MONA OFFSHORE WIND PROJECT

Environmental Statement

Volume 6, Annex 5.1: Offshore Ornithology Baseline Characterisation Technical Report

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Image of an offshore wind farm

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Prepared for:

Mona Offshore Wind Limited.

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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
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
JNCC	Joint Nature Conservation Committee
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MRSea	Marine Renewable Strategic environmental assessment
MMO	Marine Management Organisation
SALSA	Spatially Adaptive Local Smoothing Algorithm (statistics)
SEA	Strategic Environmental Assessment
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
%	Percentage
cm	Centimetres
km	Kilometres
km^2	Square kilometres (area)
kn	Knots
m	Metres

1 Offshore ornithology baseline characterisation

1.1 Introduction

1.1.1 Background

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 300 km^2 and is located 28.2 km from the Anglesey coastline, 46.9 km from the northwest coast of England, and 46.6 km 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 and Access Areas, 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 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 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 4.2: Intertidal Ornithology - Wintering and Migratory Birds of the Environmental Statement. Waterbirds at the landfall are subject to a monitoring programme of abundance and distribution, with the survey area extending up to 1.5 km seaward from Mean High Water Springs (MHWS).

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. These are:

- The Mona Offshore Ornithology Array Area study area: this includes the Mona Array Area plus a buffer extending 7 km to 16.5 km (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 10 km in all directions around the Mona Array Area assessed in this Environmental Statement.

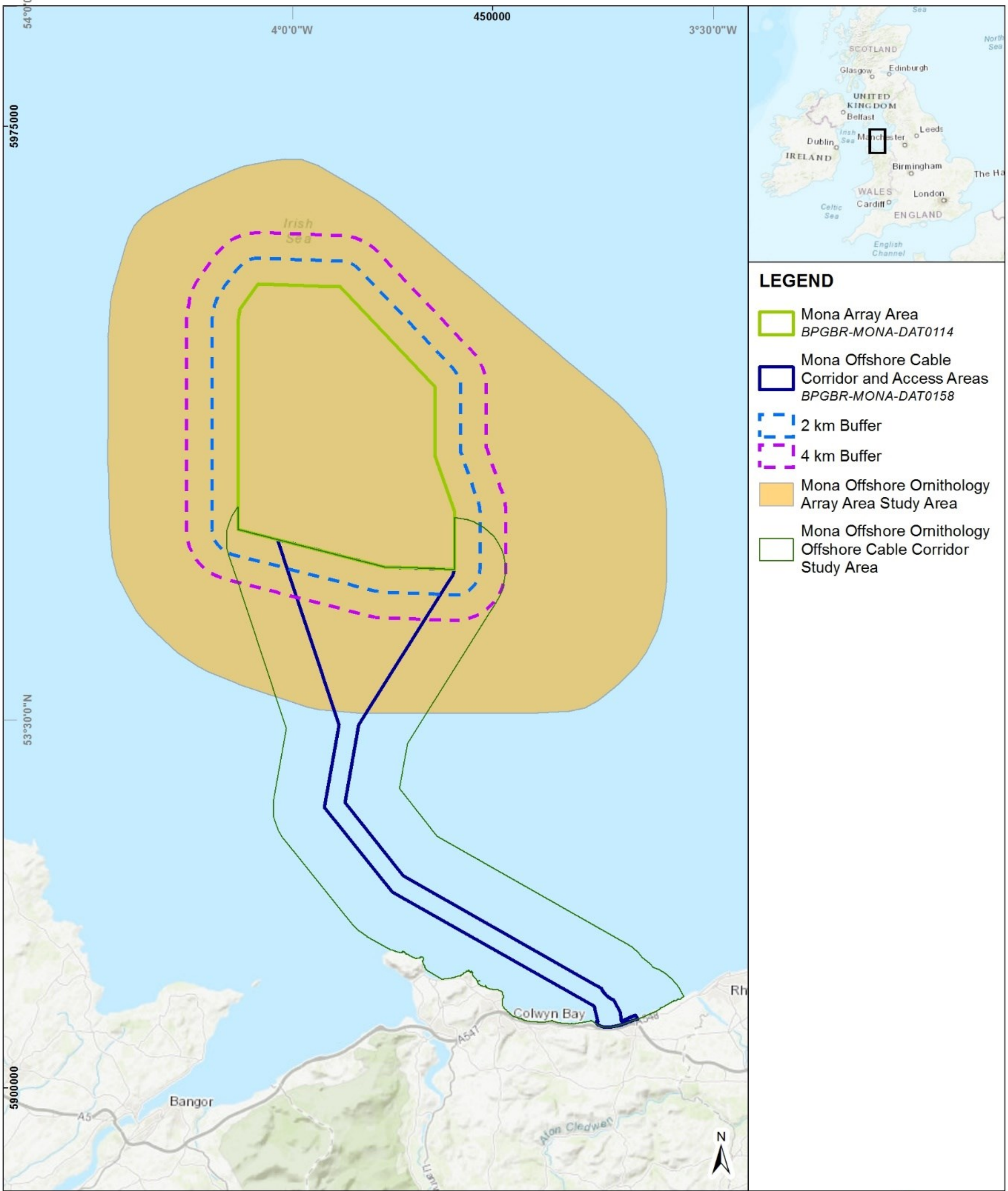
- The Mona Offshore Ornithology Offshore Cable Corridor study area: this encompasses the Mona Offshore Cable Corridor and Access Areas running between the landfall area on the Welsh Coast and the Mona Array Area, plus a 4 km buffer (Figure 1.1). Part of the Mona Offshore Ornithology Offshore Cable Corridor study area has been covered by the digital aerial bird surveys.

1.1.2.2 Guidance outlined by the SNCBs (Statutory Nature Conservation Body) (JNCC, 2022) details that the effects from disturbance and displacement is expected to be spatially limited to the offshore wind farm footprint and close proximity (birds are impacted by displacement up to 2 km from the wind farm footprint for most species, with displacement up to 4 km considered for divers and seaducks (and in some cases up to 10 km) due to being the most sensitive species groups to disturbance from sound, boat and helicopter traffic).As such, bird abundance estimates are characterised in these buffer zones. The extent of the 2 km and 4 km buffer areas are shown in Figure 1.1.

1.1.2.3 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.

1.1.2.4 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 100 km 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.

1.1.2.5 It is considered that there is the potential for an impact on breeding seabird colonies if the Mona Offshore Wind Project 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 SD)) 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 Figure 1.2.



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Data Sources: Client

Project Name: MONA OFFSHORE WIND PROJECT

0 2.5 5 nm
0 5 10 km

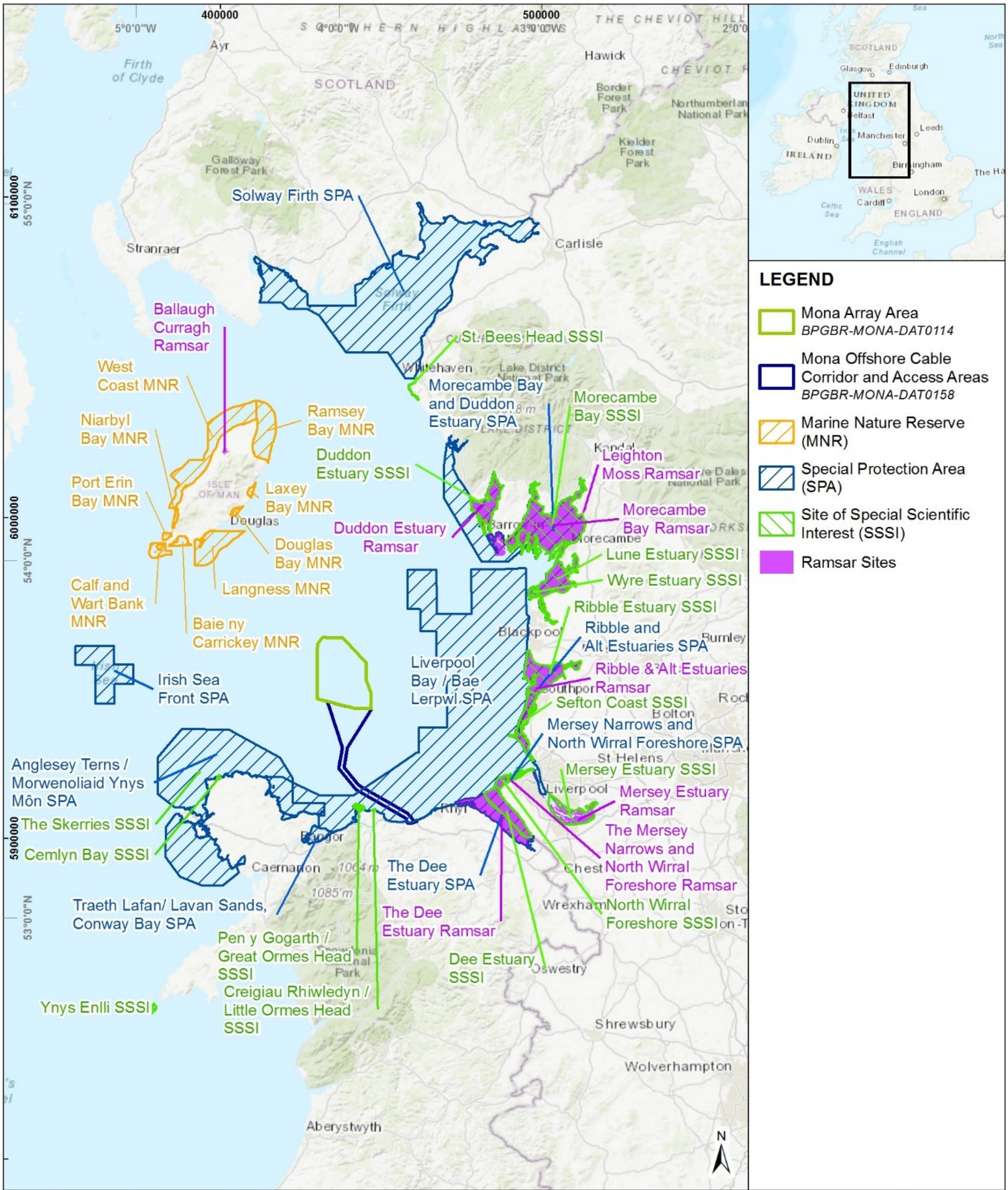
Drawing Number: RPSE-MN-ES-ORN-001-02

Drawing Title: OFFSHORE ORNITHOLOGY STUDY AREA

Geodetic Information:
Datum: ETRS 1989
Projection: ETRS 1989 UTM Zone 30N
Scale@160mmx220mm: 1:500,000

VER	DATE	DETAILS	BY	CHECK
00	24/07/23	First Issue	MJ	AN
02	06/09/23	Revision	MJ	LM

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



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community	**Data Sources:** Client, JNCC, Natural England, lle.gov.wales
Project Name: MONA OFFSHORE WIND PROJECT	0 2.5 5 10 15 20 25 nm; 0 5 10 20 30 40 50 km
Drawing Number: RPSE-MN-ES-ORN-002-01	
Drawing Title: DESIGNATED SITES IN CLOSE PROXIMITY TO THE MONA ARRAY AREA AND MONA EXPORT CABLE ROUTE	**Geodetic Information:** Datum: ETRS 1989 Projection: ETRS 1989 UTM Zone 30N Scale@160mmx220mm: 1:2,000,000

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

1.2 Consultation

1.2.1.1 A summary of the key issues raised during consultation activities undertaken to date specific to offshore ornithology baseline characterisation is presented in Table 1.1 below, together with how these issues have been considered in the production of this technical report as part of the Environmental Statement.

1.2.2 Evidence Plan process

1.2.2.1 The purpose of the Evidence Plan process is to agree the information the Mona Offshore Wind Project needs to supply to the Secretary of State, as part of a DCO application for the Mona Offshore Wind Project. The Evidence Plan seeks to ensure compliance with EIA. The development and monitoring of the Evidence Plan and its subsequent progress is being undertaken by the Steering Group. The Steering Group will comprise of the Planning Inspectorate, the Applicant, NRW, Natural England, JNCC and the MMO (Marine Management Organisation) as the key regulatory and SNCBs. To inform the EIA process during the pre-application stage of the Mona Offshore Wind Project, Expert Working Groups (EWGs) were also set up to discuss and agree topic specific issues with the relevant stakeholders. Consultation was undertaken via the Offshore Ornithology EWG, with meetings held in February 2022, July 2022, November 2022, February 2023, June 2023, October 2023 and December 2023.

1.2.2.2 The responses provided and changes suggested by the stakeholders through the EWG for baseline characterisation are summarized in Table 1.1, together with changes implemented in the technical report of the Environmental Statement.

1.2.2.3 A number of comments were received during the S42 consultation following submission of the PEIR chapter. All the responses provided, and changes suggested by the stakeholders are presented in the consultation report (Document reference E.3) together with changes implemented in the technical reports underpinning the Environmental Statement.

1.2.2.4 A summary of the key responses with changes implemented in the technical report of the Environmental Statement are presented in table 1.1.

Table 1.1: Summary of key topics and issues raised during consultation activities undertaken for the Mona Offshore Wind Project relevant to offshore ornithology baseline characterisation technical report of the Environmental Statement.

Date	Consultee and type of response	Topics and issues raised	Response to issue raised and/or where considered in this chapter
February 2022	**Offshore Ornithology Expert Working Group 1** **Attended by:** Natural England, JNCC, NRW, The Wildlife Trusts (TWT)	Agreed on broad approach to characterisation for the Mona Offshore Cable Corridor using desktop data sources only	The approach to the characterisation of the Mona Offshore Cable Corridor is to rely on available desktop data. This approach is standard for offshore wind farm transmission assets.
		Agreed on the broad approach to aerial surveys.	The Mona digital aerial survey area includes a buffer of 6-17 km from the Mona Array Area. The Mona digital aerial survey area does not extend fully to 10km in all directions around the Mona Array Area, as this area was refined following commencement of the digital aerial surveys. The uneven buffer around the Mona Array Area is a result of the surveys being designed on the basis of an array area that differed to the final boundary awarded through the Offshore Wind Leasing Round 4. The use of LiDAR as a method for collecting flight height data to parameterise collision risk models was not been endorsed by Natural England; as such it has not been progressed and flight heights are to be based on existing literature.
May 2022	**Scoping Opinion** IOM Department of Infrastructure	The Isle of Man Department of Infrastructure noted that Manx shearwater, guillemot, razorbill and kittiwake were numerous in previous surveys of the generation assets study area. These are all within foraging range of their Isle of Man breeding colonies.	Abundance at breeding colonies on the Isle of Man (using the Seabird Monitoring Programme (SMP) database (JNCC (2022)) are presented in Annex 5.1: Offshore ornithology baseline characterisation of the Environmental Statement.
May-June 2022	**Scoping Opinion** NRW The Planning Inspectorate JNCC	NRW highlighted the availability of revised guidance for red-throated diver displacement – see Joint SNCB Interim Advice on the Treatment of Displacement for Red-Throated Diver (MIG-Birds 2022). NRW advised that the Mona offshore ornithology study should include the Potential Array Area with a 10km buffer. It may help the reader to include a clearer visualisation of where this buffer does and does not fully reach 10km, and the justification for this.	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. Despite the near-absence of red-throated diver in the Mona Offshore Ornithology Array Area study area, red-throated diver design-based estimates are included in this technical report.
May – June 2022	**Scoping Opinion**	Further information on how survey design has been arrived at is required. It is likely that all Welsh SPAs and Sites of Special Scientific Interest (SSSIs) with marine or	The rationale for the study area design is presented in section 1.1.2. Coverage standing at atleast 14%, exceeding the 10% minimum coverage suggested by literature (BSH, 2013). Coefficient of

Date	Consultee and type of response	Topics and issues raised	Response to issue raised and/or where considered in this chapter
	NRW,The Planning Inspectorate,Natural England	estuarine bird features should be scoped in until surveys are complete, and the data analysis has been finalised. This includes results of a power analysis to detect the sample size needed for the analysis of aerial survey data and including more detail on the justification for 12% analysed for site-specific surveys and clearly demonstrate that the survey coverage is appropriate to provide adequate baseline characterisation. With reference to site-specific surveys, it would be useful to clarify if the intention is to provide records of all species detected from aerial surveys.	variation (CVs) are also provided in the offshore ornithology baseline characterisation to give measure of precision to support approach. A power analysis was conducted in line with advice and presented to the EWG where agreement was therefore met on the adequacy of coverage.
May - June 2022	**Scoping Opinion** NRW,The Planning Inspectorate	Digital aerial survey data collected for this project should be the primary data source used for the analysis. However, useful supplementary data (e.g. tracking data) and information may be found in a number of sources but care should be taken to ensure that information in the Environmental Statement remains representative and fit for purpose	Resources where relevant were included in section 1.4.
June 2022 – June 2023	**Scoping Opinion** The Planning Inspectorate, JNCC, Natural England	Tracking studies should also be used to inform and evidence connectivity (or a lack of) for the marine ornithology impact assessment, where available, such as site-specific tracking data for Northern gannet at Grassholm, Manx shearwater at Skomer and the Copeland Islands, black-legged kittiwake at Rockabill, and guillemot at Isle of Canna.	Tracking data available from the Seabird Tracking Database (Birdlife International, 2021) have been reviewed and summarized in section 1.4.
June 2022	**Scoping Opinion** JNCC	In addition to generating density and abundance estimates for frequently recorded seabird species, we would advise that a log of all species encountered in aerial surveys is provided.	All species encountered on the digital aerial surveys are presented in section 1.4.
June 2022	**Scoping Opinion** Natural England	It would be helpful if the figure within the Scoping Report clearly shows the areas where the buffer extends to a full 10km from the potential array area. If this Figure is to be used in the Environmental Statement, add detail to descriptive text and update the Figure to clarify the	The rationale for the study area design is presented in section 1.1.2.

Date	Consultee and type of response	Topics and issues raised	Response to issue raised and/or where considered in this chapter
		changing buffer distances and confirm the area that is covered by a full 10km buffer, including rationale for how this was selected.	
		If a modelling approach is to be adopted (e.g. MRSea), early engagement with the SNCBs is recommended. We advise that before running the model that the parameters are discussed and agreed through the Evidence Plan process via the EWG.	The modelling-based approach has been discussed and agreed with the EWG and the full approach is presented in section 1.3
July 2022	**Offshore Ornithology Expert Working Group 2**: **Attended by:** Natural England, JNCC, NRW, RSPB, TWT	The EWG agreed on the approach to baseline characterisation as set out in the baseline characterisation technical paper.	Approach to the baseline characterisation is presented in section 1.3.
July to August 2022	NRW, JNCC and Natural England – baseline characterisation paper provided and agreed as part of the Offshore Ornithology Expert Working Group 2.	NRW, JNCC and Natural England advised that the applicant also provides records of all species detected from aerial surveys.	All species recorded during the digital aerial surveys are presented in section 1.4
		NRW recommended that a power analysis is undertaken to demonstrate that survey coverage is appropriate. Although analysis of 12% of the sea surface is likely to be sufficient, best practice would be to conduct a power analysis to determine the level and distribution of survey coverage to analyse.	A power analysis was conducted in line with advice and presented to the EWG where agreement was therefore met on the coverage.
June 2023	**S42 Consultation** NRW, JNCC, Natural England	NRW expressed concerns regarding the numbers of guillemot/razorbill recorded, the potential issues related to this and apportionment of these birds to species and how these have been applied in model-based abundance estimates.	ID rates for auk species have been updated and therefore all modelling rerun for these species. Updated numbers, population estimates and monthly breakdown of total raw abundance are provided within Appendix A.

Date	Consultee and type of response	Topics and issues raised	Response to issue raised and/or where considered in this chapter
		NRW seek clarification on availability bias correction factors that have been used and how these have been applied in model-based abundance estimates.	More clarity has been given on the apportioning and availability bias factors applied to relevant species with sources used provided within the text within section 1.4.
		NRW seek clarification on how model-based abundance estimates of birds in flight only have been generated for use in collision risk modelling (CRM) including how the mean monthly in-flight densities and confidence intervals have been generated.	Additional text has been provided within section 1.3 to state how birds in flight have been calculated from model-based estimates utilising the site-specific data
		Although apportioning of unidentified groups to species provides the best available approach to estimating numbers of each species, this method may introduce biases, for example if one species in a group is easier to identify to species than others in the same general group, then the apportioning may overestimate numbers of the easily identified species and correspondingly underestimate numbers of the less easily identified species. This needs to be considered when assessing densities of species for which a significant proportion of birds had to be assigned to an unidentified group. As a result, apportioning such a large proportion of unidentified auks based on the proportions of identified species may not be appropriate and NRW (A) are unsure whether spatial modelling of a species with such a low identification rate is likely to be representative.	Auk ID rates were revised upward following a revised QA of images. As the result, the apportioning is based on a smaller proportion of unidentified Auk species than presented in the PEIR. Therefore, the apportioning method is considered appropriate.
		NRW advise that a breakdown of monthly records of positively identified guillemot and razorbill alongside the number of records per month of guillemot/razorbill (and any other relevant species groups) is provided. Consideration should also be given to issues with bias regarding apportioning to species of guillemot/razorbill records given the very high number of records of this group.	This technical report provides a breakdown of all unknown groups and the number of birds recorded. The report additionally states which birds are apportioned to which category aiding with clarity on how unknown birds were dealt with. Additionally, unidentified gulls, skuas, petrels, terns, thrushes and wader species were apportioned to identified species
		NRW note that it is unclear how apportionment of unidentified birds or availability bias correction has been	The apportioning of unidentified species was applied to design and model based estimates of known species and we have used the

Date	Consultee and type of response	Topics and issues raised	Response to issue raised and/or where considered in this chapter
		applied to the abundance estimates generated from MRSea modelling. This includes how the mean monthly in-flight densities and confidence intervals have been generated.	correct and uniformly used correction factors which are presented in section 1.3.
		NRW note that there is some inconsistency in the correction factors applied between the information presented in the baseline characterisation annex (Annex 10.1) and the displacement annex (Annex 10.2). Clarification is therefore required as to the correction factors that have actually been used.	All reports have been cross checked against each other to ensure clarity and consistency in approach.
		No coefficient of variation (CVs) for any estimates have been presented anywhere in the PEIR documents, despite Table 10.5Summary of key topics and issue raised during consultation activities undertaken for the Mona Offshore Wind Project relevant to offshore ornithology, stating that: 'CVs are also provided in Volume 6, Annex 5.1 Offshore ornithology baseline characterisation technical report of the Environmental Statement to give a measure of precision to support the approach.' NRW (A) request that the CVs are provided.	The coefficient of variation associated with design-based and model-based population estimates for the Mona Array Area plus buffer zones was presented in section 1.3.
		NRW suggest that a watching brief is kept for publication of the results of digital aerial surveys of the original Liverpool Bay SPA boundary that have taken place over several successive winters (2015, 2018, 2019 and 2020), as these should provide more recent information on the distribution of red-throated diver and common scoter within the SPA and hence the section of the Mona offshore cable corridor area that passes through the SPA, than is currently considered. This should also be considered regarding red-throated diver and common scoter densities in the offshore export cable area that overlaps the Liverpool Bay SPA in the HRA assessments. The most up to date data available should be considered for the Mona offshore cable corridor, which passes through the SPA.	Key findings from HiDef Aerial Surveying Limited (2023) Densities of qualifying species within Liverpool Bay/ Bae Lerpwl SPA: 2015 to 2020. Natural England Commissioned Report 440, Natural England have been summarised in section 1.4. Densities for red-throated diver and common scoter are based on this report in place of Lawson *et al*. (2016)/Bradbury *et a*l. (2014) densities due to the age of that underlaying data (2001-2011). As NRW have stated, the HiDef report gives a more up to date representation of densities within the area now and therefore population count have been used in the assessment. As no row data was provided by HIDef, maps based on Bradbury *et al*. (2014) have still been shown for the cable route for historical context.

