0.01 to 0.01)	5 (4 to 6)	0.01 (0.01 to 0.01)	7 (5 to 8)	0.01 (0.01 to 0.01)	14 (11 to 16)	0.01 (0.01 to 0.01)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	6 (4 to 9)	0.01 (0.01 to 0.02)	9 (6 to 11)	0.01 (0.01 to 0.02)	14 (11 to 17)	0.02 (0.01 to 0.02)	30 (25 to 35)	0.02 (0.02 to 0.02)
2	Nov	5 (2 to 11)	0.01 (0.00 to 0.03)	7 (2 to 13)	0.01 (0.00 to 0.02)	9 (2 to 14)	0.01 (0.00 to 0.02)	43 (29 to 60)	0.03 (0.02 to 0.04)
2	Dec	52 (42 to 66)	0.12 (0.09 to 0.15)	64 (53 to 79)	0.10 (0.08 to 0.12)	83 (70 to 99)	0.10 (0.08 to 0.12)	135 (117 to 154)	0.09 (0.08 to 0.11)
2	Jan	37 (31 to 45)	0.08 (0.07 to 0.10)	49 (42 to 57)	0.08 (0.07 to 0.09)	62 (53 to 71)	0.07 (0.06 to 0.08)	90 (81 to 100)	0.06 (0.06 to 0.07)
2	Feb	19 (14 to 25)	0.04 (0.03 to 0.06)	25 (20 to 32)	0.04 (0.03 to 0.05)	30 (24 to 36)	0.04 (0.03 to 0.04)	50 (42 to 58)	0.03 (0.03 to 0.04)

Table 1.32: Design-based common guillemot (sitting) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	4,002 (3,174 to 4,956)	8.89 (7.05 to 11.01)	6,768 (5,641 to 8,131)	10.59 (8.82 to 12.72)	8,599 (7,367 to 10,009)	10.07 (8.63 to 11.72)	13,034 (11,379 to 14,622)	9.18 (8.01 to 10.30)
1	Apr	458 (324 to 632)	1.02 (0.72 to 1.40)	715 (527 to 927)	1.12 (0.82 to 1.45)	867 (665 to 1,105)	1.02 (0.78 to 1.29)	1,627 (1,349 to 1,955)	1.15 (0.95 to 1.38)
1	May	65 (23 to 112)	0.14 (0.05 to 0.25)	90 (39 to 144)	0.14 (0.06 to 0.23)	134 (73 to 206)	0.16 (0.08 to 0.24)	355 (247 to 485)	0.25 (0.17 to 0.34)
1	Jun	678 (479 to 918)	1.51 (1.06 to 2.04)	983 (726 to 1259)	1.54 (1.14 to 1.97)	1,369 (1,042 to 1,685)	1.60 (1.22 to 1.97)	2,219 (1,837 to 2,643)	1.56 (1.29 to 1.86)
1	Jul	259 (150 to 404)	0.58 (0.33 to 0.90)	350 (221 to 516)	0.55 (0.35 to 0.81)	522 (339 to 716)	0.61 (0.40 to 0.84)	1,218 (894 to 1,554)	0.86 (0.63 to 1.09)
1	Aug	169 (91 to 271)	0.38 (0.20 to 0.60)	257 (164 to 404)	0.40 (0.26 to 0.63)	442 (287 to 626)	0.52 (0.34 to 0.73)	1,513 (1,052 to 1,980)	1.07 (0.74 to 1.39)
1	Sep	81 (21 to 153)	0.18 (0.05 to 0.34)	118 (57 to 206)	0.19 (0.09 to 0.32)	231 (115 to 377)	0.27 (0.13 to 0.44)	636 (438 to 861)	0.45 (0.31 to 0.61)
1	Oct	9 (0 to 29)	0.02 (0.00 to 0.06)	28 (0 to 57)	0.04 (0.00 to 0.09)	37 (9 to 77)	0.04 (0.01 to 0.09)	599 (373 to 840)	0.42 (0.26 to 0.59)
1	Nov	335 (92 to 603)	0.75 (0.20 to 1.34)	1,010 (598 to 1,538)	1.58 (0.94 to 2.41)	1,405 (836 to 1,979)	1.65 (0.98 to 2.32)	1,985 (1,404 to 2,755)	1.40 (0.99 to 1.94)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	1,240 (624 to 2,042)	2.76 (1.39 to 4.54)	1,692 (1,006 to 2,567)	2.65 (1.57 to 4.02)	1,890 (1,146 to 2,781)	2.21 (1.34 to 3.26)	2,482 (1,665 to 3,561)	1.75 (1.17 to 2.51)
1	Feb	2,778 (2,042 to 3,634)	6.17 (4.54 to 8.08)	3,529 (2,685 to 4,467)	5.52 (4.20 to 6.99)	4,451 (3,569 to 5,537)	5.21 (4.18 to 6.49)	6,543 (5,526 to 7,940)	4.61 (3.89 to 5.59)
1	Mar	1,854 (1,304 to 2,505)	4.12 (2.90 to 5.57)	2,910 (2,072 to 3,822)	4.55 (3.24 to 5.98)	5,315 (3,824 to 6,913)	6.23 (4.48 to 8.10)	8,733 (6,885 to 10,756)	6.15 (4.85 to 7.57)
2	Apr	2,437 (1,852 to 3,084)	5.41 (4.12 to 6.85)	3,391 (2,651 to 4,201)	5.30 (4.15 to 6.57)	4,185 (3,361 to 5,081)	4.90 (3.94 to 5.95)	6,839 (5,763 to 7,902)	4.82 (4.06 to 5.56)
2	May	140 (77 to 208)	0.31 (0.17 to 0.46)	228 (155 to 334)	0.36 (0.24 to 0.52)	320 (229 to 435)	0.37 (0.27 to 0.51)	625 (470 to 790)	0.44 (0.33 to 0.56)
2	Jun	332 (212 to 457)	0.74 (0.47 to 1.02)	519 (387 to 699)	0.81 (0.61 to 1.09)	1,095 (778 to 1,416)	1.28 (0.91 to 1.66)	1,809 (1,396 to 2,211)	1.27 (0.98 to 1.56)
2	Jul	658 (472 to 895)	1.46 (1.05 to 1.99)	986 (743 to 1,283)	1.54 (1.16 to 2.01)	1,357 (1,058 to 1,714)	1.59 (1.24 to 2.01)	2,798 (2,235 to 3,360)	1.97 (1.57 to 2.37)
2	Aug	63 (20 to 124)	0.14 (0.04 to 0.28)	111 (40 to 187)	0.17 (0.06 to 0.29)	119 (47 to 195)	0.14 (0.06 to 0.23)	566 (322 to 836)	0.40 (0.23 to 0.59)
2	Sep	57 (22 to 120)	0.13 (0.05 to 0.27)	70 (22 to 131)	0.11 (0.03 to 0.20)	82 (34 to 144)	0.10 (0.04 to 0.17)	315 (194 to 479)	0.22 (0.14 to 0.34)
2	Oct	550 (369 to 770)	1.22 (0.82 to 1.71)	778 (546 to 1,005)	1.22 (0.85 to 1.57)	1,214 (955 to 1,516)	1.42 (1.12 to 1.78)	2,621 (2,210 to 3,044)	1.85 (1.56 to 2.14)
2	Nov	60 (19 to 133)	0.13 (0.04 to 0.30)	79 (28 to 152)	0.12 (0.04 to 0.24)	100 (29 to 164)	0.12 (0.03 to 0.19)	502 (339 to 704)	0.35 (0.24 to 0.50)
2	Dec	2,000 (1,619 to 2,541)	4.45 (3.60 to 5.65)	2,474 (2,040 to 3,014)	3.87 (3.19 to 4.71)	3,188 (2,681 to 3,785)	3.73 (3.14 to 4.43)	5,176 (4,498 to 5,898)	3.64 (3.17 to 4.15)
2	Jan	3,340 (2,780 to 3,999)	7.42 (6.18 to 8.89)	4,413 (3,760 to 5,124)	6.90 (5.88 to 8.01)	5,512 (4,762 to 6,310)	6.46 (5.58 to 7.39)	8,045 (7,183 to 8,927)	5.66 (5.06 to 6.29)
2	Feb	1,572 (1,143 to 2,017)	3.49 (2.54 to 4.48)	2,035 (1,600 to 2,602)	3.18 (2.50 to 4.07)	2,448 (1,932 to 2,965)	2.87 (2.26 to 3.47)	4,039 (3,416 to 4,706)	2.84 (2.40 to 3.31)

Table 1.33: Design-based common guillemot (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	5,341 (4,237 to 6,615)	11.87 (9.42 to 14.70)	9,033 (7,529 to 10,852)	14.13 (11.78 to 16.98)	11,477 (9,833 to 13,359)	13.44 (11.52 to 15.65)	17,396 (15,187 to 19,516)	12.25 (10.69 to 13.74)
1	Apr	632 (447 to 872)	1.40 (0.99 to 1.94)	986 (727 to 1,279)	1.54 (1.14 to 2.00)	1,196 (918 to 1,525)	1.40 (1.08 to 1.79)	2,245 (1,861 to 2,698)	1.58 (1.31 to 1.90)
1	May	93 (33 to 159)	0.21 (0.07 to 0.35)	128 (56 to 205)	0.20 (0.09 to 0.32)	190 (103 to 293)	0.22 (0.12 to 0.34)	505 (351 to 690)	0.36 (0.25 to 0.49)
1	Jun	958 (677 to 1,297)	2.13 (1.50 to 2.88)	1,389 (1,026 to 1,778)	2.17 (1.60 to 2.78)	1,934 (1,473 to 2,380)	2.27 (1.72 to 2.79)	3,135 (2,595 to 3,735)	2.21 (1.83 to 2.63)
1	Jul	353 (204 to 551)	0.78 (0.45 to 1.22)	477 (301 to 703)	0.75 (0.47 to 1.10)	712 (462 to 975)	0.83 (0.54 to 1.14)	1,660 (1,217 to 2,117)	1.17 (0.86 to 1.49)
1	Aug	222 (120 to 357)	0.49 (0.27 to 0.79)	338 (216 to 531)	0.53 (0.34 to 0.83)	583 (377 to 825)	0.68 (0.44 to 0.97)	1,992 (1,386 to 2,608)	1.40 (0.98 to 1.84)
1	Sep	107 (28 to 202)	0.24 (0.06 to 0.45)	156 (75 to 271)	0.24 (0.12 to 0.42)	304 (152 to 496)	0.36 (0.18 to 0.58)	837 (577 to 1,134)	0.59 (0.41 to 0.80)
1	Oct	12 (0 to 39)	0.03 (0.00 to 0.09)	37 (0 to 76)	0.06 (0.00 to 0.12)	50 (12 to 102)	0.06 (0.01 to 0.12)	798 (497 to 1,119)	0.56 (0.35 to 0.79)
1	Nov	475 (130 to 855)	1.06 (0.29 to 1.90)	1,431 (848 to 2,179)	2.24 (1.33 to 3.41)	1,990 (1,184 to 2,804)	2.33 (1.39 to 3.28)	2,812 (1,989 to 3,903)	1.98 (1.40 to 2.75)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	1,701 (856 to 2,802)	3.78 (1.90 to 6.23)	2,322 (1,380 to 3,523)	3.63 (2.16 to 5.51)	2,593 (1,573 to 3,816)	3.04 (1.84 to 4.47)	3,405 (2,285 to 4,887)	2.40 (1.61 to 3.44)
1	Feb	3,890 (2,861 to 5,090)	8.65 (6.36 to 11.31)	4,942 (3,761 to 6,256)	7.73 (5.88 to 9.79)	6,235 (4,999 to 7,755)	7.30 (5.86 to 9.08)	9,164 (7,739 to 11,120)	6.45 (5.45 to 7.83)
1	Mar	2,476 (1,742 to 3,346)	5.50 (3.87 to 7.44)	3,887 (2,768 to 5,107)	6.08 (4.33 to 7.99)	7,101 (5,110 to 9,236)	8.32 (5.99 to 10.82)	11,668 (9,199 to 14,371)	8.22 (6.48 to 10.12)
2	Apr	3,348 (2,546 to 4,238)	7.44 (5.66 to 9.42)	4,660 (3,643 to 5,773)	7.29 (5.70 to 9.03)	5,752 (4,619 to 6,983)	6.74 (5.41 to 8.18)	9,399 (7,921 to 10,860)	6.62 (5.58 to 7.65)
2	May	199 (110 to 295)	0.44 (0.24 to 0.66)	325 (221 to 475)	0.51 (0.35 to 0.74)	455 (326 to 618)	0.53 (0.38 to 0.72)	888 (669 to 1,124)	0.63 (0.47 to 0.79)
2	Jun	448 (287 to 618)	1.00 (0.64 to 1.37)	702 (524 to 945)	1.10 (0.82 to 1.48)	1,480 (1,053 to 1,915)	1.73 (1.23 to 2.24)	2,446 (1,888 to 2,990)	1.72 (1.33 to 2.11)
2	Jul	869 (624 to 1,183)	1.93 (1.39 to 2.63)	1,303 (982 to 1,695)	2.04 (1.54 to 2.65)	1,793 (1,399 to 2,265)	2.10 (1.64 to 2.65)	3,698 (2,954 to 4,441)	2.60 (2.08 to 3.13)
2	Aug	83 (26 to 163)	0.18 (0.06 to 0.36)	146 (53 to 246)	0.23 (0.08 to 0.39)	156 (62 to 257)	0.18 (0.07 to 0.30)	745 (424 to 1,100)	0.52 (0.30 to 0.77)
2	Sep	76 (29 to 157)	0.17 (0.06 to 0.35)	92 (29 to 172)	0.14 (0.05 to 0.27)	108 (44 to 190)	0.13 (0.05 to 0.22)	415 (255 to 630)	0.29 (0.18 to 0.44)
2	Oct	730 (490 to 1,023)	1.62 (1.09 to 2.27)	1,033 (726 to 1,334)	1.62 (1.13 to 2.09)	1,612 (1,269 to 2,013)	1.89 (1.49 to 2.36)	3,481 (2,935 to 4,043)	2.45 (2.07 to 2.85)
2	Nov	84 (26 to 187)	0.19 (0.06 to 0.42)	111 (39 to 213)	0.17 (0.06 to 0.33)	141 (40 to 230)	0.16 (0.05 to 0.27)	703 (475 to 986)	0.50 (0.33 to 0.69)
2	Dec	2,686 (2,173 to 3,412)	5.97 (4.83 to 7.58)	3,322 (2,739 to 4,046)	5.20 (4.28 to 6.33)	4,281 (3,600 to 5,082)	5.01 (4.22 to 5.95)	6,950 (6,040 to 7,920)	4.89 (4.25 to 5.58)
2	Jan	4,435 (3,691 to 5,311)	9.86 (8.20 to 11.80)	5,860 (4,992 to 6,803)	9.17 (7.81 to 10.64)	7,319 (6,323 to 8,378)	8.57 (7.41 to 9.81)	10,683 (9,538 to 11,854)	7.52 (6.72 to 8.35)
2	Feb	2,089 (1,520 to 2,681)	4.64 (3.38 to 5.96)	2,704 (2,126 to 3,458)	4.23 (3.33 to 5.41)	3,253 (2,568 to 3,940)	3.81 (3.01 to 4.62)	5,368 (4,539 to 6,254)	3.78 (3.20 to 4.40)

Razorbill

1.3.3.11 Although present in much lower abundance than common guillemot, razorbill were recorded in the highest numbers in February 2021 and March 2022, with 6,473 (95% CI range: 4,129 to 9,450) and 5,818 (95% CI range: 2,674 to 11,258) respectively (Table 1.34). At this time of the year, the species starts gathering at sea in the vicinity of breeding colonies. Outside the pre-breeding period (February to March), population estimates were very low (Table 1.34).

1.3.3.12 Whilst in March 2020 and February 2021, the species was widely distributed across the site, the March 2021 survey predicted the highest densities to be found inshore of the Mona Array Area (Figure 1.23). As with common guillemot, most birds were recorded on the sea surface.

1.3.3.13 Design-based estimates produced by behaviour (sitting and flying) are given for each boundary (Table 1.35; Table 1.36; Table 1.37).

1.3.3.14 The design-based and MRSea abundance estimates derived from the site-specific surveys confirmed the findings from Waggitt *et al.* (2020) and Bradbury *et al.* (2014) that abundance was low in both the non-breeding and breeding seasons. MRSea estimates for each boundary area can be found in Appendix B.

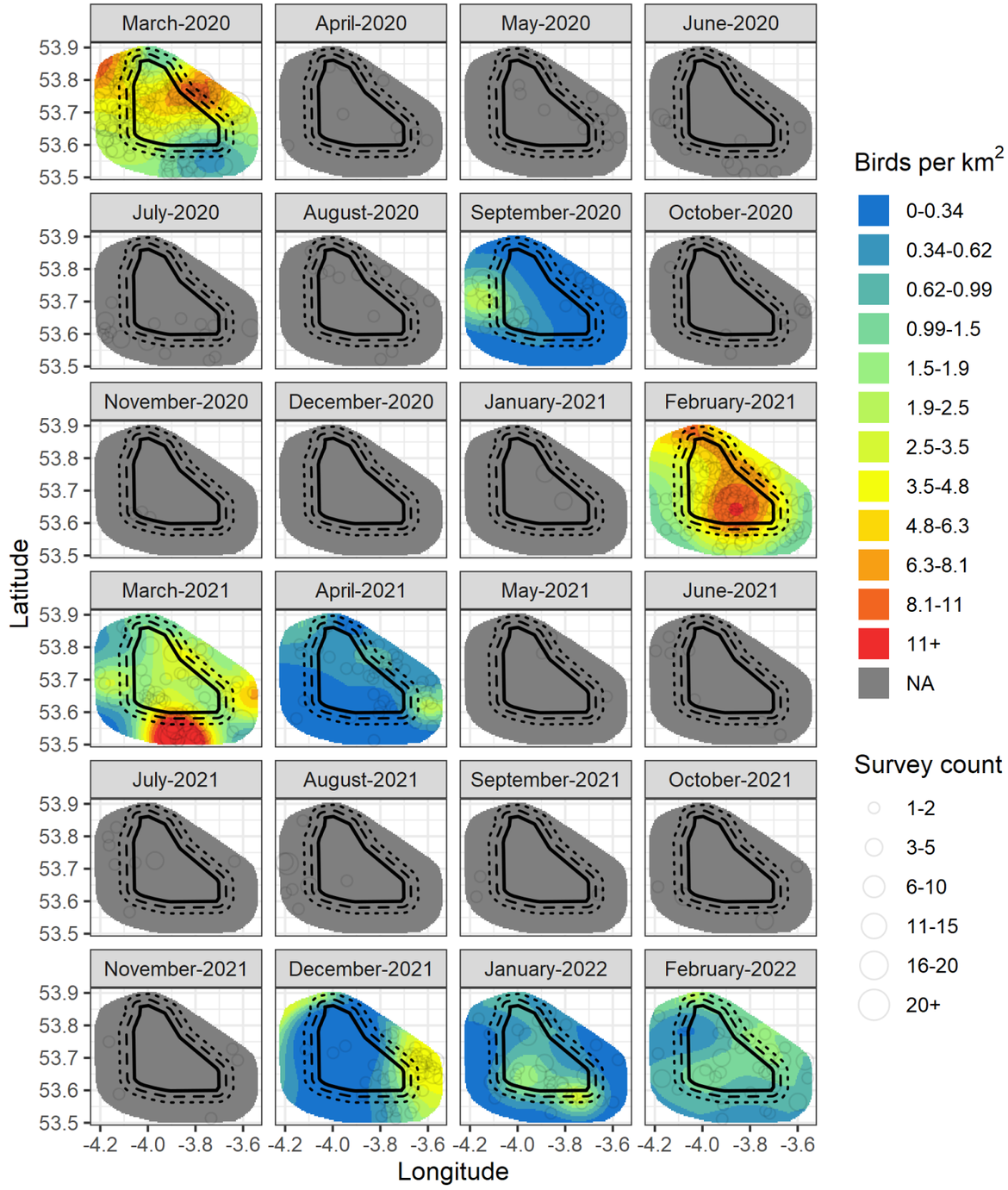

Figure 1.23: Razorbill monthly densities (birds per km^2) and raw counts. Estimates are based on the MRSea model outputs.