Date	Consultee and type of response	Topics and issues raised	Response to issue raised and/or where considered in this chapter
		NRW advise the list of designated sites in Table 10.9 Designated sites and relevant qualifying interests for the offshore ornithology assessment, should include relevant Ramsar sites (for example the Dee Estuary is also designated as a Ramsar site and non-breeding waterbirds are features) and SSSIs (for example the Pen y Gogarth / Great Ormes Head SSSI, which is designated for breeding kittiwake, guillemot and razorbill, and the Mona site is located within mean-maximum foraging range of these species from this SSSI).	SSSI & RAMSAR sites/colonies within individual species foraging range (mean-max foraging range + SD) from the Mona Array Area and the Mona Offshore Cable Corridor and Access Areaa are presented. These Welsh colonies/sites have therefore now been considered in more detail
		NRW suggest there is a lack of assessment of Sites of Special Scientific Interest (SSSIs) and features where there is potential for connectivity.	SSSI sites/colonies within individual species foraging range (mean-max foraging range + SD) from the Mona Array Area and the Mona Offshore Cable Corridor and Access Areas have been presented and taken forward to the impact assessment. These have additionally received apportioning figures to further state how these non-SPA sites have been accounted for and considered in the assessment
		NRW suggest that the list of SPA colonies for the different species presented in Appendix A of Annex 5.5 (and the relevant species tables within this annex) are checked, as for the Welsh sites at least, there are some colonies listed as being SPAs, that are not designated as SPAs, for example: Great Orme, Little Orme and South Stack.	Collision and displacement impacts have been apportioned to SSSIs sites with seabird features within the foraging ranges of the Mona Array Area. The impact of the increase in baseline in mortality on the common guillemot breeding population at Great Orme's Head SSSIs is investigated in Volume 6, Annex 5.6: Offshore ornithology population viability analysis technical report of the Environmental Statement. No other species was investigated due to apportioning highlighting the impact did not go above 1% hence no further assessment needed. The chapter assessed the impact of collision and displacement on features of SSSI sites connected to the Mona Array Area.
		NRW are uncertain of the appropriateness of the approach that has been taken to calculate the regional breeding season reference populations. We suggest that approaches to calculating regional breeding reference populations be explored collaboratively through the offshore ornithology EWG.	There were potential inaccuracies associated with the approach proposed by NRW at the EWG with broad assumptions about immature populations which result in an increase in the total regional breeding population figure. As a more precautionary approach in the chapter, the number of immature birds present in the regional BDMPS has been estimated using the ratio of immatures per breeding adult provided in the relevant species accounts in Furness

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			(2015). This approach likely under-estimates the true count of juvenile and immature birds due to failing to account for juvenile and immature birds migrating across to UK colonies in the breeding season from wintering grounds outside of the UK. However as stated, will result in a more precautionary assessment in-line with Natural England guidance due to making use of a much smaller total regional breeding population against which the impacts have been assessed.
		JNCC welcome the use of Woodward *et al.,* 2019 mean max plus 1 standard deviation foraging ranges. Note that we advise that breeding season foraging ranges for razorbill and guillemot are those within Appendix 1 of Woodward *et al.,* 2019 which excludes data from Fair Isle where foraging range may have been unusually high as a result of reduced prey availability during the study year. Therefore, the foraging range to use for razorbill is 73.8km + 48.4km and for guillemot is 55.5km + 39.7km. Further, there are site-specific forging ranges for gannet. Those of relevance to Mona OWF are Grassholm SPA (foraging range max = 516.7km) and St Kilda SPA (foraging range max = 709km).	Foraging ranges used in the assessment have been updated in line with SNCBs comments and discussion through the evidence plan process. Updated foraging ranges are presented in section 1.4 for each species.
		Natural England reiterate recommendation to carry out some scenario testing to investigate the potential impact of low ID rates and determine if spatial modelling and apportioning is appropriate. Further, we request that a full monthly breakdown of records relating to razorbill and guillemot is presented to facilitate scrutiny of seasonal variation in ID rates.	The following process has been followed by APEM (Digital Aerial Survey contractor) to update the Auk ID rates. As part of the digital aerial image analysis process, 50% of targets identified within the imagery passed through quality assurance (QA) checks, where the bird image was checked by another team member and re-identified if needed. The QA team have increased QA of auk species so that 100% of the auks identified in images were checked by APEM's QA team. Additionally, for any auks where there was still uncertainty around the level of ID or that remained identified to group level, were reviewed by a senior member of the QA team. APEM only identify to a species level when completely confident in that ID, if there was any uncertainty APEM used a higher classification level.

Date	Consultee and type of response	Topics and issues raised	Response to issue raised and/or where considered in this chapter
		Natural England comment on the generation and use of model-based abundance estimates. Rec Resolve- The submitted ES should include presentation of more detailed methods, including corrections for the apportionment of unidentified birds and availability bias and the generation of birds in flight densities for use in CRM.	Detailed methods presenting corrections factors used for availability, apportionment of species and estimate of flying birds are presented in section 1.4 for each species.
		Natural England recommend providing species-specific raw counts for each individual survey.	Monthly breakdown of total raw abundance within the Mona Offshore Ornithology Array Area study are presented in Appendix A.
		Natural England note that there appears to be an inconsistency in the availability bias correction factors applied to auks. Natural England also highlight that Manx shearwater is a surface diving species and data are available detailing foraging & diving behaviour. It may also be appropriate to consider availability bias for that species. Recommendation - Clarify which correction factors have been used in calculations and ensure consistency across method descriptions (and application). Discuss the calculation and application of an availability bias correction factor for Manx shearwater at future EWG meetings.	The correction factors applied to sitting common guillemot and razorbill, were based on the proportion of time spent underwater from Thaxter *et al*. (2010) and were refined following the method recommended by JNCC (2013) which excludes the percentage of birds in flight from the calculations. Proportion of time spent underwater were 23.75% and 17.4%, respectively for common guillemot and razorbill. For Atlantic puffin, a proportion of time spent underwater of 14.16% was used (Spencer, 2012). Methodology detailing how correction factors were applied to abundance estimates is presented in section 1.3.
		Natural England recommend that worked examples are included to fully detail the assessment process for both collision (e.g., gulls) and displacement (e.g., auks). Clarify and specify throughout the documentation where modelled and design-based data have been used.	Further detail on the methodology is presented in section 1.3.
June 2023	**S42 Consultation** IOM Gov Detailed response	Note, no Manx sites have been included here. Note also, that there are no SPAs on the Isle of Man and there has to date been no assessment for European level interest, but the IoM is within the foraging range of some species and we look to the EIA for assurance that Manx seabird populations are not predicted to be significantly affected. The Manx data is available from the JNCC Seabird Monitoring Partnership Programme or the Manx report from Manx BirdLife.	Seabird colonies on the Isle of Man within individual species foraging range (mean-max foraging range + SD) from the Mona Array Area and the Mona Offshore Cable Corridor are presented in section 1.4.

Date	Consultee and type of response	Topics and issues raised	Response to issue raised and/or where considered in this chapter
November 2023	**Offshore Ornithology Expert Working Group 3:** **Attended by:** Natural England, JNCC, NRW, TWT, IOM, Marine Management Organisation (MMO)	Agreed on the methodology used to improve auk ID rates	Updated auk ID rates the Digital Aerial Surveys (DAS) have been used to generate population estimates for auk species. The population estimates are presented in section 1.4.
December 2023	**Offshore Ornithology Expert Working Group 7** **Attended by:** Natural England, JNCC, NRW, MMO, RSPB, IoM	Methodology updates that affect the assessment were presented to the EWG (e.g., project alone and CEA breeding regional population approach and avoidance rates for gull species).	No actions required for this technical report.

1.3 Methodology

1.3.1 Desktop review of data sources

1.3.1.1 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 (which was searched through the Marine Data Exchange website (www.marinedataexchange.co.uk)), and survey data from surveillance monitoring undertaken by the Statutory Nature Conservation Bodies (SNCBs).

1.3.1.2 The data that have been collected and used to inform this baseline characterisation annex are summarised in Table 1.2. 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 1.2: Summary of key desktop datasets and reports.

Source/reference	Description	Data source	Date	Site coverage	Limitations & assumptions
HiDef Aerial Surveying Limited (2023). Report commissioned by Natural England to inform Natural England, Natural Resources Wales and the Joint Nature Conservation Committee (JNCC) in adjusting the conservation objectives within the Joint Conservation Advice package.	Digital video aerial surveys conducted between 2015 and 2020 to provide updated density and abundance estimates for red-throated diver *Gavia stellata*, common scoter and the waterbird assemblage within the Liverpool Bay/Bae Lerpwl SPA.	Digital aerial data	January to March in 2015, 2018, 2019 and 2020.	Liverpool Bay/Bae Lerpwl SPA designated in 2010 (excluding 2017 extension). Some overlap with the Mona Offshore Ornithology Offshore Cable Corridor study area.	Liverpool Bay/Bae Lerpwl SPA waterbird assemblage.
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 *Rissa tridactyla*, common guillemot *Uria aalge*, razorbill *Alca torda* and European shag *Phalacrocorax aristotelis.*	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.

Source/reference	Description	Data source	Date	Site coverage	Limitations & assumptions
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.	10 km resolution.
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.
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 3 km.
Existing offshore wind farm grey literature	Information obtained from several offshore wind farm applications (Morgan Generation, Morecambe Generation, 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.
Joint Nature Conservation Committee (JNCC) (2021)	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.
Cranswick *et al.* (2004)	Aerial visual surveys of common scoter. Surveys undertaken by Wildfowl & Wetlands Trust (WWT) on behalf of the Countryside Council for Wales.	Visual aerial surveys	2002 to 2003	Coverage limited to inshore areas of the Mona Offshore Ornithology Array Area study area.	Common scoter only.

Source/reference	Description	Data source	Date	Site coverage	Limitations & assumptions
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/Bae Lerpwl SPA.	Divers and common scoter only.
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/Bae Lerpwl SPA.	Aerial surveys	2001 to 2011	Coverage limited to inshore areas.	No coverage of the Mona Array Area.
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 SEA.
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.

1.3.2 Mapping seabirds at sea data sources

1.3.2.1 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.

1.3.2.2 Waggitt et al. (2020) have developed an approach to produce distribution maps for 12 seabird species at 10 km 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 3×3 km. 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 km2 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 1.3.

1.3.2.3 Average density per season was mapped in GIS. For several seabird species, the spatial variation in densities was shown at a 10×10 km resolution, for an area which included the Mona Array Area, the 2 km, 4 km and the Mona Offshore Ornithology Array Area study area. 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).

1.3.2.4 Seasonal predicted densities were already available in a shapefile format in Bradbury *et al.* (2014) and were mapped using GIS. 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).

1.3.2.5 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 3×3 km in Bradbury *et al.* (2014) to 10×10 km in Waggitt *et al*. (2020).

1.3.3 Seasonal definitions and population importance

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

- Breeding: when birds are attending colonies, nesting and provisioning young
- Post-breeding: when birds are migrating to wintering areas or dispersing from colonies
- Non-breeding: when birds are over-wintering in an area
- Pre-breeding: when birds are migrating to breeding grounds.

1.3.3.2 Seasonal definitions are required in the first instance to determine the importance of populations estimated within the Mona Offshore Wind Project. Seasonal extents have been defined using a range of sources including Furness (2015) and Kober *et al.* (2010). Seasonal definitions for species relevant to the Mona Offshore Wind Project are presented in Table 1.3.

Table 1.3: Annual life cycle across months for species recorded during the digital aerial surveys based on Furness (2015). In the absence of seasons in Furness (2015), common gull and black-headed gull seasons are taken from Kober *et al.* (2010).

Species	Pre-breeding season/spring migration	Migration-free breeding season	Breeding Season	Post breeding Season/autumn migration	Migration-free non-breeding/ winter season
European shag	December to February	March to July	February to August	August to October	September to January
Great cormorant *Phalacrocorax carbo*	February to April	May to July	April to August	August to October	November to January
Red-throated diver	February to April	May to August	March to August	September to November	December to January
Common guillemot	December to February	March to June	March to July	July to October	November
Razorbill	January to March	April to June	April to July	August to October	November to December

Species	Pre-breeding season/spring migration	Migration-free breeding season	Breeding Season	Post breeding Season/autumn migration	Migration-free non-breeding/ winter season
Atlantic puffin *Fratercula arctica*	March to April	May to June	April to early August	Late July to August	September to February
Northern fulmar *Fulmarus glacialis*	December to March	April to August	January to August	September to October	November
Northern gannet	December to March	April to August	March to September	September to November	N/A
Manx shearwater *Puffinus puffinus*	Late March to May	June to July	April to August	August to early October	November to February
Black-legged kittiwake	January to April	May to July	March to August	August to December	N/A
European herring gull *Larus argentatus*	January to April	May to July	March to August	August to November	December
Lesser black-backed gull *Larus fuscus*	March to April	May to July	April to August	August to October	November to February
Great black-backed gull	January to April	May to July	Late March to August	August to November	December
Black-headed gull *Chroicocephalus ridibundus*	N/A	N/A	April to August	N/A	September to March
Common gull *Larus canus*	N/A	N/A	April to August	N/A	September to March
Little gull *Hydrocoloeus minutus*	N/A	April to July	March to August	N/A	August to March
Great skua *Stercorarius skua*	March to April	May to July	May to August	August to October	November to February
Arctic skua *Stercorarius parasiticus*	April to May	June to July	May to July	August to October	November to March
Common tern *Sterna hirundo*	April to May	June to mid-July	May to August	Late July to early September	October to March
Sandwich tern *Thalasseus sandvicensis*	March to May	June	April to August	July to September	October to February
Arctic tern *Sterna paradisaea*	April to May	June	May to early August	July to early September	October to March

1.3.3.3 Only certain seasons have been taken forward to the assessment as detailed in Furness (2015) (Table 1.4). Under each species account Furness (2015) provides the appropriate seasons to be used within assessments and hence not all seasons in Table 1.3 have been utilised. These are identified using 'N/A' in Table 1.4.The Migration-free breeding season was not used in the assessment as advised by JNCC (EWG meeting two, held on 13/07/2022). Furness (2015) includes overlapping seasons and for the purpose of the assessment, the breeding season was given priority due to its significance. Where a season is not relevant to a species the relevant cell in Table 1.4 has been greyed out.

Table 1.4: Bio-season population sizes used within the assessment

Species	Pre-breeding season/spring migration	Breeding Season	Post breeding Season/autumn migration	Migration-free non-breeding/ winter season
European shag	N/A	February to August	N/A	September to January
Great cormorant *Phalacrocorax carbo*	N/A	April to August	N/A	September to March
Red-throated diver	February to April	March to August	September to November	December to January
Common guillemot	N/A	March to July	N/A	August to February
Razorbill	January to March	April to July	August to October	November to December
Atlantic puffin *Fratercula arctica*	N/A	April to August	N/A	September to March
Northern fulmar *Fulmarus glacialis*	December to March	January to August	September to October	November
Northern gannet	December to February	March to September	October to November	N/A
Manx shearwater *Puffinus puffinus*	March	April to August	September to October	N/A
Black-legged kittiwake	January to March	April to August	September to December	N/A
European herring gull *Larus argentatus*	N/A	March to August	N/A	September to February
Lesser black-backed gull *Larus fuscus*	March	April to August	August to October	November to February
Great black-backed gull	N/A	March to August	N/A	September to February
Black-headed gull *Chroicocephalus ridibundus*	N/A	April to August	N/A	September to March
Common gull *Larus canus*	N/A	April to August	N/A	September to March

Species	Pre-breeding season/spring migration	Breeding Season	Post breeding Season/autumn migration	Migration-free non-breeding/ winter season
Little gull *Hydrocoloeus minutus*	N/A	March to August	N/A	September to February
Great skua *Stercorarius skua*	March to April	May to August	August to October	N/A
Arctic skua *Stercorarius parasiticus*	April	May to July	August to October	N/A
Common tern *Sterna hirundo*	April	May to August	September	N/A
Sandwich tern *Thalasseus sandvicensis*	March	April to August	September	N/A
Arctic tern *Sterna paradisaea*	April	May to August	September	N/A

1.3.3.4 Regional populations are shown in Table 1.5 and have been defined for every species recorded within the Mona Offshore Wind Project. These have been derived using a number of sources that are outlined here and referenced in footnotes below in Table 1.5.

1.3.3.5 In the breeding season, regional populations have been calculated utilising data from the Seabird Monitoring Programme (SMP) database. Breeding data within the mean-maximum foraging range plus one standard deviation has been extracted from the online SMP database up to the year 2023. To not significantly under-estimate the regional breeding population a check of all designated and non-designated site colonies within the relevant foraging range has been undertaken to ensure all of these colonies are accounted for within the regional breeding population estimated for each species. In these cases, the most recent population estimate for each colony was used. Note that the SMP database is a live database and so counts can be updated at any given time. Count data uploaded to the SMP database before July 2023 has been considered.

1.3.3.6 In addition to breeding adult birds associated with the breeding colonies, there will be immature and juvenile seabirds present within the region. Population counts therefore must be adjusted to account for these seabirds. The proportion of immature to adults have been taken from Furness (2015).

1.3.3.7 For common guillemot and razorbill, during the breeding season the number of individuals counted and provided in the SMP is likely to be an underestimate of the colony size, given that at any one time, a significant number of individuals may be away from the colony. This species also breeds at high densities on cliffs, and so it can be difficult to identify nests or breeding pairs. A correction factor of 1.34 has therefore applied to the SMP count based on JNCC guidance (Walsh et al. 1995) and is considered to be the most useful for providing reliable data from which to extract population trends (Walsh et al., 1995). An in-depth breakdown of colony counts for species are provided within Appendix B where it is possible to do so (e.g. colony counts that were taken from the SMP database).

1.3.3.8 Regional seas populations for all seasons are defined using the BDMPS relevant to each species. The BDMPS is defined as the smallest geographical range and population scale that can be supported by evidence relating to the life history of a species including seasonal distribution and migratory movements. Relevant BDMPS populations are calculated for all seasons defined for a species and follow Natural England guidance and have been obtained from Furness (2015) or other relevant sources.

Table 1.5: Population levels for species included in this report. All population estimates are for individual birds.

1. Based on data from the Seabird Monitoring Programme database.
2. Regional seas populations are sourced from Woodward *et al.* (2020) or Furness (2015).
3. HiDef. (2023) – Latest population for the Liverpool Bay/Lerpwl Bae Area of Search.

Species	Foraging range population			Regional seas population			
	Breeding			Breeding[2]	Post-breeding[2]	Non-breeding[2]	Pre-breeding[2]
	Foraging range[1] (adults only) (breeding individuals)	Foraging range (Juvenile and immature birds) (individuals)	Foraging range (total individuals adult and immature)	Regional (adult and immature individuals)	Regional (adult and immature individuals)	Regional (adult and immature individuals)	Regional (adult and immature individuals)
European shag	0	0	0	50,229	N/A	13,075	N/A
Great cormorant	0	0	0	21,179	N/A	9,602	N/A
Red-throated diver	0	0	0	1,767	4,373	2,073[3]	4,373
Common guillemot	78,552	58,128	136,680	1,145,528	N/A	1,139,220	N/A
Razorbill	10,483	7,862	18,345	198,969	606,914	341,422	606,914
Atlantic puffin	99,658	103,644	203,302	1,482,791	N/A	304,557	N/A
Northern fulmar	33,582	20,821	54,403	629,594	828,194	556,367	828,194
Northern gannet	377,342	305,647	682,989	522,888	545,954	N/A	661,888
Manx shearwater	1,289,394	1,083,091	2,372,485	1,821,544	1,580,895	N/A	1,580,895
Black-legged kittiwake	83,340	73,339	156,679	245,234	911,586	N/A	691,526
European herring gull	14,935	16,279	31,214	217,167	N/A	173,299	N/A

	Foraging range population			Regional seas population			
Lesser black-backed gull	94,805	64,467	159,272	240,750	163,304	41,159	163,305
Great black-backed gull	662	834	1,496	44,753	N/A	17,742	N/A
Black-headed gull	0	0	0	N/A	N/A	N/A	N/A
Common gull	0	0	0	N/A	13,036	N/A	13,036
Little gull	0	0	0	N/A	N/A	333[3]	N/A
Great skua	512	727	1,239	2,013	16,336	1,398	25,090
Arctic skua	0	0	0	684	5,287	N/A	5,111
Common tern	0	0	0	11,210	64,659	N/A	64,659
Sandwich tern	0	0	0	8,247	10,761	N/A	10,761
Arctic tern	0	0	0	49,846	17,696	N/A	17,696

1.3.4 Site-specific digital aerial survey

Survey area

1.3.4.1 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 10 km 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.

1.3.4.2 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.

1.3.4.3 Previous 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 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 15.5% (± 0.12% SE). These values are higher than the 10% previous minimum coverage suggested by literature (BSH, 2013) and coverage accepted by previous projects. The approach to baseline characterization using digital aerial surveys was agreed with the SNCBs.

Survey summary methodology

1.3.4.4 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 2 km apart. The aircraft collected the data at an altitude of approximately 396 m, and a speed of approximately 120 kn.

1.3.4.5 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 process.

1.3.4.6 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'.

1.3.4.7 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 >396 m, visibility of >5 km, wind speed of <30 km 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.

1.3.4.8 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.

1.3.4.9 The dates, start and end times for each digital aerial survey are provided in Table 1.6 with the corresponding weather conditions reported in Table 1.7.

Table 1.6: 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

Survey No.	Date	Flight No.	UTC Start Time (HH:MM)	UTC End Time (HH:MM)
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 1.7: Weather conditions during all digital aerial surveys from March 2020 to February 2022.

[1] 0 = Calm (Glassy), 1 = Calm (Rippled), 2 = Smooth, 3 = Slightly Moderate, 4 = Moderate

[2] 0 = Clear, 1 = Slightly Turbid, 2 = Moderately Turbid, 3 = Highly Turbid

[3] 0 = 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 (°C)	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 to 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

Survey no.	Date	Visibility (km)	Sea state[1]	Glint/glare (%)	Turbidity[2]	Cloud (%)[3]	Air temp (°C)	Wind Speed (kn)/direction
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

1.3.5 Abundance estimates

1.3.5.1 As previously stated, digital aerial surveys encompassed the Mona Array Area and extended 7 km to 16.5 km. Abundance estimates from the raw survey data (provided in Appendix A) are required in order to establish a baseline for assessments of effects. Guidance outlined by the SNCBs (JNCC, 2022) require impacts from displacement to be assessed at distances from the wind farm array, with the extent of the buffer areas dependant on bird species (e.g. 2 km for auk species). As such, abundance estimates were produced for a number of areas, including the Mona Array Area itself.

1.3.5.2 Abundances were generated either through a complex model based approach or though parametric bootstrapping, both of which are detailed further below.

Model-based approach

1.3.5.3 All available digital stills high resolution data collected between March 2020 and February 2022 were utilised in the initial model building stage. The Marine Renewable Strategic Environmental Assessment (MRSea) package was used to predict numbers across the Mona Offshore Ornithology Array Area study area alongside 95% confidence intervals derived from 1,000 bootstraps to provide a range of uncertainty predicted by the model.

1.3.5.4 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.

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

1.3.5.6 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 VAexplanatory 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 30 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 1.4.2.

1.3.5.7 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 Quasi-Akaike information criterion and Quasi-Bayesian information criterion.

1.3.5.8 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 Mona Offshore Ornithology Array Area study 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.

1.3.5.9 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 2 km and 4 km boundaries, as well as Mona Offshore Ornithology Array Area study area. Each grid cell in the environmental grid contained an area of 0.1276 km^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. To aid with model validation, MRSea diagnostic plots for common guillemot and razorbill have been provided in MRSea extended methodologyAppendix E.

1.3.5.10 It was only possible to run MRSea for five focal species (Table 1.8) because the spatial model can run into issues when data is too sparse. It was also not possible to run MRSea for every month, with N/A used to indicate when MRSea could not run for that month due to low numbers of observations. It was found that when there were at least 30 observations in a single survey, models tended to perform well (Table 1.8). Below this threshold, design-based abundance estimates were produced for all species observed between March 2020 and February 2022.

Table 1.8: Number of sightings within the Mona Offshore Ornithology Array Area study area per month for species modelled using MRSea.

Month	Black-legged kittiwake	Common guillemot	Razorbill	Manx shearwater	Northern gannet
28/03/2020	355	1,806	540	7	38
17/04/2020	61	246	18	0	19
05/05/2020	10	76	22	0	8
08/06/2020	121	262	15	19	13
06/07/2020	58	201	35	465	101
11/08/2020	21	227	20	22	78
01/09/2020	20	119	48	10	43
14/10/2020	6	104	8	0	41

Month	Black-legged kittiwake	Common guillemot	Razorbill	Manx shearwater	Northern gannet
04/11/2020	168	243	22	0	23
09/12/2020	102	76	32	0	1
04/01/2021	132	158	79	0	5
01/02/2021	99	787	364	0	0
12/03/2021	613	576	283	2	126
01/04/2021	212	996	73	15	88
06/05/2021	54	88	3	0	28
08/06/2021	91	263	8	1,269	38
05/07/2021	275	407	12	543	49
09/08/2021	2	80	22	138	66
02/09/2021	4	35	3	54	113
06/10/2021	22	363	9	0	58
03/11/2021	78	51	6	0	11
02/12/2021	353	449	268	0	2
11/01/2022	276	846	266	0	3
09/02/2022	334	346	118	7	6

Design-based approach

1.3.5.11 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.

1.3.5.12 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 four times to cover each of the four area boundaries (Mona Array Area, Mona Array Area + 2 km, + 4 km, 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).

1.3.5.13 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.

1.3.5.14 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.

1.3.6 Apportioning of unidentified species

1.3.6.1 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, unidentified auk species and unidentified auk/shearwater species (Table 1.9) 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. Additionally, unidentified gulls, skuas, petrels, terns, thrushes and wader species were apportioned to identified species (Table 1.10).

1.3.6.2 The apportioning of unidentified species was applied to design and model based estimates of known species.

Table 1.9: Monthly breakdown of total raw abundance for identified and unidentified auk/shearwater species within the Mona Offshore Ornithology Array Area study.

Month	Common guillemot	Razorbill	Atlantic puffin	Unidentified common guillemot/razorbill	Unidentified auk species	Unidentified auk/shearwater species
28/03/2020	1,806	540	14	422	0	0
17/04/2020	246	18	3	26	0	0
05/05/2020	76	22	0	8	1	0
08/06/2020	262	15	0	109	7	0
06/07/2020	201	35	4	8	2	0
11/08/2020	227	20	1	1	1	0
01/09/2020	119	48	1	12	0	0
14/10/2020	104	8	1	3	0	0
04/11/2020	243	22	0	124	8	0
09/12/2020	76	32	0	225	14	0
04/01/2021	158	79	0	228	10	0
01/02/2021	787	364	0	765	2	0
12/03/2021	576	283	1	1,236	62	0
01/04/2021	996	73	0	80	0	13
06/05/2021	88	3	0	16	1	0
08/06/2021	263	8	4	12	7	17
05/07/2021	407	12	0	7	4	10
09/08/2021	80	22	1	6	2	6
02/09/2021	35	3	0	11	0	11
06/10/2021	363	9	0	34	1	0

Month	Common guillemot	Razorbill	Atlantic puffin	Unidentified common guillemot/razorbill	Unidentified auk species	Unidentified auk/shearwater species
03/11/2021	51	6	0	37	0	0
02/12/2021	449	268	2	244	0	0
11/01/2022	846	266	0	241	3	0
09/02/2022	346	118	14	273	0	0

Table 1.10: Monthly breakdown of total raw abundance for other identified and unidentified species within the Mona Offshore Ornithology Array Area study.

Month	Black-backed gull species	Gull species	Large gull species	Small gull species	Skua species	Storm-petrel species	Tern species	Thrush species	Wader species
28/03/2020	0	0	0	0	0	0	0	0	0
17/04/2020	0	1	1	4	0	0	0	0	0
05/05/2020	0	0	0	0	1	1	0	0	11
08/06/2020	0	5	7	3	0	0	1	0	0
06/07/2020	0	0	0	0	0	0	0	0	0
11/08/2020	0	0	1	1	0	0	0	0	1
01/09/2020	0	2	0	1	0	0	0	0	0
14/10/2020	0	0	0	0	0	0	0	0	0
04/11/2020	1	0	0	1	0	0	0	42	0
09/12/2020	0	0	0	5	0	0	0	0	0
04/01/2021	0	1	1	0	0	0	0	0	0
01/02/2021	0	4	1	0	0	0	0	0	0

Month	Black-backed gull species	Gull species	Large gull species	Small gull species	Skua species	Storm-petrel species	Tern species	Thrush species	Wader species
12/03/2021	0	1	0	0	0	0	0	0	0
01/04/2021	0	0	0	0	0	0	0	0	0
06/05/2021	0	0	0	0	0	0	0	0	4
08/06/2021	0	0	1	0	0	0	0	0	0
05/07/2021	0	2	0	1	0	0	1	0	0
09/08/2021	0	1	0	0	0	0	0	0	4
02/09/2021	0	0	0	0	0	0	0	0	0
06/10/2021	0	0	0	1	0	0	0	0	0
03/11/2021	0	0	0	2	0	0	0	26	5
02/12/2021	0	0	8	0	0	0	0	0	0
11/01/2022	0	0	2	5	0	0	0	0	0
09/02/2022	0	12	2	1	0	0	0	0	0

1.3.6.3 There was a total of 11 broader groups (Table 1.11) 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: $\sum(\text{Proportion})_{ij} = \sum(\text{Unknown})_{ij} / \sum(\text{Known})_{ij}$.

Table 1.11: Unknown species groups apportioning to known species.

Unknown species group	Apportioned to known species
Large auk	Guillemot, razorbill
Auk species	Guillemot, razorbill, Atlantic puffin
Unidentified bird species	Guillemot, razorbill, Atlantic puffin, manx shearwater, fulmar, kittiwake, great-black backed gull, herring gull, common gull, little gull, lesser black-backed gull, black headed gull, common tern, Arctic tern, sandwich tern, Gannet, Arctic skua, great skua
Small gull species	Kittiwake, common gull, little gull, black headed gull
Auk/shearwater species	Guillemot, razorbill, Atlantic puffin, Manx shearwater
Black backed gull species	Great black-backed gull, lesser black-backed gull
Commic tern	Common tern, Arctic tern
Gull species	Kittiwake, great-black backed gull, herring gull, common gull, little gull, lesser black-backed gull, black headed gull
Skua species	Arctic skua, great skua
Tern species	Sandwich tern, Arctic tern, common tern
Large gull species	Great-black backed gull, herring gull, lesser black-backed gull

1.3.6.4 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 unapportion 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.

1.3.6.5 For example, assume a month has 1,200 common guillemot and razorbill combined, 200 of which are 'common guillemot/razorbill', 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 (180 to common guillemot and 20 to razorbill).

1.3.6.6 If the same month had a total of 1,700 auks, comprising the 1,200 birds mentioned above, plus 300 individuals of an unknown auk species (i.e. common guillemot, razorbill, or Atlantic puffin) and 200 Atlantic puffin, applying the formula again using only identified species this leads to a proportion of: 300 (unknown)/(900 common guillemot + 100 razorbill + 200 Atlantic puffin) = 0.25, or a correction factor of 1.25.

1.3.6.7 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 a correction factor of 1.45) for common guillemot and razorbill, and 0+0.25 for Atlantic puffin (a correction factor of 1.25). This results in 900*1.45=1,305 common guillemot, 100*1.45=145 razorbill, and 200*1.25=250 Atlantic puffin. Both the 'guillemot/razorbill' and 'auk species' categories have now been apportioned to known species, as 1,305+145+250=1,700.

1.3.6.8 This process is repeated for each of the eleven unknown groups (Table 1.12 to Table 1.14) resulting in unique apportioning factors for each species.

Table 1.12: Monthly apportioning values used for auk species and Manx shearwater to correct the relative abundances and densities for unidentified birds.

Month	Common guillemot	Razorbill	Atlantic puffin	Manx shearwater
28/03/2020	1.180	1.180	1.000	1.000
17/04/2020	1.098	1.098	1.000	1.000
05/05/2020	1.092	1.092	1.010	1.000
08/06/2020	1.419	1.419	1.025	1.000
06/07/2020	1.042	1.042	1.008	1.000
11/08/2020	1.008	1.008	1.004	1.000
01/09/2020	1.072	1.072	1.000	1.000
14/10/2020	1.027	1.027	1.000	1.000
04/11/2020	1.498	1.498	1.030	1.000
09/12/2020	3.213	3.213	1.130	1.000
04/01/2021	2.004	2.004	1.042	1.000
01/02/2021	1.666	1.666	1.002	1.000
12/03/2021	2.511	2.511	1.072	1.000
01/04/2021	1.088	1.088	1.013	1.013
06/05/2021	1.187	1.187	1.011	1.000
08/06/2021	1.081	1.081	1.036	1.011
05/07/2021	1.037	1.037	1.020	1.010
09/08/2021	1.106	1.106	1.047	1.028
02/09/2021	1.409	1.409	1.120	1.120
06/10/2021	1.094	1.094	1.003	1.000

Month	Common guillemot	Razorbill	Atlantic puffin	Manx shearwater
03/11/2021	1.655	1.655	1.006	1.006
02/12/2021	1.341	1.341	1.001	1.001
11/01/2022	1.221	1.221	1.004	1.001
09/02/2022	1.652	1.652	1.063	1.063

Table 1.13: Monthly apportioning values used for gull species, northern fulmar and northern gannet to correct the relative abundances and densities for unidentified birds.

Month	Black-headed gull	Common gull	Great black-backed gull	European herring gull	Black-legged kittiwake	Lesser black-backed gull	Little gull	Northern fulmar	Northern gannet
28/03/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
17/04/2020	1.081	1.081	1.516	1.516	1.081	1.516	1.081	1.000	1.000
05/05/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
08/06/2020	1.057	1.057	1.245	1.245	1.057	1.245	1.057	1.000	1.000
06/07/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
11/08/2020	1.045	1.045	1.091	1.091	1.045	1.091	1.045	1.000	1.000
01/09/2020	1.130	1.130	1.080	1.080	1.130	1.080	1.130	1.000	1.000
14/10/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
04/11/2020	1.006	1.006	1.000	1.000	1.006	1.000	1.006	1.000	1.000
09/12/2020	1.048	1.048	1.000	1.000	1.048	1.000	1.048	1.000	1.000
04/01/2021	1.007	1.007	1.174	1.174	1.007	1.174	1.007	1.000	1.000
01/02/2021	1.023	1.023	1.046	1.046	1.023	1.046	1.023	1.000	1.000

Month	Black-headed gull	Common gull	Great black-backed gull	European herring gull	Black-legged kittiwake	Lesser black-backed gull	Little gull	Northern fulmar	Northern gannet
12/03/2021	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.000	1.000
01/04/2021	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
06/05/2021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
08/06/2021	1.000	1.000	1.500	1.500	1.000	1.500	1.000	1.000	1.000
05/07/2021	1.011	1.011	1.007	1.007	1.011	1.007	1.011	1.000	1.000
09/08/2021	1.128	1.128	1.128	1.128	1.128	1.128	1.128	1.003	1.003
02/09/2021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
06/10/2021	1.045	1.045	1.000	1.000	1.045	1.000	1.045	1.000	1.000
03/11/2021	1.031	1.031	1.006	1.006	1.031	1.006	1.031	1.006	1.006
02/12/2021	1.001	1.001	5.001	5.001	1.001	5.001	1.001	1.001	1.001
11/01/2022	1.018	1.018	1.113	1.113	1.018	1.113	1.018	1.001	1.001
09/02/2022	1.097	1.097	1.144	1.144	1.097	1.144	1.097	1.063	1.063

Table 1.14: Monthly apportioning values used for all other species record to correct the relative abundances and densities for unidentified birds.

Month	Arctic skua	Great skua	Arctic tern	Common tern	Sandwich tern	Great cormorant	Black-tailed godwit	Red-throated diver	European shag
28/03/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
17/04/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
05/05/2020	2.000	2.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
08/06/2020	1.000	1.000	1.077	1.077	1.077	1.000	1.000	1.000	1.000

Month	Arctic skua	Great skua	Arctic tern	Common tern	Sandwich tern	Great cormorant	Black-tailed godwit	Red-throated diver	European shag
06/07/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
11/08/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
01/09/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
14/10/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
04/11/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
09/12/2020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
04/01/2021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
01/02/2021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
12/03/2021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
01/04/2021	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
06/05/2021	1.000	1.000	1.333	1.333	1.000	1.000	1.000	1.000	1.000
08/06/2021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
05/07/2021	1.000	1.000	1.167	1.167	1.167	1.000	1.000	1.000	1.000
09/08/2021	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.003
02/09/2021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
06/10/2021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
03/11/2021	1.006	1.006	1.006	1.006	1.006	1.006	1.006	1.006	1.006
02/12/2021	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
11/01/2022	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
09/02/2022	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063

1.3.7 Correction factors to account for availability bias

1.3.7.1 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 et al., 2010). 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.

1.3.7.2 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 recommendation, 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 spent under water per dive 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 very 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.

1.3.7.3 The correction factors applied to sitting common guillemot and razorbill, were based on the proportion of time spent underwater from Thaxter et al. (2010) and were refined following the method recommended by JNCC (2013) which excludes the percentage of birds in flight from the calculations. Proportion of time spent underwater were 23.75% and 17.4%, respectively for common guillemot and razorbill. For Atlantic puffin, a proportion of time spent underwater of 14.16% was used (Spencer, 2012).

1.3.7.4 Availability bias correction multiplication factors were calculated using the following formula: (Correction factor) = (1/(1-proportion(time spent underwater)), leading to correction factors of 1.311 for common guillemot, 1.211 for razorbill, and 1.165 for Atlantic puffin.

1.3.7.5 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. 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))).

1.3.7.6 For example, if it was estimated from the visible data (relative number) that there were 1,000 common 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.

1.3.8 Design-based and model-based estimates flying and sitting birds

1.3.8.1 For model and design-based estimates, the monthly mean densities of flying and sitting birds (and associated confidence intervals and coefficient of variations) have been generated from the bird behaviour observed during the monthly digital aerial survey of the Mona Offshore Ornithology Array Area study area. This has been done by apportioning the model-based and design-based estimates for all behaviour to birds flying and sitting based on the ratios recorded of birds sitting and birds in flight.

1.3.8.2 MRSea estimates for the Mona Array Area, and the Mona Array Area + 2 km can be found in section 1.4.2.

1.3.8.3 MRSea estimates for the Mona Array Area + 4 km and the Mona Offshore Ornithology Array Area study area can be found in Appendix B, while design-based estimates can be found in Appendix D.

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

1.4.1 Review of data sources and desk-based studies

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

1.4.1.1 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).

1.4.1.2 Analysis of European Seabird Survey at Sea surveys (ESAS) conducted in the Irish Sea from 1980 to 2003 was undertaken for 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 European 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.

1.4.1.3 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.

1.4.1.4 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 100 km 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.

1.4.1.5 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. 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; CMACS, 2014).

1.4.1.6 Foraging ranges of seabirds are species-specific and range from a few kilometres from the colonies (e.g. little tern) to over 1,000 km (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.

1.4.1.7 For the most widespread and abundant seabirds of the central Irish Sea (northern gannet, common guillemot, European herring gull, black-legged kittiwake, lesser black-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 1.15) were used.

Table 1.15: Mean-maximum foraging ranges with standard deviation (SD) for seabird species (Woodward *et al*., 2019) used to identify to SSSI and SPA colonies within individual species range. Sample sizes are shown in parentheses (i.e. no. of colonies sampled).

Species	Mean Max foraging range + SD
Arctic skua	Unknown
Arctic tern	25.7±14.8 (9)
Atlantic puffin	137.1±128.3 (7)
Black-headed gull	18.5 (1)
Black-legged kittiwake	156.1±144.5 (37)
Black-tailed godwit	Unknown
Common guillemot	(55.5±39.7). Discounting Fair Isle values (NatureScot, 2023). However, includes all Northern SPAs within 153.7 km (JNCC, 2023).
Common gull	50 (1)
Common tern	18.0±8.9 (16)
European shag	13.2±10.5 (17)
European herring gull	58.8±26.8 (10)

Species	Mean Max foraging range + SD
Great black-backed gull	73 (1)
Great cormorant	25.6±8.3 (4)
Great skua	443.3±487.9 (3)
Northern fulmar	542.3±657.9 (16)
Northern gannet	315.2±194.2 (21) for colonies without site specific maximum values. However, for Grassholm SPA and St Kilda SPA where site specific evidence exceeds this value (509.4 km), 516.7 km and 709 km were used respectively (NatureScot, 2023).
Lesser black-backed gull	127±109 (18)
Little gull	Unknown
Little tern	5 (1)
Manx shearwater	1,346.8±1,018.7 (6)
Razorbill	(73.8±48.4). Discounting Fair Isle values (NatureScot, 2023). However, it includes all Northern SPAs within 164.6 km (JNCC, 2023).
Red-throated diver	9 (1)
Roseate tern	12.6±10.6 (3)
Sandwich tern	34.3±23.2 (9)

1.4.1.8 The locations of the breeding sites and the latest colony counts were sourced from the JNCC Seabird Monitoring Programme (SMP) online database (JNCC, 2023).

1.4.1.9 In the Seabird Monitoring Programme (SMP) online database, the 'Master Site' can be made up of several sub-sites, which may sit within a designated area (e.g. SPA). Where a sub-site in the SMP was located within a designated area, the colony was associated with the regardless the site's designation for the species feature. A centroid was generated for each designated site and the distance to the Mona Array Area were calculated.

1.4.1.10 The list of SPAs within range of the Mona Array Area is shown in Table 1.16.

Table 1.16: SPA sites/colonies (qualifying as an individual species and/or assemblage of species) within individual species foraging range (mean-max foraging range + SD) from the Mona Array Area and the Mona Offshore Cable Corridor.

Site	Site code	Relevant qualifying features within mean maximum foraging range +1SD
Marine SPAs (designated for aggregations of feeding and rafting seabirds within the marine environment)		
Liverpool Bay/Bae Lerpwl SPA	UK9020294	Red-throated diver (non-breeding)
		Little gull (non-breeding)
		Common scoter (non-breeding)
		Little tern
		Common tern
		Waterbird assemblage (non-breeding) including the components:
		Great cormorant
		Black-headed gull
		Common gull
		Common eider
		Northern fulmar
		Great black-backed gull
		Great crested grebe
		Common guillemot
		Northern gannet
		Atlantic puffin
		European herring gull
		Lesser black-backed gull
		Black-legged kittiwake
		Great northern diver
		European shag
		Razorbill
		Velvet scoter
Irish Seafront SPA	UK9020328	Manx shearwater
Breeding seabird colony SPAs (designated for breeding seabirds)		
Ribble and Alt Estuaries SPA	UK9005103	Lesser black-backed gull
Bowland Fells	UK9005151	Lesser black-backed gull
Morecambe Bay and Duddon Estuary SPA	UK9020326	Lesser black-backed gull
		European herring gull
Aberdaron Coast and Bardsey Island SPA	UK9013121	Manx shearwater

Site	Site code	Relevant qualifying features within mean maximum foraging range +1SD
Lambay Island SPA	4069	Lesser black-backed gull
		Northern fulmar
		Black-legged kittiwake
		Razorbill
		Atlantic puffin
Howth Head Coast SPA	4113	Black-legged kittiwake
Ireland's Eye SPA	4117	Black-legged kittiwake
Wicklow Head SPA	4127	Black-legged kittiwake
Copeland Islands SPA	UK9020291	Manx shearwater
Ailsa Craig SPA	UK9003091	Northern gannet
		Black-legged kittiwake
		Lesser black-backed gull
Rathlin Island SPA	UK0030055	Black-legged kittiwake
		Seabird assemblage including the components:
		Lesser black-backed gull
		Atlantic puffin
Skomer, Skokholm and the Seas off Pembrokeshire SPA	UK9014051	Lesser black-backed gull Manx shearwater Atlantic puffin European storm petrel Seabird assemblage (breeding) including the components: Black-legged kittiwake
Grassholm SPA	UK9014041	Northern fulmar
		Northern gannet
Saltee Islands SPA	4002	Northern gannet
		Northern fulmar
		Black-legged kittiwake
		Atlantic puffin
North Colonsay and Western Cliffs SPA	UK9003171	Black-legged kittiwake
Helvick Head to Ballyquin SPA	4192	Black-legged kittiwake
Rum SPA	UK9001341	Manx shearwater
Shiant Isles SPA	UK9001041	Seabird assemblage including the components:
		Northern fulmar
Handa SPA	UK9001241	Seabird assemblage including the components:

Site	Site code	Relevant qualifying features within mean maximum foraging range +1SD
		Northern fulmar
St Kilda SPA	UK9001031	Northern gannet
		Northern fulmar
Cape Wrath SPA	UK9001231	Northern fulmar
Flannan Isles SPA	UK9001021	Northern fulmar
Blasket Islands SPA	4008	Manx shearwater
Deenish Island and Scariff Island SPA	4175	Northern fulmar
		Manx shearwater
Puffin Island SPA, Kerry	4003	Northern fulmar
Skelligs SPA	4007	Manx shearwater
		Northern fulmar
Cruagh Island SPA	4170	Manx shearwater

1.4.2 Species Accounts

European shag

Desk-based data

1.4.2.1 The European shag is a predominantly coastal seabird species that is found in inshore waters. It is largely restricted to certain regions and has a limited distribution. In the UK, the European shag is considered a red-listed species in the UK Birds of Conservation Concern 5 (Stanbury *et al*., 2021). The breeding population of European shag consists of approximately 17,500 pairs (Woodward *et al*., 2020), making up around 10% of the global breeding population (about 80% of these are located in Scotland), and an estimated 110,000 spend their winters in the UK (Austin *et al.*, 2023).