Table 1.34: Razorbill (all behaviour) of design-based and MRSea population estimates for the Mona Array Area plus 4 to 10km buffer.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	4,638 (2,756 to 7,125)	3.26 (1.94 to 5.01)	4,861 (4,113 to 5,780)	3.42 (2.90 to 4.07)
1	Apr	n/a	n/a	190 (82 to 325)	0.13 (0.06 to 0.23)
1	May	n/a	n/a	251 (145 to 374)	0.18 (0.10 to 0.26)
1	Jun	n/a	n/a	173 (67 to 307)	0.12 (0.05 to 0.22)
1	Jul	n/a	n/a	408 (206 to 639)	0.29 (0.15 to 0.45)
1	Aug	n/a	n/a	169 (90 to 267)	0.12 (0.06 to 0.19)
1	Sep	606 (209 to 1,398)	0.43 (0.15 to 0.98)	607 (382 to 908)	0.43 (0.27 to 0.64)
1	Oct	n/a	n/a	170 (68 to 320)	0.12 (0.05 to 0.23)
1	Nov	n/a	n/a	375 (63 to 729)	0.26 (0.04 to 0.51)
1	Dec	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	n/a	n/a	669 (0 to 1565)	0.47 (0.00 to 1.10)
1	Feb	6,473 (4,129 to 9,450)	4.55 (2.90 to 6.64)	6,855 (5,505 to 8,218)	4.83 (3.88 to 5.79)
2	Mar	5,818 (2,674 to 11,258)	4.09 (1.88 to 7.91)	6,189 (4,086 to 8,521)	4.36 (2.88 to 6.00)
2	Apr	571 (325 to 956)	0.40 (0.23 to 0.67)	596 (438 to 804)	0.42 (0.31 to 0.57)
2	May	n/a	n/a	30 (0 to 61)	0.02 (0.00 to 0.04)
2	Jun	n/a	n/a	72 (26 to 129)	0.05 (0.02 to 0.09)
2	Jul	n/a	n/a	101 (41 to 200)	0.07 (0.03 to 0.14)
2	Aug	n/a	n/a	188 (34 to 353)	0.13 (0.02 to 0.25)
2	Sep	n/a	n/a	44 (0 to 88)	0.03 (0.00 to 0.06)
2	Oct	n/a	n/a	72 (0 to 147)	0.05 (0.00 to 0.10)
2	Nov	n/a	n/a	79 (13 to 149)	0.06 (0.01 to 0.10)
2	Dec	1,101 (581 to 1,815)	0.77 (0.41 to 1.28)	1,138 (784 to 1,480)	0.80 (0.55 to 1.04)
2	Jan	941 (397 to 1,805)	0.66 (0.28 to 1.27)	992 (635 to 1,370)	0.70 (0.45 to 0.96)
2	Feb	1,246 (564 to 2,300)	0.88 (0.40 to 1.62)	1,294 (712 to 1,863)	0.91 (0.50 to 1.31)

Table 1.35: Design-based razorbill (flying) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	4 (3 to 5)	0.01 (0.01 to 0.01)	8 (6 to 9)	0.01 (0.01 to 0.01)	9 (7 to 11)	0.01 (0.01 to 0.01)	15 (12 to 18)	0.01 (0.01 to 0.01)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	2 (0 to 3)	0.00 (0.00 to 0.01)	2 (1 to 5)	0.00 (0.00 to 0.01)	4 (1 to 7)	0.00 (0.00 to 0.01)	10 (5 to 15)	0.01 (0.00 to 0.01)
1	Aug	2 (0 to 4)	0.00 (0.00 to 0.01)	3 (1 to 5)	0.00 (0.00 to 0.01)	4 (2 to 7)	0.00 (0.00 to 0.01)	7 (4 to 11)	0.00 (0.00 to 0.01)
1	Sep	2 (1 to 4)	0.00 (0.00 to 0.01)	3 (1 to 5)	0.00 (0.00 to 0.01)	3 (1 to 6)	0.00 (0.00 to 0.01)	7 (4 to 11)	0.01 (0.00 to 0.01)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	26 (19 to 33)	0.06 (0.04 to 0.07)	32 (25 to 40)	0.05 (0.04 to 0.06)	37 (29 to 45)	0.04 (0.03 to 0.05)	50 (40 to 60)	0.04 (0.03 to 0.04)
1	Mar	115 (72 to 176)	0.26 (0.16 to 0.39)	140 (90 to 198)	0.22 (0.14 to 0.31)	273 (151 to 423)	0.32 (0.18 to 0.50)	487 (321 to 670)	0.34 (0.23 to 0.47)
2	Apr	9 (5 to 14)	0.02 (0.01 to 0.03)	14 (8 to 20)	0.02 (0.01 to 0.03)	20 (13 to 29)	0.02 (0.02 to 0.03)	36 (27 to 49)	0.03 (0.02 to 0.03)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	3 (0 to 9)	0.00 (0.00 to 0.01)	8 (0 to 15)	0.01 (0.00 to 0.01)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	1 (1 to 3)	0.00 (0.00 to 0.01)	2 (1 to 4)	0.00 (0.00 to 0.01)	4 (2 to 6)	0.00 (0.00 to 0.01)	10 (7 to 14)	0.01 (0.01 to 0.01)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	38 (12 to 74)	0.08 (0.03 to 0.16)	63 (23 to 114)	0.10 (0.04 to 0.18)	88 (45 to 144)	0.10 (0.05 to 0.17)	123 (68 to 177)	0.09 (0.05 to 0.12)

Table 1.36: Design-based razorbill (sitting) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	1,112 (845 to 1,452)	2.47 (1.88 to 3.23)	2,032 (1,578 to 2,547)	3.18 (2.47 to 3.98)	2,479 (1,946 to 3,015)	2.90 (2.28 to 3.53)	3,965 (3,355 to 4,714)	2.79 (2.36 to 3.32)
1	Apr	44 (8 to 99)	0.10 (0.02 to 0.22)	87 (25 to 177)	0.14 (0.04 to 0.28)	121 (42 to 222)	0.14 (0.05 to 0.26)	156 (67 to 266)	0.11 (0.05 to 0.19)
1	May	63 (17 to 132)	0.14 (0.04 to 0.29)	100 (44 to 188)	0.16 (0.07 to 0.29)	148 (80 to 246)	0.17 (0.09 to 0.29)	206 (118 to 306)	0.14 (0.08 to 0.22)
1	Jun	10 (0 to 29)	0.02 (0.00 to 0.06)	10 (0 to 29)	0.02 (0.00 to 0.05)	10 (0 to 29)	0.01 (0.00 to 0.03)	142 (55 to 251)	0.10 (0.04 to 0.18)
1	Jul	55 (9 to 117)	0.12 (0.02 to 0.26)	83 (27 to 155)	0.13 (0.04 to 0.24)	122 (45 to 223)	0.14 (0.05 to 0.26)	326 (165 to 510)	0.23 (0.12 to 0.36)
1	Aug	39 (6 to 81)	0.09 (0.01 to 0.18)	53 (19 to 101)	0.08 (0.03 to 0.16)	79 (32 to 135)	0.09 (0.04 to 0.16)	133 (71 to 209)	0.09 (0.05 to 0.15)
1	Sep	154 (41 to 287)	0.34 (0.09 to 0.64)	210 (77 to 376)	0.33 (0.12 to 0.59)	235 (99 to 410)	0.28 (0.12 to 0.48)	491 (309 to 734)	0.35 (0.22 to 0.52)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	9 (0 to 29)	0.01 (0.00 to 0.05)	18 (0 to 49)	0.02 (0.00 to 0.06)	139 (55 to 262)	0.10 (0.04 to 0.18)
1	Nov	152 (0 to 331)	0.34 (0.00 to 0.74)	305 (51 to 602)	0.48 (0.08 to 0.94)	306 (51 to 599)	0.36 (0.06 to 0.70)	307 (52 to 596)	0.22 (0.04 to 0.42)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	542 (0 to 1,298)	1.21 (0.00 to 2.88)	542 (0 to 1,290)	0.85 (0.00 to 2.02)	546 (0 to 1,289)	0.64 (0.00 to 1.51)	548 (0 to 1,280)	0.39 (0.00 to 0.90)
1	Feb	2,949 (2,159 to 3,740)	6.55 (4.80 to 8.31)	3,632 (2,822 to 4,536)	5.68 (4.41 to 7.10)	4,155 (3,252 to 5,090)	4.87 (3.81 to 5.96)	5,568 (4,471 to 6,675)	3.92 (3.15 to 4.70)
1	Mar	1,101 (686 to 1,687)	2.45 (1.52 to 3.75)	1,341 (867 to 1,896)	2.10 (1.36 to 2.97)	2,621 (1,448 to 4,055)	3.07 (1.70 to 4.75)	4,666 (3,080 to 6,424)	3.29 (2.17 to 4.52)
2	Apr	113 (58 to 182)	0.25 (0.13 to 0.41)	172 (103 to 256)	0.27 (0.16 to 0.40)	254 (170 to 370)	0.30 (0.20 to 0.43)	458 (337 to 617)	0.32 (0.24 to 0.43)
2	May	8 (0 to 26)	0.02 (0.00 to 0.06)	8 (0 to 25)	0.01 (0.00 to 0.04)	16 (0 to 34)	0.02 (0.00 to 0.04)	24 (0 to 50)	0.02 (0.00 to 0.04)
2	Jun	15 (0 to 38)	0.03 (0.00 to 0.08)	15 (0 to 37)	0.02 (0.00 to 0.06)	23 (0 to 46)	0.03 (0.00 to 0.05)	59 (21 to 105)	0.04 (0.02 to 0.07)
2	Jul	33 (0 to 86)	0.07 (0.00 to 0.19)	33 (0 to 86)	0.05 (0.00 to 0.13)	34 (0 to 86)	0.04 (0.00 to 0.10)	82 (34 to 164)	0.06 (0.02 to 0.12)
2	Aug	7 (0 to 22)	0.02 (0.00 to 0.05)	7 (0 to 22)	0.01 (0.00 to 0.03)	34 (0 to 94)	0.04 (0.00 to 0.11)	154 (27 to 289)	0.11 (0.02 to 0.20)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	12 (0 to 36)	0.01 (0.00 to 0.04)	36 (0 to 72)	0.03 (0.00 to 0.05)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	20 (0 to 61)	0.02 (0.00 to 0.07)	53 (0 to 108)	0.04 (0.00 to 0.08)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	65 (11 to 122)	0.05 (0.01 to 0.09)
2	Dec	132 (48 to 242)	0.29 (0.11 to 0.54)	183 (88 to 314)	0.29 (0.14 to 0.49)	339 (197 to 494)	0.40 (0.23 to 0.58)	922 (636 to 1,200)	0.65 (0.45 to 0.84)
2	Jan	321 (152 to 518)	0.71 (0.34 to 1.15)	518 (297 to 817)	0.81 (0.47 to 1.28)	676 (407 to 979)	0.79 (0.48 to 1.15)	812 (519 to 1,121)	0.57 (0.37 to 0.79)
2	Feb	294 (93 to 578)	0.65 (0.21 to 1.28)	492 (178 to 890)	0.77 (0.28 to 1.39)	686 (348 to 1125)	0.80 (0.41 to 1.32)	958 (527 to 1,380)	0.67 (0.37 to 0.97)

Table 1.37: Design-based razorbill (all behaviour) population estimates (Pop) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	1,363 (1,036 to 1,780)	3.03 (2.30 to 3.96)	2,492 (1,935 to 3,123)	3.90 (3.03 to 4.88)	3,039 (2,386 to 3,697)	3.56 (2.80 to 4.33)	4,861 (4,113 to 5,780)	3.42 (2.90 to 4.07)
1	Apr	53 (10 to 120)	0.12 (0.02 to 0.27)	106 (30 to 217)	0.17 (0.05 to 0.34)	148 (51 to 272)	0.17 (0.06 to 0.32)	190 (82 to 325)	0.13 (0.06 to 0.23)
1	May	78 (21 to 162)	0.17 (0.05 to 0.36)	122 (53 to 230)	0.19 (0.08 to 0.36)	180 (98 to 301)	0.21 (0.11 to 0.35)	251 (145 to 374)	0.18 (0.10 to 0.26)
1	Jun	12 (0 to 35)	0.03 (0.00 to 0.08)	12 (0 to 35)	0.02 (0.00 to 0.06)	12 (0 to 35)	0.01 (0.00 to 0.04)	173 (67 to 307)	0.12 (0.05 to 0.22)
1	Jul	69 (11 to 146)	0.15 (0.02 to 0.33)	104 (34 to 194)	0.16 (0.05 to 0.30)	152 (57 to 280)	0.18 (0.07 to 0.33)	408 (206 to 639)	0.29 (0.15 to 0.45)
1	Aug	50 (8 to 104)	0.11 (0.02 to 0.23)	67 (24 to 128)	0.10 (0.04 to 0.20)	101 (40 to 172)	0.12 (0.05 to 0.20)	169 (90 to 267)	0.12 (0.06 to 0.19)
1	Sep	190 (51 to 355)	0.42 (0.11 to 0.79)	260 (95 to 465)	0.41 (0.15 to 0.73)	291 (123 to 507)	0.34 (0.14 to 0.59)	607 (382 to 908)	0.43 (0.27 to 0.64)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	11 (0 to 36)	0.02 (0.00 to 0.06)	22 (0 to 60)	0.03 (0.00 to 0.07)	170 (68 to 320)	0.12 (0.05 to 0.23)
1	Nov	186 (0 to 404)	0.41 (0.00 to 0.90)	372 (62 to 735)	0.58 (0.10 to 1.15)	374 (62 to 732)	0.44 (0.07 to 0.86)	375 (63 to 729)	0.26 (0.04 to 0.51)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	663 (0 to 1,586)	1.47 (0.00 to 3.53)	662 (0 to 1,577)	1.04 (0.00 to 2.47)	667 (0 to 1,575)	0.78 (0.00 to 1.85)	669 (0 to 1,565)	0.47 (0.00 to 1.10)
1	Feb	3,630 (2,657 to 4,605)	8.07 (5.91 to 10.23)	4,471 (3,474 to 5,584)	6.99 (5.43 to 8.74)	5,115 (4,004 to 6,267)	5.99 (4.69 to 7.34)	6,855 (5,505 to 8,218)	4.83 (3.88 to 5.79)
1	Mar	1,461 (910 to 2,238)	3.25 (2.02 to 4.97)	1,779 (1,151 to 2,515)	2.78 (1.80 to 3.93)	3,477 (1,921 to 5,379)	4.07 (2.25 to 6.30)	6,189 (4,086 to 8,521)	4.36 (2.88 to 6.00)
2	Apr	147 (75 to 237)	0.33 (0.17 to 0.53)	224 (134 to 333)	0.35 (0.21 to 0.52)	331 (221 to 482)	0.39 (0.26 to 0.56)	596 (438 to 804)	0.42 (0.31 to 0.57)
2	May	10 (0 to 31)	0.02 (0.00 to 0.07)	10 (0 to 31)	0.02 (0.00 to 0.05)	20 (0 to 41)	0.02 (0.00 to 0.05)	30 (0 to 61)	0.02 (0.00 to 0.04)
2	Jun	18 (0 to 46)	0.04 (0.00 to 0.10)	18 (0 to 46)	0.03 (0.00 to 0.07)	28 (0 to 56)	0.03 (0.00 to 0.07)	72 (26 to 129)	0.05 (0.02 to 0.09)
2	Jul	41 (0 to 106)	0.09 (0.00 to 0.23)	41 (0 to 105)	0.06 (0.00 to 0.16)	41 (0 to 105)	0.05 (0.00 to 0.12)	101 (41 to 200)	0.07 (0.03 to 0.14)
2	Aug	8 (0 to 27)	0.02 (0.00 to 0.06)	8 (0 to 26)	0.01 (0.00 to 0.04)	41 (0 to 115)	0.05 (0.00 to 0.13)	188 (34 to 353)	0.13 (0.02 to 0.25)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	14 (0 to 44)	0.02 (0.00 to 0.05)	44 (0 to 88)	0.03 (0.00 to 0.06)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	28 (0 to 83)	0.03 (0.00 to 0.10)	72 (0 to 147)	0.05 (0.00 to 0.10)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	79 (13 to 149)	0.06 (0.01 to 0.10)
2	Dec	163 (59 to 299)	0.36 (0.13 to 0.66)	226 (108 to 388)	0.35 (0.17 to 0.61)	418 (243 to 609)	0.49 (0.28 to 0.71)	1,138 (784 to 1,480)	0.80 (0.55 to 1.04)
2	Jan	393 (185 to 633)	0.87 (0.41 to 1.41)	633 (364 to 998)	0.99 (0.57 to 1.56)	826 (497 to 1,196)	0.97 (0.58 to 1.40)	992 (635 to 1,370)	0.70 (0.45 to 0.96)
2	Feb	397 (126 to 780)	0.88 (0.28 to 1.73)	664 (240 to 1,202)	1.04 (0.38 to 1.88)	926 (470 to 1,519)	1.08 (0.55 to 1.78)	1,294 (712 to 1,863)	0.91 (0.50 to 1.31)

1.3.4 Northern fulmar

1.3.4.1 The species was frequently recorded, albeit as single individuals. The relative low numbers of monthly sightings meant that only design-based estimates were produced (Table 1.38;Table 1.39;Table 1.40).

1.3.4.2 The design-based estimates peaked in February 2021 (Year 1) and March 2021 (Year 2) and were followed by a decline in population size throughout the breeding season. This is contrary to the work of Waggitt *et al*. (2020) which showed a steady increase in abundance throughout the breeding season in the Mona Array Area, with a peak in abundance predicted in August.

1.3.4.3 However, the level of abundance reported by Waggitt *et al*. (2020) was in line with the results of the digital aerial surveys, indicating that the area was of low importance for Northern fulmar. A maximum design-based estimate of 307 birds (95% CI range: 217 to 409) was recorded within the Mona Array Area plus 4 to 10km buffer zone.

Table 1.38: Design-based Northern fulmar (flying) population estimates (Pop) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	20 (3 to 38)	0.04 (0.01 to 0.08)	26 (9 to 51)	0.04 (0.01 to 0.08)	30 (10 to 51)	0.04 (0.01 to 0.06)	57 (29 to 85)	0.04 (0.02 to 0.06)
1	Apr	9 (0 to 22)	0.02 (0.00 to 0.05)	18 (3 to 37)	0.03 (0.00 to 0.06)	22 (6 to 44)	0.03 (0.01 to 0.05)	39 (18 to 68)	0.03 (0.01 to 0.05)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 17)	0.01 (0.00 to 0.02)	6 (0 to 17)	0.00 (0.00 to 0.01)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	3 (0 to 10)	0.01 (0.00 to 0.02)	10 (0 to 20)	0.01 (0.00 to 0.02)	13 (3 to 27)	0.01 (0.00 to 0.02)
1	Jul	2 (0 to 5)	0.00 (0.00 to 0.01)	3 (0 to 9)	0.01 (0.00 to 0.01)	5 (0 to 10)	0.01 (0.00 to 0.01)	7 (0 to 14)	0.00 (0.00 to 0.01)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	2 (0 to 5)	0.00 (0.00 to 0.01)	2 (0 to 5)	0.00 (0.00 to 0.01)	6 (0 to 13)	0.00 (0.00 to 0.01)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	4 (0 to 8)	0.01 (0.00 to 0.02)	4 (0 to 8)	0.01 (0.00 to 0.01)	5 (1 to 11)	0.01 (0.00 to 0.01)	7 (3 to 14)	0.00 (0.00 to 0.01)
1	Dec	6 (2 to 14)	0.01 (0.00 to 0.03)	22 (8 to 40)	0.03 (0.01 to 0.06)	31 (14 to 51)	0.04 (0.02 to 0.06)	44 (26 to 67)	0.03 (0.02 to 0.05)
1	Jan	5 (0 to 15)	0.01 (0.00 to 0.03)	9 (0 to 19)	0.01 (0.00 to 0.03)	18 (5 to 39)	0.02 (0.01 to 0.05)	37 (14 to 63)	0.03 (0.01 to 0.04)
1	Feb	39 (17 to 72)	0.09 (0.04 to 0.16)	43 (18 to 76)	0.07 (0.03 to 0.12)	58 (29 to 95)	0.07 (0.03 to 0.11)	84 (47 to 126)	0.06 (0.03 to 0.09)
1	Mar	96 (55 to 151)	0.21 (0.12 to 0.34)	116 (70 to 171)	0.18 (0.11 to 0.27)	135 (85 to 195)	0.16 (0.10 to 0.23)	229 (162 to 304)	0.16 (0.11 to 0.21)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 18)	0.01 (0.00 to 0.03)	11 (0 to 29)	0.01 (0.00 to 0.03)	61 (0 to 141)	0.04 (0.00 to 0.10)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	1 (0 to 3)	0.00 (0.00 to 0.01)	2 (0 to 6)	0.00 (0.00 to 0.01)	6 (1 to 12)	0.01 (0.00 to 0.01)	7 (1 to 12)	0.00 (0.00 to 0.01)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	2 (0 to 5)	0.00 (0.00 to 0.01)	2 (0 to 5)	0.00 (0.00 to 0.01)	7 (2 to 14)	0.00 (0.00 to 0.01)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.00 (0.00 to 0.01)
2	Sep	8 (0 to 24)	0.02 (0.00 to 0.05)	12 (0 to 28)	0.02 (0.00 to 0.04)	20 (4 to 45)	0.02 (0.00 to 0.05)	20 (4 to 45)	0.01 (0.00 to 0.03)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	29 (9 to 60)	0.06 (0.02 to 0.13)	64 (22 to 120)	0.10 (0.03 to 0.19)	81 (31 to 143)	0.10 (0.04 to 0.17)	124 (61 to 198)	0.09 (0.04 to 0.14)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	3 (0 to 10)	0.01 (0.00 to 0.02)	3 (0 to 10)	0.00 (0.00 to 0.01)	7 (0 to 17)	0.00 (0.00 to 0.01)
2	Feb	16 (4 to 34)	0.04 (0.01 to 0.08)	24 (8 to 47)	0.04 (0.01 to 0.07)	29 (12 to 55)	0.03 (0.01 to 0.06)	62 (32 to 98)	0.04 (0.02 to 0.07)