1.4.2.2 HiDef Aerial Survey Limited (2023) showed that non-breeding European shag presence within the Liverpool Bay/Bae Lerpwl SPA was generally sparse with a peak of 0.13 birds per km^2. Slightly higher concentrations of birds were observed in the southern part of the Liverpool Bay SPA. During the summer period, Bradbury *et al.* (2014) showed that they expanded their distribution further offshore, although the densities were comparatively lower (Figure 1.3).

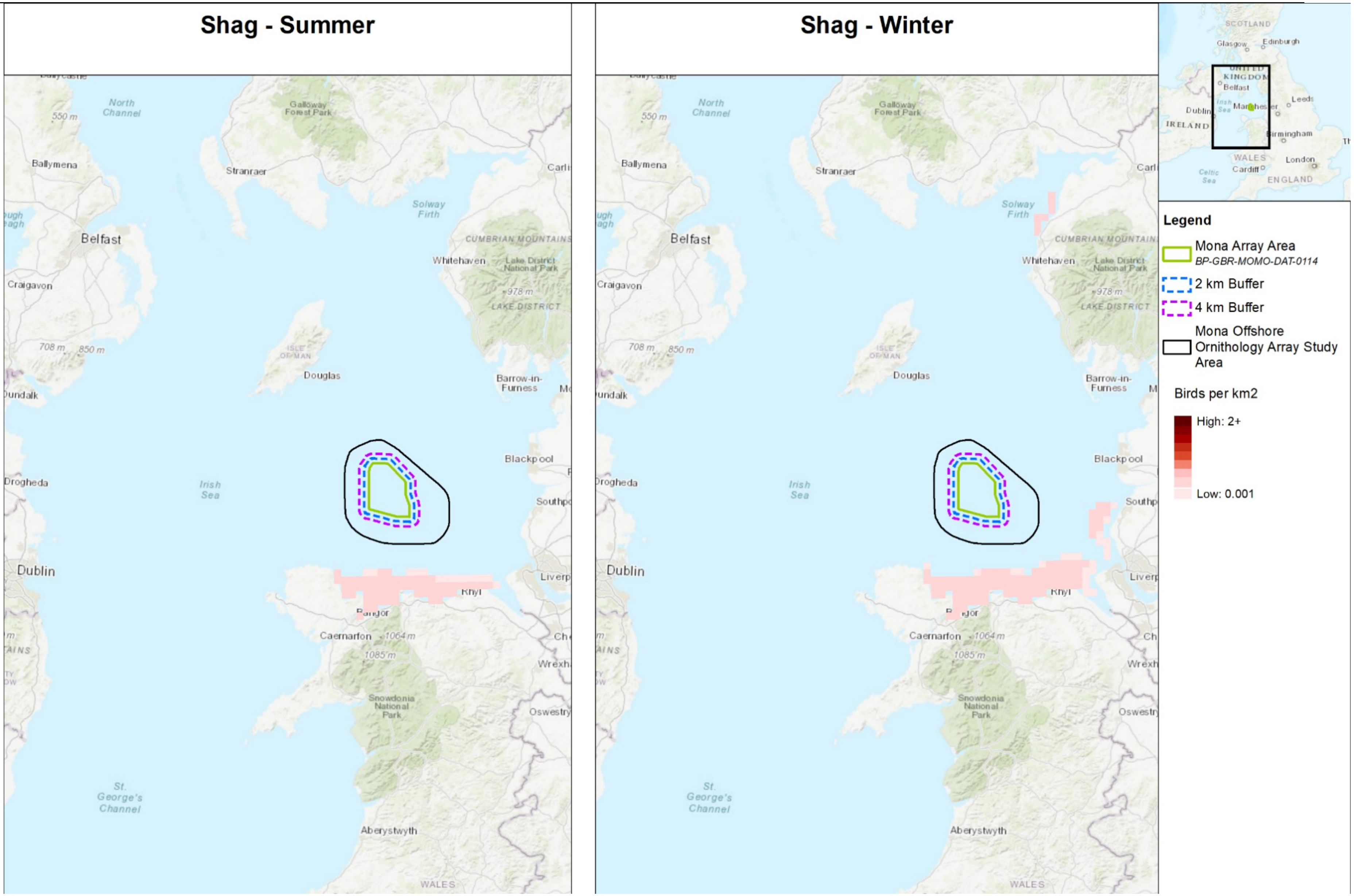

Figure 1.3: Spatial variation in predicted densities (animals per km^2) of European shag per season (data extracted from Bradbury *et al*. (2014)).

Telemetry data

1.4.2.3 There is a breeding colony of European shag present on Puffin Island, near to the Mona Offshore Ornithology Array Area study area. Inland census data collected by the staff on the island report 401 breeding pairs (Puffin Island Seabird Research 2010). Tracking data from Bird Life International confirms individuals from this colony forage close to the Mona Offshore Ornithology Array Area study area and travel through the Cable Corridor study area to reach their foraging grounds (Waggitt and Green 2022).

Site specific digital aerial survey results

1.4.2.4 During the digital aerial surveys of the Mona Offshore Ornithology Array Area Study Area, only two records of European shag were recorded in December 2021. This confirms the results of the desk-based data from HiDef Aerial Survey Limited (2023) and Bradbury *et al*. (2014), that European shag are near absent within the Mona Array Area and surrounding site (within 7 km to 16.5 km of the array area). Both birds were recorded flying.

1.4.2.5 Design-based abundance for European shag for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.17 and Table 1.18. It must be noted that no European shags were recorded in the Mona Array Area and the Mona Array Area + 2 km buffer. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.17: Design-based European shag 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Table 1.18: Design-based European shag 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Great cormorant

Desk-based data

1.4.2.6 Great cormorant are widespread in the UK and present on all coastlines, where they nest on rocky islands and cliffs, and are increasingly found inland. Breeding pairs will return to the same nesting site every year. Great Cormorant are large diving birds that feed on fish, which in the past led them to become persecuted due to their effects on fishing industries. Numbers have since increased and stabilised, with the UK population estimated at 8,884 breeding pairs (JNCC, 2021). The wintering population is over 64,500.

1.4.2.7 Data published in 2015 estimated the average peak numbers of great cormorants in the Liverpool Bay/Bae Lerpwl SPA between 2004 to 2011 to be 732 individuals (Lawson *et al*., 2015), making this population of national importance (as the local population >1% of GB population, i.e., 350 ind.). However, this was likely to be an underestimate since data was collected from aerial surveys (recording birds on the sea surface) whist cormorants spend much of their time below water diving for fish or resting on land or structures. Puffin Island SPA (Wales), near to the Mona Offshore Ornithology Array Area study area holds the largest UK population of great cormorant, with 464 breeding pairs present (Puffin Island Seabird Research 2010).

1.4.2.8 Data from HiDef Aerial Survey Limited (2023) shows great cormorants are present within the Liverpool Bay/Bae Lerpwl SPA area during the wintering period in densities of up to 1.87 birds per km^2. Bradbury *et al*. (2014) showed that during the summer period great cormorant are further restricted to the shoreline (Figure 1.4).

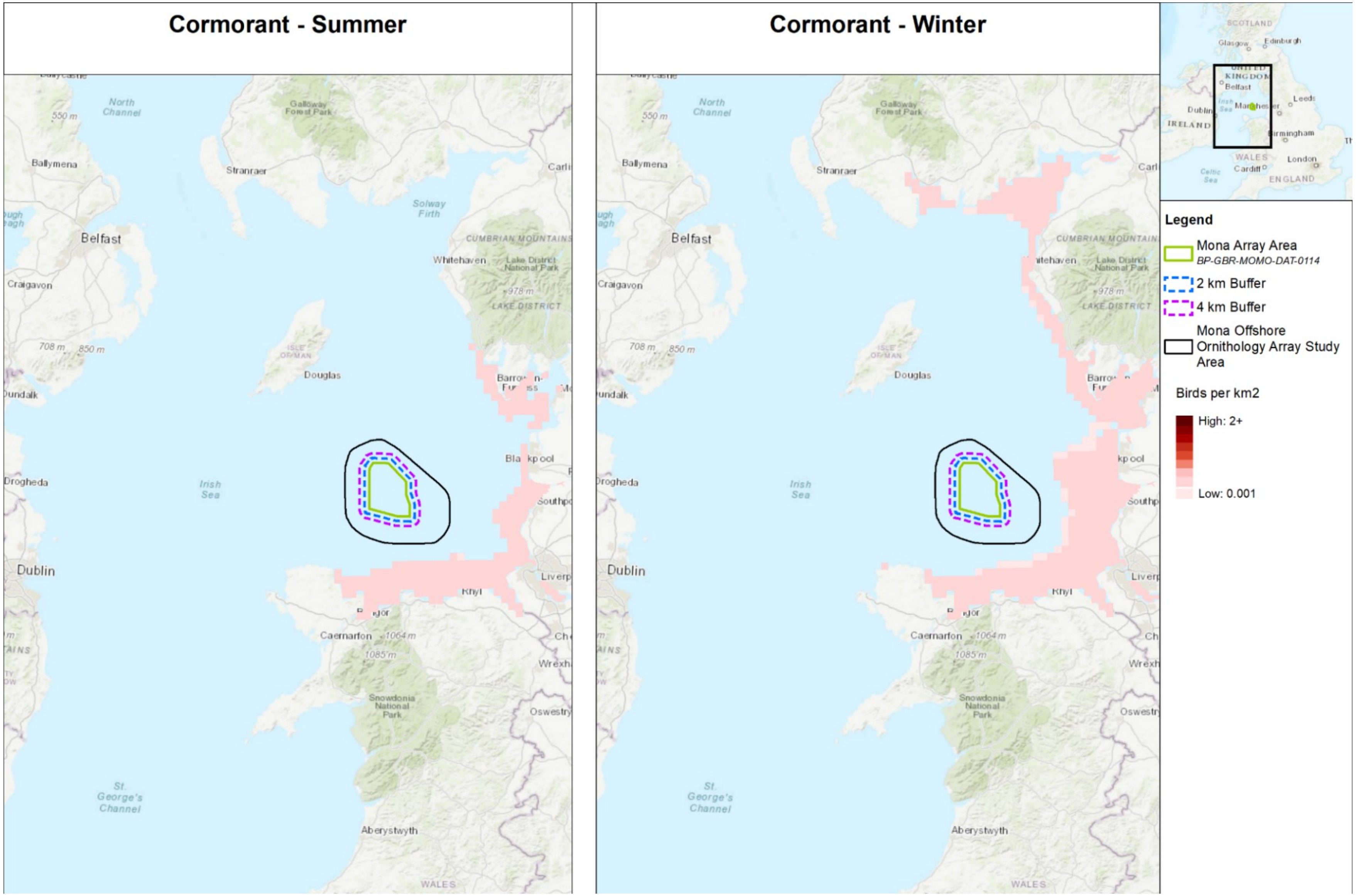

Figure 1.4: Spatial variation in predicted densities (animals per km^2) of great cormorant per season (data extracted from Bradbury *et al*. (2014)).

Telemetry data

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

Site specific digital aerial survey results

1.4.2.10 During digital aerial surveys of the Mona Offshore Ornithology Array Area Study Area, only one record of great cormorant was made in April 2021. This confirms the results of the desk-based data from HiDef Aerial Survey Limited (2023) and Bradbury *et al*. (2014), that great cormorant are near absent within the Mona Array Area and surrounding site (within 7 km to 16.5 km of the array area).

1.4.2.11 Design-based abundance for great cormorant for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.19 and Table 1.20. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.19: Design-based great cormorant 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Table 1.20: Design-based great cormorant 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) in the Mona Array Area + 2km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	0.00%
2	Apr	6 (0 to 20)	0.01 (0.04 to 0.04)	6 (0 to 20)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.17	97.95%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Red-throated diver

Desk-based data

1.4.2.12 The UK winter population of red-throated diver is 22,000 individuals (2011 to 2015) (Austin *et al.,* 2023). The species is listed on Annex I of the European Commission Birds Directive and is subject to special conservation measures such as protection within SPAs. Wintering birds can be seen along the entire UK coastline, with the highest numbers present along the east coast of the UK. Population threats include fishing net entanglement, pollution including oil spills, and habitat degradation. Like common scoter, red-throated diver are highly vulnerable to anthropogenic disturbance. Red-throated diver are highly sensitive to anthropogenic disturbance (Garthe and Hüppop 2004).

1.4.2.13 Red-throated diver are a qualifying feature of the Liverpool Bay/Bae Lerpwl SPA with a nationally important population of 1,171 individuals (Lawson *et al*., 2016). Records of red-throated diver in the Liverpool Bay/Bae Lerpwl SPA show that density varies between zero and 1.22 birds per km^2 during the winter months (HiDef Aerial Survey Limited, 2023), with consistent high densities occurring along the shoreline, with presence decreasing further ashore. Studies show that red-throated diver typically forage in waters of less than 20 m depth (Duckworth *et al.*, 2021). Bradbury *et al*. (2014) showed that during the winter period red-throated diver are found in the inshore areas of the Liverpool Bay/Bae Lerpwl SPA (Figure 1.5).

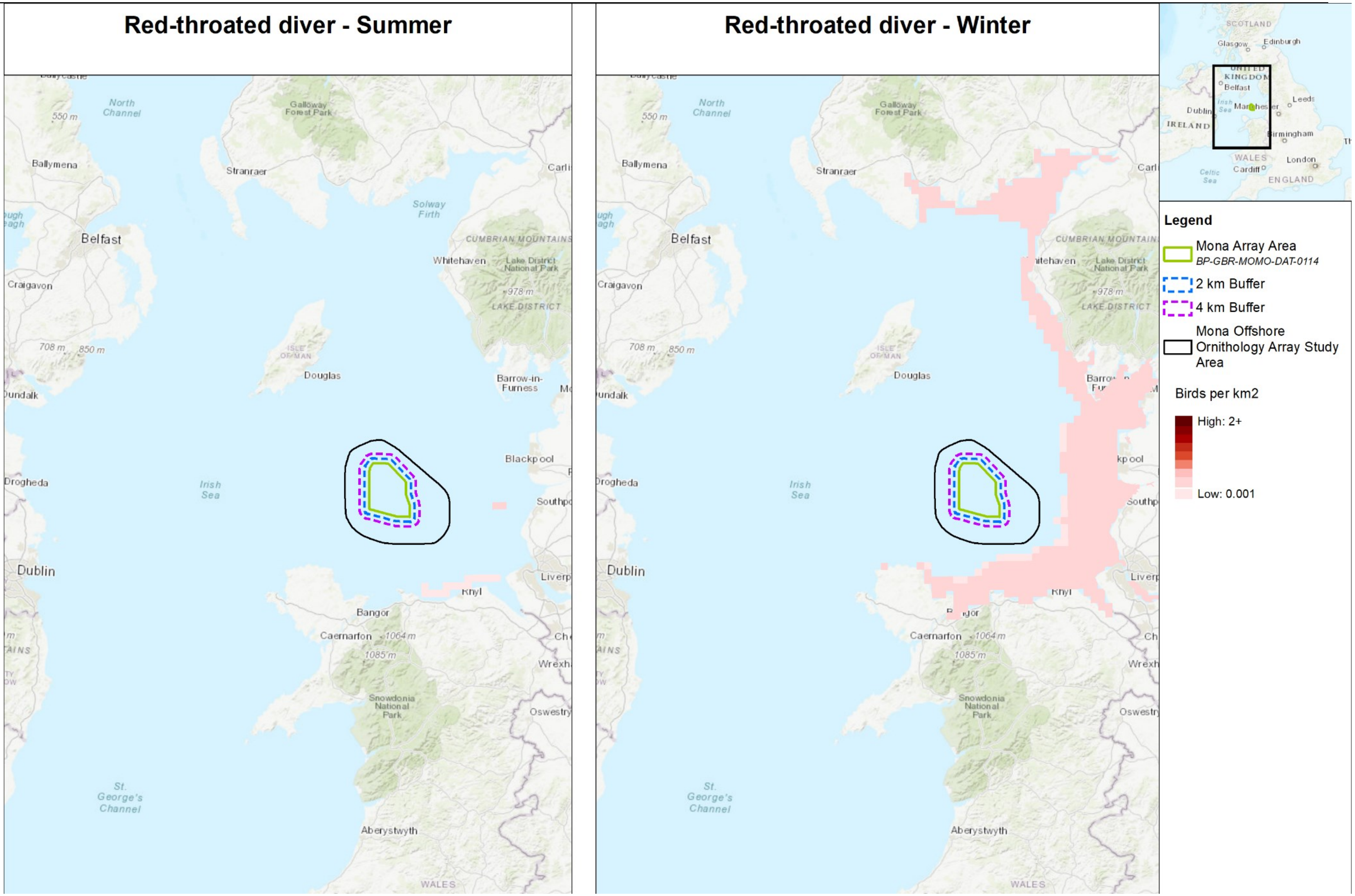

Figure 1.5: Spatial variation in predicted densities (animals per km^2) of red-throated diver per season (data extracted from Bradbury *et al*. (2014)).

Telemetry data

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

Site specific digital aerial survey results

1.4.2.15 During digital aerial surveys of the Mona Offshore Ornithology Array Area Study Area, only four records of red-throated diver were made in August 2020, October 2020, November 2020 and December 2021. This confirms the results of the desk-based data from Bradbury *et al*. (2014), that red-throated diver are near absent within the Mona Array Area and surrounding site (within 7 km to 16.5 km of the Mona Array Area). Three birds were recorded sitting, while one red-throated diver was observed in flight.

1.4.2.16 Design-based abundance for red-throated diver for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.21 and Table 1.22. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.21: Design-based red-throated diver 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Table 1.22: Design-based red-throated diver 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) in the Mona Array Area + 2km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Common guillemot

Desk-based data

1.4.2.17 Common guillemot are one of the most abundant seabird species in the northern hemisphere. The UK holds a population of 1,416,300 individuals, representing a third of the North Atlantic population and 12.9% of the world population (Mitchell *et al.,* 2004). Common guillemot are included in the amber list of Birds of Conservation Concern 5 (Stanbury et al., 2021). In the UK, common guillemot breed along much of the coastline where there is suitable cliff habitat for nesting.

1.4.2.18 Common guillemot are present within the Liverpool Bay/Bae Lerpwl SPA with an estimated population of 1,470 individuals (Lawson *et al*. 2016). There is a breeding colony of 2,249 pairs on Puffin Island (Puffin Island Seabird Research 2010). The species form dense colonies and nest on the ledges of high cliffs. Common guillemot forage at sea and can dive up to 138 m.

1.4.2.19 HiDef Aerial Survey Limited (2023) found the density of common guillemots to vary between years in the non-breeding period, with densities ranging from 0.56 to 6.25 birds per km^2 in the Liverpool Bay SPA. 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 1.6).

1.4.2.20 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 1.7). 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.

1.4.2.21 It is apparent from Bradbury *et al*. (2014) and Waggitt *et al*. (2020) 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.

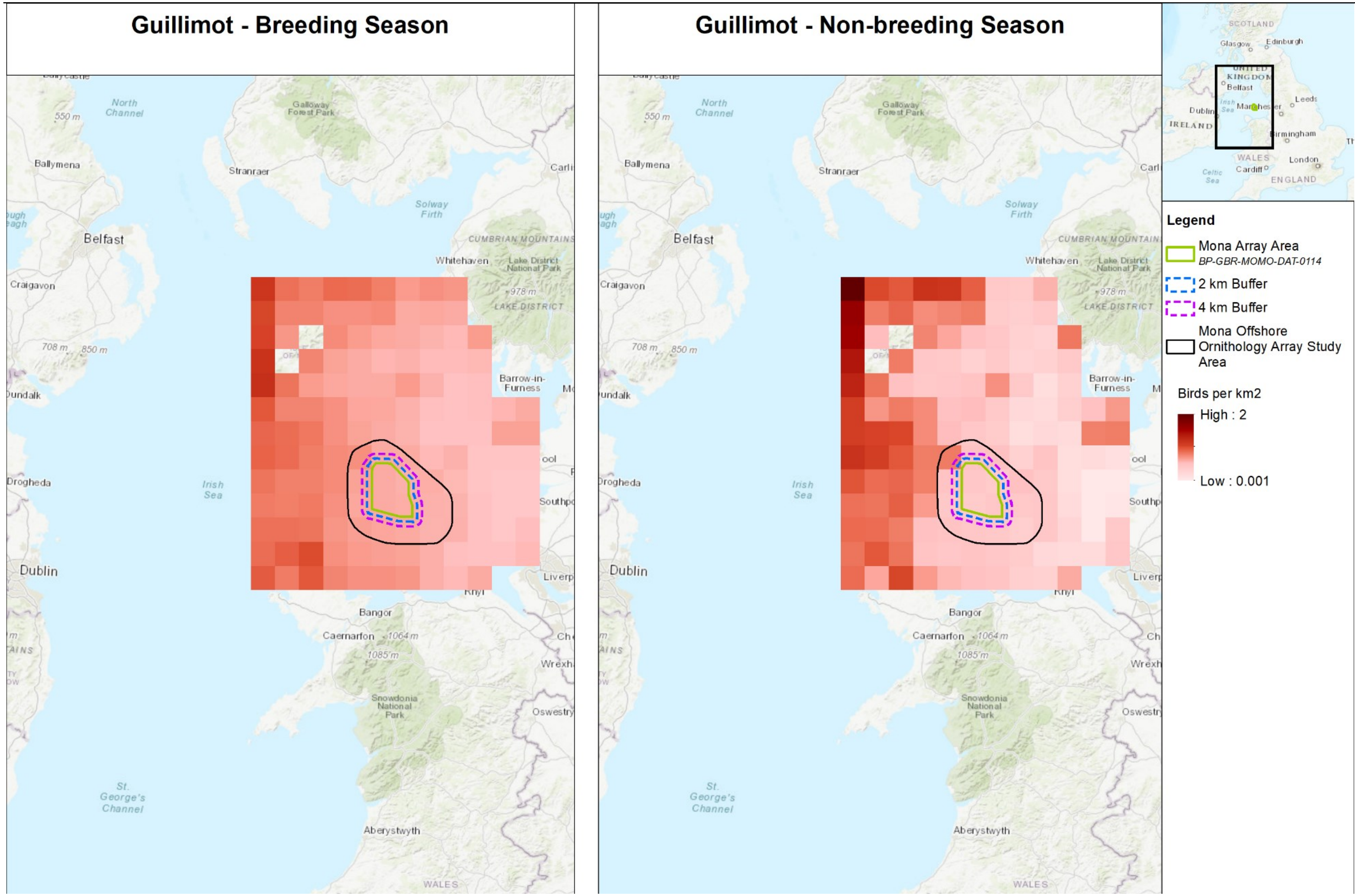

Figure 1.6: Spatial variation in predicted densities (animals per km^2) of common guillemot per season (data extracted from Waggitt *et al.* (2020)).