Table 1.39: Design-based Northern fulmar (sitting) population estimates (Pop) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	17 (3 to 34)	0.04 (0.01 to 0.07)	23 (8 to 46)	0.04 (0.01 to 0.07)	27 (9 to 46)	0.03 (0.01 to 0.05)	51 (26 to 76)	0.04 (0.02 to 0.05)
1	Apr	11 (0 to 26)	0.02 (0.00 to 0.06)	21 (3 to 44)	0.03 (0.01 to 0.07)	25 (7 to 51)	0.03 (0.01 to 0.06)	46 (21 to 80)	0.03 (0.01 to 0.06)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	3 (0 to 10)	0.01 (0.00 to 0.02)	10 (0 to 20)	0.01 (0.00 to 0.02)	13 (3 to 27)	0.01 (0.00 to 0.02)
1	Jul	5 (0 to 16)	0.01 (0.00 to 0.03)	10 (0 to 26)	0.02 (0.00 to 0.04)	15 (0 to 31)	0.02 (0.00 to 0.04)	20 (0 to 41)	0.01 (0.00 to 0.03)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	5 (0 to 15)	0.01 (0.00 to 0.02)	5 (0 to 15)	0.01 (0.00 to 0.02)	18 (0 to 40)	0.01 (0.00 to 0.03)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	16 (0 to 33)	0.04 (0.00 to 0.07)	16 (0 to 33)	0.02 (0.00 to 0.05)	21 (5 to 44)	0.02 (0.01 to 0.05)	27 (10 to 54)	0.02 (0.01 to 0.04)
1	Dec	19 (5 to 41)	0.04 (0.01 to 0.09)	67 (23 to 121)	0.10 (0.04 to 0.19)	92 (43 to 152)	0.11 (0.05 to 0.18)	132 (77 to 202)	0.09 (0.05 to 0.14)
1	Jan	2 (0 to 6)	0.00 (0.00 to 0.01)	4 (0 to 8)	0.01 (0.00 to 0.01)	8 (2 to 17)	0.01 (0.00 to 0.02)	16 (6 to 27)	0.01 (0.00 to 0.02)
1	Feb	30 (13 to 56)	0.07 (0.03 to 0.12)	33 (14 to 58)	0.05 (0.02 to 0.09)	45 (22 to 73)	0.05 (0.03 to 0.09)	65 (36 to 97)	0.05 (0.03 to 0.07)
1	Mar	33 (19 to 52)	0.07 (0.04 to 0.11)	40 (24 to 59)	0.06 (0.04 to 0.09)	46 (29 to 67)	0.05 (0.03 to 0.08)	78 (55 to 104)	0.06 (0.04 to 0.07)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	1 (0 to 3)	0.00 (0.00 to 0.00)	2 (0 to 5)	0.00 (0.00 to 0.01)	10 (0 to 23)	0.01 (0.00 to 0.02)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	6 (0 to 17)	0.01 (0.00 to 0.04)	11 (0 to 28)	0.02 (0.00 to 0.04)	28 (5 to 58)	0.03 (0.01 to 0.07)	33 (5 to 62)	0.02 (0.00 to 0.04)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	5 (0 to 15)	0.01 (0.00 to 0.02)	5 (0 to 15)	0.01 (0.00 to 0.02)	20 (5 to 41)	0.01 (0.00 to 0.03)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	5 (0 to 16)	0.01 (0.00 to 0.04)	8 (0 to 19)	0.01 (0.00 to 0.03)	13 (3 to 30)	0.02 (0.00 to 0.04)	13 (3 to 30)	0.01 (0.00 to 0.02)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	29 (9 to 60)	0.06 (0.02 to 0.13)	64 (22 to 120)	0.10 (0.03 to 0.19)	81 (31 to 143)	0.10 (0.04 to 0.17)	124 (61 to 198)	0.09 (0.04 to 0.14)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	3 (0 to 10)	0.01 (0.00 to 0.02)	3 (0 to 10)	0.00 (0.00 to 0.01)	7 (0 to 17)	0.00 (0.00 to 0.01)
2	Feb	13 (3 to 27)	0.03 (0.01 to 0.06)	19 (6 to 36)	0.03 (0.01 to 0.06)	22 (9 to 43)	0.03 (0.01 to 0.05)	48 (25 to 76)	0.03 (0.02 to 0.05)

Table 1.40: Design-based Northern fulmar (all behaviour) population estimates (Pop) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	37 (6 to 71)	0.08 (0.01 to 0.16)	50 (18 to 97)	0.08 (0.03 to 0.15)	56 (18 to 97)	0.07 (0.02 to 0.11)	107 (55 to 161)	0.08 (0.04 to 0.11)
1	Apr	20 (0 to 48)	0.04 (0.00 to 0.11)	40 (6 to 81)	0.06 (0.01 to 0.13)	47 (13 to 95)	0.05 (0.01 to 0.11)	85 (38 to 148)	0.06 (0.03 to 0.10)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 17)	0.01 (0.00 to 0.02)	6 (0 to 17)	0.00 (0.00 to 0.01)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	20 (0 to 41)	0.02 (0.00 to 0.05)	26 (6 to 54)	0.02 (0.00 to 0.04)
1	Jul	7 (0 to 21)	0.01 (0.00 to 0.05)	13 (0 to 34)	0.02 (0.00 to 0.05)	20 (0 to 41)	0.02 (0.00 to 0.05)	26 (0 to 55)	0.02 (0.00 to 0.04)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.01 (0.00 to 0.03)	6 (0 to 20)	0.01 (0.00 to 0.02)	25 (0 to 53)	0.02 (0.00 to 0.04)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	20 (0 to 41)	0.04 (0.00 to 0.09)	20 (0 to 41)	0.03 (0.00 to 0.06)	27 (6 to 55)	0.03 (0.01 to 0.06)	34 (13 to 68)	0.02 (0.01 to 0.05)
1	Dec	26 (6 to 54)	0.06 (0.01 to 0.12)	89 (31 to 161)	0.14 (0.05 to 0.25)	123 (57 to 202)	0.14 (0.07 to 0.24)	177 (102 to 270)	0.12 (0.07 to 0.19)
1	Jan	7 (0 to 21)	0.01 (0.00 to 0.05)	13 (0 to 28)	0.02 (0.00 to 0.04)	26 (6 to 55)	0.03 (0.01 to 0.06)	53 (20 to 90)	0.04 (0.01 to 0.06)
1	Feb	70 (31 to 128)	0.15 (0.07 to 0.28)	77 (31 to 134)	0.12 (0.05 to 0.21)	103 (51 to 169)	0.12 (0.06 to 0.20)	149 (84 to 223)	0.10 (0.06 to 0.16)
1	Mar	129 (74 to 203)	0.29 (0.17 to 0.45)	155 (94 to 229)	0.24 (0.15 to 0.36)	182 (114 to 262)	0.21 (0.13 to 0.31)	307 (217 to 409)	0.22 (0.15 to 0.29)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	13 (0 to 34)	0.02 (0.00 to 0.04)	71 (0 to 164)	0.05 (0.00 to 0.12)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	7 (0 to 20)	0.01 (0.00 to 0.05)	13 (0 to 34)	0.02 (0.00 to 0.05)	33 (6 to 69)	0.04 (0.01 to 0.08)	40 (6 to 75)	0.03 (0.00 to 0.05)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	7 (0 to 21)	0.01 (0.00 to 0.02)	26 (6 to 55)	0.02 (0.00 to 0.04)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.00 (0.00 to 0.01)
2	Sep	13 (0 to 41)	0.03 (0.00 to 0.09)	20 (0 to 47)	0.03 (0.00 to 0.07)	33 (6 to 75)	0.04 (0.01 to 0.09)	33 (6 to 74)	0.02 (0.00 to 0.05)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	57 (18 to 121)	0.13 (0.04 to 0.27)	128 (43 to 239)	0.20 (0.07 to 0.37)	163 (62 to 287)	0.19 (0.07 to 0.34)	248 (121 to 396)	0.17 (0.09 to 0.28)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	7 (0 to 20)	0.01 (0.00 to 0.02)	13 (0 to 34)	0.01 (0.00 to 0.02)
2	Feb	29 (7 to 61)	0.06 (0.02 to 0.14)	43 (14 to 83)	0.07 (0.02 to 0.13)	51 (21 to 98)	0.06 (0.02 to 0.11)	109 (57 to 174)	0.08 (0.04 to 0.12)

1.3.5 Manx shearwater

1.3.5.1 As expected, Manx shearwater were absent or near absent during the non-breeding season (September to March) as the species overwinters off the coast of South America.

1.3.5.2 Within the Mona Array Area plus 4 to 10km buffer zone, the highest abundance was recorded in June in 2021, with an estimated 8,378 birds (95% range: 2,062 to 22,154). The design-based estimate for that month yielded a similar population size (8,541), but with much narrower confidence limits (95% range: (3,811 to 13,795)) (Table 1.41). MRSea estimates for each boundary area can be found in Appendix B.

1.3.5.3 The presence of Manx shearwater in July suggested that these birds might be associated with the Welsh colonies and thus foraged within the Mona Array Area plus 4 to 10km buffer zone. There was a hotspot of high densities to the southwest of the Mona Array Area where densities exceeding 45 individuals per km^2 were recorded in July 2020 and June to July 2021. Further offshore, high densities were also recorded outside the Mona Array Area.

1.3.5.4 Within the Mona Array Area, design-based estimates peaked at 670 individuals (95% range: 25 to 1,578) in July 2020.

1.3.5.5 Design-based estimates produced by each behaviour (flying, sitting and all behaviour) are given for each boundary (Table 1.42; Table 1.43; Table 1.44).

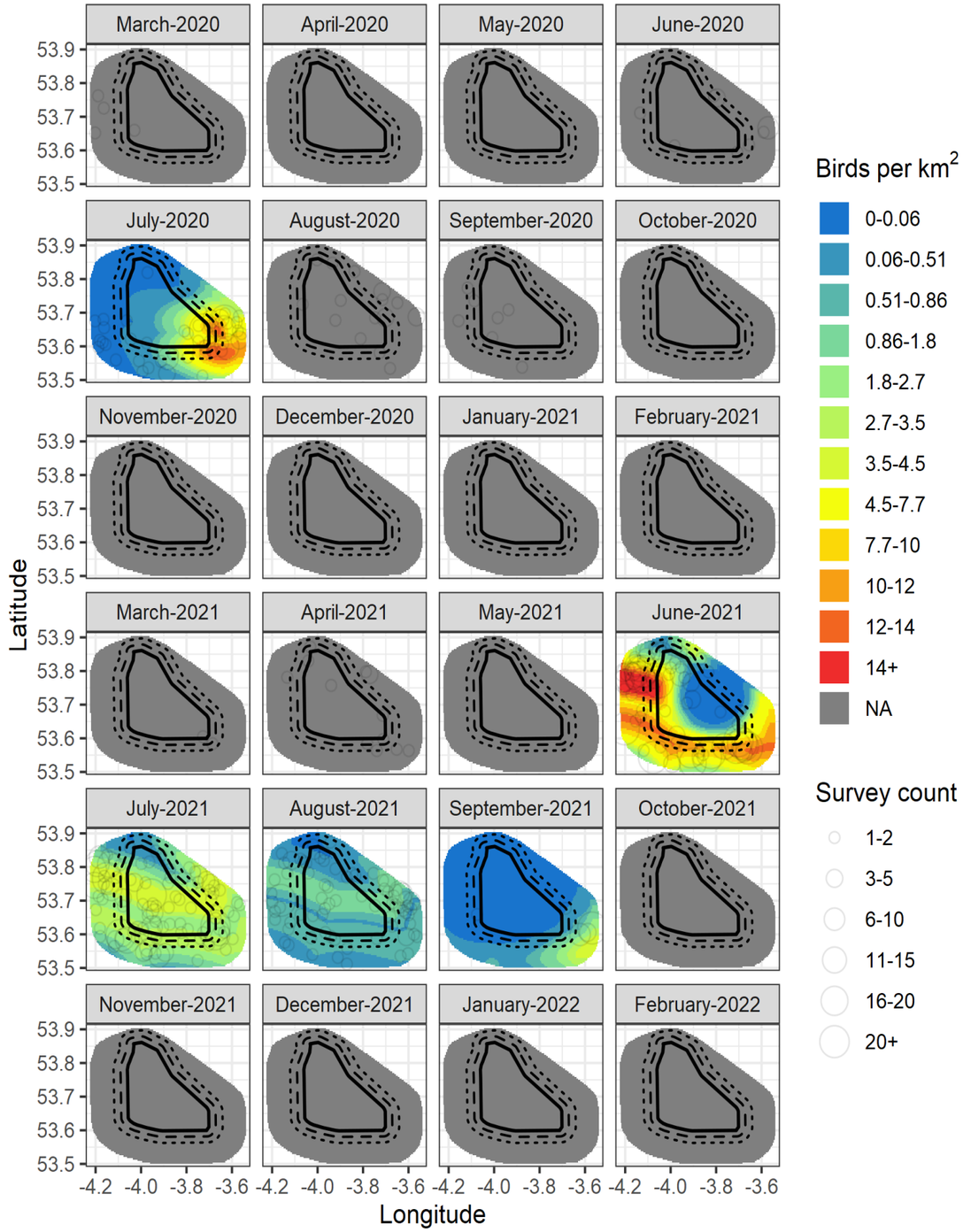

Figure 1.24: Manx shearwater monthly densities (birds per km^2) and raw counts. Estimates are based on the MRSea model outputs.

Table 1.41: Manx shearwater (all behaviour) design-based and MRSea population estimates for the Mona Array Area plus 4 to 10km buffer zone.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	n/a	n/a	44 (6 to 97)	0.03 (0.00 to 0.07)
1	Apr	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	n/a	n/a	125 (45 to 225)	0.09 (0.03 to 0.16)
1	Jul	3,114 (477 to 9,903)	2.19 (0.34 to 6.96)	3,042 (500 to 6,750)	2.14 (0.35 to 4.75)
1	Aug	n/a	n/a	126 (65 to 191)	0.09 (0.05 to 0.13)
1	Sep	n/a	n/a	65 (25 to 120)	0.05 (0.02 to 0.08)
1	Oct	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Mar	n/a	n/a	13 (0 to 27)	0.01 (0.00 to 0.02)
2	Apr	n/a	n/a	101 (46 to 179)	0.07 (0.03 to 0.13)
2	May	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	8,378 (2,062 to 22,154)	5.89 (1.45 to 15.57)	8,541 (3,811 to 13,795)	6.01 (2.68 to 9.71)
2	Jul	3,703 (1,404 to 7,521)	2.60 (0.99 to 5.29)	36,40 (2,032 to 5,400)	2.56 (1.43 to 3.80)
2	Aug	903 (298 to 1,974)	0.64 (0.21 to 1.39)	913 (581 to 1,301)	0.64 (0.41 to 0.92)
2	Sep	409 (24 to 1,931)	0.29 (0.02 to 1.36)	405 (44 to 806)	0.29 (0.03 to 0.57)
2	Oct	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.42: Design-based Manx shearwater (flying) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	1 (0 to 3)	0.00 (0.00 to 0.01)	1 (0 to 3)	0.00 (0.00 to 0.00)	1 (0 to 3)	0.00 (0.00 to 0.00)	6 (1 to 14)	0.00 (0.00 to 0.01)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	2 (0 to 6)	0.00 (0.00 to 0.01)	4 (0 to 11)	0.01 (0.00 to 0.02)	17 (4 to 37)	0.02 (0.00 to 0.04)	40 (14 to 71)	0.03 (0.01 to 0.05)
1	Jul	389 (15 to 916)	0.86 (0.03 to 2.04)	428 (41 to 953)	0.67 (0.06 to 1.49)	492 (79 to 1,031)	0.58 (0.09 to 1.21)	1,766 (290 to 3,919)	1.24 (0.20 to 2.76)
1	Aug	39 (12 to 75)	0.09 (0.03 to 0.17)	71 (31 to 129)	0.11 (0.05 to 0.20)	79 (32 to 130)	0.09 (0.04 to 0.15)	126 (65 to 191)	0.09 (0.05 to 0.13)
1	Sep	25 (0 to 53)	0.06 (0.00 to 0.12)	26 (0 to 53)	0.04 (0.00 to 0.08)	52 (12 to 100)	0.06 (0.01 to 0.12)	65 (25 to 120)	0.05 (0.02 to 0.08)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	6 (0 to 20)	0.01 (0.00 to 0.05)	6 (0 to 20)	0.01 (0.00 to 0.03)	13 (0 to 27)	0.02 (0.00 to 0.03)	13 (0 to 27)	0.01 (0.00 to 0.02)
2	Apr	12 (3 to 26)	0.03 (0.01 to 0.06)	19 (6 to 35)	0.03 (0.01 to 0.06)	19 (6 to 36)	0.02 (0.01 to 0.04)	47 (21 to 84)	0.03 (0.02 to 0.06)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	162 (50 to 291)	0.36 (0.11 to 0.65)	1,390 (110 to 3,745)	2.17 (0.17 to 5.86)	2,431 (464 to 5,088)	2.85 (0.54 to 5.96)	4,806 (2,144 to 7,762)	3.38 (1.51 to 5.47)
2	Jul	93 (37 to 169)	0.21 (0.08 to 0.37)	135 (69 to 220)	0.21 (0.11 to 0.34)	367 (141 to 618)	0.43 (0.16 to 0.72)	686 (383 to 1,017)	0.48 (0.27 to 0.72)
2	Aug	101 (58 to 154)	0.22 (0.13 to 0.34)	161 (107 to 229)	0.25 (0.17 to 0.36)	207 (143 to 283)	0.24 (0.17 to 0.33)	708 (451 to 1,009)	0.50 (0.32 to 0.71)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	1 (0 to 2)	0.00 (0.00 to 0.00)	1 (0 to 4)	0.00 (0.00 to 0.00)	37 (4 to 75)	0.03 (0.00 to 0.05)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.43: Design-based Manx shearwater (sitting) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	5 (0 to 17)	0.01 (0.00 to 0.04)	5 (0 to 17)	0.01 (0.00 to 0.03)	5 (0 to 17)	0.01 (0.00 to 0.02)	38 (5 to 83)	0.03 (0.00 to 0.06)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	5 (0 to 14)	0.01 (0.00 to 0.03)	9 (0 to 23)	0.01 (0.00 to 0.04)	36 (9 to 79)	0.04 (0.01 to 0.09)	86 (31 to 154)	0.06 (0.02 to 0.11)
1	Jul	281 (11 to 662)	0.62 (0.02 to 1.47)	309 (29 to 688)	0.48 (0.05 to 1.08)	355 (57 to 745)	0.42 (0.07 to 0.87)	1,276 (210 to 2,831)	0.90 (0.15 to 1.99)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	14 (3 to 30)	0.03 (0.01 to 0.07)	21 (7 to 40)	0.03 (0.01 to 0.06)	21 (7 to 41)	0.03 (0.01 to 0.05)	54 (25 to 96)	0.04 (0.02 to 0.07)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	126 (39 to 226)	0.28 (0.09 to 0.50)	1,080 (86 to 2,911)	1.69 (0.13 to 4.55)	1,889 (361 to 3,955)	2.21 (0.42 to 4.63)	3,735 (1,667 to 6,033)	2.63 (1.17 to 4.25)
2	Jul	399 (161 to 726)	0.89 (0.36 to 1.61)	583 (297 to 949)	0.91 (0.46 to 1.48)	1,582 (606 to 2,664)	1.85 (0.71 to 3.12)	2,954 (1,649 to 4,382)	2.08 (1.16 to 3.09)
2	Aug	29 (17 to 44)	0.06 (0.04 to 0.10)	47 (31 to 66)	0.07 (0.05 to 0.10)	60 (41 to 82)	0.07 (0.05 to 0.10)	205 (131 to 292)	0.14 (0.09 to 0.21)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.01 (0.00 to 0.03)	14 (0 to 35)	0.02 (0.00 to 0.04)	367 (40 to 732)	0.26 (0.03 to 0.52)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.44: Design-based Manx shearwater (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed from March 2020 to February 2021 (Year 1) and from March 2021 to February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	6 (0 to 20)	0.01 (0.00 to 0.04)	6 (0 to 19)	0.01 (0.00 to 0.03)	6 (0 to 19)	0.01 (0.00 to 0.02)	44 (6 to 97)	0.03 (0.00 to 0.07)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	7 (0 to 21)	0.01 (0.00 to 0.05)	13 (0 to 34)	0.02 (0.00 to 0.05)	53 (13 to 116)	0.06 (0.01 to 0.14)	125 (45 to 225)	0.09 (0.03 to 0.16)
1	Jul	670 (25 to 1,578)	1.49 (0.06 to 3.51)	737 (70 to 1,641)	1.15 (0.11 to 2.57)	847 (135 to 1,776)	0.99 (0.16 to 2.08)	3,042 (500 to 6,750)	2.14 (0.35 to 4.75)
1	Aug	39 (12 to 75)	0.09 (0.03 to 0.17)	71 (31 to 129)	0.11 (0.05 to 0.20)	79 (32 to 130)	0.09 (0.04 to 0.15)	126 (65 to 191)	0.09 (0.05 to 0.13)
1	Sep	25 (0 to 53)	0.06 (0.00 to 0.12)	26 (0 to 53)	0.04 (0.00 to 0.08)	52 (12 to 100)	0.06 (0.01 to 0.12)	65 (25 to 120)	0.05 (0.02 to 0.08)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	6 (0 to 20)	0.01 (0.00 to 0.05)	6 (0 to 20)	0.01 (0.00 to 0.03)	13 (0 to 27)	0.02 (0.00 to 0.03)	13 (0 to 27)	0.01 (0.00 to 0.02)
2	Apr	26 (6 to 56)	0.06 (0.01 to 0.12)	40 (13 to 76)	0.06 (0.02 to 0.12)	40 (13 to 76)	0.05 (0.02 to 0.09)	101 (46 to 179)	0.07 (0.03 to 0.13)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	288 (88 to 518)	0.64 (0.20 to 1.15)	2,470 (196 to 6,657)	3.86 (0.31 to 10.41)	4,320 (825 to 9,042)	5.06 (0.97 to 10.59)	8,541 (3,811 to 13,795)	6.01 (2.68 to 9.71)
2	Jul	491 (198 to 895)	1.09 (0.44 to 1.99)	718 (366 to 1,169)	1.12 (0.57 to 1.83)	1,949 (747 to 3,282)	2.28 (0.87 to 3.84)	3,640 (2,032 to 5,400)	2.56 (1.43 to 3.80)
2	Aug	130 (75 to 198)	0.29 (0.17 to 0.44)	207 (137 to 296)	0.32 (0.21 to 0.46)	267 (184 to 365)	0.31 (0.22 to 0.43)	913 (581 to 1,301)	0.64 (0.41 to 0.92)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 23)	0.01 (0.00 to 0.04)	15 (0 to 38)	0.02 (0.00 to 0.05)	405 (44 to 806)	0.29 (0.03 to 0.57)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

1.3.6 Northern gannet

1.3.6.1 As expected, abundance was low during the non-breeding season with the birds' departure to wintering grounds off West Africa.