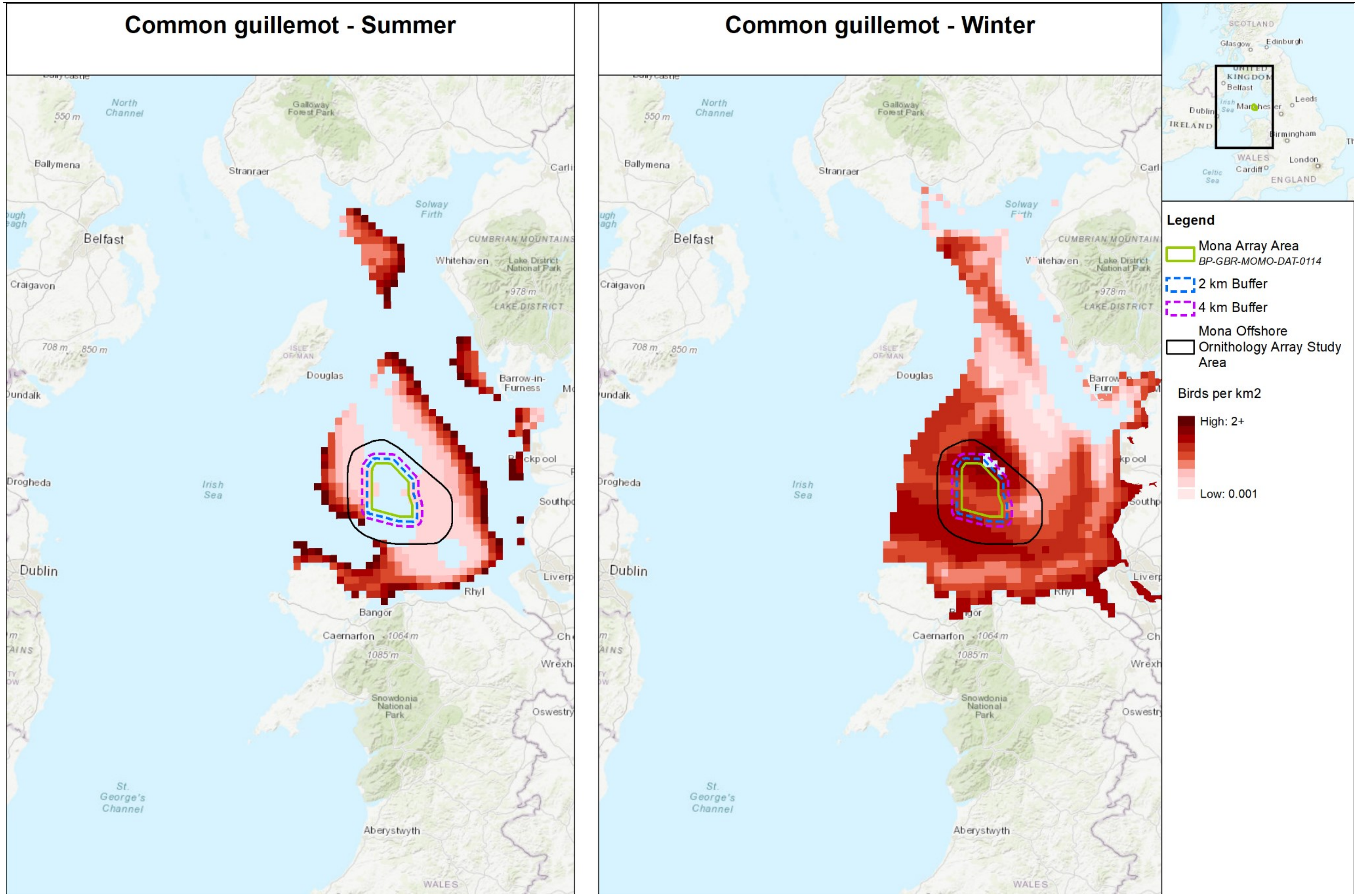

Figure 1.7: Spatial variation in predicted densities (animals per km^2) of common guillemot per season (data extracted from Bradbury *et al*. (2014)).

Telemetry Data

1.4.2.22 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.

Site specific digital aerial survey results

1.4.2.23 Common guillemot was the most abundant seabird species recorded during the digital aerial surveys, with a total raw count of 8,805 observations across all surveys in the whole survey area consisting of the array area plus a buffer zone extending between 7 km to 16.5 km of the Mona Array Area. They were predominantly observed sitting on the water, with only an average 3.13% of birds recorded in flight (Table 1.23).

Table 1.23: Common guillemot behaviours in birds observed during the surveys.

Survey	Flying	Sitting	Total	% Flying
2020-03	32	1,774	1,806	1.77
2020-04	16	230	246	6.50
2020-05	5	71	76	6.58
2020-06	23	239	262	8.78
2020-07	6	195	201	2.99
2020-08	0	227	227	0.00
2020-09	0	119	119	0.00
2020-10	1	103	104	0.96
2020-11	12	231	243	4.94
2020-12	1	75	76	1.32
2021-01	6	152	158	3.80
2021-02	28	759	787	3.56
2021-03	8	568	576	1.39
2021-04	54	942	996	5.42
2021-05	8	80	88	9.09
2021-06	9	254	263	3.42
2021-07	2	405	407	0.49
2021-08	0	80	80	0.00
2021-09	0	35	35	0.00
2021-10	4	359	363	1.10
2021-11	4	47	51	7.84
2021-12	12	437	449	2.67

Survey	Flying	Sitting	Total	% Flying
2022-01	11	835	846	1.30
2022-02	4	342	346	1.16

1.4.2.24 Common guillemot distribution was heterogeneous depending on year and month. Whilst birds were widespread across the Mona Offshore Ornithology Array Area study are 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 58 birds per km^2 were recorded (Figure 1.8). Upper and Lower confidence interval spatial distribution maps for common guillemot are provided in Appendix F.

1.4.2.25 Within the Mona Array Area plus 2 km, the highest estimates were recorded in March in Year 1 with 5,739 (95% CI range: 4,895 to 6,657;Table 1.24) Numbers remained high in February 2021 (Year 2) with 4,415 individuals (95% CI range: 3,738 to 5,201). 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.

1.4.2.26 When comparing the sum of all behaviour, density estimates were similar between design-based and MRSea predictions in majority of months. Estimates (both MRSea and design-based) for each behaviour (sitting, flying, and all behaviour) are given for the Mona Array Area and the Mona Array Area + 2 km (Table 1.24 to Table 1.29).

1.4.2.27 MRSea estimates for the Mona Array Area + 4 km and the Mona Offshore Ornithology Array Area study area can be found in Appendix C, while design-based estimates can be found in Appendix D.

1.4.2.28 During the breeding season, Waggit *et al.* (2020) 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.

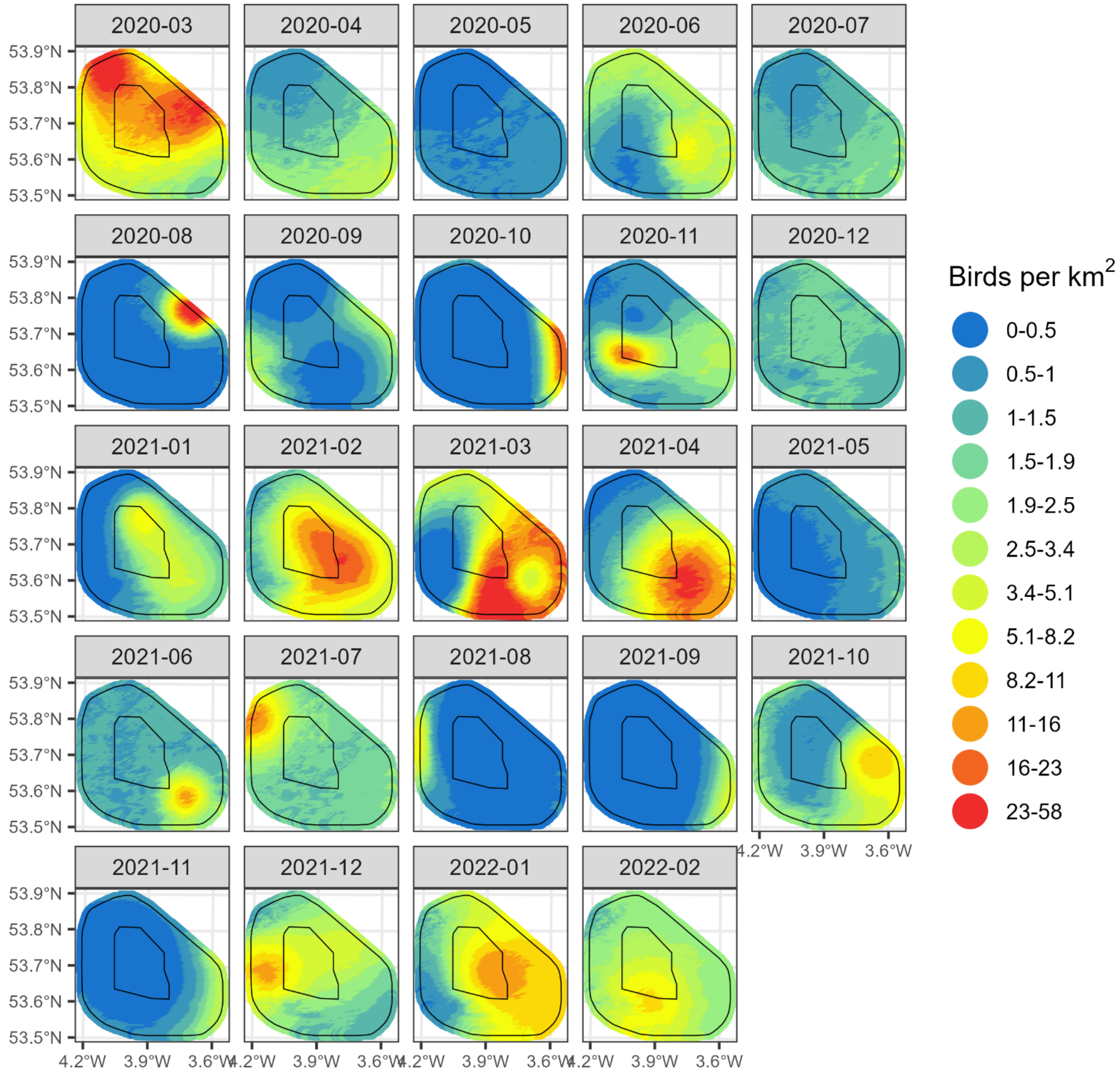

Figure 1.8: Common guillemot monthly densities (birds per km²) and raw counts. Estimates are based on the MRSea model outputs.

Table 1.24: Common guillemot (all behaviour) design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
Year	Month	Pop	D	SD	CV	Pop	D	SD	CV
1	Mar	3,791 (3,236 to 4,396)	12.65 (10.80 to 14.67)	295.95	7.81%	4,016 (3,259 to 5,056)	13.40 (5.38 to 16.87)	296.04	11.36%
1	Apr	337 (242 to 443)	1.12 (0.81 to 1.48)	51.21	15.20%	400 (274 to 529)	1.34 (0.49 to 1.76)	46.94	16.64%
1	May	103 (59 to 164)	0.34 (0.20 to 0.55)	26.75	26.04%	54 (22 to 96)	0.18 (0.04 to 0.32)	13.95	36.39%
1	Jun	428 (289 to 598)	1.43 (0.96 to 2.00)	78.92	18.44%	497 (303 to 716)	1.66 (0.42 to 2.39)	58.48	21.44%
1	Jul	283 (194 to 392)	0.94 (0.65 to 1.31)	50.39	17.81%	216 (111 to 321)	0.72 (0.21 to 1.07)	40.08	25.15%
1	Aug	117 (70 to 181)	0.39 (0.23 to 0.60)	28.19	24.07%	163 (70 to 263)	0.54 (0.13 to 0.88)	38.29	31.00%
1	Sep	142 (95 to 205)	0.47 (0.32 to 0.68)	28.20	19.87%	105 (17 to 208)	0.35 (0.03 to 0.69)	36.83	49.19%
1	Oct	12 (1 to 74)	0.04 (0.00 to 0.25)	18.80	150.61%	9 (0 to 26)	0.03 (0.00 to 0.09)	6.44	99.12%
1	Nov	691 (468 to 965)	2.31 (1.56 to 3.22)	126.82	18.34%	713 (481 to 943)	2.38 (0.63 to 3.15)	60.92	16.59%
1	Dec	434 (316 to 567)	1.45 (1.05 to 1.89)	64.15	14.78%	593 (351 to 846)	1.98 (0.21 to 2.82)	30.32	21.47%
1	Jan	858 (584 to 1,151)	2.86 (1.95 to 3.84)	144.56	16.85%	925 (632 to 1,236)	3.09 (0.62 to 4.12)	60.07	16.92%
1	Feb	3,159 (2,669 to 3,730)	10.54 (8.90 to 12.44)	270.68	8.57%	3,545 (2,923 to 4,083)	11.82 (3.43 to 13.62)	137.15	8.38%
2	Mar	1,630 (1,174 to 2,163)	5.44 (3.92 to 7.22)	252.48	15.49%	1,489 (1,069 to 1,970)	4.97 (0.83 to 6.57)	70.45	15.53%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
2	Apr	1,152 (962 to 1,360)	3.84 (3.21 to 4.54)	101.57	8.82%	1,920 (1,417 to 2,452)	6.41 (2.56 to 8.18)	190.66	13.98%
2	May	130 (75 to 200)	0.43 (0.25 to 0.67)	31.95	24.51%	131 (69 to 208)	0.44 (0.12 to 0.69)	23.44	27.28%
2	Jun	287 (211 to 379)	0.96 (0.70 to 1.26)	42.80	14.90%	230 (136 to 322)	0.77 (0.25 to 1.07)	34.56	21.09%
2	Jul	523 (414 to 641)	1.74 (1.38 to 2.14)	57.76	11.05%	656 (445 to 862)	2.19 (0.83 to 2.87)	79.98	16.55%
2	Aug	24 (7 to 59)	0.08 (0.02 to 0.20)	13.17	55.41%	46 (0 to 95)	0.15 (0.00 to 0.32)	19.06	60.78%
2	Sep	8 (1 to 24)	0.03 (0.00 to 0.08)	5.90	77.25%	37 (0 to 74)	0.12 (0.00 to 0.25)	11.43	57.56%
2	Oct	232 (162 to 318)	0.77 (0.54 to 1.06)	39.80	17.15%	249 (157 to 345)	0.83 (0.28 to 1.15)	34.89	20.04%
2	Nov	22 (5 to 54)	0.07 (0.02 to 0.18)	12.45	57.23%	55 (0 to 117)	0.18 (0.00 to 0.39)	15.57	60.06%
2	Dec	1,193 (1,000 to 1,401)	3.98 (3.34 to 4.67)	102.16	8.56%	1,324 (1,057 to 1,592)	4.42 (1.54 to 5.31)	79.07	10.44%
2	Jan	2,215 (1,825 to 2,630)	7.39 (6.09 to 8.77)	205.41	9.27%	2,383 (2,004 to 2,737)	7.95 (3.19 to 9.13)	119.01	7.97%
2	Feb	1,097 (907 to 1,308)	3.66 (3.03 to 4.36)	102.26	9.32%	1,465 (1,114 to 1,885)	4.89 (1.31 to 6.29)	93.68	13.81%

Table 1.25: Common guillemot (sitting) design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	3,724 (3,179 to 4,318)	12.42 (10.60 to 14.41)	3,961 (3,215 to 4,987)	13.21 (10.73 to 16.64)
1	Apr	315 (226 to 414)	1.05 (0.75 to 1.38)	380 (261 to 502)	1.27 (0.87 to 1.67)
1	May	96 (55 to 153)	0.32 (0.18 to 0.51)	51 (21 to 91)	0.17 (0.07 to 0.31)
1	Jun	390 (263 to 546)	1.30 (0.88 to 1.82)	463 (282 to 667)	1.54 (0.94 to 2.23)
1	Jul	274 (188 to 380)	0.92 (0.63 to 1.27)	211 (108 to 314)	0.70 (0.36 to 1.05)
1	Aug	117 (70 to 181)	0.39 (0.23 to 0.60)	163 (70 to 263)	0.54 (0.23 to 0.88)
1	Sep	142 (95 to 205)	0.47 (0.32 to 0.68)	105 (17 to 208)	0.35 (0.06 to 0.69)
1	Oct	12 (1 to 73)	0.04 (0.00 to 0.25)	9 (0 to 26)	0.03 (0.00 to 0.09)
1	Nov	657 (445 to 918)	2.19 (1.48 to 3.06)	686 (463 to 907)	2.29 (1.54 to 3.03)
1	Dec	428 (312 to 560)	1.43 (1.04 to 1.87)	587 (348 to 837)	1.96 (1.16 to 2.79)
1	Jan	825 (562 to 1,107)	2.75 (1.87 to 3.69)	898 (613 to 1,200)	3.00 (2.05 to 4.00)
1	Feb	3,047 (2,574 to 3,598)	10.16 (8.59 to 12.00)	3,448 (2,843 to 3,971)	11.50 (9.48 to 13.25)
2	Mar	1,607 (1,157 to 2,133)	5.36 (3.86 to 7.12)	1,473 (1,058 to 1,949)	4.91 (3.53 to 6.50)
2	Apr	1,090 (910 to 1,286)	3.63 (3.03 to 4.29)	1,840 (1,357 to 2,349)	6.14 (4.53 to 7.84)
2	May	118 (68 to 182)	0.40 (0.23 to 0.61)	122 (64 to 193)	0.41 (0.21 to 0.64)
2	Jun	278 (204 to 366)	0.93 (0.68 to 1.22)	224 (133 to 314)	0.75 (0.44 to 1.05)
2	Jul	520 (412 to 638)	1.74 (1.38 to 2.13)	654 (444 to 858)	2.18 (1.48 to 2.86)
2	Aug	24 (7 to 59)	0.08 (0.02 to 0.20)	46 (0 to 95)	0.15 (0.00 to 0.32)
2	Sep	8 (1 to 24)	0.03 (0.00 to 0.08)	37 (0 to 74)	0.12 (0.00 to 0.25)
2	Oct	229 (160 to 315)	0.77 (0.53 to 1.05)	247 (156 to 342)	0.82 (0.52 to 1.14)
2	Nov	20 (5 to 50)	0.07 (0.02 to 0.17)	52 (0 to 110)	0.17 (0.00 to 0.37)
2	Dec	1,161 (974 to 1,363)	3.87 (3.25 to 4.55)	1,297 (1,035 to 1,559)	4.33 (3.45 to 5.20)

		MRSea estimates		Design-based estimates	
2	Jan	2,186 (1,801 to 2,596)	7.29 (6.01 to 8.66)	2,359 (1,984 to 2,709)	7.87 (6.62 to 9.04)
2	Feb	1,084 (897 to 1,293)	3.62 (2.99 to 4.31)	1,452 (1,104 to 1,868)	4.84 (3.68 to 6.23)

Table 1.26: Common guillemot (flying) design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	67 (57 to 78)	0.22 (0.19 to 0.08)	54 (44 to 69)	0.18 (0.15 to 0.23)
1	Apr	22 (16 to 29)	0.07 (0.05 to 0.15)	20 (14 to 27)	0.07 (0.05 to 0.09)
1	May	7 (4 to 11)	0.02 (0.01 to 0.26)	3 (1 to 5)	0.01 (0.00 to 0.02)
1	Jun	38 (25 to 53)	0.13 (0.08 to 0.18)	34 (21 to 49)	0.11 (0.07 to 0.16)
1	Jul	8 (6 to 12)	0.03 (0.02 to 0.18)	5 (3 to 7)	0.02 (0.01 to 0.02)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.24)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.20)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 1)	0.00 (0.00 to 1.51)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	34 (23 to 48)	0.11 (0.08 to 0.18)	27 (18 to 36)	0.09 (0.06 to 0.12)
1	Dec	6 (4 to 7)	0.02 (0.01 to 0.15)	6 (4 to 9)	0.02 (0.01 to 0.03)
1	Jan	33 (22 to 44)	0.11 (0.07 to 0.17)	27 (18 to 36)	0.09 (0.06 to 0.12)
1	Feb	112 (95 to 133)	0.37 (0.32 to 0.09)	97 (80 to 112)	0.32 (0.27 to 0.37)
2	Mar	23 (16 to 30)	0.08 (0.05 to 0.15)	16 (11 to 21)	0.05 (0.04 to 0.07)
2	Apr	62 (52 to 74)	0.21 (0.17 to 0.09)	80 (59 to 103)	0.27 (0.20 to 0.34)
2	May	12 (7 to 18)	0.04 (0.02 to 0.25)	9 (5 to 15)	0.03 (0.02 to 0.05)
2	Jun	10 (7 to 13)	0.03 (0.02 to 0.15)	6 (4 to 8)	0.02 (0.01 to 0.03)
2	Jul	3 (2 to 3)	0.01 (0.01 to 0.11)	2 (2 to 3)	0.01 (0.01 to 0.01)

		MRSea estimates		Design-based estimates	
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.55)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.77)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	3 (2 to 4)	0.01 (0.01 to 0.17)	2 (1 to 3)	0.01 (0.00 to 0.01)
2	Nov	2 (0 to 4)	0.01 (0.00 to 0.57)	3 (0 to 7)	0.01 (0.00 to 0.02)
2	Dec	32 (27 to 37)	0.11 (0.09 to 0.09)	27 (22 to 33)	0.09 (0.07 to 0.11)
2	Jan	29 (24 to 34)	0.10 (0.08 to 0.09)	24 (20 to 27)	0.08 (0.07 to 0.09)
2	Feb	13 (10 to 15)	0.04 (0.03 to 0.09)	13 (10 to 17)	0.04 (0.03 to 0.06)

Table 1.27: Common guillemot (all behaviour) design-based and MRSea population estimates in the Mona Array Area + 2 km buffer.