1.3.6.2 In Year 1, the highest abundance in the survey area was recorded in July and August, with 669 (95% range: 440 to 942) and 509 (95% range: 272 to 841) respectively (Table 1.45). In contrast the highest abundance was recorded at the start of the breeding season in Year 2 with 833 individuals (95% range: 413 to 1,434) in March 2022 (Table 3.40). MRSea estimates for each boundary area can be found in Appendix B.

1.3.6.3 The distribution of Northern gannet during the key breeding months was patchy, and the highest densities were found outside the Mona Array Area (Figure 1.25)

1.3.6.4 To date, the low abundances and high inter-annual variability during the breeding season suggests that the Mona Array Area is not favoured by foraging Northern gannet.

1.3.6.5 Design-based estimates produced by each behaviour (flying, sitting and all behaviour) are given for each boundary (Table 1.46;Table 1.47;Table 1.48).

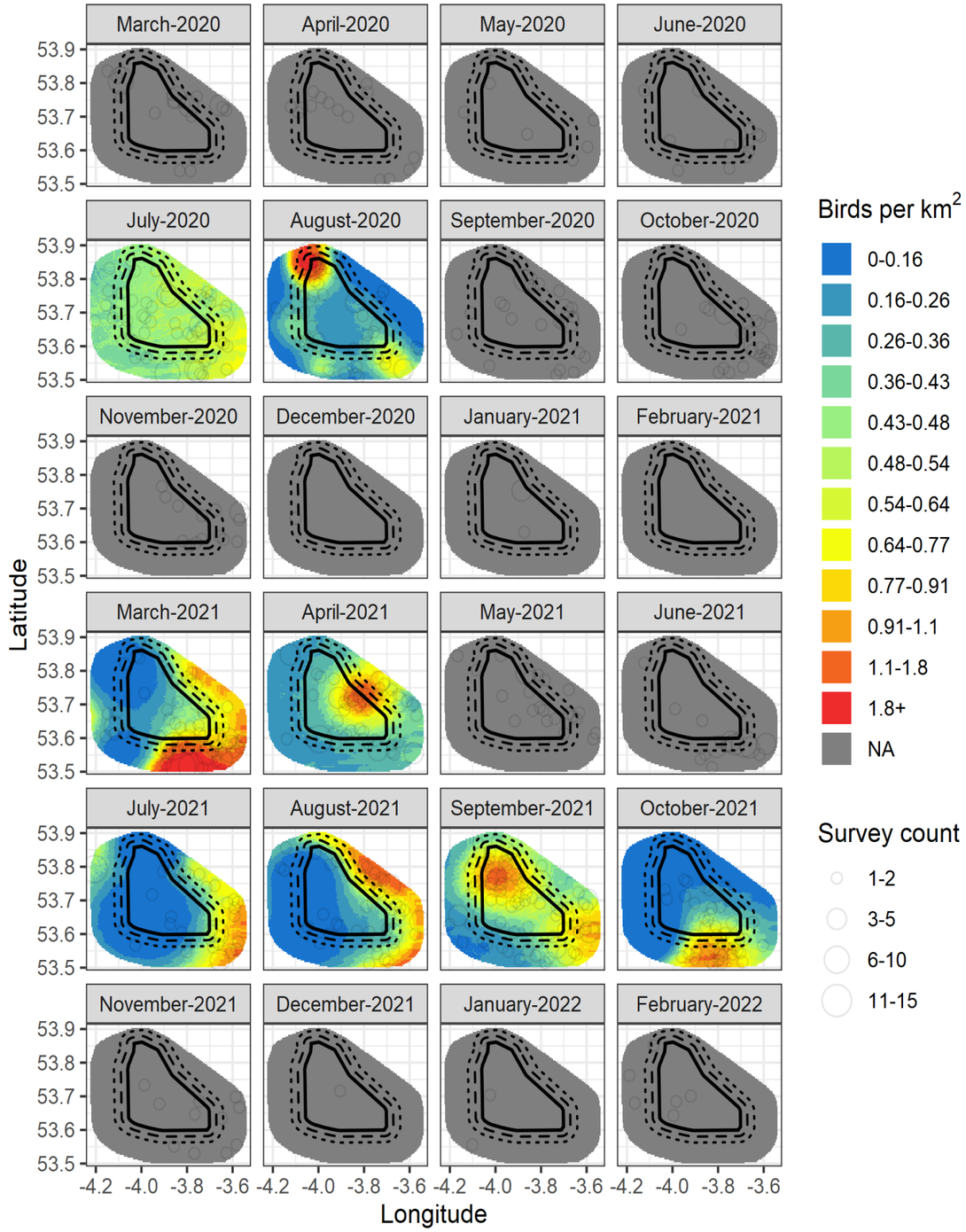

Figure 1.25: Northern gannet monthly densities (birds per km^2) and raw counts. Estimates are based on the MRSea model outputs.

Table 1.45: Northern gannet (all behaviour) design-based and MRSea population estimates for the Mona Array Area plus 4 to 10km buffer zone.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	n/a	n/a	240 (159 to 348)	0.17 (0.11 to 0.25)
1	Apr	n/a	n/a	124 (71 to 189)	0.09 (0.05 to 0.13)
1	May	n/a	n/a	44 (16 to 75)	0.03 (0.01 to 0.05)
1	Jun	n/a	n/a	87 (45 to 149)	0.06 (0.03 to 0.11)
1	Jul	669 (440 to 942)	0.47 (0.31 to 0.66)	671 (507 to 868)	0.47 (0.36 to 0.61)
1	Aug	509 (272 to 841)	0.36 (0.19 to 0.59)	511 (383 to 655)	0.36 (0.27 to 0.46)
1	Sep	n/a	n/a	270 (183 to 392)	0.19 (0.13 to 0.28)
1	Oct	n/a	n/a	264 (163 to 382)	0.19 (0.12 to 0.27)
1	Nov	n/a	n/a	151 (71 to 245)	0.11 (0.05 to 0.17)
1	Dec	n/a	n/a	7 (0 to 20)	0.00 (0.00 to 0.01)
1	Jan	n/a	n/a	34 (7 to 62)	0.02 (0.00 to 0.04)
1	Feb	n/a	n/a	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Mar	833 (413 to 1,434)	0.59 (0.29 to 1.01)	813 (595 to 1,039)	0.57 (0.42 to 0.73)
2	Apr	584 (355 to 874)	0.41 (0.25 to 0.61)	587 (434 to 757)	0.41 (0.31 to 0.53)
2	May	n/a	n/a	185 (122 to 263)	0.13 (0.09 to 0.19)
2	Jun	n/a	n/a	248 (123 to 436)	0.17 (0.09 to 0.31)
2	Jul	354 (158 to 647)	0.25 (0.11 to 0.45)	327 (207 to 443)	0.23 (0.15 to 0.31)
2	Aug	436 (178 to 850)	0.31 (0.13 to 0.60)	420 (312 to 539)	0.30 (0.22 to 0.38)
2	Sep	747 (440 to 1,138)	0.53 (0.31 to 0.80)	744 (597 to 933)	0.52 (0.42 to 0.66)
2	Oct	376 (249 to 543)	0.26 (0.18 to 0.38)	387 (280 to 493)	0.27 (0.20 to 0.35)
2	Nov	n/a	n/a	73 (26 to 114)	0.05 (0.02 to 0.08)
2	Dec	n/a	n/a	13 (0 to 40)	0.01 (0.00 to 0.03)
2	Jan	n/a	n/a	20 (0 to 41)	0.01 (0.00 to 0.03)
2	Feb	n/a	n/a	45 (14 to 83)	0.03 (0.01 to 0.06)

Table 1.46: Design-based Northern gannet (flying) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	4 (0 to 9)	0.01 (0.00 to 0.02)	21 (10 to 34)	0.03 (0.02 to 0.05)	40 (20 to 58)	0.05 (0.02 to 0.07)	57 (38 to 82)	0.04 (0.03 to 0.06)
1	Apr	17 (7 to 32)	0.04 (0.02 to 0.07)	19 (7 to 32)	0.03 (0.01 to 0.05)	22 (9 to 37)	0.03 (0.01 to 0.04)	46 (26 to 70)	0.03 (0.02 to 0.05)
1	May	8 (0 to 17)	0.02 (0.00 to 0.04)	12 (0 to 25)	0.02 (0.00 to 0.04)	16 (4 to 34)	0.02 (0.00 to 0.04)	33 (12 to 56)	0.02 (0.01 to 0.04)
1	Jun	12 (4 to 30)	0.03 (0.01 to 0.07)	12 (4 to 29)	0.02 (0.01 to 0.05)	32 (12 to 63)	0.04 (0.01 to 0.07)	53 (28 to 92)	0.04 (0.02 to 0.06)
1	Jul	84 (56 to 127)	0.19 (0.12 to 0.28)	105 (73 to 149)	0.16 (0.11 to 0.23)	129 (92 to 174)	0.15 (0.11 to 0.20)	266 (201 to 344)	0.19 (0.14 to 0.24)
1	Aug	70 (43 to 101)	0.16 (0.10 to 0.23)	95 (65 to 134)	0.15 (0.10 to 0.21)	132 (97 to 179)	0.15 (0.11 to 0.21)	177 (133 to 227)	0.12 (0.09 to 0.16)
1	Sep	18 (3 to 34)	0.04 (0.01 to 0.08)	40 (17 to 68)	0.06 (0.03 to 0.11)	102 (60 to 164)	0.12 (0.07 to 0.19)	154 (105 to 224)	0.11 (0.07 to 0.16)
1	Oct	28 (8 to 55)	0.06 (0.02 to 0.12)	32 (12 to 59)	0.05 (0.02 to 0.09)	53 (24 to 93)	0.06 (0.03 to 0.11)	168 (104 to 242)	0.12 (0.07 to 0.17)
1	Nov	24 (7 to 47)	0.05 (0.01 to 0.10)	37 (13 to 61)	0.06 (0.02 to 0.09)	55 (27 to 89)	0.06 (0.03 to 0.10)	79 (37 to 128)	0.06 (0.03 to 0.09)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.02)	7 (0 to 20)	0.00 (0.00 to 0.01)
1	Jan	20 (4 to 38)	0.04 (0.01 to 0.08)	20 (4 to 37)	0.03 (0.01 to 0.06)	20 (4 to 37)	0.02 (0.00 to 0.04)	20 (4 to 37)	0.01 (0.00 to 0.03)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	41 (22 to 67)	0.09 (0.05 to 0.15)	85 (53 to 128)	0.13 (0.08 to 0.20)	168 (108 to 231)	0.20 (0.13 to 0.27)	368 (269 to 470)	0.26 (0.19 to 0.33)
2	Apr	58 (35 to 88)	0.13 (0.08 to 0.20)	100 (67 to 151)	0.16 (0.10 to 0.24)	125 (89 to 179)	0.15 (0.10 to 0.21)	193 (143 to 250)	0.14 (0.10 to 0.18)
2	May	36 (15 to 63)	0.08 (0.03 to 0.14)	55 (31 to 91)	0.09 (0.05 to 0.14)	76 (43 to 112)	0.09 (0.05 to 0.13)	112 (74 to 160)	0.08 (0.05 to 0.11)
2	Jun	8 (0 to 17)	0.02 (0.00 to 0.04)	29 (8 to 55)	0.04 (0.01 to 0.09)	107 (29 to 209)	0.13 (0.03 to 0.25)	157 (78 to 276)	0.11 (0.05 to 0.19)
2	Jul	14 (2 to 23)	0.03 (0.00 to 0.05)	27 (11 to 42)	0.04 (0.02 to 0.07)	45 (24 to 70)	0.05 (0.03 to 0.08)	111 (70 to 150)	0.08 (0.05 to 0.11)
2	Aug	39 (14 to 64)	0.09 (0.03 to 0.14)	53 (28 to 86)	0.08 (0.04 to 0.13)	133 (88 to 188)	0.16 (0.10 to 0.22)	238 (177 to 306)	0.17 (0.12 to 0.22)
2	Sep	141 (98 to 199)	0.31 (0.22 to 0.44)	184 (132 to 243)	0.29 (0.21 to 0.38)	227 (164 to 293)	0.27 (0.19 to 0.34)	349 (280 to 438)	0.25 (0.20 to 0.31)
2	Oct	56 (29 to 80)	0.13 (0.06 to 0.18)	81 (50 to 110)	0.13 (0.08 to 0.17)	96 (64 to 131)	0.11 (0.08 to 0.15)	160 (116 to 204)	0.11 (0.08 to 0.14)
2	Nov	12 (3 to 25)	0.03 (0.01 to 0.05)	12 (3 to 24)	0.02 (0.00 to 0.04)	15 (3 to 28)	0.02 (0.00 to 0.03)	33 (12 to 52)	0.02 (0.01 to 0.04)
2	Dec	12 (0 to 40)	0.03 (0.00 to 0.09)	12 (0 to 40)	0.02 (0.00 to 0.06)	13 (0 to 40)	0.01 (0.00 to 0.05)	13 (0 to 40)	0.01 (0.00 to 0.03)
2	Jan	7 (0 to 21)	0.01 (0.00 to 0.05)	13 (0 to 34)	0.02 (0.00 to 0.05)	13 (0 to 34)	0.02 (0.00 to 0.04)	20 (0 to 41)	0.01 (0.00 to 0.03)
2	Feb	11 (0 to 23)	0.02 (0.00 to 0.05)	11 (0 to 23)	0.02 (0.00 to 0.04)	15 (4 to 30)	0.02 (0.00 to 0.04)	22 (7 to 42)	0.02 (0.01 to 0.03)

Table 1.47: Design-based Northern gannet (sitting) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	14 (0 to 30)	0.03 (0.00 to 0.07)	66 (32 to 108)	0.10 (0.05 to 0.17)	130 (65 to 188)	0.15 (0.08 to 0.22)	183 (122 to 266)	0.13 (0.09 to 0.19)
1	Apr	29 (12 to 56)	0.06 (0.03 to 0.12)	33 (12 to 56)	0.05 (0.02 to 0.09)	37 (16 to 64)	0.04 (0.02 to 0.08)	79 (45 to 119)	0.06 (0.03 to 0.08)
1	May	3 (0 to 6)	0.01 (0.00 to 0.01)	4 (0 to 8)	0.01 (0.00 to 0.01)	5 (1 to 11)	0.01 (0.00 to 0.01)	11 (4 to 19)	0.01 (0.00 to 0.01)
1	Jun	8 (2 to 18)	0.02 (0.01 to 0.04)	8 (2 to 18)	0.01 (0.00 to 0.03)	20 (7 to 39)	0.02 (0.01 to 0.05)	33 (17 to 57)	0.02 (0.01 to 0.04)
1	Jul	129 (85 to 193)	0.29 (0.19 to 0.43)	160 (111 to 228)	0.25 (0.17 to 0.36)	197 (140 to 266)	0.23 (0.16 to 0.31)	405 (306 to 524)	0.29 (0.22 to 0.37)
1	Aug	132 (82 to 192)	0.29 (0.18 to 0.43)	179 (124 to 253)	0.28 (0.19 to 0.40)	250 (184 to 339)	0.29 (0.22 to 0.40)	334 (251 to 428)	0.24 (0.18 to 0.30)
1	Sep	14 (3 to 26)	0.03 (0.01 to 0.06)	30 (13 to 51)	0.05 (0.02 to 0.08)	77 (45 to 123)	0.09 (0.05 to 0.14)	116 (78 to 168)	0.08 (0.06 to 0.12)
1	Oct	16 (4 to 32)	0.04 (0.01 to 0.07)	18 (7 to 34)	0.03 (0.01 to 0.05)	31 (14 to 54)	0.04 (0.02 to 0.06)	97 (60 to 140)	0.07 (0.04 to 0.10)
1	Nov	22 (6 to 43)	0.05 (0.01 to 0.10)	34 (12 to 56)	0.05 (0.02 to 0.09)	50 (24 to 82)	0.06 (0.03 to 0.10)	72 (34 to 117)	0.05 (0.02 to 0.08)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	13 (3 to 25)	0.03 (0.01 to 0.06)	13 (3 to 25)	0.02 (0.00 to 0.04)	13 (3 to 25)	0.02 (0.00 to 0.03)	14 (3 to 25)	0.01 (0.00 to 0.02)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	50 (27 to 81)	0.11 (0.06 to 0.18)	103 (65 to 155)	0.16 (0.10 to 0.24)	204 (131 to 279)	0.24 (0.15 to 0.33)	445 (326 to 569)	0.31 (0.23 to 0.40)
2	Apr	119 (72 to 180)	0.26 (0.16 to 0.40)	203 (136 to 307)	0.32 (0.21 to 0.48)	253 (181 to 363)	0.30 (0.21 to 0.43)	393 (291 to 508)	0.28 (0.20 to 0.36)
2	May	23 (10 to 41)	0.05 (0.02 to 0.09)	36 (20 to 59)	0.06 (0.03 to 0.09)	49 (28 to 72)	0.06 (0.03 to 0.08)	73 (48 to 104)	0.05 (0.03 to 0.07)
2	Jun	5 (0 to 10)	0.01 (0.00 to 0.02)	17 (5 to 32)	0.03 (0.01 to 0.05)	62 (17 to 122)	0.07 (0.02 to 0.14)	91 (45 to 161)	0.06 (0.03 to 0.11)
2	Jul	26 (4 to 45)	0.06 (0.01 to 0.10)	52 (21 to 81)	0.08 (0.03 to 0.13)	88 (46 to 135)	0.10 (0.05 to 0.16)	216 (137 to 292)	0.15 (0.10 to 0.21)
2	Aug	30 (11 to 49)	0.07 (0.02 to 0.11)	41 (21 to 65)	0.06 (0.03 to 0.10)	101 (67 to 143)	0.12 (0.08 to 0.17)	182 (135 to 233)	0.13 (0.10 to 0.16)
2	Sep	160 (111 to 226)	0.36 (0.25 to 0.50)	209 (149 to 275)	0.33 (0.23 to 0.43)	257 (186 to 332)	0.30 (0.22 to 0.39)	395 (317 to 495)	0.28 (0.22 to 0.35)
2	Oct	80 (41 to 113)	0.18 (0.09 to 0.25)	115 (71 to 156)	0.18 (0.11 to 0.24)	136 (91 to 186)	0.16 (0.11 to 0.22)	227 (164 to 289)	0.16 (0.12 to 0.20)
2	Nov	14 (3 to 29)	0.03 (0.01 to 0.07)	14 (3 to 29)	0.02 (0.01 to 0.05)	18 (3 to 33)	0.02 (0.00 to 0.04)	40 (14 to 62)	0.03 (0.01 to 0.04)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	11 (0 to 23)	0.02 (0.00 to 0.05)	11 (0 to 23)	0.02 (0.00 to 0.04)	15 (4 to 30)	0.02 (0.00 to 0.04)	22 (7 to 42)	0.02 (0.01 to 0.03)

Table 1.48: Design-based Northern gannet (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**
1	Mar	19 (0 to 39)	0.04 (0.00 to 0.09)	87 (42 to 142)	0.14 (0.07 to 0.22)	170 (85 to 246)	0.20 (0.10 to 0.29)	240 (159 to 348)	0.17 (0.11 to 0.25)
1	Apr	46 (19 to 88)	0.10 (0.04 to 0.20)	52 (19 to 88)	0.08 (0.03 to 0.14)	59 (25 to 101)	0.07 (0.03 to 0.12)	124 (71 to 189)	0.09 (0.05 to 0.13)
1	May	10 (0 to 23)	0.02 (0.00 to 0.05)	16 (0 to 34)	0.02 (0.00 to 0.05)	21 (5 to 45)	0.02 (0.01 to 0.05)	44 (16 to 75)	0.03 (0.01 to 0.05)
1	Jun	20 (6 to 48)	0.04 (0.01 to 0.11)	20 (6 to 47)	0.03 (0.01 to 0.07)	53 (19 to 102)	0.06 (0.02 to 0.12)	87 (45 to 149)	0.06 (0.03 to 0.11)
1	Jul	213 (140 to 320)	0.47 (0.31 to 0.71)	265 (184 to 377)	0.41 (0.29 to 0.59)	327 (232 to 440)	0.38 (0.27 to 0.52)	671 (507 to 868)	0.47 (0.36 to 0.61)
1	Aug	202 (125 to 293)	0.45 (0.28 to 0.65)	274 (189 to 387)	0.43 (0.30 to 0.61)	382 (281 to 518)	0.45 (0.33 to 0.61)	511 (383 to 655)	0.36 (0.27 to 0.46)
1	Sep	32 (6 to 60)	0.07 (0.01 to 0.13)	70 (30 to 119)	0.11 (0.05 to 0.19)	179 (106 to 286)	0.21 (0.12 to 0.34)	270 (183 to 392)	0.19 (0.13 to 0.28)
1	Oct	44 (12 to 87)	0.10 (0.03 to 0.19)	50 (18 to 92)	0.08 (0.03 to 0.14)	83 (37 to 147)	0.10 (0.04 to 0.17)	264 (163 to 382)	0.19 (0.12 to 0.27)
1	Nov	46 (13 to 90)	0.10 (0.03 to 0.20)	71 (25 to 116)	0.11 (0.04 to 0.18)	105 (51 to 171)	0.12 (0.06 to 0.20)	151 (71 to 245)	0.11 (0.05 to 0.17)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.02)	7 (0 to 20)	0.00 (0.00 to 0.01)
1	Jan	33 (6 to 63)	0.07 (0.01 to 0.14)	33 (6 to 62)	0.05 (0.01 to 0.10)	34 (6 to 62)	0.04 (0.01 to 0.07)	34 (7 to 62)	0.02 (0.00 to 0.04)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	90 (49 to 148)	0.20 (0.11 to 0.33)	188 (118 to 282)	0.29 (0.18 to 0.44)	372 (239 to 510)	0.44 (0.28 to 0.60)	813 (595 to 1,039)	0.57 (0.42 to 0.73)
2	Apr	177 (107 to 268)	0.39 (0.24 to 0.60)	303 (203 to 458)	0.47 (0.32 to 0.72)	378 (270 to 542)	0.44 (0.32 to 0.63)	587 (434 to 757)	0.41 (0.31 to 0.53)
2	May	59 (25 to 103)	0.13 (0.06 to 0.23)	91 (50 to 150)	0.14 (0.08 to 0.23)	125 (70 to 184)	0.15 (0.08 to 0.22)	185 (122 to 263)	0.13 (0.09 to 0.19)
2	Jun	13 (0 to 27)	0.03 (0.00 to 0.06)	45 (13 to 88)	0.07 (0.02 to 0.14)	169 (45 to 332)	0.20 (0.05 to 0.39)	248 (123 to 436)	0.17 (0.09 to 0.31)
2	Jul	40 (6 to 69)	0.09 (0.01 to 0.15)	79 (32 to 123)	0.12 (0.05 to 0.19)	133 (70 to 205)	0.16 (0.08 to 0.24)	327 (207 to 443)	0.23 (0.15 to 0.31)
2	Aug	69 (24 to 113)	0.15 (0.05 to 0.25)	94 (49 to 151)	0.15 (0.08 to 0.24)	234 (155 to 331)	0.27 (0.18 to 0.39)	420 (312 to 539)	0.30 (0.22 to 0.38)
2	Sep	302 (209 to 425)	0.67 (0.47 to 0.94)	393 (281 to 518)	0.61 (0.44 to 0.81)	483 (350 to 625)	0.57 (0.41 to 0.73)	744 (597 to 933)	0.52 (0.42 to 0.66)
2	Oct	136 (69 to 193)	0.30 (0.15 to 0.43)	196 (121 to 267)	0.31 (0.19 to 0.42)	231 (155 to 317)	0.27 (0.18 to 0.37)	387 (280 to 493)	0.27 (0.20 to 0.35)
2	Nov	26 (6 to 54)	0.06 (0.01 to 0.12)	26 (6 to 54)	0.04 (0.01 to 0.08)	33 (6 to 61)	0.04 (0.01 to 0.07)	73 (26 to 114)	0.05 (0.02 to 0.08)
2	Dec	12 (0 to 40)	0.03 (0.00 to 0.09)	12 (0 to 40)	0.02 (0.00 to 0.06)	13 (0 to 40)	0.01 (0.00 to 0.05)	13 (0 to 40)	0.01 (0.00 to 0.03)
2	Jan	7 (0 to 21)	0.01 (0.00 to 0.05)	13 (0 to 34)	0.02 (0.00 to 0.05)	13 (0 to 34)	0.02 (0.00 to 0.04)	20 (0 to 41)	0.01 (0.00 to 0.03)
2	Feb	22 (0 to 46)	0.05 (0.00 to 0.10)	22 (0 to 45)	0.03 (0.00 to 0.07)	30 (7 to 60)	0.03 (0.01 to 0.07)	45 (14 to 83)	0.03 (0.01 to 0.06)

1.3.7 Other species

Other species list and raw counts

1.3.7.1 Other true seabird species were present in very low numbers across the site e.g. Atlantic puffin and storm petrel species.

1.3.7.2 As expected seaducks and divers were almost absent from the site given the distance to the coastline and water depth. It is of note that only four red-throated divers were recorded (Table 1.49).

1.3.7.3 The rest of the species recorded are expected to be transient through the site e.g. terns, gulls, waders and passerines.

Table 1.49: Other species/groups recorded during March 2020 to February 2022 ranked by abundance.

Species/Groups	Flying	Other behaviour	Total
Unidentified thrush species	68	0	68
Unidentified bird species	3	58	61
Common gull	52	9	61
Little gull	21	7	28
‘Commic’ tern (unidentified arctic tern/common tern)	13	13	26
Atlantic puffin	1	24	25
Unidentified wader species	25	0	25
Black-tailed godwit	13	0	13
Common tern	13	0	13
Sandwich tern	10	0	10
Black-headed gull	9	0	9
Arctic tern	5	0	5
Red-throated diver	1	3	4
Great skua	3	0	3
Unidentified tern species	1	1	2
Arctic skua	2	0	2
European shag	2	0	2
Great cormorant	0	1	1
Unidentified skua species	0	1	1
Unidentified storm-petrel species	0	1	1

Other species design-based abundance (ranked by taxonomic order)

1.3.7.4 Given the paucity of sightings, only design-based estimates of total numbers were produced and are presented in taxonomic order (Table 1.50 to Table 1.65).

1.3.7.5 Design-based estimates of terns were below 100 individuals during the non-breeding season in the Mona Offshore Ornithology Array Area study area (Table 1.55; Table 1.56; Table 1.57).

1.3.7.6 Design-based estimates of little gull and black-headed gull did not exceed 100 individuals in the Mona Offshore Ornithology Array Area study area (Table 1.52; Table 1.53). There were however annual peaks of 122 (95% CI range: 66 to 186) and 128 (95% CI range 66 to 193) common gull in February 2021 and January 2022 respectively (Table 1.54).

Table 1.50: Design-based black-tailed godwit (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	70 (0 to 207)	0.08 (0.00 to 0.24)	90 (0 to 225)	0.06 (0.00 to 0.16)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.51: Design-based unidentified wader species (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	56 (0 to 158)	0.12 (0.00 to 0.35)	56 (0 to 157)	0.09 (0.00 to 0.25)	63 (0 to 170)	0.07 (0.00 to 0.20)	64 (0 to 172)	0.04 (0.00 to 0.12)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.02)	7 (0 to 20)	0.00 (0.00 to 0.01)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	26 (0 to 83)	0.06 (0.00 to 0.18)	26 (0 to 82)	0.04 (0.00 to 0.13)	26 (0 to 82)	0.03 (0.00 to 0.10)	26 (0 to 81)	0.02 (0.00 to 0.06)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	13 (0 to 40)	0.03 (0.00 to 0.09)	13 (0 to 40)	0.02 (0.00 to 0.06)	25 (0 to 66)	0.03 (0.00 to 0.08)	25 (0 to 65)	0.02 (0.00 to 0.05)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	33 (0 to 101)	0.02 (0.00 to 0.07)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.52: Design-based black-headed gull (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	7 (0 to 22)	0.02 (0.00 to 0.05)	7 (0 to 21)	0.01 (0.00 to 0.03)	7 (0 to 21)	0.01 (0.00 to 0.03)	7 (0 to 21)	0.00 (0.00 to 0.02)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	7 (0 to 20)	0.01 (0.00 to 0.04)	7 (0 to 20)	0.01 (0.00 to 0.03)	7 (0 to 20)	0.01 (0.00 to 0.02)	27 (0 to 53)	0.02 (0.00 to 0.04)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 35)	0.01 (0.00 to 0.02)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 41)	0.01 (0.00 to 0.03)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.53: Design-based little gull (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	7 (0 to 21)	0.02 (0.00 to 0.05)	7 (0 to 21)	0.01 (0.00 to 0.03)	7 (0 to 21)	0.01 (0.00 to 0.02)	14 (0 to 28)	0.01 (0.00 to 0.02)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	21 (0 to 55)	0.01 (0.00 to 0.04)
1	Feb	33 (0 to 76)	0.07 (0.00 to 0.17)	33 (0 to 76)	0.05 (0.00 to 0.12)	47 (6 to 96)	0.05 (0.01 to 0.11)	73 (26 to 138)	0.05 (0.02 to 0.10)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	6 (0 to 21)	0.01 (0.00 to 0.05)	13 (0 to 28)	0.02 (0.00 to 0.04)	26 (0 to 55)	0.03 (0.00 to 0.06)	33 (0 to 69)	0.02 (0.00 to 0.05)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	44 (0 to 93)	0.07 (0.00 to 0.15)	44 (0 to 93)	0.05 (0.00 to 0.11)	45 (0 to 94)	0.03 (0.00 to 0.07)

Table 1.54: Design-based common gull (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.00 (0.00 to 0.01)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	34 (6 to 68)	0.02 (0.00 to 0.05)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	33 (6 to 62)	0.07 (0.01 to 0.14)	47 (13 to 83)	0.07 (0.02 to 0.13)	73 (32 to 118)	0.09 (0.04 to 0.14)	122 (66 to 186)	0.09 (0.05 to 0.13)
1	Mar	7 (0 to 20)	0.01 (0.00 to 0.05)	7 (0 to 20)	0.01 (0.00 to 0.03)	7 (0 to 20)	0.01 (0.00 to 0.02)	7 (0 to 20)	0.00 (0.00 to 0.01)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.01 (0.00 to 0.03)	19 (0 to 40)	0.02 (0.00 to 0.05)	71 (32 to 114)	0.05 (0.02 to 0.08)
2	Jan	6 (0 to 21)	0.01 (0.00 to 0.05)	13 (0 to 28)	0.02 (0.00 to 0.04)	20 (0 to 42)	0.02 (0.00 to 0.05)	128 (66 to 193)	0.09 (0.05 to 0.14)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 23)	0.01 (0.00 to 0.04)	23 (0 to 47)	0.03 (0.00 to 0.05)	31 (7 to 62)	0.02 (0.01 to 0.04)

Table 1.55: Design-based Sandwich tern (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	7 (0 to 22)	0.02 (0.00 to 0.05)	7 (0 to 22)	0.01 (0.00 to 0.03)	7 (0 to 22)	0.01 (0.00 to 0.03)	7 (0 to 22)	0.00 (0.00 to 0.02)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	14 (0 to 41)	0.03 (0.00 to 0.09)	13 (0 to 41)	0.02 (0.00 to 0.06)	14 (0 to 41)	0.02 (0.00 to 0.05)	14 (0 to 41)	0.01 (0.00 to 0.03)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	15 (0 to 48)	0.03 (0.00 to 0.11)	15 (0 to 48)	0.02 (0.00 to 0.08)	46 (7 to 96)	0.05 (0.01 to 0.11)	46 (8 to 96)	0.03 (0.01 to 0.07)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.56: Design-based common tern (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 22)	0.01 (0.00 to 0.03)	78 (0 to 176)	0.09 (0.00 to 0.21)	85 (0 to 183)	0.06 (0.00 to 0.13)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	10 (0 to 30)	0.01 (0.00 to 0.02)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.57: Design-based Arctic tern (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	49 (0 to 152)	0.03 (0.00 to 0.11)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.58: Design-based great skua (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.01 (0.00 to 0.03)	7 (0 to 21)	0.01 (0.00 to 0.02)	13 (0 to 34)	0.01 (0.00 to 0.02)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.59: Design-based Arctic skua (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	11 (0 to 34)	0.02 (0.00 to 0.08)	11 (0 to 34)	0.02 (0.00 to 0.05)	11 (0 to 34)	0.01 (0.00 to 0.04)	11 (0 to 34)	0.01 (0.00 to 0.02)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	6 (0 to 20)	0.01 (0.00 to 0.04)	6 (0 to 20)	0.01 (0.00 to 0.03)	6 (0 to 20)	0.01 (0.00 to 0.02)	6 (0 to 20)	0.00 (0.00 to 0.01)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.60: Design-based Atlantic puffin (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	29 (0 to 60)	0.06 (0.00 to 0.13)	43 (7 to 82)	0.07 (0.01 to 0.13)	51 (14 to 97)	0.06 (0.02 to 0.11)	102 (50 to 165)	0.07 (0.04 to 0.12)
1	Apr	8 (0 to 24)	0.02 (0.00 to 0.05)	8 (0 to 24)	0.01 (0.00 to 0.04)	15 (0 to 40)	0.02 (0.00 to 0.05)	23 (0 to 47)	0.02 (0.00 to 0.03)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	24 (0 to 57)	0.05 (0.00 to 0.13)	31 (0 to 73)	0.05 (0.00 to 0.11)	31 (0 to 73)	0.04 (0.00 to 0.09)	31 (0 to 73)	0.02 (0.00 to 0.05)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	8 (0 to 24)	0.01 (0.00 to 0.03)	8 (0 to 24)	0.01 (0.00 to 0.02)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	8 (0 to 24)	0.01 (0.00 to 0.02)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	8 (0 to 24)	0.01 (0.00 to 0.03)	8 (0 to 24)	0.01 (0.00 to 0.02)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.61: Design-based red-throated diver (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.01 (0.00 to 0.03)	6 (0 to 20)	0.01 (0.00 to 0.02)	6 (0 to 20)	0.00 (0.00 to 0.01)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	7 (0 to 20)	0.01 (0.00 to 0.02)	7 (0 to 20)	0.00 (0.00 to 0.01)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.00 (0.00 to 0.01)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.00 (0.00 to 0.01)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.62: Design-based storm petrel species (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 17)	0.00 (0.00 to 0.01)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.63: Design-based great cormorant (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	7 (0 to 21)	0.01 (0.00 to 0.05)	7 (0 to 20)	0.01 (0.00 to 0.03)	7 (0 to 21)	0.01 (0.00 to 0.02)	7 (0 to 21)	0.00 (0.00 to 0.01)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.64: Design-based European shag (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 40)	0.01 (0.00 to 0.03)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

Table 1.65: Design-based thrush species (all behaviour) population estimates (Pop) and density (D) with lower and upper (95%) confidence limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2).

		Mona Array Area		Mona Array Area + 2km		Mona Array Area + 4km		Mona Offshore Ornithology Array Area study area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	156 (0 to 491)	0.18 (0.00 to 0.57)	278 (0 to 649)	0.20 (0.00 to 0.46)
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	42 (0 to 141)	0.03 (0.00 to 0.10)
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)

1.4 Baseline characterisation of the Mona Offshore Ornithology Offshore Cable Corridor study area

1.4.1 Desktop studies associated with the Liverpool Bay SPA

1.4.1.1 The Mona Offshore Cable Corridor crosses the Liverpool Bay SPA which encompasses marine areas supporting large aggregations of wintering red-throated diver and common scoter as well as important marine foraging areas of breeding little tern. The boundary of Liverpool Bay SPA extends beyond 12nm and therefore lies partly in Welsh and English territorial waters and partly in offshore waters.

1.4.1.2 The SPA protects the largest aggregation of common scoter in the UK. The Mona Offshore Cable Corridor intersects the Colwyn Bay which support consistent numbers of common scoter throughout the non-breeding season (Cranswick *et al*., 2004). Aerial surveys conducted between 2004 and 2005 and between 2010 and 2011 found two main aggregations of common scoter in the Liverpool Bay SPA. It is evident that the inshore area (within 10km of the coastline) of the Mona Offshore Cable Corridor intersects with one of the common scoter aggregations during the non-breeding season (Lawson *et al.*, 2016).

1.4.1.3 Liverpool Bay also supports the third largest aggregation of red-throated diver in the UK. Webb *et al*. (2006) found red-throated diver to be distributed in two large core areas in Conwy Bay, north Wales, and off the coast of Lancashire, both core areas were separated by a gap of approximately 2km approximately due west of the mouth of the River Mersey. As with common scoter, the inshore area of the Mona Offshore Cable Corridor overlapped with high densities of red-throated diver (Lawson *et al*., 2016).

1.4.1.4 Liverpool Bay SPA also supports the largest marine aggregation of little gull. However, the Mona Offshore Cable Corridor falls outside the key concentrations of little gull, which are located in the west part of the Liverpool Bay SPA (Lawson *et al*., 2016).

1.4.1.5 Lastly, the Liverpool Bay SPA also supports foraging areas for nearly 7% of the GB population of little terns, and nearly 2% of the GB population common terns.

1.4.2 Mapping seabirds at sea data sources

1.4.2.1 For true seabirds, densities did not exceed one bird per kilometre square in the Mona Offshore Cable Corridor (Figure 1.26 to Figure 1.34).

1.4.2.2 As for red-throated diver and common scoter, Bradbury *et al*. (2014) highlighted an overlap between relatively high densities of both species with the Mona Offshore Cable Corridor. The overlap was however confined to the very nearshore areas (Figure 1.35 and Figure 1.36). It is of note that the densities of red-throated diver were very low in the Mona Offshore Cable Corridor (<0.1 birds per km^2).

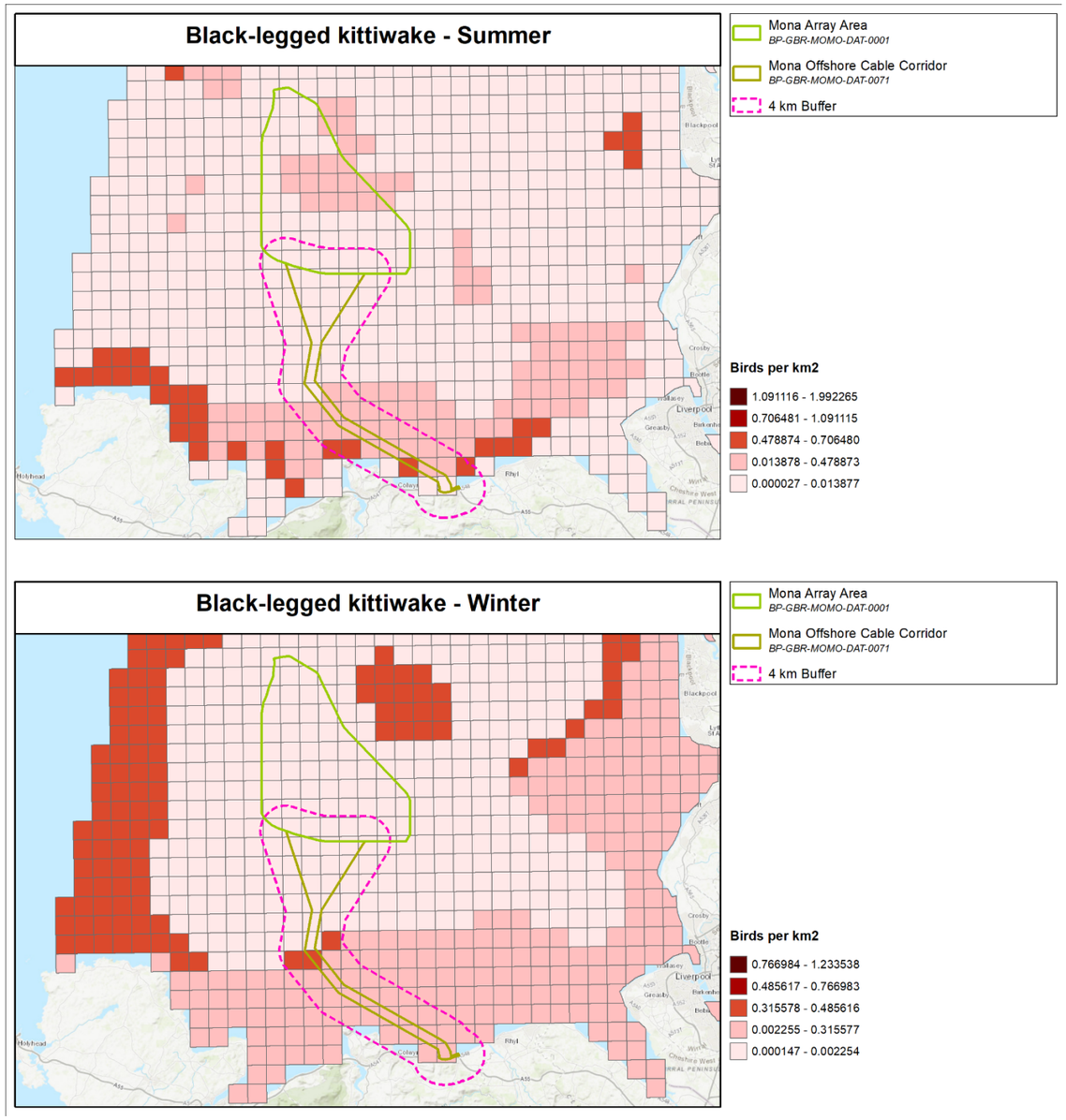

Figure 1.26: Spatial variation in predicted densities (animals per km^2) of black-legged kittiwake per season (extracted from Bradbury *et al*. (2014)) within the Mona Offshore Cable Corridor.