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	5,739 (4,895 to 6,657)	12.77 (10.89 to 14.81)	449.51	7.83%	6,825 (5,858 to 8,043)	15.19 (6.45 to 17.90)	369.61	8.34%
1	Apr	519 (375 to 683)	1.16 (0.83 to 1.52)	78.59	15.14%	620 (462 to 791)	1.38 (0.55 to 1.76)	61.36	14.03%
1	May	154 (88 to 247)	0.34 (0.20 to 0.55)	40.62	26.45%	77 (37 to 124)	0.17 (0.04 to 0.28)	16.55	30.20%
1	Jun	713 (477 to 1,000)	1.59 (1.06 to 2.23)	133.54	18.73%	777 (534 to 1,025)	1.73 (0.50 to 2.28)	69.71	16.34%
1	Jul	436 (301 to 601)	0.97 (0.67 to 1.34)	76.60	17.57%	322 (192 to 472)	0.72 (0.24 to 1.05)	52.90	22.26%
1	Aug	200 (121 to 306)	0.44 (0.27 to 0.68)	47.29	23.69%	223 (121 to 340)	0.50 (0.16 to 0.76)	43.10	25.53%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
1	Sep	215 (144 to 313)	0.48 (0.32 to 0.70)	42.93	19.97%	141 (43 to 253)	0.31 (0.05 to 0.56)	38.85	38.70%
1	Oct	20 (1 to 124)	0.05 (0.00 to 0.28)	31.31	153.74%	26 (0 to 52)	0.06 (0.00 to 0.12)	10.65	54.33%
1	Nov	1,171 (815 to 1,596)	2.61 (1.81 to 3.55)	199.26	17.01%	1,613 (1,229 to 2,002)	3.59 (1.07 to 4.46)	103.72	12.49%
1	Dec	642 (466 to 839)	1.43 (1.04 to 1.87)	95.01	14.79%	807 (514 to 1,085)	1.80 (0.21 to 2.42)	34.63	18.02%
1	Jan	1,162 (791 to 1,569)	2.59 (1.76 to 3.49)	198.40	17.07%	1,305 (972 to 1,693)	2.90 (0.63 to 3.77)	71.09	14.19%
1	Feb	4,415 (3,738 to 5,201)	9.82 (8.32 to 11.57)	373.12	8.45%	5,115 (4,366 to 5,765)	11.38 (3.42 to 12.83)	167.68	7.10%
2	Mar	2,702 (1,953 to 3,570)	6.01 (4.35 to 7.94)	412.45	15.26%	2,272 (1,680 to 2,826)	5.06 (0.87 to 6.29)	89.32	12.90%
2	Apr	1,919 (1,605 to 2,261)	4.27 (3.57 to 5.03)	167.50	8.73%	2,925 (2,336 to 3,533)	6.51 (2.82 to 7.86)	222.09	10.69%
2	May	203 (118 to 309)	0.45 (0.26 to 0.69)	48.83	24.09%	230 (136 to 316)	0.51 (0.15 to 0.70)	30.81	20.42%
2	Jun	458 (338 to 599)	1.02 (0.75 to 1.33)	66.62	14.55%	328 (212 to 447)	0.73 (0.26 to 0.99)	42.92	18.40%
2	Jul	836 (664 to 1,026)	1.86 (1.48 to 2.28)	92.56	11.07%	956 (678 to 1,230)	2.13 (0.85 to 2.74)	105.20	14.95%
2	Aug	50 (18 to 113)	0.11 (0.04 to 0.25)	24.11	48.08%	110 (27 to 189)	0.25 (0.03 to 0.42)	30.17	39.62%
2	Sep	14 (3 to 44)	0.03 (0.01 to 0.10)	10.48	72.77%	49 (12 to 97)	0.11 (0.01 to 0.22)	13.18	50.08%
2	Oct	408 (291 to 552)	0.91 (0.65 to 1.23)	66.60	16.34%	371 (236 to 490)	0.83 (0.28 to 1.09)	45.02	17.36%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
2	Nov	41 (12 to 98)	0.09 (0.03 to 0.22)	21.93	52.88%	55 (0 to 117)	0.12 (0.00 to 0.26)	15.46	59.93%
2	Dec	1,763 (1,464 to 2,091)	3.92 (3.26 to 4.65)	159.85	9.07%	1,848 (1,503 to 2,168)	4.11 (1.46 to 4.83)	95.69	9.05%
2	Jan	3,097 (2,565 to 3,665)	6.89 (5.71 to 8.16)	280.61	9.06%	3,575 (3,103 to 4,018)	7.96 (3.30 to 8.94)	147.82	6.60%
2	Feb	1,648 (1,352 to 1,978)	3.67 (3.01 to 4.40)	159.85	9.70%	1,931 (1,482 to 2,342)	4.30 (1.16 to 5.21)	101.96	11.41%

Table 1.28: Common guillemot (sitting) design-based and MRSea population estimates for the Mona Array Area + 2 km buffer.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	5,637 (4,808 to 6,539)	12.55 (10.70 to 14.55)	6,733 (5,779 to 7,934)	14.98 (12.86 to 17.66)
1	Apr	485 (350 to 638)	1.08 (0.78 to 1.42)	589 (439 to 751)	1.31 (0.98 to 1.67)
1	May	143 (82 to 231)	0.32 (0.18 to 0.51)	73 (35 to 118)	0.16 (0.08 to 0.26)
1	Jun	651 (435 to 912)	1.45 (0.97 to 2.03)	724 (497 to 955)	1.61 (1.11 to 2.13)
1	Jul	423 (292 to 583)	0.94 (0.65 to 1.30)	315 (188 to 461)	0.70 (0.42 to 1.03)
1	Aug	200 (121 to 306)	0.44 (0.27 to 0.68)	223 (121 to 340)	0.50 (0.27 to 0.76)
1	Sep	215 (144 to 313)	0.48 (0.32 to 0.70)	141 (43 to 253)	0.31 (0.10 to 0.56)
1	Oct	20 (1 to 123)	0.04 (0.00 to 0.27)	26 (0 to 52)	0.06 (0.00 to 0.11)
1	Nov	1,114 (775 to 1,517)	2.48 (1.72 to 3.38)	1,551 (1,182 to 1,926)	3.45 (2.63 to 4.29)
1	Dec	634 (460 to 828)	1.41 (1.02 to 1.84)	799 (509 to 1,074)	1.78 (1.13 to 2.39)
1	Jan	1,118 (761 to 1,509)	2.49 (1.69 to 3.36)	1,266 (944 to 1,643)	2.82 (2.10 to 3.66)
1	Feb	4,258 (3,605 to 5,016)	9.48 (8.02 to 11.16)	4,976 (4,247 to 5,607)	11.07 (9.45 to 12.48)
2	Mar	2,665 (1,926 to 3,520)	5.93 (4.29 to 7.83)	2,248 (1,662 to 2,796)	5.00 (3.70 to 6.22)
2	Apr	1,815 (1,518 to 2,139)	4.04 (3.38 to 4.76)	2,803 (2,238 to 3,386)	6.24 (4.98 to 7.53)
2	May	184 (107 to 281)	0.41 (0.24 to 0.63)	213 (126 to 293)	0.48 (0.28 to 0.65)
2	Jun	442 (326 to 579)	0.98 (0.73 to 1.29)	319 (206 to 435)	0.71 (0.46 to 0.97)
2	Jul	832 (660 to 1,021)	1.85 (1.47 to 2.27)	952 (675 to 1,226)	2.12 (1.50 to 2.73)
2	Aug	50 (18 to 113)	0.11 (0.04 to 0.25)	110 (27 to 189)	0.25 (0.06 to 0.42)
2	Sep	14 (3 to 44)	0.03 (0.01 to 0.10)	49 (12 to 97)	0.11 (0.03 to 0.22)
2	Oct	403 (287 to 546)	0.90 (0.64 to 1.21)	368 (234 to 486)	0.82 (0.52 to 1.08)
2	Nov	38 (11 to 90)	0.09 (0.02 to 0.20)	52 (0 to 109)	0.11 (0.00 to 0.24)
2	Dec	1,716 (1,425 to 2,035)	3.82 (3.17 to 4.53)	1,810 (1,472 to 2,124)	4.03 (3.28 to 4.73)

		MRSea estimates		Design-based estimates	
2	Jan	3,057 (2,531 to 3,617)	6.80 (5.63 to 8.05)	3,540 (3,072 to 3,978)	7.88 (6.84 to 8.85)
2	Feb	1,628 (1,336 to 1,956)	3.62 (2.97 to 4.35)	1,914 (1,468 to 2,321)	4.26 (3.27 to 5.17)

Table 1.29: Common guillemot (flying) design-based and MRSea population estimates for in the Mona Array Area + 2 km buffer.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	102 (87 to 118)	0.23 (0.19 to 0.08)	93 (79 to 109)	0.21 (0.18 to 0.24)
1	Apr	34 (24 to 44)	0.08 (0.05 to 0.15)	31 (23 to 40)	0.07 (0.05 to 0.09)
1	May	10 (6 to 16)	0.02 (0.01 to 0.26)	4 (2 to 6)	0.01 (0.00 to 0.01)
1	Jun	63 (42 to 88)	0.14 (0.09 to 0.19)	53 (36 to 70)	0.12 (0.08 to 0.16)
1	Jul	13 (9 to 18)	0.03 (0.02 to 0.18)	7 (4 to 11)	0.02 (0.01 to 0.02)
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.24)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.20)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	0 (0 to 1)	0.00 (0.00 to 1.54)	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	58 (40 to 79)	0.13 (0.09 to 0.17)	61 (47 to 76)	0.14 (0.10 to 0.17)
1	Dec	8 (6 to 11)	0.02 (0.01 to 0.15)	8 (5 to 11)	0.02 (0.01 to 0.02)
1	Jan	44 (30 to 60)	0.10 (0.07 to 0.17)	38 (28 to 49)	0.08 (0.06 to 0.11)
1	Feb	157 (133 to 185)	0.35 (0.30 to 0.08)	140 (119 to 158)	0.31 (0.27 to 0.35)
2	Mar	38 (27 to 50)	0.08 (0.06 to 0.15)	24 (18 to 30)	0.05 (0.04 to 0.07)
2	Apr	104 (87 to 123)	0.23 (0.19 to 0.09)	123 (98 to 148)	0.27 (0.22 to 0.33)
2	May	18 (11 to 28)	0.04 (0.02 to 0.24)	16 (10 to 22)	0.04 (0.02 to 0.05)
2	Jun	16 (12 to 21)	0.03 (0.03 to 0.15)	9 (6 to 12)	0.02 (0.01 to 0.03)
2	Jul	4 (3 to 5)	0.01 (0.01 to 0.11)	4 (3 to 5)	0.01 (0.01 to 0.01)

		MRSea estimates		Design-based estimates	
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.48)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.73)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	4 (3 to 6)	0.01 (0.01 to 0.16)	3 (2 to 4)	0.01 (0.00 to 0.01)
2	Nov	3 (1 to 8)	0.01 (0.00 to 0.53)	3 (0 to 7)	0.01 (0.00 to 0.02)
2	Dec	47 (39 to 56)	0.10 (0.09 to 0.09)	38 (31 to 44)	0.08 (0.07 to 0.10)
2	Jan	40 (33 to 48)	0.09 (0.07 to 0.09)	36 (31 to 40)	0.08 (0.07 to 0.09)
2	Feb	19 (16 to 23)	0.04 (0.03 to 0.10)	17 (13 to 21)	0.04 (0.03 to 0.05)

Razorbill

Desk-based data

1.4.2.29 Razorbill are primarily pelagic but have a distribution that spans the entire perimeter of Britain and Ireland during the winter months. Their breeding distribution is similar to guillemots, nesting on the ledges of cliffs or in cracks and under boulders. Razorbill forage at sea and can dive up to 140 m. In the UK, there are approximately 165,000 pairs of razorbills, accounting for more than 20% of the global population (Mitchell *et al*., 2004). The species is included in the amber list of Birds of Conservation Concern 5 (Stanbury *et al.,* 2021). Razorbill are present within the Liverpool Bay/Bae Lerpwl SPA with an estimated population of 57 individuals (Lawson *et al.* 2016). There is a breeding colony of 416 pairs on Puffin Island (Puffin Island Seabird Research, 2010).

1.4.2.30 HiDef Aerial Survey Limited (2023) shows the density of non-breeding season razorbills in the Liverpool Bay SPA to remain below exceeded 1.2 birds per km². Waggitt *et al*. (2020) showed that Razorbill had a similar seasonal distribution to that of common guillemot (Figure 1.9), although abundance was much lower. 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 1.10).

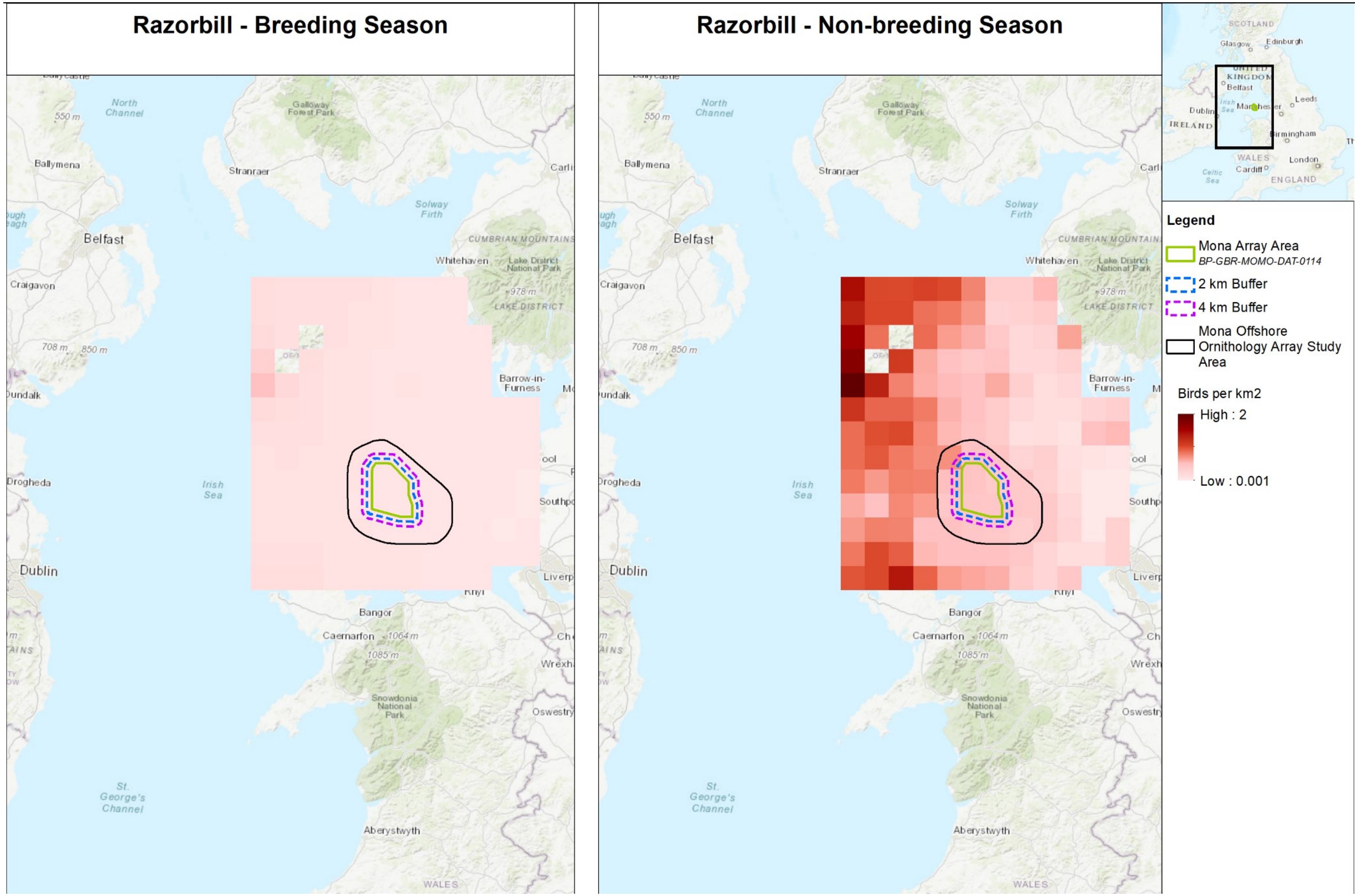

Figure 1.9: Spatial variation in predicted densities (animals per km^2) of razorbill per season (data extracted from Waggitt *et al.* (2020)).

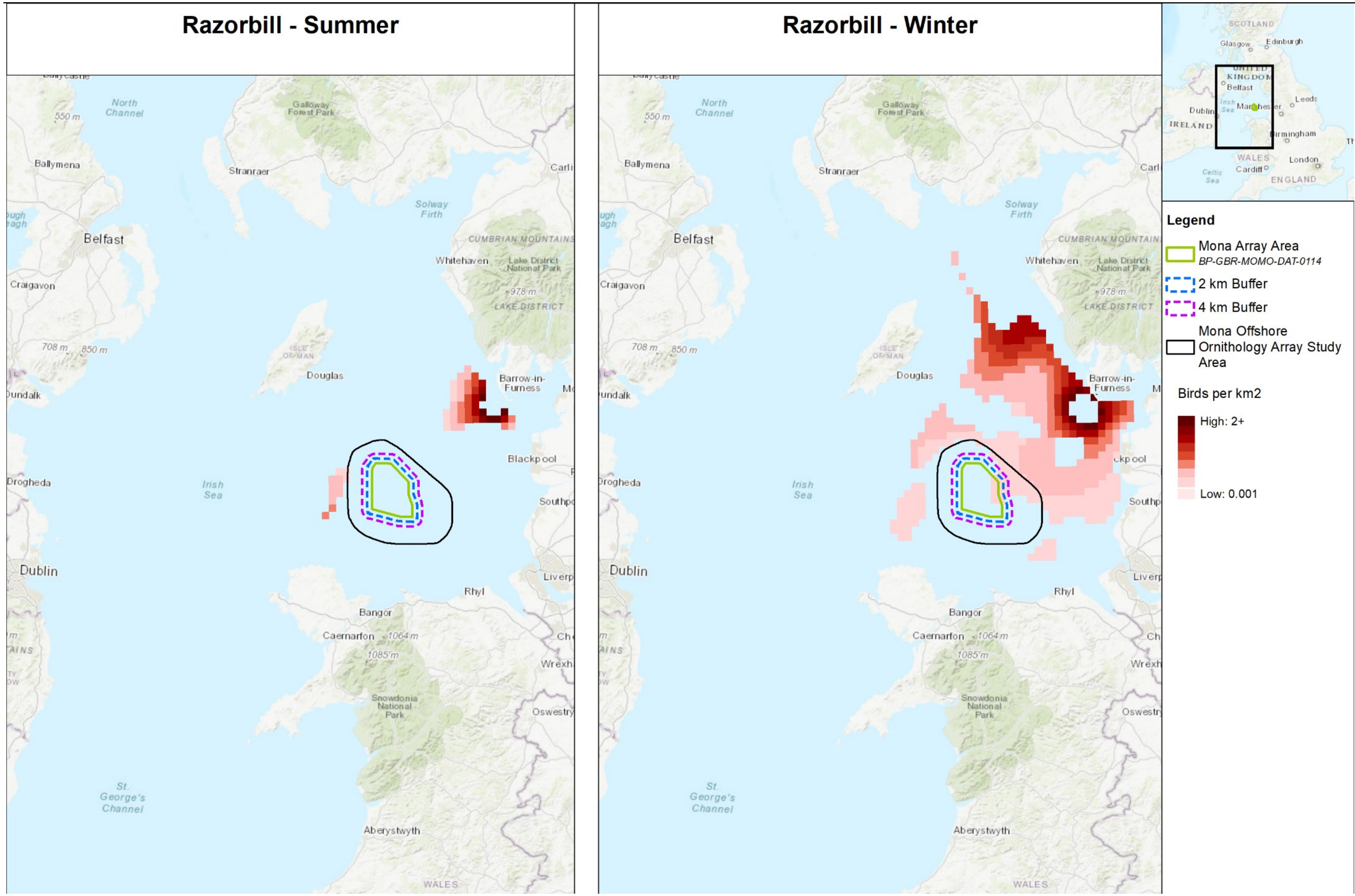

Figure 1.10: Spatial variation in predicted densities (animals per km^2) of razorbill per season (extracted from Bradbury *et al.* (2020)).

Telemetry data

1.4.2.31 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.

Site specific digital aerial survey results

1.4.2.32 Razorbill was the second most abundant auk species recorded during digital aerial surveys, with a total raw count of 2,274 birds. Similarly to guillemot, razorbill were mostly observed sitting on the water, with only an overage percentage of 3.56% (Table 1.30).

Table 1.30: Razorbill behaviours in birds observed during the surveys.

Survey	Flying	Sitting	Total	% Flying
2020-03	2	538	540	0.37
2020-04	0	18	18	0.00
2020-05	0	22	22	0.00
2020-06	0	15	15	0.00
2020-07	1	34	35	2.86
2020-08	1	19	20	5.00
2020-09	1	47	48	2.08
2020-10	0	8	8	0.00
2020-11	0	22	22	0.00
2020-12	9	23	32	28.13
2021-01	9	70	79	11.39
2021-02	2	362	364	0.55
2021-03	19	264	283	6.71
2021-04	5	68	73	6.85
2021-05	0	3	3	0.00
2021-06	0	8	8	0.00
2021-07	0	12	12	0.00
2021-08	0	22	22	0.00
2021-09	0	3	3	0.00
2021-10	1	8	9	11.11
2021-11	0	6	6	0.00
2021-12	5	263	268	1.87
2022-01	0	266	266	0.00
2022-02	10	108	118	8.47

1.4.2.33 Although present in much lower abundance than common guillemot within the Mona Array Area + 2 km, razorbill were recorded in the highest numbers in February 2021 with 2,305 (95% CI range: 1,547 to 3,219) (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).

1.4.2.34 Whilst in February 2021, the species was widely distributed across the site, the March 2020 and 2021 survey predicted the highest densities to be found outside of the Mona Array Area (Figure 1.11). Upper and Lower confidence interval spatial distribution maps for razorbill are provided in Appendix F.

1.4.2.35 Estimates (both MRSea and design-based) for each behaviour (sitting, flying and all behaviour) are given for the Mona Array Area and the Mona Array Area + 2 km (Table 1.31 to Table 1.36). 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 the Mona Array Area + 4 km and the Mona Offshore Ornithology Array Area study area can be found in Appendix C while design-based estimates are found in Appendix D.

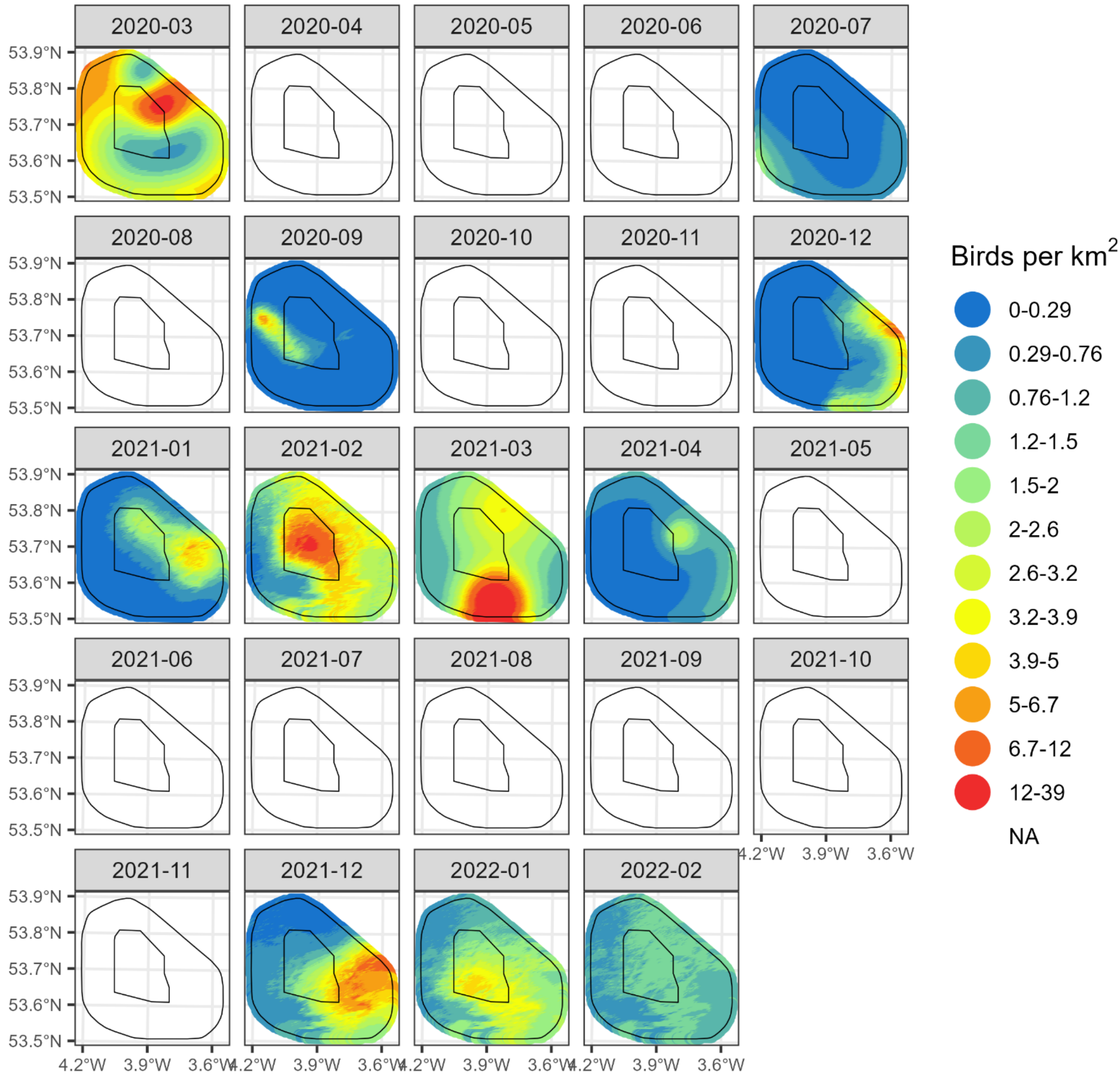

Figure 1.11: Razorbill monthly densities (birds per km^2) and raw counts. Estimates are based on the MRSea model outputs.

Table 1.31: Razorbill (all behaviour) of design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	1,056 (767 to 1,412)	3.52 (2.56 to 4.71)	164.41	15.57%	992 (727 to 1,249)	3.31 (1.40 to 4.17)	93.73	13.49%
1	Apr	N/A	N/A	N/A	N/A	8 (0 to 26)	0.03 (0.00 to 0.09)	6.37	103.53%
1	May	N/A	N/A	N/A	N/A	35 (0 to 71)	0.12 (0.00 to 0.24)	16.35	62.37%
1	Jun	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jul	11 (2 to 47)	0.04 (0.01 to 0.16)	11.52	105.19%	25 (0 to 59)	0.08 (0.00 to 0.20)	14.95	74.96%
1	Aug	N/A	N/A	N/A	N/A	39 (8 to 81)	0.13 (0.02 to 0.27)	17.34	53.91%
1	Sep	112 (37 to 270)	0.37 (0.12 to 0.90)	59.40	53.09%	101 (0 to 200)	0.34 (0.00 to 0.67)	44.98	57.83%
1	Oct	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	N/A	N/A	N/A	N/A	116 (23 to 236)	0.39 (0.03 to 0.79)	31.50	49.11%
1	Dec	29 (3 to 602)	0.10 (0.01 to 2.01)	152.77	525.71%	24 (0 to 71)	0.08 (0.00 to 0.24)	6.28	98.43%
1	Jan	283 (121 to 551)	0.94 (0.40 to 1.84)	109.80	38.84%	362 (149 to 618)	1.21 (0.17 to 2.06)	51.63	33.91%
1	Feb	1,843 (1,230 to 2,564)	6.15 (4.10 to 8.55)	340.21	18.46%	2,006 (1,540 to 2,485)	6.69 (2.11 to 8.29)	121.06	12.16%
2	Mar	682 (477 to 922)	2.28 (1.59 to 3.08)	113.71	16.67%	641 (342 to 935)	2.14 (0.31 to 3.12)	52.40	24.56%
2	Apr	72 (30 to 143)	0.24 (0.10 to 0.48)	28.80	39.84%	96 (33 to 163)	0.32 (0.07 to 0.54)	25.49	34.69%
2	May	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jun	N/A	N/A	N/A	N/A	17 (0 to 37)	0.06 (0.00 to 0.12)	9.04	70.72%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
2	Jul	N/A	N/A	N/A	N/A	42 (0 to 98)	0.14 (0.00 to 0.33)	24.37	73.46%
2	Aug	N/A	N/A	N/A	N/A	9 (0 to 26)	0.03 (0.00 to 0.09)	6.60	99.21%
2	Sep	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Nov	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Dec	392 (259 to 550)	1.31 (0.86 to 1.83)	74.15	18.90%	416 (251 to 622)	1.39 (0.43 to 2.07)	60.39	23.49%
2	Jan	678 (439 to 983)	2.26 (1.46 to 3.28)	138.87	20.48%	645 (382 to 941)	2.15 (0.71 to 3.14)	99.45	22.80%
2	Feb	355 (248 to 498)	1.19 (0.83 to 1.66)	63.82	17.97%	402 (105 to 755)	1.34 (0.15 to 2.52)	91.68	44.96%

Table 1.32: Razorbill (sitting) of design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	1,052 (764 to 1,406)	3.51 (2.55 to 4.69)	989 (725 to 1,245)	3.30 (2.42 to 4.15)
1	Apr	N/A	N/A	8 (0 to 26)	0.03 (0.00 to 0.09)
1	May	N/A	N/A	35 (0 to 71)	0.12 (0.00 to 0.24)
1	Jun	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	11 (2 to 46)	0.04 (0.01 to 0.15)	24 (0 to 57)	0.08 (0.00 to 0.19)
1	Aug	N/A	N/A	37 (7 to 78)	0.12 (0.02 to 0.26)
1	Sep	110 (36 to 264)	0.37 (0.12 to 0.88)	99 (0 to 197)	0.33 (0.00 to 0.66)
1	Oct	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	N/A	N/A	116 (23 to 236)	0.39 (0.08 to 0.79)
1	Dec	21 (3 to 433)	0.07 (0.01 to 1.44)	18 (0 to 54)	0.06 (0.00 to 0.18)
1	Jan	251 (107 to 488)	0.84 (0.36 to 1.63)	327 (135 to 558)	1.09 (0.45 to 1.86)
1	Feb	1,833 (1,224 to 2,550)	6.11 (4.08 to 8.51)	1,997 (1,533 to 2,473)	6.66 (5.11 to 8.25)
2	Mar	636 (445 to 860)	2.12 (1.48 to 2.87)	605 (322 to 882)	2.02 (1.08 to 2.94)
2	Apr	67 (28 to 133)	0.22 (0.09 to 0.44)	90 (31 to 153)	0.30 (0.10 to 0.51)
2	May	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	N/A	N/A	17 (0 to 37)	0.06 (0.00 to 0.12)
2	Jul	N/A	N/A	42 (0 to 98)	0.14 (0.00 to 0.33)
2	Aug	N/A	N/A	9 (0 to 26)	0.03 (0.00 to 0.09)
2	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
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	385 (254 to 539)	1.28 (0.85 to 1.80)	410 (247 to 612)	1.37 (0.82 to 2.04)

		MRSea estimates		Design-based estimates	
2	Jan	678 (439 to 983)	2.26 (1.46 to 3.28)	645 (382 to 941)	2.15 (1.27 to 3.14)
2	Feb	325 (227 to 456)	1.08 (0.76 to 1.52)	373 (98 to 701)	1.24 (0.33 to 2.34)

Table 1.33: Razorbill (flying) of design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	4 (3 to 5)	0.01 (0.01 to 0.16)	3 (2 to 4)	0.01 (0.01 to 0.01)
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	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	0 (0 to 1)	0.00 (0.00 to 1.05)	1 (0 to 1)	0.00 (0.00 to 0.00)
1	Aug	N/A	N/A	2 (0 to 3)	0.01 (0.00 to 0.01)
1	Sep	2 (1 to 6)	0.01 (0.00 to 0.53)	2 (0 to 3)	0.01 (0.00 to 0.01)
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	8 (1 to 169)	0.03 (0.00 to 5.26)	6 (0 to 17)	0.02 (0.00 to 0.06)
1	Jan	32 (14 to 63)	0.11 (0.05 to 0.39)	35 (14 to 59)	0.12 (0.05 to 0.20)
1	Feb	10 (7 to 14)	0.03 (0.02 to 0.18)	9 (7 to 11)	0.03 (0.02 to 0.04)
2	Mar	46 (32 to 62)	0.15 (0.11 to 0.17)	36 (19 to 52)	0.12 (0.06 to 0.17)
2	Apr	5 (2 to 10)	0.02 (0.01 to 0.40)	5 (2 to 9)	0.02 (0.01 to 0.03)
2	May	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)

		MRSea estimates		Design-based estimates	
2	Aug	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
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	7 (5 to 10)	0.02 (0.02 to 0.19)	6 (4 to 10)	0.02 (0.01 to 0.03)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.20)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	30 (21 to 42)	0.10 (0.07 to 0.18)	29 (7 to 54)	0.10 (0.02 to 0.18)

Table 1.34: Razorbill (all behaviour) of design-based and MRSea population estimates in the Mona Array Area + 2 km.

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	1,543 (1,104 to 2,078)	3.43 (2.46 to 4.62)	248.41	16.10%	2,064 (1,587 to 2,535)	4.59 (2.04 to 5.64)	169.21	11.70%
1	Apr	N/A	N/A	N/A	N/A	8 (0 to 26)	0.02 (0.00 to 0.06)	6.35	103.58%
1	May	N/A	N/A	N/A	N/A	35 (0 to 72)	0.08 (0.00 to 0.16)	16.46	62.33%
1	Jun	N/A	N/A	N/A	N/A	11 (0 to 34)	0.03 (0.00 to 0.08)	6.70	101.07%
1	Jul	23 (6 to 79)	0.05 (0.01 to 0.18)	18.73	82.37%	33 (0 to 70)	0.07 (0.00 to 0.16)	16.10	60.79%
1	Aug	N/A	N/A	N/A	N/A	55 (15 to 103)	0.12 (0.02 to 0.23)	20.02	44.14%
1	Sep	173 (58 to 413)	0.38 (0.13 to 0.92)	90.51	52.33%	173 (48 to 311)	0.38 (0.07 to 0.69)	55.09	41.19%
1	Oct	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	N/A	N/A	N/A	N/A	223 (94 to 350)	0.50 (0.10 to 0.78)	38.14	31.04%
1	Dec	60 (10 to 793)	0.13 (0.02 to 1.76)	199.74	332.29%	72 (0 to 170)	0.16 (0.00 to 0.38)	14.09	72.37%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
1	Jan	387 (172 to 735)	0.86 (0.38 to 1.64)	143.66	37.14%	520 (235 to 826)	1.16 (0.18 to 1.84)	65.71	30.08%
1	Feb	2,305 (1,547 to 3,219)	5.13 (3.44 to 7.16)	426.54	18.50%	2,562 (2,080 to 3,129)	5.70 (1.90 to 6.96)	133.04	10.46%
2	Mar	1,097 (769 to 1,484)	2.44 (1.71 to 3.30)	182.27	16.61%	1,007 (594 to 1,401)	2.24 (0.36 to 3.12)	69.16	20.63%
2	Apr	130 (57 to 256)	0.29 (0.13 to 0.57)	50.79	39.08%	155 (87 to 234)	0.34 (0.12 to 0.52)	29.80	25.02%
2	May	N/A	N/A	N/A	N/A	10 (0 to 28)	0.02 (0.00 to 0.06)	6.64	97.90%
2	Jun	N/A	N/A	N/A	N/A	17 (0 to 36)	0.04 (0.00 to 0.08)	9.00	70.66%
2	Jul	N/A	N/A	N/A	N/A	41 (0 to 99)	0.09 (0.00 to 0.22)	24.21	73.39%
2	Aug	N/A	N/A	N/A	N/A	9 (0 to 26)	0.02 (0.00 to 0.06)	6.51	99.17%
2	Sep	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Nov	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Dec	619 (409 to 870)	1.38 (0.91 to 1.94)	117.59	19.00%	616 (412 to 855)	1.37 (0.47 to 1.90)	72.39	19.03%
2	Jan	960 (623 to 1,391)	2.14 (1.39 to 3.10)	196.02	20.41%	1,101 (642 to 1,528)	2.45 (0.80 to 3.40)	153.64	20.62%
2	Feb	515 (357 to 721)	1.15 (0.79 to 1.61)	92.92	18.03%	608 (197 to 1,046)	1.35 (0.18 to 2.33)	118.48	38.36%

Table 1.35: Razorbill (sitting) of design-based and MRSea population estimates in the Mona Array Area + 2 km.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	1,538 (1,100 to 2,070)	3.42 (2.45 to 4.61)	2,058 (1,582 to 2,527)	4.58 (3.52 to 5.62)
1	Apr	N/A	N/A	8 (0 to 26)	0.02 (0.00 to 0.06)
1	May	N/A	N/A	35 (0 to 72)	0.08 (0.00 to 0.16)
1	Jun	N/A	N/A	11 (0 to 34)	0.03 (0.00 to 0.08)
1	Jul	22 (6 to 77)	0.05 (0.01 to 0.17)	32 (0 to 68)	0.07 (0.00 to 0.15)
1	Aug	N/A	N/A	53 (14 to 99)	0.12 (0.03 to 0.22)
1	Sep	169 (57 to 405)	0.38 (0.13 to 0.90)	170 (47 to 306)	0.38 (0.10 to 0.68)
1	Oct	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	N/A	N/A	223 (94 to 350)	0.50 (0.21 to 0.78)
1	Dec	43 (7 to 570)	0.10 (0.02 to 1.27)	54 (0 to 128)	0.12 (0.00 to 0.29)
1	Jan	343 (153 to 652)	0.76 (0.34 to 1.45)	470 (212 to 746)	1.05 (0.47 to 1.66)
1	Feb	2,293 (1,539 to 3,201)	5.10 (3.42 to 7.13)	2,550 (2,070 to 3,115)	5.68 (4.61 to 6.93)
2	Mar	1,024 (717 to 1,384)	2.28 (1.60 to 3.08)	951 (561 to 1,322)	2.12 (1.25 to 2.94)
2	Apr	121 (53 to 238)	0.27 (0.12 to 0.53)	146 (82 to 220)	0.32 (0.18 to 0.49)
2	May	N/A	N/A	10 (0 to 28)	0.02 (0.00 to 0.06)
2	Jun	N/A	N/A	17 (0 to 36)	0.04 (0.00 to 0.08)
2	Jul	N/A	N/A	41 (0 to 99)	0.09 (0.00 to 0.22)
2	Aug	N/A	N/A	9 (0 to 26)	0.02 (0.00 to 0.06)
2	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
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	607 (401 to 854)	1.35 (0.89 to 1.90)	606 (406 to 842)	1.35 (0.90 to 1.87)

		MRSea estimates		Design-based estimates	
2	Jan	960 (623 to 1,391)	2.14 (1.39 to 3.10)	1,101 (642 to 1,528)	2.45 (1.43 to 3.40)
2	Feb	472 (327 to 660)	1.05 (0.73 to 1.47)	565 (183 to 972)	1.26 (0.41 to 2.16)

Table 1.36: Razorbill (flying) of design-based and MRSea population estimates in the Mona Array Area + 2 km.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	6 (4 to 8)	0.01 (0.01 to 0.16)	6 (5 to 8)	0.01 (0.01 to 0.02)
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	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	1 (0 to 2)	0.00 (0.00 to 0.82)	1 (0 to 2)	0.00 (0.00 to 0.00)
1	Aug	N/A	N/A	2 (1 to 4)	0.01 (0.00 to 0.01)
1	Sep	4 (1 to 9)	0.01 (0.00 to 0.52)	3 (1 to 5)	0.01 (0.00 to 0.01)
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	17 (3 to 223)	0.04 (0.01 to 3.32)	18 (0 to 41)	0.04 (0.00 to 0.09)
1	Jan	44 (20 to 84)	0.10 (0.04 to 0.37)	50 (23 to 79)	0.11 (0.05 to 0.18)
1	Feb	13 (9 to 18)	0.03 (0.02 to 0.19)	12 (9 to 14)	0.03 (0.02 to 0.03)
2	Mar	74 (52 to 100)	0.16 (0.11 to 0.17)	57 (33 to 79)	0.13 (0.07 to 0.17)
2	Apr	9 (4 to 18)	0.02 (0.01 to 0.39)	9 (5 to 13)	0.02 (0.01 to 0.03)
2	May	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jul	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)

		MRSea estimates		Design-based estimates	
2	Aug	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
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	12 (8 to 16)	0.03 (0.02 to 0.19)	10 (6 to 13)	0.02 (0.01 to 0.03)
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.20)	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Feb	44 (30 to 61)	0.10 (0.07 to 0.18)	43 (14 to 74)	0.10 (0.03 to 0.17)

Atlantic puffin

Desk-based data

1.4.2.36 Atlantic puffin are the second most abundant breeding seabird in Britain and Ireland. Their winter distribution is largely offshore. During the summer, the highest densities of breeding Atlantic puffin can be found in the Northern Isles, St Kilda, along the Yorkshire coast, in southwest Wales, and in western Ireland. There are 580,000 pairs of Atlantic puffin in the UK, representing 9.6% of the world's entire population (Mitchell *et al.,* 2004). Atlantic puffin are red listed in the Birds of Conservation Concern 4 (2015 update). 51 Atlantic puffin were recorded in the Liverpool Bay/Bae Lerpwl SPA in 2010/11 (Lawson *et al.,* 2016). There are eight breeding pairs on Puffin Island (Puffin Island Seabird Research, 2010).

1.4.2.37 HiDef Aerial Survey Limited (2023) showed Atlantic puffin to be present in very low numbers , with densities between 0 to 0.03 birds per km^2 being recorded in the non-breeding period in the Liverpool Bay SPA. Waggitt *et al.* (2020) found the species to be in very low densities across the area (Figure 1.12), whilst Bradbury *et al*. (2014) did not record Atlantic puffin in the area (Figure 1.13).