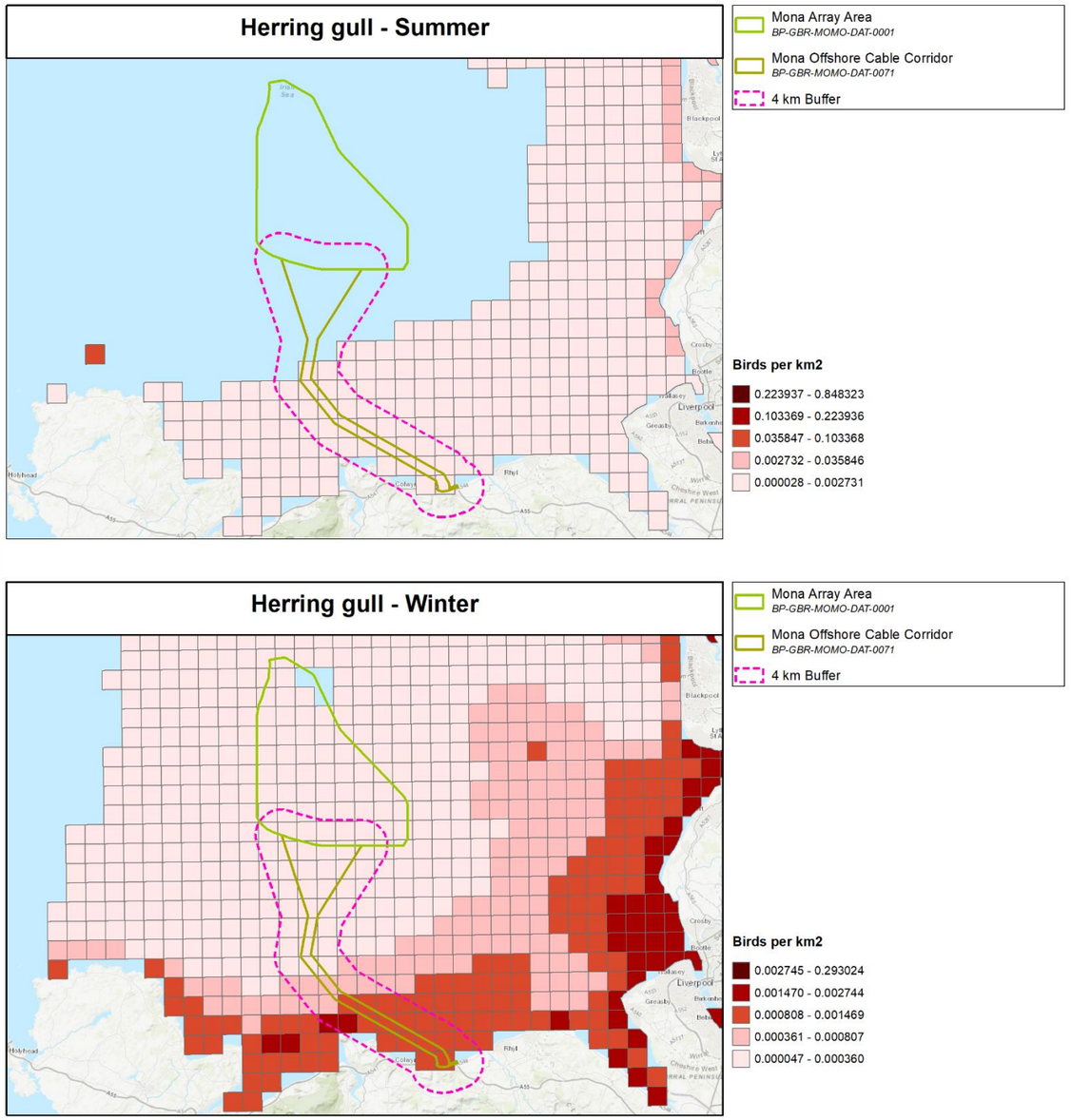

Figure 1.27: Spatial variation in predicted densities (animals per km^2) of herring gull per season (extracted from Bradbury *et al*. (2014)) within the Mona Offshore Cable Corridor.

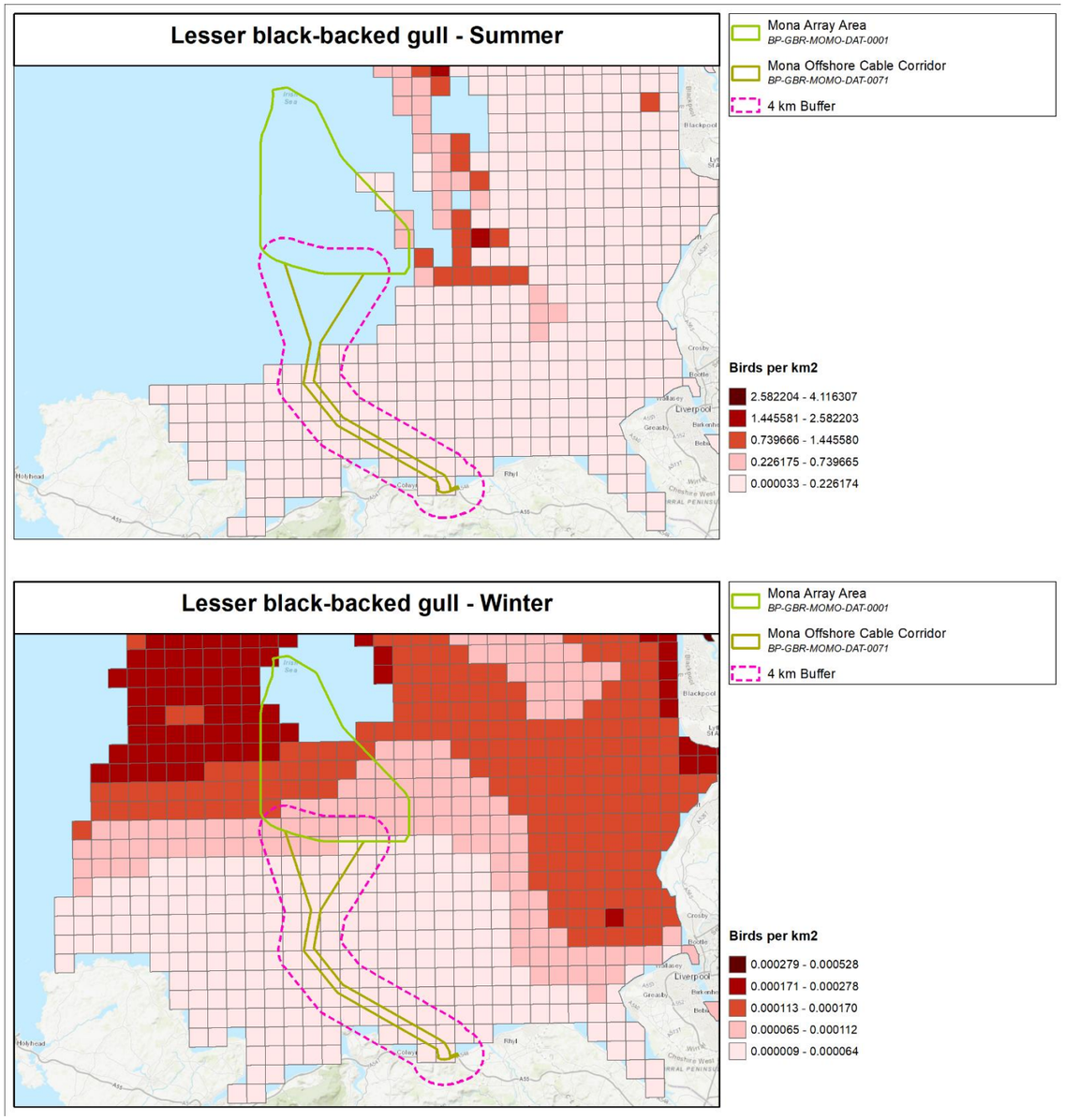

Figure 1.28: Spatial variation in predicted densities (animals per km^2) of lesser black-backed gull per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor.

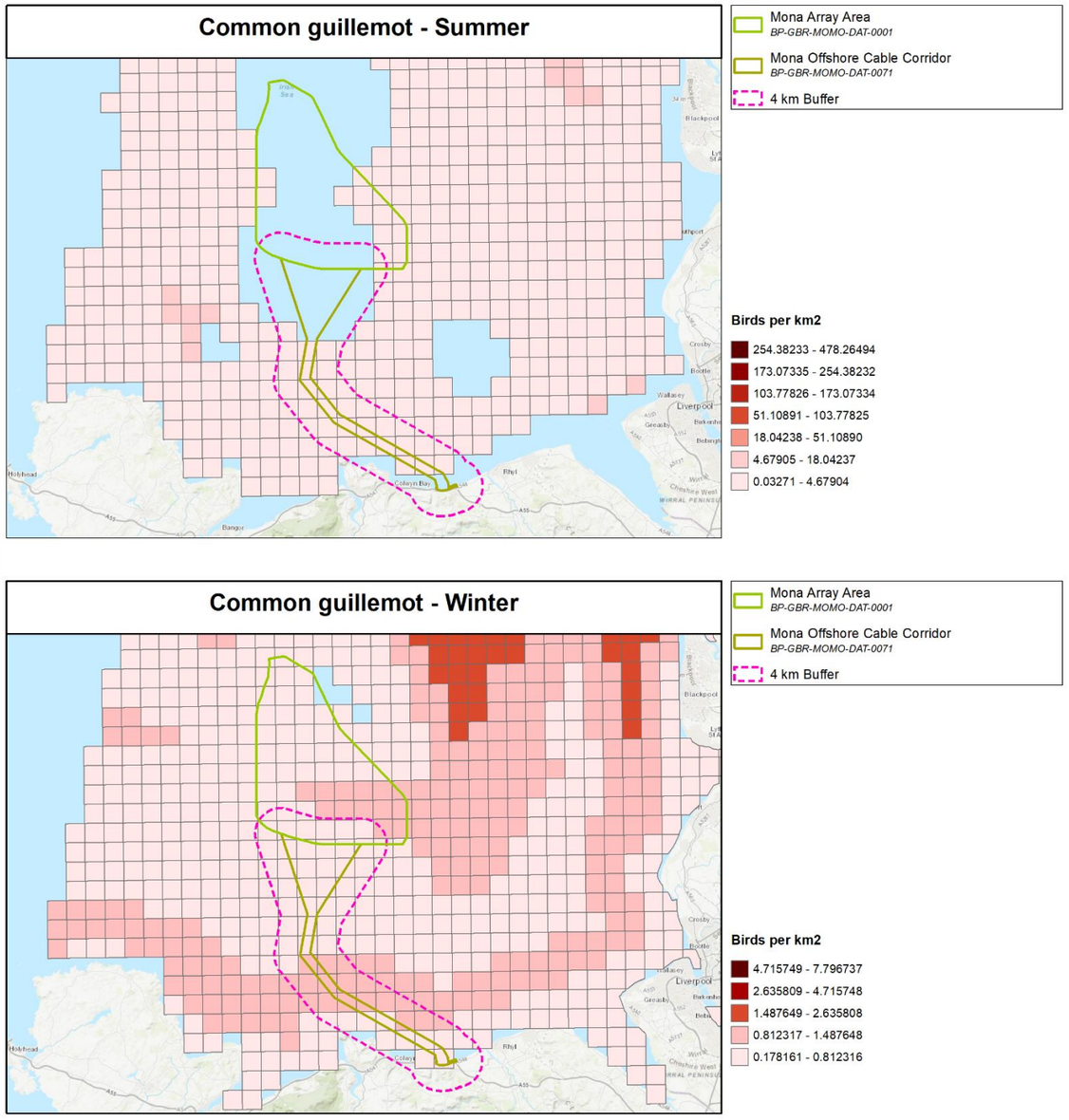

Figure 1.29: Spatial variation in predicted densities (animals per km^2) of common guillemot per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor.

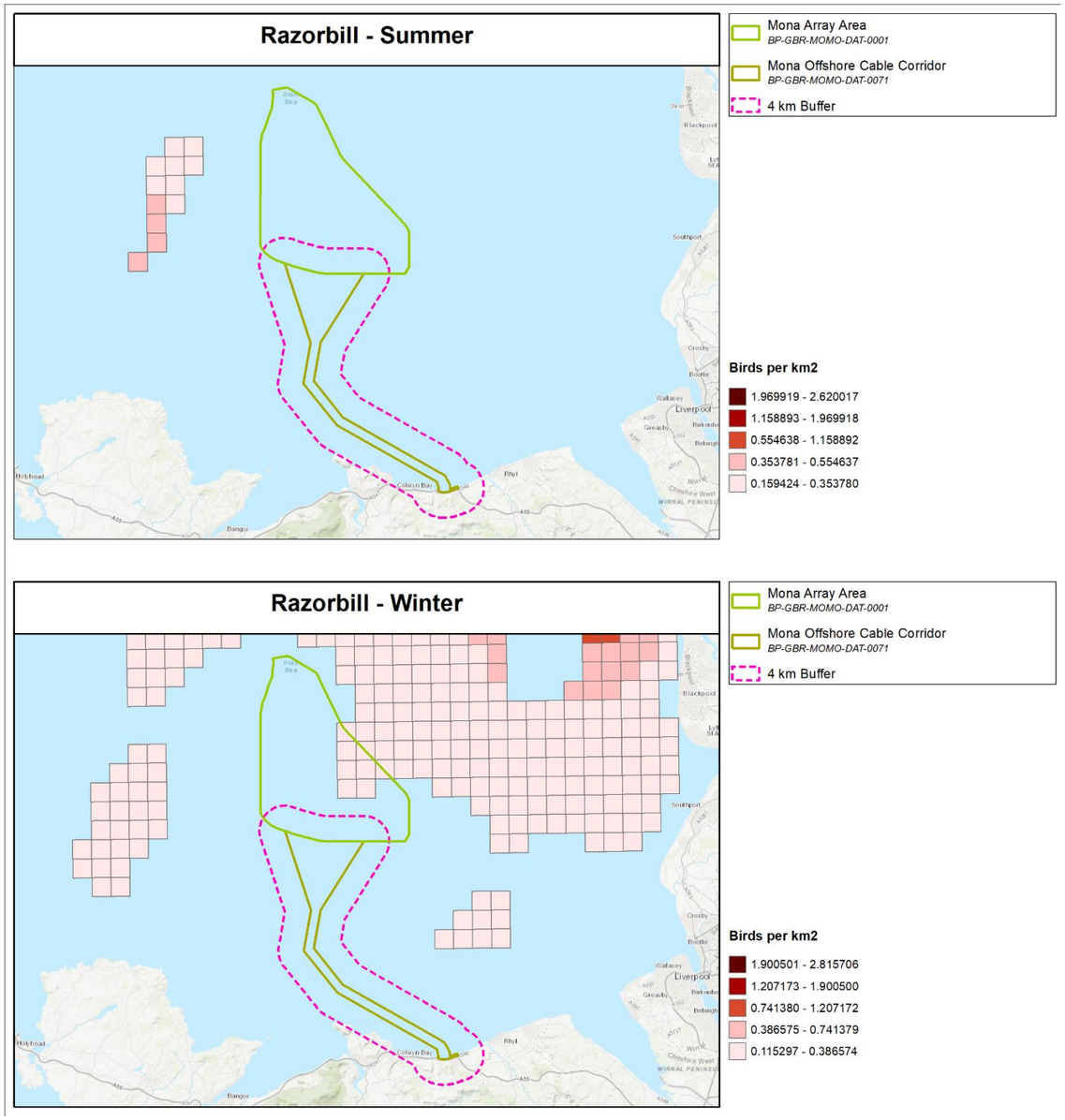

Figure 1.30: Spatial variation in predicted densities (animals per km^2) of razorbill per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor.

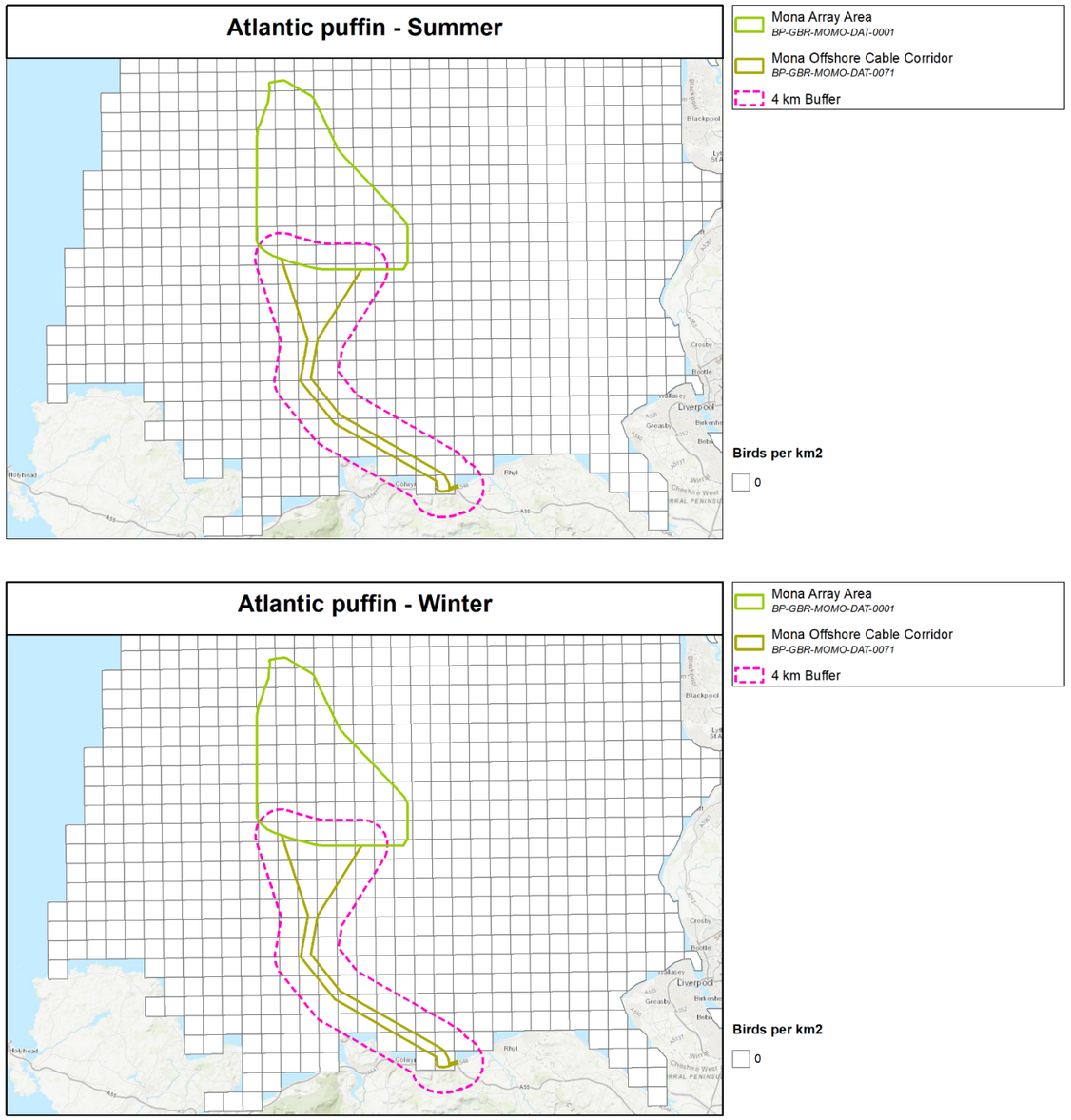

Figure 1.31: Spatial variation in predicted densities (animals per km^2) of Atlantic puffin per season (extracted from Bradbury *et al*. (2014)) within the Mona Offshore Cable Corridor.

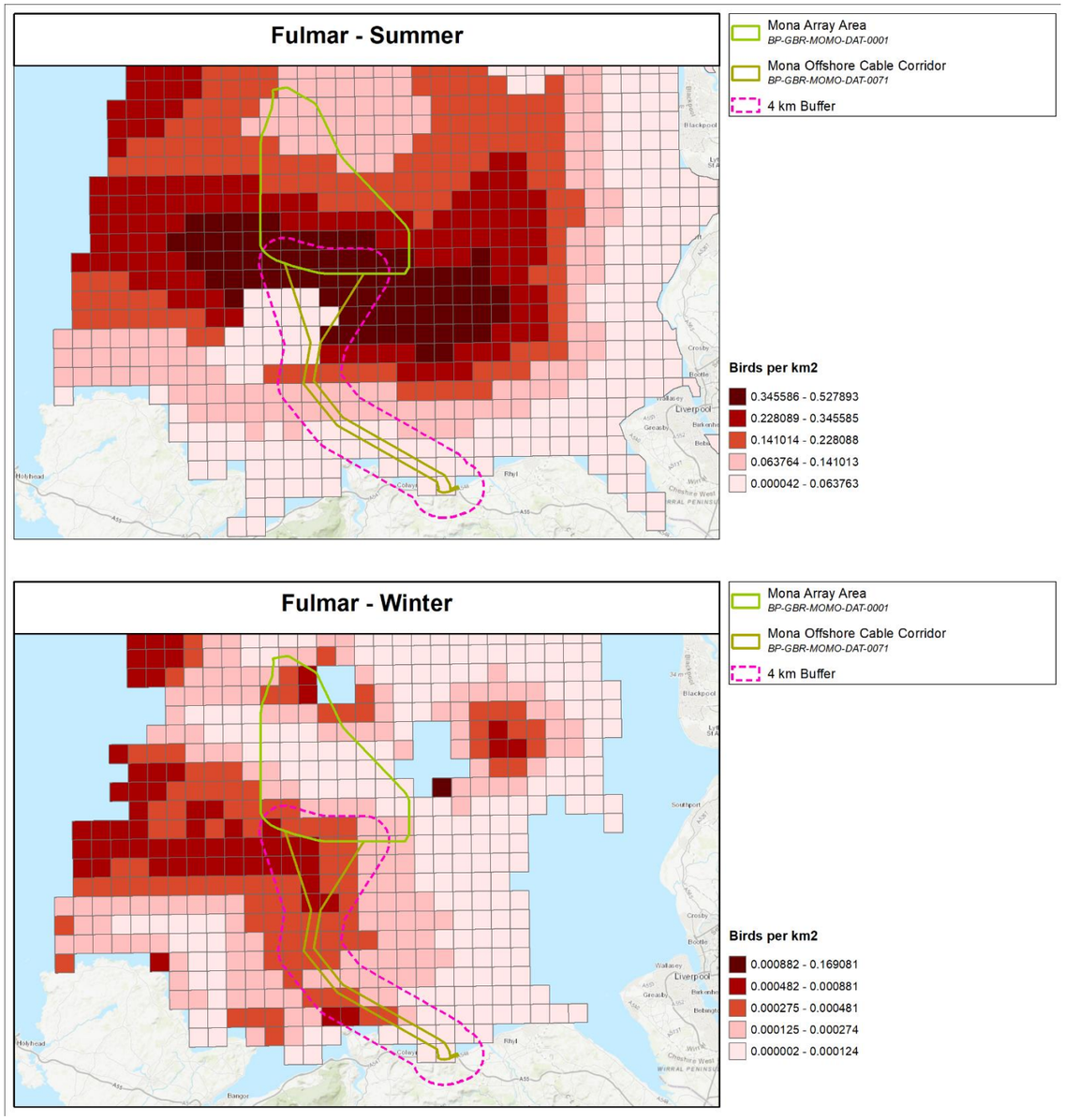

Figure 1.32: Spatial variation in predicted densities (animals per km^2) of Northern fulmar per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor.

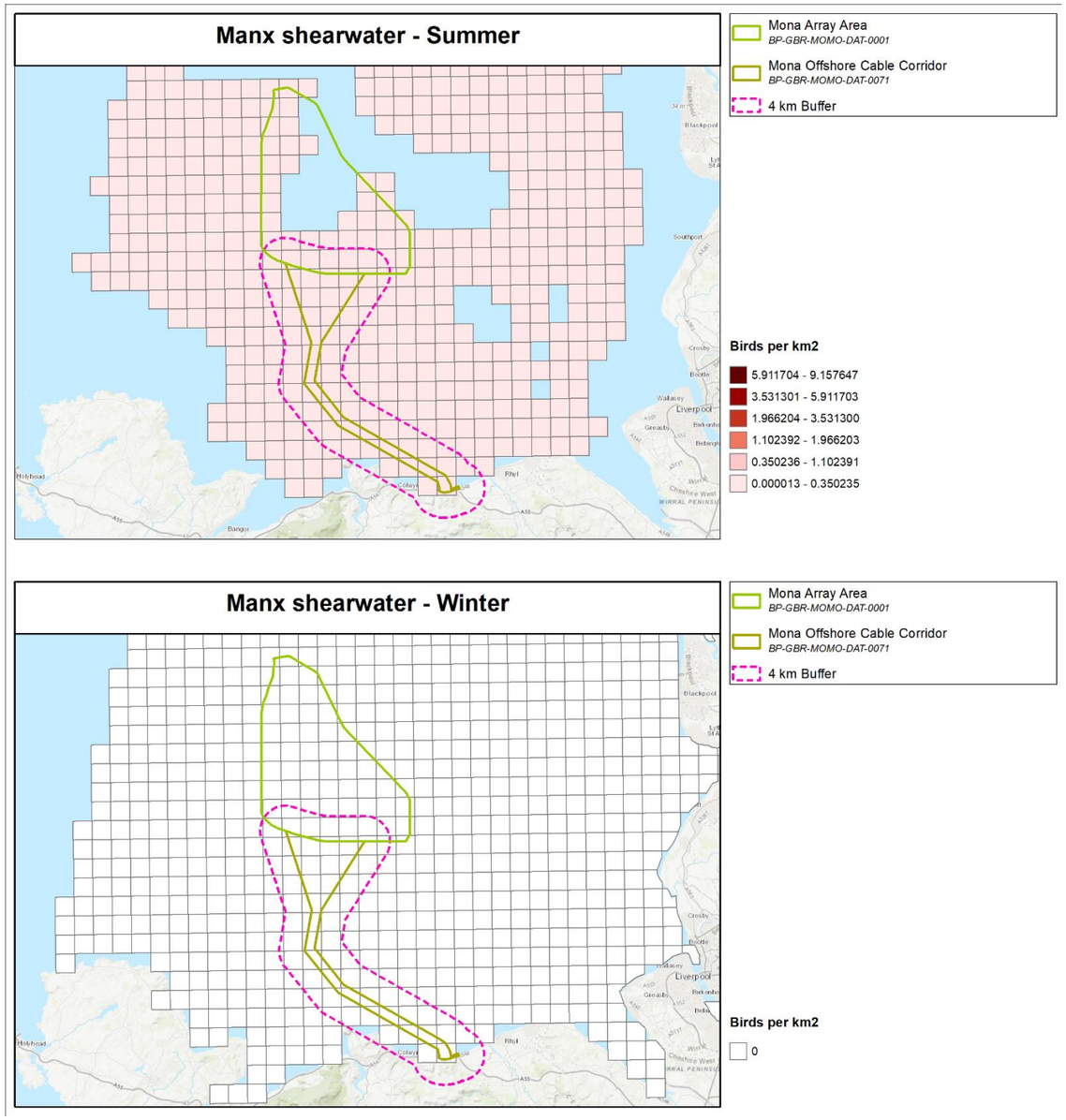

Figure 1.33: Spatial variation in predicted densities (animals per km^2) of Manx shearwater per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor.

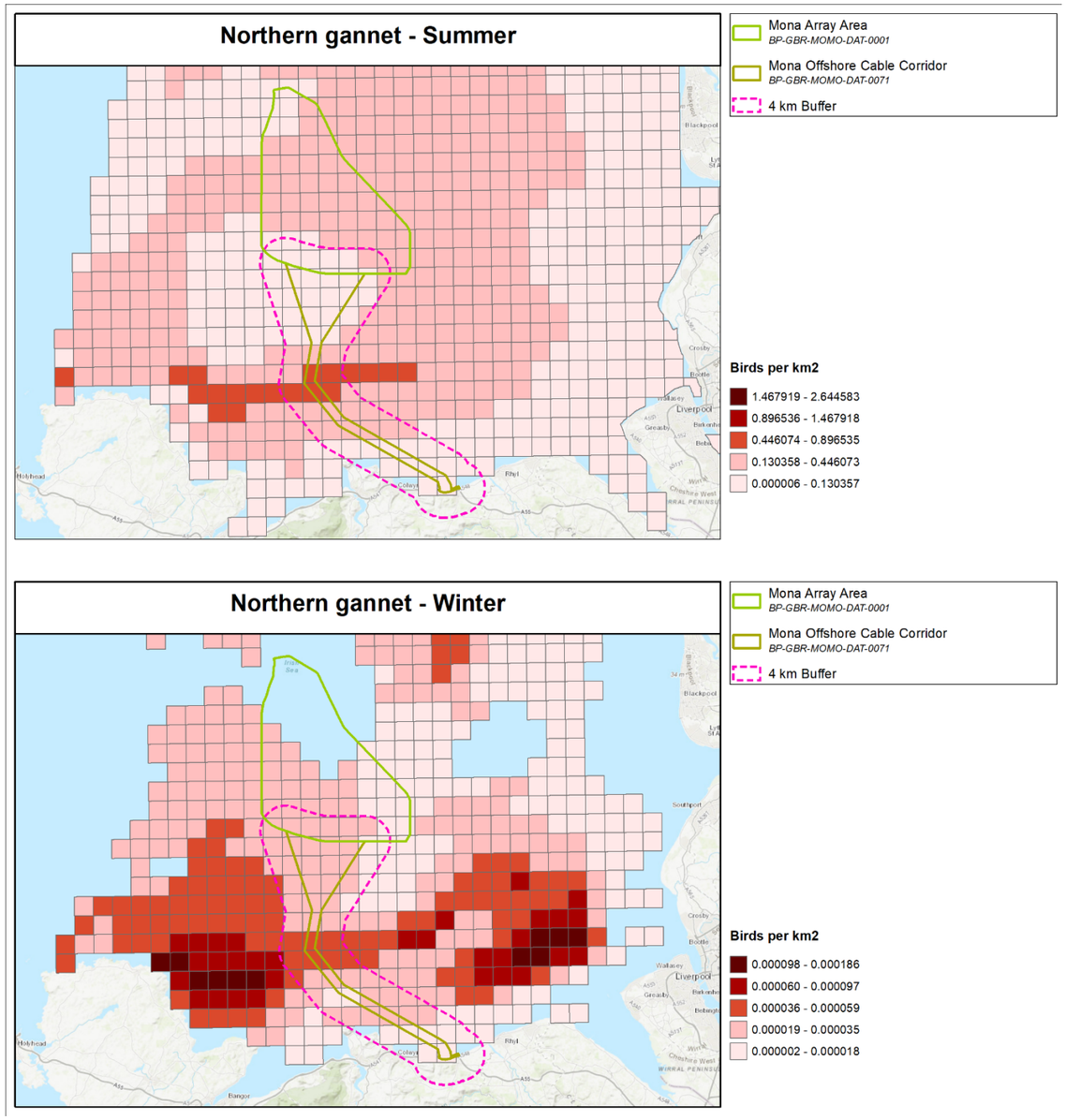

Figure 1.34: Spatial variation in predicted densities (animals per km^2) of Northern gannet per season (extracted from Bradbury *et al*. (2014)) within the Mona Offshore Cable Corridor.

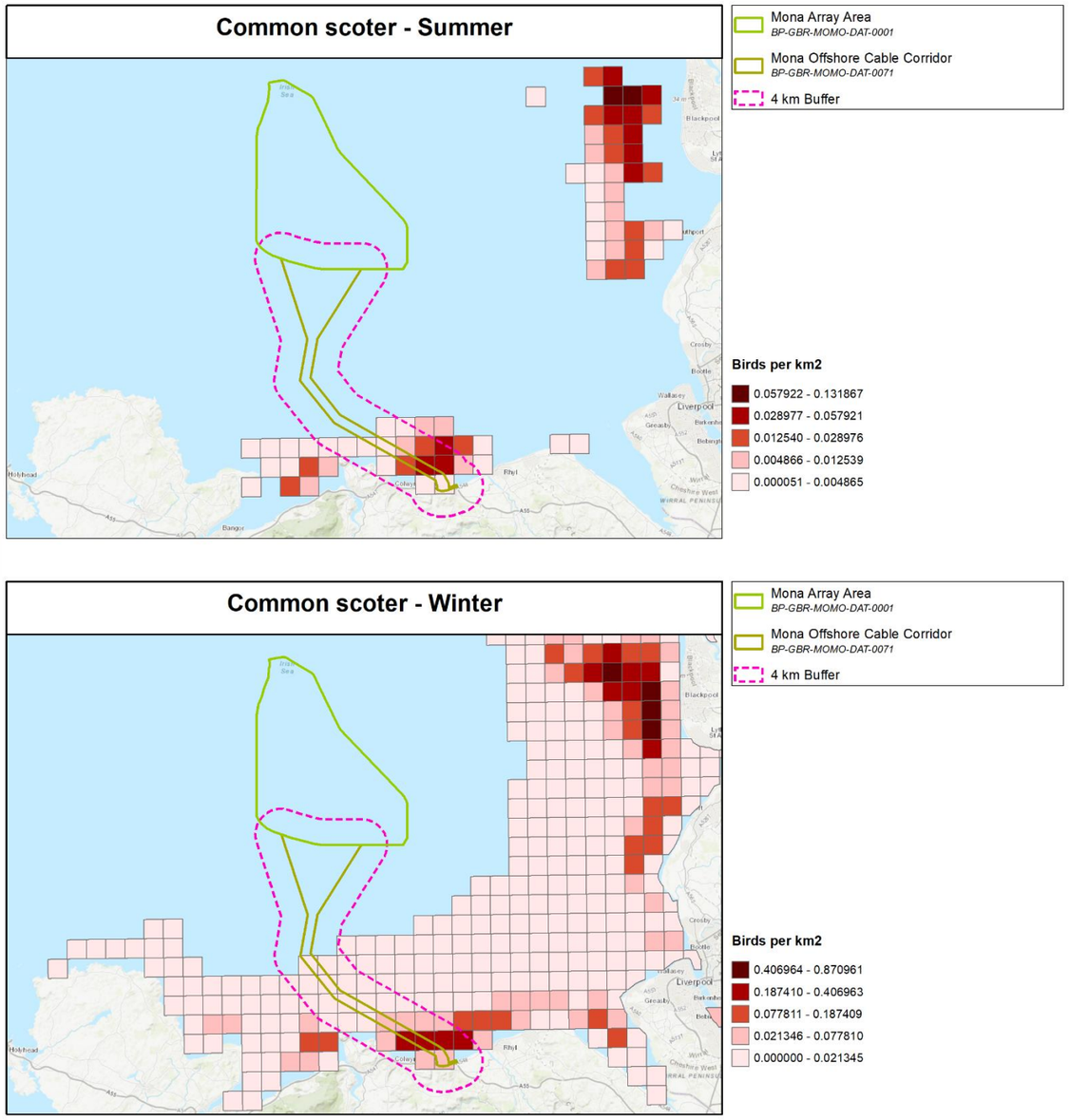

Figure 1.35: Spatial variation in predicted densities (animals per km^2) of common scoter per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor.

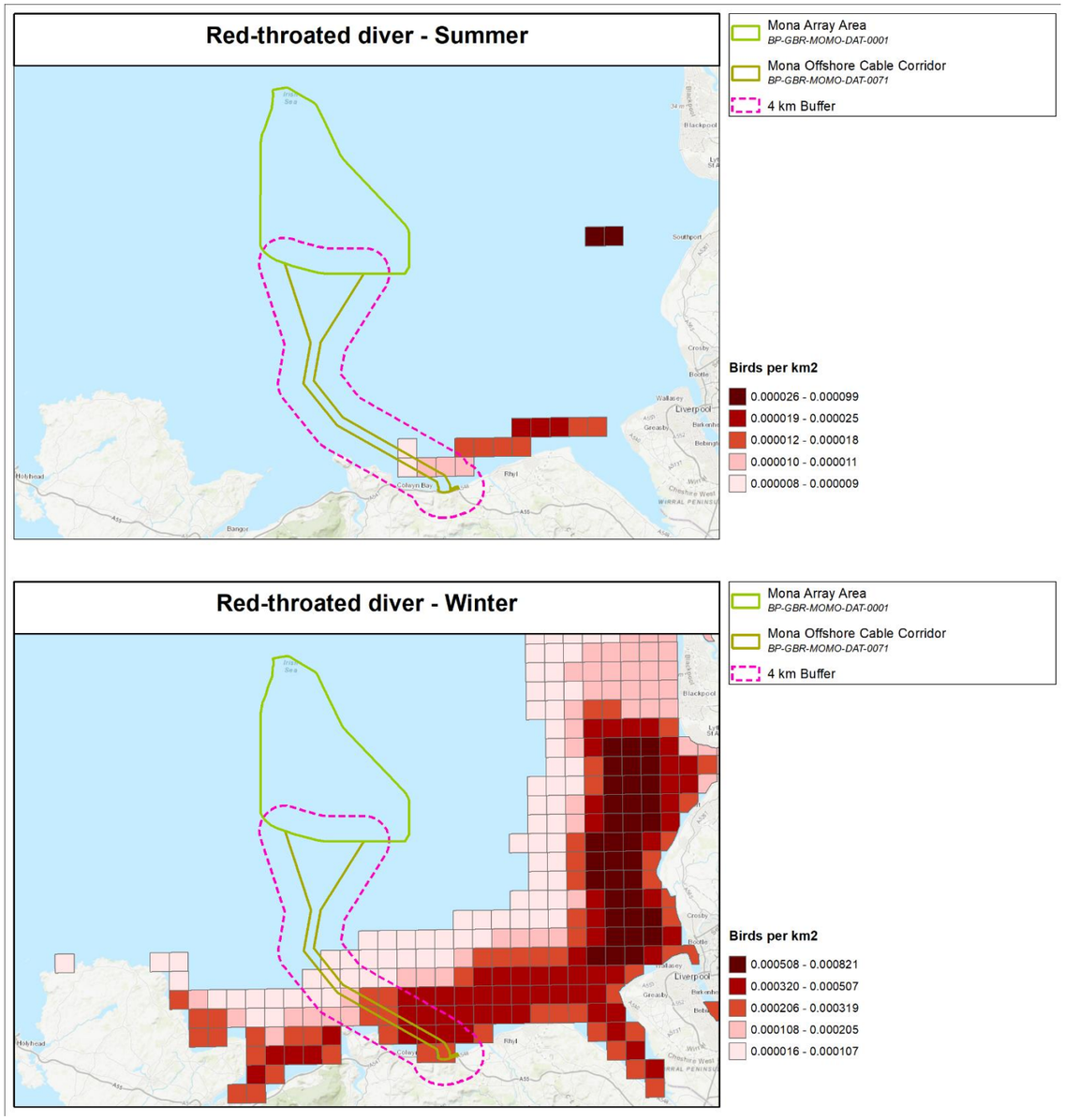

Figure 1.36: Spatial variation in predicted densities (animals per km^2) of red-throated diver per season (extracted from Bradbury et al. (2014)) within the Mona Offshore Cable Corridor.

1.5 References

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Appendix A: Colonies Counts

A.1 Northern gannet colony counts (no. of apparently occupied sites (AOS)/apparently occupied nest (AON)).

SPA name	Qualifying feature	No. of AOS	Year
Ailsa Craig SPA	Individual	32,226	2014
Grassholm SPA	Individual	36,011	2015
Great Saltee Island	Individual	2,446	2004
Ireland's Eye SPA	Individual	350	2015

A.2 Manx shearwater (no. of apparently occupied sites (AOS)/apparently occupied nest (AON)).

SPA name	Qualifying feature	No. of AOS	Year
Copeland Islands SPA	Individual	4,850	2007
Deenish Island and Scariff Island SPA	Individual	2,010	2000
Puffin Island SPA, Kerry	Individual	6,329	2000
Rum SPA	Individual	120,000	2001
St Kilda SPA	Individual	1,299	1999
Skomer and Skokholm SPA	Individual	455,156	2018
Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island	Individual	16,183	2001
Saltee Islands SPA	Individual	250	2002 & 2002
Skelligs SPA	Individual	738	2001
Blasket Islands SPA	Individual	19,534	2000 & 2001
High Island, Inishshark and Davillaun SPA	Individual	869	2001 & 2015
Cruagh Island (Connemara Islands)	Individual	3,286	2001

A.3 Common guillemot (no. of individuals).

SPA name	Qualifying feature	No. of individuals	Year
Howth Head Coast SPA	Individual	871	2015
Ireland's Eye SPA	Individual	4,410	2015
Lambay Island SPA	Individual	59,983	2015

A.4 Razorbill (no. of individuals).

SPA name	Qualifying feature	No. of individuals	Year
Wicklow Head SPA	Individual	232	2019
Howth Head Coast SPA	Individual	279	2015
Ireland's Eye SPA	Individual	1,600	2015
Lambay Island SPA	Individual	7,353	2015

A.5 Lesser black-backed gull (no. of individuals).

SPA name	Qualifying interest	No. of individuals	Year
Ireland's Eye SPA	Individual	5	2015
Lambay Island SPA	Individual	476	2010
Rathlin Island SPA	Assemblage	519	2021
Ailsa Craig SPA	Individual	189	2019
Morecambe Bay and Duddon Estuary	Individual	413	1996/2017/2018/2020
Ribble and Alt Estuaries SPA	Individual	7,022	2016

A.6 Herring gull (no. of apparently occupied nest (AON)).

SPA name	Qualifying interest	No. of AON	Year
Ireland's Eye SPA	Individual (listed as optional)	358	2015
Lambay Island SPA	Individual (listed as optional)	135	2015
Skerries Islands SPA	Individual (listed as optional)	27	2007
Howth Head Coast SPA	Individual (listed as optional)	9	2015
Morecambe Bay and Duddon Estuary SPA	Individual	445	2016-2020

A.7 Great black-backed gull.

SPA name	Qualifying feature	No. of AON	Year
Ireland's Eye SPA	Individual (listed as optional)	154	2015
Lambay Island SPA	Individual (listed as optional)	99	2015

A.8 Black-legged kittiwake.

SPA name	Qualifying feature	No. of AON	Year
Helvick Head to Ballyquin SPA	Individual	168	1999 and 2018
Saltee Islands SPA	Individual	845	2013
Wicklow Head SPA	Individual	848	2019
Howth Head Coast SPA	Individual	3,081	2015
Ireland's Eye SPA	Individual	1,610	2015
Lambay Island SPA	Individual	3,320	2015
Rathlin Island SPA	Individual	7,983	2011 and 2013
Inishtrahull Island SPA	Individual	7	2016
Ailsa Craig SPA	Individual	300	2019
North Colonsay and Western Cliffs SPA	Individual	143	2018
Skomer, Skokholm and the Seas off Pembrokeshire SPA	Assemblage	1,236	2018

Appendix B: MRSea estimates for each boundary area

B.1 Black-legged kittiwake

		Array Area		Array Area + 2km		Array Area + 4km		Mona Offshore Ornithology Array Area Study Area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	566 (351 to 847)	1.26 (0.78 to 1.89)	834 (508 to 1,262)	1.30 (0.79 to 1.97)	1,174 (709 to 1,790)	1.37 (0.83 to 2.09)	2,235 (1,381 to 3,351)	1.57 (0.97 to 2.36)
1	Apr	131 (85 to 188)	0.29 (0.19 to 0.42)	188 (116 to 279)	0.29 (0.18 to 0.44)	261 (155 to 402)	0.31 (0.18 to 0.47)	450 (254 to 721)	0.32 (0.18 to 0.51)
1	May	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Jun	273 (184 to 382)	0.61 (0.41 to 0.85)	383 (250 to 550)	0.60 (0.39 to 0.86)	514 (330 to 755)	0.60 (0.39 to 0.88)	853 (539 to 1,272)	0.60 (0.38 to 0.89)
1	Jul	135 (86 to 198)	0.30 (0.19 to 0.44)	184 (114 to 276)	0.29 (0.18 to 0.43)	243 (145 to 375)	0.28 (0.17 to 0.44)	402 (237 to 623)	0.28 (0.17 to 0.44)
1	Aug	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Sep	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Oct	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Nov	254 (151 to 390)	0.57 (0.34 to 0.87)	389 (231 to 598)	0.61 (0.36 to 0.93)	573 (341 to 876)	0.67 (0.40 to 1.02)	1,129 (697 to 1,669)	0.79 (0.49 to 1.17)
1	Dec	215 (125 to 330)	0.48 (0.28 to 0.73)	309 (177 to 482)	0.48 (0.28 to 0.75)	428 (239 to 680)	0.50 (0.28 to 0.80)	715 (394 to 1,152)	0.50 (0.28 to 0.81)
1	Jan	312 (226 to 413)	0.69 (0.50 to 0.92)	451 (319 to 607)	0.71 (0.50 to 0.95)	595 (415 to 811)	0.70 (0.48 to 0.95)	899 (615 to 1,241)	0.63 (0.43 to 0.87)
1	Feb	261 (177 to 359)	0.58 (0.39 to 0.80)	353 (236 to 494)	0.55 (0.37 to 0.77)	451 (300 to 636)	0.53 (0.35 to 0.74)	666 (444 to 938)	0.47 (0.31 to 0.66)
1	Mar	862 (610 to 1,182)	1.92 (1.36 to 2.63)	1,410 (957 to 1,995)	2.20 (1.50 to 3.12)	2,110 (1,392 to 3,041)	2.47 (1.63 to 3.56)	4,066 (2,675 to 5,843)	2.86 (1.88 to 4.11)
2	Apr	397 (275 to 541)	0.88 (0.61 to 1.21)	574 (393 to 789)	0.90 (0.61 to 1.23)	801 (545 to 1,111)	0.94 (0.64 to 1.30)	1,450 (987 to 2,018)	1.02 (0.69 to 1.42)
2	May	100 (52 to 165)	0.22 (0.12 to 0.37)	144 (74 to 243)	0.23 (0.12 to 0.38)	202 (104 to 345)	0.24 (0.12 to 0.40)	360 (189 to 628)	0.25 (0.13 to 0.44)
2	Jun	122 (72 to 191)	0.27 (0.16 to 0.43)	199 (114 to 315)	0.31 (0.18 to 0.49)	296 (163 to 480)	0.35 (0.19 to 0.56)	600 (304 to 1,016)	0.42 (0.21 to 0.71)
2	Jul	394 (220 to 641)	0.88 (0.49 to 1.43)	516 (270 to 888)	0.81 (0.42 to 1.39)	677 (327 to 1,243)	0.79 (0.38 to 1.45)	1,897 (735 to 3,854)	1.33 (0.52 to 2.71)
2	Aug	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Sep	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Oct	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Nov	114 (65 to 181)	0.25 (0.14 to 0.40)	181 (106 to 286)	0.28 (0.17 to 0.45)	267 (158 to 418)	0.31 (0.18 to 0.49)	517 (304 to 823)	0.36 (0.21 to 0.58)
2	Dec	848 (578 to 1,199)	1.89 (1.29 to 2.67)	1,177 (780 to 1,702)	1.84 (1.22 to 2.66)	1,559 (1,012 to 2,291)	1.82 (1.18 to 2.68)	2,337 (1,481 to 3,506)	1.64 (1.04 to 2.46)
2	Jan	614 (392 to 918)	1.37 (0.87 to 2.04)	862 (558 to 1,274)	1.35 (0.87 to 1.99)	1,120 (729 to 1,654)	1.31 (0.85 to 1.93)	1,841 (1,184 to 2,747)	1.29 (0.83 to 1.93)
2	Feb	835 (564 to 1,192)	1.86 (1.26 to 2.65)	1,162 (759 to 1,708)	1.82 (1.19 to 2.67)	1,541 (976 to 2,321)	1.80 (1.14 to 2.71)	2,517 (1,543 to 3,822)	1.77 (1.08 to 2.69)

B.2 Common guillemot

		Array Area		Array Area + 2km		Array Area + 4km		Mona Offshore Ornithology Array Area Study Area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	5,710 (3,270 to 9,308)	12.73 (7.29 to 20.76)	8,409 (4,832 to 13,467)	13.16 (7.56 to 21.07)	11,268 (6,513 to 17,804)	13.32 (7.7 to 21.05)	17,177 (9,723 to 27,481)	12.09 (6.85 to 19.35)
1	Apr	631 (333 to 1,022)	1.41 (0.74 to 2.28)	854 (455 to 1,385)	1.34 (0.71 to 2.17)	1,140 (618 to 1,849)	1.35 (0.73 to 2.19)	2,293 (1,218 to 3,782)	1.61 (0.86 to 2.66)
1	May	83 (17 to 238)	0.19 (0.04 to 0.53)	139 (32 to 404)	0.22 (0.05 to 0.63)	216 (56 to 641)	0.26 (0.07 to 0.76)	512 (169 to 1,419)	0.36 (0.12 to 1)
1	Jun	859 (454 to 1,468)	1.92 (1.01 to 3.27)	1,348 (744 to 2,225)	2.11 (1.16 to 3.48)	1,912 (1,058 to 3,132)	2.26 (1.25 to 3.7)	3,153 (1,584 to 5,740)	2.22 (1.12 to 4.04)
1	Jul	333 (110 to 808)	0.74 (0.25 to 1.8)	533 (199 to 1,218)	0.83 (0.31 to 1.91)	773 (301 to 1,717)	0.91 (0.36 to 2.03)	1,687 (673 to 3,583)	1.19 (0.47 to 2.52)
1	Aug	200 (73 to 470)	0.45 (0.16 to 1.05)	373 (150 to 844)	0.58 (0.23 to 1.32)	666 (294 to 1,438)	0.79 (0.35 to 1.7)	2,247 (1,119 to 4,409)	1.58 (0.79 to 3.1)
1	Sep	89 (18 to 334)	0.2 (0.04 to 0.74)	188 (50 to 583)	0.29 (0.08 to 0.91)	333 (103 to 949)	0.39 (0.12 to 1.12)	849 (282 to 2,238)	0.6 (0.2 to 1.58)
1	Oct	10 (0.00 to 1,835)	0.02 (0.00 to 4.09)	17 (1 to 2,318)	0.03 (0.00 to 3.63)	43 (4 to 2,671)	0.05 (0.00 to 3.16)	847 (350 to 5,288)	0.6 (0.25 to 3.72)
1	Nov	568 (194 to 1,404)	1.27 (0.43 to 3.13)	1,232 (442 to 2,924)	1.93 (0.69 to 4.57)	1,850 (625 to 4,526)	2.19 (0.74 to 5.35)	2,749 (814 to 7,713)	1.94 (0.57 to 5.43)
1	Dec	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Jan	1,615 (595 to 3,903)	3.6 (1.33 to 8.7)	2,185 (785 to 5,396)	3.42 (1.23 to 8.44)	2,645 (921 to 6,795)	3.13 (1.09 to 8.03)	3,394 (1,075 to 10,203)	2.39 (0.76 to 7.18)
1	Feb	3,836 (2,440 to 5,582)	8.55 (5.44 to 12.45)	5,028 (3,179 to 7,384)	7.87 (4.97 to 11.55)	6,161 (3,856 to 9,168)	7.28 (4.56 to 10.84)	9,063 (5,396 to 14,181)	6.38 (3.8 to 9.99)
1	Mar	2,759 (1,527 to 4,626)	6.15 (3.4 to 10.32)	4,512 (2,505 to 7,482)	7.06 (3.92 to 11.71)	6,350 (3,515 to 10,566)	7.51 (4.15 to 12.49)	11,786 (6,325 to 20,451)	8.3 (4.45 to 14.4)
2	Apr	3,079 (1,727 to 5,064)	6.87 (3.85 to 11.29)	4,429 (2,465 to 7,301)	6.93 (3.86 to 11.42)	5,794 (3,170 to 9,633)	6.85 (3.75 to 11.39)	9,433 (5,062 to 15,805)	6.64 (3.56 to 11.13)
2	May	197 (78 to 393)	0.44 (0.17 to 0.88)	297 (123 to 583)	0.46 (0.19 to 0.91)	421 (179 to 822)	0.5 (0.21 to 0.97)	905 (394 to 1,810)	0.64 (0.28 to 1.27)
2	Jun	518 (269 to 919)	1.16 (0.6 to 2.05)	899 (471 to 1,625)	1.41 (0.74 to 2.54)	1,351 (694 to 2,523)	1.6 (0.82 to 2.98)	2,466 (1,203 to 4,608)	1.74 (0.85 to 3.24)
2	Jul	848 (496 to 1,326)	1.89 (1.11 to 2.96)	1,255 (723 to 1,997)	1.96 (1.13 to 3.13)	1,755 (998 to 2,836)	2.07 (1.18 to 3.35)	3,699 (1,935 to 6,305)	2.6 (1.36 to 4.44)
2	Aug	35 (4 to 198)	0.08 (0.01 to 0.44)	69 (9 to 334)	0.11 (0.01 to 0.52)	132 (22 to 544)	0.16 (0.03 to 0.64)	763 (180 to 2,415)	0.54 (0.13 to 1.7)
2	Sep	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Oct	645 (464 to 858)	1.44 (1.03 to 1.91)	1,032 (742 to 1,386)	1.61 (1.16 to 2.17)	1,563 (1,123 to 2,096)	1.83 (1.31 to 2.45)	3,552 (2,549 to 4,753)	2.50 (1.79 to 3.34)
2	Nov	50 (12 to 137)	0.11 (0.03 to 0.30)	99 (30 to 238)	0.15 (0.05 to 0.37)	196 (75 to 415)	0.23 (0.09 to 0.48)	738 (360 to 1,320)	0.52 (0.25 to 0.93)
2	Dec	2,245 (1,577 to 3,035)	5.00 (3.51 to 6.76)	3,102 (2,154 to 4,329)	4.85 (3.37 to 6.76)	4,040 (2,791 to 5,631)	4.72 (3.26 to 6.58)	7,015 (4,828 to 9,734)	4.93 (3.39 to 6.84)
2	Jan	4,534 (3,519 to 5,686)	10.09 (7.83 to 12.66)	5,874 (4,525 to 7,485)	9.18 (7.07 to 11.70)	7,328 (5,618 to 9,369)	8.57 (6.57 to 10.95)	10,960 (8,311 to 14,119)	7.70 (5.84 to 9.92)
2	Feb	2,055 (1,491 to 2,721)	4.58 (3.32 to 6.06)	2,810 (2,022 to 3,880)	4.39 (3.16 to 6.06)	3,554 (2,565 to 4,864)	4.16 (3.00 to 5.69)	5,370 (3,845 to 7,319)	3.77 (2.70 to 5.14)

B.3 Razorbill

		Array Area		Array Area + 2km		Array Area + 4km		Mona Offshore Ornithology Array Area Study Area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	1,570 (998 to 2,291)	3.49 (2.22 to 5.10)	2,170 (1,330 to 3,268)	3.39 (2.08 to 5.11)	2,868 (1,702 to 4,434)	3.35 (1.99 to 5.18)	4,638 (2,756 to 7,125)	3.26 (1.94 to 5.01)
1	Apr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	May	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Jun	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Jul	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Aug	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Sep	195 (68 to 435)	0.43 (0.15 to 0.97)	279 (96 to 645)	0.44 (0.15 to 1.01)	372 (126 to 883)	0.44 (0.15 to 1.03)	606 (209 to 1,398)	0.43 (0.15 to 0.98)
1	Oct	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Nov	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Dec	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Jan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Feb	3,049 (2,069 to 4,244)	6.79 (4.61 to 9.45)	4,081 (2,729 to 5,746)	6.38 (4.26 to 8.98)	5,073 (3,343 to 7,222)	5.93 (3.91 to 8.44)	6,473 (4,129 to 9,450)	4.55 (2.90 to 6.64)
1	Mar	1,082 (480 to 2,008)	2.41 (1.07 to 4.47)	1,680 (727 to 3,258)	2.63 (1.14 to 5.09)	2,452 (1,052 to 4,914)	2.87 (1.23 to 5.74)	5,818 (2,674 to 11,258)	4.09 (1.88 to 7.91)
2	Apr	155 (91 to 252)	0.34 (0.20 to 0.56)	227 (129 to 394)	0.36 (0.20 to 0.62)	319 (177 to 568)	0.37 (0.21 to 0.66)	571 (325 to 956)	0.40 (0.23 to 0.67)
2	May	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Jun	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Jul	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Aug	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Sep	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Oct	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Nov	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Dec	104 (55 to 173)	0.23 (0.12 to 0.39)	201 (108 to 329)	0.31 (0.17 to 0.51)	367 (195 to 606)	0.43 (0.23 to 0.71)	1,101 (581 to 1,815)	0.77 (0.41 to 1.28)
2	Jan	438 (206 to 778)	0.98 (0.46 to 1.73)	597 (267 to 1,094)	0.93 (0.42 to 1.71)	748 (322 to 1,407)	0.87 (0.38 to 1.64)	941 (397 to 1,805)	0.66 (0.28 to 1.27)
2	Feb	404 (166 to 793)	0.90 (0.37 to 1.77)	578 (240 to 1,133)	0.90 (0.37 to 1.77)	790 (330 to 1,537)	0.92 (0.39 to 1.80)	1,246 (564 to 2,300)	0.88 (0.40 to 1.62)

B.4 Manx shearwater

		Array Area		Array Area + 2km		Array Area + 4km		Mona Offshore Ornithology Array Area Study Area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Apr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	May	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Jun	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Jul	612 (112 to 1,785)	1.36 (0.25 to 3.97)	1,056 (176 to 3,251)	1.65 (0.28 to 5.08)	1,600 (253 to 5,091)	1.87 (0.30 to 5.95)	3,114 (477 to 9,903)	2.19 (0.34 to 6.96)
1	Aug	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Sep	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Oct	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Nov	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Dec	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Jan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Feb	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Mar	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Apr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	May	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Jun	1,659 (453 to 4,215)	3.69 (1.01 to 9.38)	2,854 (679 to 7,787)	4.46 (1.06 to 12.17)	4258 (965 to 11,701)	4.98 (1.13 to 13.68)	8,378 (2,062 to 22,154)	5.89 (1.45 to 15.57)
2	Jul	1,308 (530 to 2,484)	2.91 (1.18 to 5.53)	1,793 (701 to 3,511)	2.80 (1.09 to 5.49)	2307 (890 to 4,567)	2.70 (1.04 to 5.34)	3,703 (1,404 to 7,521)	2.60 (0.99 to 5.29)
2	Aug	319 (111 to 658)	0.71 (0.25 to 1.47)	437 (148 to 924)	0.68 (0.23 to 1.44)	563 (189 to 1,198)	0.66 (0.22 to 1.40)	903 (298 to 1,974)	0.64 (0.21 to 1.39)
2	Sep	3 (0 to 17)	0.01 (0.00 to 0.04)	16 (2 to 63)	0.03 (0.00 to 0.10)	53 (5 to 192)	0.06 (0.01 to 0.22)	409 (24 to 1,931)	0.29 (0.02 to 1.36)
2	Oct	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Nov	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Dec	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Jan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Feb	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

B.5 Northern gannet

		Array Area		Array Area + 2km		Array Area + 4km		Mona Offshore Ornithology Array Area Study Area	
Year	Month	Pop	D	Pop	D	Pop	D	Pop	D
1	Mar	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Apr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	May	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Jun	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Jul	211 (144 to 285)	0.47 (0.32 to 0.63)	299 (203 to 407)	0.47 (0.32 to 0.64)	399 (269 to 547)	0.47 (0.32 to 0.64)	669 (440 to 942)	0.47 (0.31 to 0.66)
1	Aug	169 (108 to 243)	0.38 (0.24 to 0.54)	271 (166 to 403)	0.42 (0.26 to 0.63)	375 (221 to 575)	0.44 (0.26 to 0.67)	509 (272 to 841)	0.36 (0.19 to 0.59)
1	Sep	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Oct	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Nov	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Dec	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Jan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Feb	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	Mar	130 (70 to 215)	0.29 (0.16 to 0.48)	205 (112 to 333)	0.32 (0.18 to 0.52)	308 (170 to 498)	0.36 (0.20 to 0.58)	833 (413 to 1,434)	0.59 (0.29 to 1.01)
2	Apr	216 (141 to 307)	0.48 (0.31 to 0.68)	299 (191 to 430)	0.47 (0.30 to 0.67)	385 (243 to 561)	0.45 (0.28 to 0.66)	584 (355 to 874)	0.41 (0.25 to 0.61)
2	May	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Jun	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Jul	39 (18 to 72)	0.09 (0.04 to 0.16)	69 (33 to 124)	0.11 (0.05 to 0.19)	114 (55 to 206)	0.13 (0.06 to 0.24)	354 (158 to 647)	0.25 (0.11 to 0.45)
2	Aug	73 (34 to 134)	0.16 (0.08 to 0.30)	120 (53 to 223)	0.19 (0.08 to 0.35)	191 (80 to 364)	0.22 (0.09 to 0.43)	436 (178 to 850)	0.31 (0.13 to 0.60)
2	Sep	296 (189 to 428)	0.66 (0.42 to 0.95)	402 (254 to 583)	0.63 (0.40 to 0.91)	506 (317 to 742)	0.59 (0.37 to 0.87)	747 (440 to 1,138)	0.53 (0.31 to 0.80)
2	Oct	103 (70 to 148)	0.23 (0.16 to 0.33)	149 (101 to 214)	0.23 (0.16 to 0.33)	201 (136 to 289)	0.24 (0.16 to 0.34)	376 (249 to 543)	0.26 (0.18 to 0.38)
2	Nov	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Dec	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Jan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Feb	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a