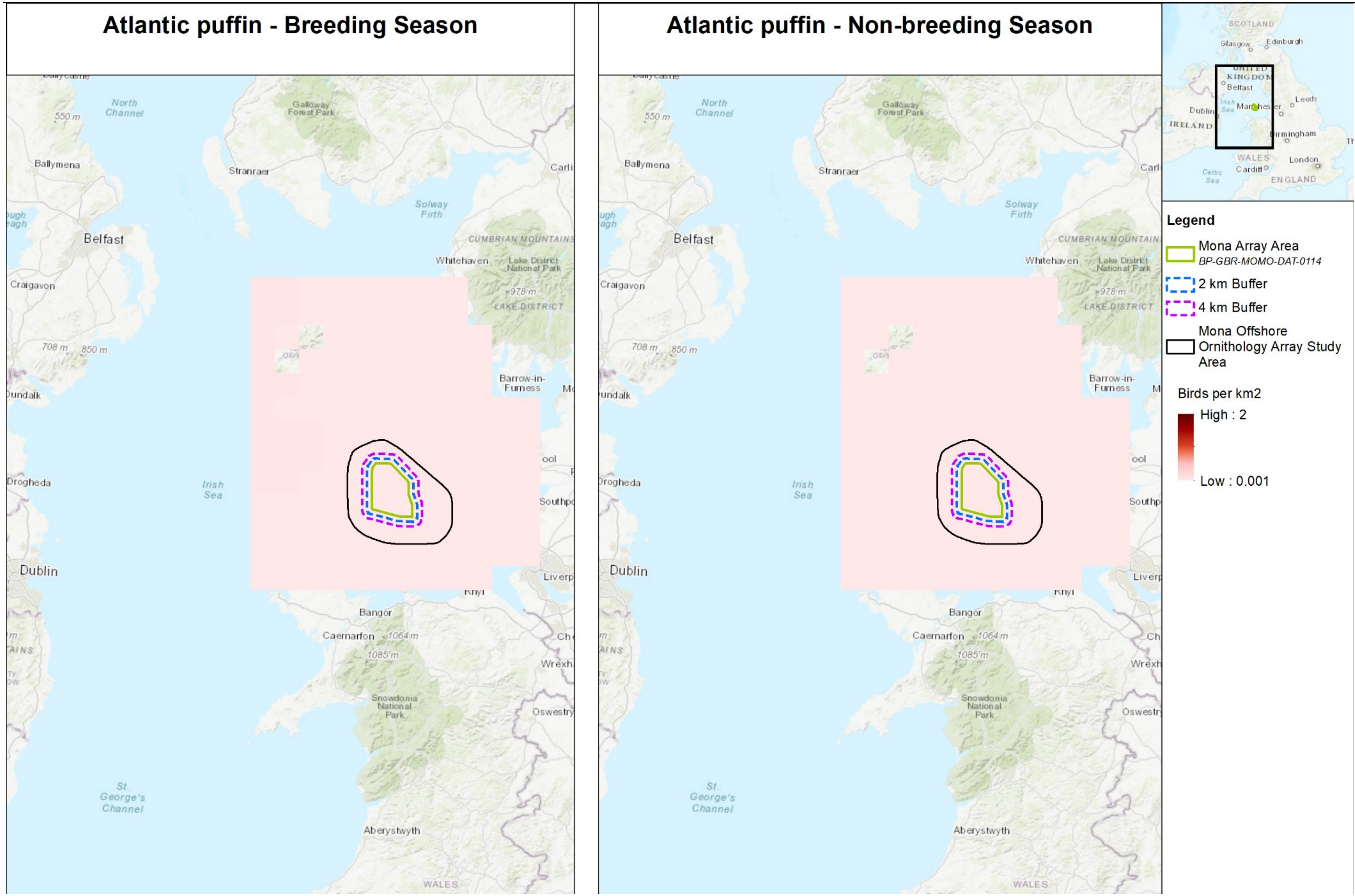

Figure 1.12: Spatial variation in predicted densities (animals per km²) of Atlantic puffin per season (extracted from Waggitt *et al.* (2020)).

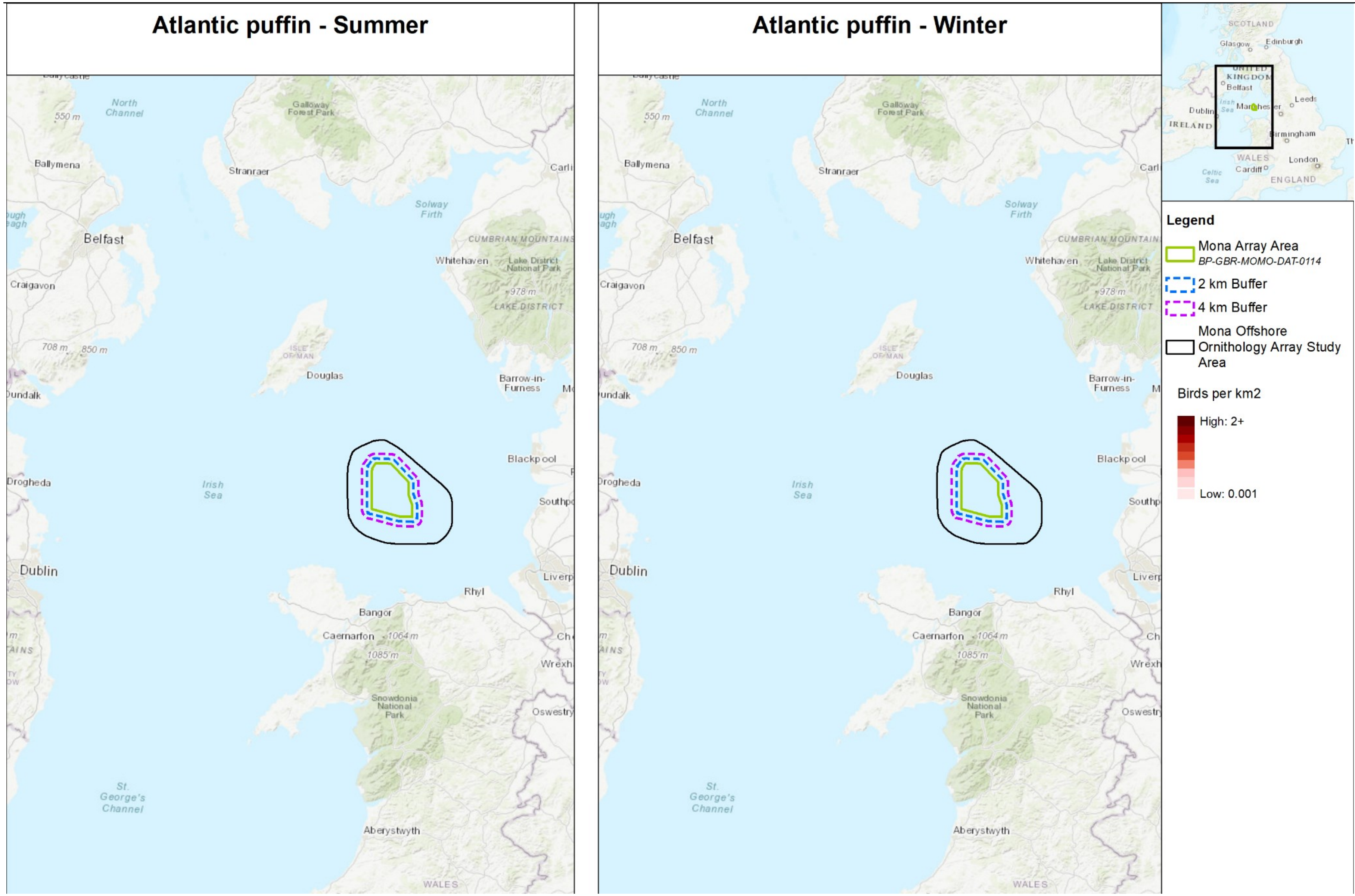

Figure 1.13: Spatial variation in predicted densities (animals per km^2) of Atlantic puffin per season (extracted from Bradbury *et al.* (2014)).

Telemetry data

1.4.2.38 Tracking data from Bird Life International shows many flight lines of Atlantic puffin from Skomer Island (south-west Wales) flying over and near to the Mona Offshore Ornithology Array Area study area, but no significant foraging in the area (Fayet and Guilford, 2007-2014).

Site specific digital aerial survey results

1.4.2.39 During the digital aerial surveys of the Mona Offshore Ornithology Array Area Study Area, 32 records of Atlantic puffin were made in March 2020 to April 2020, July 2020 to October 2020, March 2021, June 2021, August 2021 and December 2021. This confirms the results of the desk-based data from Waggitt *et al*. (2020), that Atlantic puffin are present in very low numbers within the Mona Array Area and surrounding site (within 7 km to 16.5 km of the array area) during the non-breeding period. Out of those recorded, 31 birds were recorded sitting, while one Atlantic puffin was observed in flight.

1.4.2.40 Design-based abundance for Atlantic puffin for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.37 and Table 1.38. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.37: Design-based Atlantic puffin 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) in the Mona Array Area

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	30 (0 to 59)	0.10 (0.20 to 0.20)	30 (0 to 59)	0.10 (0.00 to 0.20)	0 (0 to 0)	0.00 (0.00 to 0.00)	15.01	59.23%
1	Apr	8 (0 to 23)	0.03 (0.08 to 0.08)	8 (0 to 23)	0.03 (0.00 to 0.08)	0 (0 to 0)	0.00 (0.00 to 0.00)	7.10	102.26%
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)	0.00	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)	0.00	0.00%
1	Jul	15 (0 to 47)	0.05 (0.16 to 0.16)	15 (0 to 47)	0.05 (0.00 to 0.16)	0 (0 to 0)	0.00 (0.00 to 0.00)	12.90	100.95%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Table 1.38: Design-based Atlantic puffin 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) in the Mona Array Area + 2km buffer

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	44 (7 to 80)	0.10 (0.18 to 0.18)	44 (7 to 80)	0.10 (0.02 to 0.18)	0 (0 to 0)	0.00 (0.00 to 0.00)	17.06	44.76%
1	Apr	8 (0 to 23)	0.02 (0.05 to 0.05)	8 (0 to 23)	0.02 (0.00 to 0.05)	0 (0 to 0)	0.00 (0.00 to 0.00)	7.06	102.20%
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)	0.00	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)	0.00	0.00%
1	Jul	30 (0 to 63)	0.07 (0.14 to 0.14)	30 (0 to 63)	0.07 (0.00 to 0.14)	0 (0 to 0)	0.00 (0.00 to 0.00)	15.40	59.81%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Northern fulmar

Desk-based data

1.4.2.41 Northern fulmar are a member of the Procellariidae family and are true seabirds, spending much of their lives over water and only coming ashore to breed. Northern fulmar are long lived birds with an average lifespan of 30 years. They do not reach sexual maturity for 6 to 12 years and will spend the first 5 years of their life solely at sea, feeding on fish, zooplankton, jellyfish, and other marine invertebrates. Northern fulmar breed on cliffs along much of the UK's coastline. There are over 330,000 breeding pairs in the UK, however 1.6 to 1.8 million can be found in the surrounding seas during the winter (JNCC, 2021). The breeding season, as taken from Furness (2015), runs from January to September.

1.4.2.42 Northern fulmar have been recorded in the Liverpool Bay/Bae Lerpwl SPA with an estimated population of 185 (Lawson *et al*., 2016). There are 31 breeding pairs on Puffin Island (Puffin Island Seabird Research, 2010).

1.4.2.43 Records from Waggitt *et al.* (2020) show that northern fulmar densities increase further from the shore. The densities of breeding and non-breeding birds peak at 0.424 per km^2 and 0.396 per km^2, respectively, both in areas northwest from the shoreline (Figure 1.14).

1.4.2.44 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 1.15).

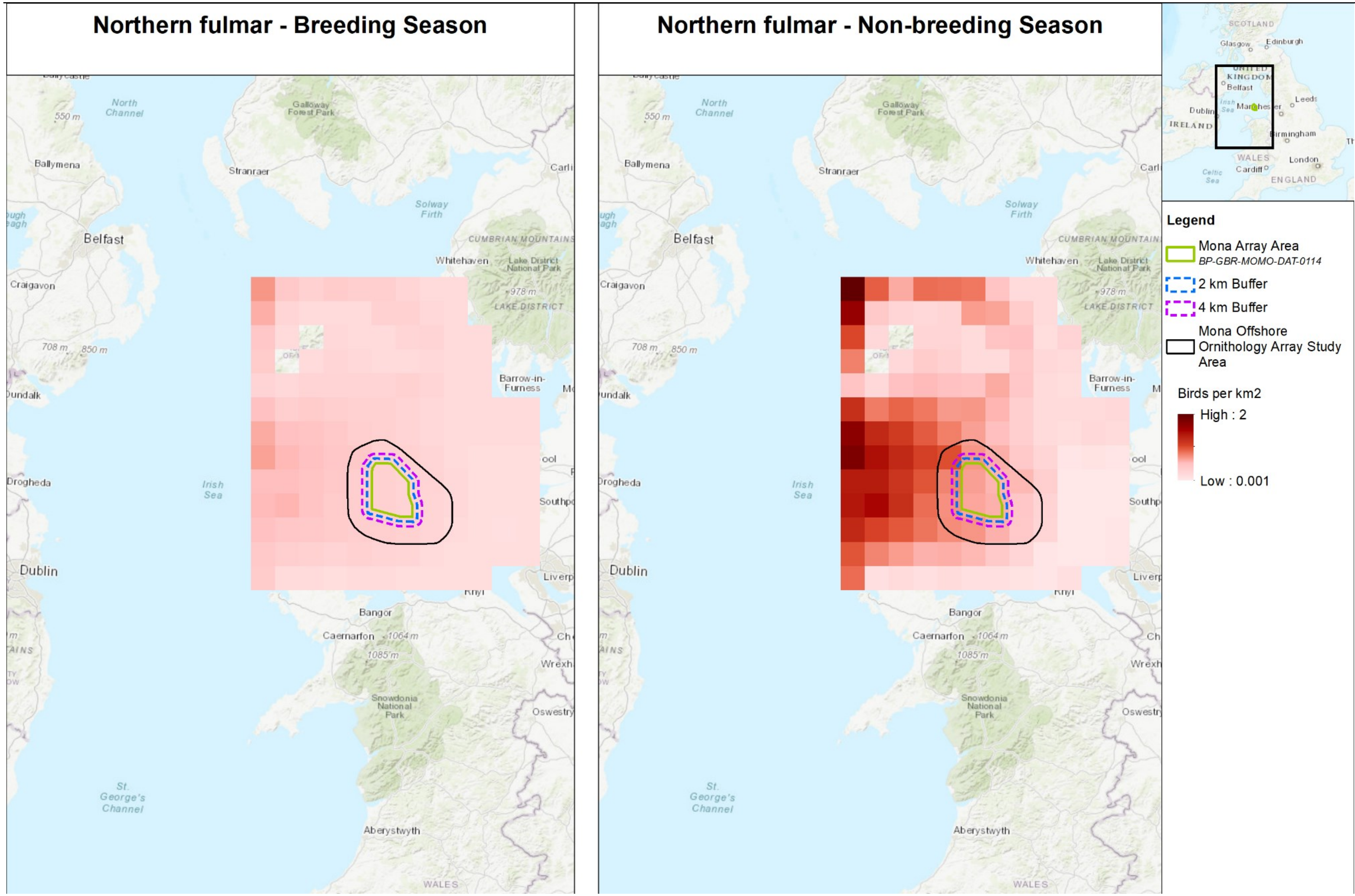

Figure 1.14: Spatial variation in predicted densities (animals per km^2) of northern fulmar per season (extracted from Waggitt *et al.* (2020)).

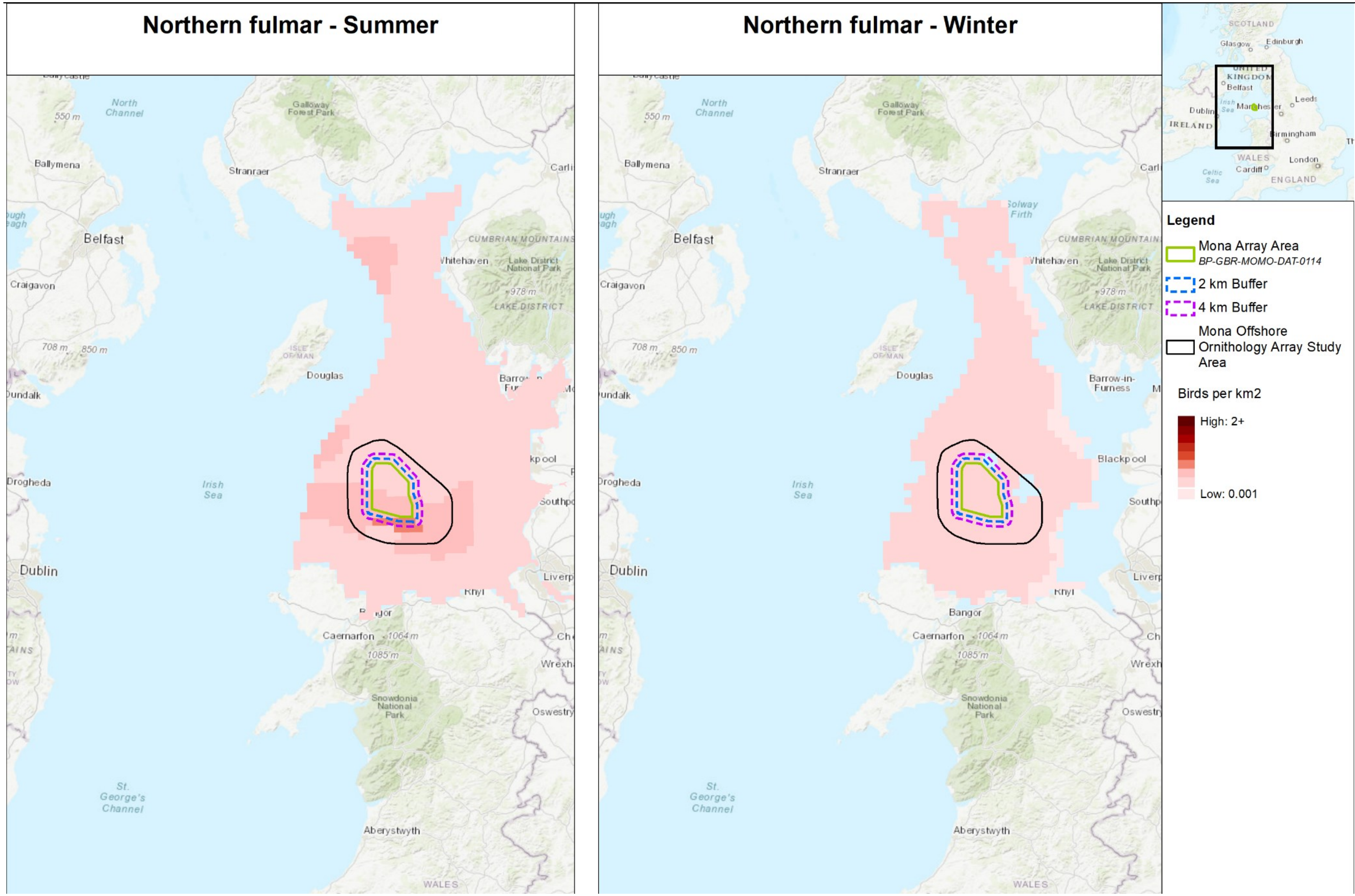

Figure 1.15: Spatial variation in predicted densities (animals per km2) of northern fulmar per season (extracted from Bradbury et al. (2014)).

Telemetry data

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

Site specific digital aerial survey results

1.4.2.46 The species was frequently recorded, albeit as single individuals, with a total raw count of 239 birds recorded across all survey months (Table 1.39).

Table 1.39: Northern fulmar behaviours in birds observed during the surveys.

Survey	Flying	Sitting	Total	% Flying
2020-03	9	8	17	52.94
2020-04	6	7	13	46.15
2020-05	1	0	1	100.00
2020-06	2	2	4	50.00
2020-07	1	3	4	25.00
2020-08	0	0	0	0.00
2020-09	1	3	4	25.00
2020-10	0	0	0	0.00
2020-11	1	4	5	20.00
2020-12	7	20	27	25.93
2021-01	7	3	10	70.00
2021-02	13	10	23	56.52
2021-03	35	12	47	74.47
2021-04	11	1	12	91.67
2021-05	0	0	0	0.00
2021-06	1	5	6	16.67
2021-07	1	3	4	25.00
2021-08	1	0	1	100.00
2021-09	3	2	5	60.00
2021-10	0	0	0	0.00
2021-11	0	0	0	0.00
2021-12	19	19	38	50.00
2022-01	1	1	2	50.00
2022-02	9	7	16	56.25

1.4.2.47 The relative low numbers of monthly sightings meant that only design-based estimates were produced (Table 1.40 to Table 1.41).

1.4.2.48 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. A maximum design-based estimate of 131 birds (95% CI range: 75 to 196) was recorded within the Mona Array Area.

Table 1.40: Design-based northern fulmar 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	38 (6 to 70)	0.13 (0.02 to 0.23)	18 (3 to 33)	0.06 (0.01 to 0.11)	20 (3 to 37)	0.07 (0.01 to 0.12)	17.83	46.94%
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Jul	6 (0 to 20)	0.02 (0.00 to 0.07)	5 (0 to 15)	0.02 (0.00 to 0.05)	2 (0 to 5)	0.01 (0.00 to 0.02)	6.20	98.54%
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Nov	20 (0 to 40)	0.07 (0.00 to 0.14)	16 (0 to 32)	0.05 (0.00 to 0.11)	4 (0 to 8)	0.01 (0.00 to 0.03)	11.62	59.54%
1	Dec	20 (0 to 40)	0.07 (0.00 to 0.13)	15 (0 to 29)	0.05 (0.00 to 0.10)	5 (0 to 10)	0.02 (0.00 to 0.03)	11.29	57.12%
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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
1	Feb	52 (19 to 97)	0.17 (0.06 to 0.32)	23 (8 to 42)	0.08 (0.03 to 0.14)	29 (11 to 55)	0.10 (0.04 to 0.18)	20.71	39.69%
1	Mar	131 (75 to 196)	0.44 (0.25 to 0.65)	33 (19 to 50)	0.11 (0.06 to 0.17)	98 (56 to 146)	0.33 (0.19 to 0.49)	31.29	23.85%
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)	0.00	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)	0.00	0.00%
2	Jun	7 (0 to 20)	0.02 (0.00 to 0.07)	5 (0 to 17)	0.02 (0.00 to 0.06)	1 (0 to 3)	0.00 (0.00 to 0.01)	6.70	102.25%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Dec	19 (0 to 39)	0.06 (0.00 to 0.13)	9 (0 to 19)	0.03 (0.00 to 0.06)	9 (0 to 19)	0.03 (0.00 to 0.06)	10.90	57.72%
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)	0.00	0.00%
2	Feb	29 (7 to 57)	0.10 (0.02 to 0.19)	13 (3 to 25)	0.04 (0.01 to 0.08)	16 (4 to 32)	0.05 (0.01 to 0.11)	13.14	48.77%

Table 1.41: Design-based northern fulmar 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	50 (18 to 87)	0.11 (0.04 to 0.19)	24 (8 to 41)	0.05 (0.02 to 0.09)	27 (9 to 46)	0.06 (0.02 to 0.10)	19.22	38.13%
1	Apr	26 (0 to 54)	0.06 (0.00 to 0.12)	14 (0 to 29)	0.03 (0.00 to 0.06)	12 (0 to 25)	0.03 (0.00 to 0.06)	15.65	60.91%
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)	0.00	0.00%
1	Jun	7 (0 to 19)	0.01 (0.00 to 0.04)	3 (0 to 10)	0.01 (0.00 to 0.02)	3 (0 to 10)	0.01 (0.00 to 0.02)	6.33	95.18%
1	Jul	13 (0 to 27)	0.03 (0.00 to 0.06)	10 (0 to 20)	0.02 (0.00 to 0.05)	3 (0 to 7)	0.01 (0.00 to 0.02)	9.03	70.63%
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Nov	20 (0 to 41)	0.04 (0.00 to 0.09)	16 (0 to 33)	0.03 (0.00 to 0.07)	4 (0 to 8)	0.01 (0.00 to 0.02)	11.63	59.57%
1	Dec	77 (19 to 137)	0.17 (0.04 to 0.30)	57 (14 to 101)	0.13 (0.03 to 0.23)	20 (5 to 35)	0.04 (0.01 to 0.08)	31.59	41.03%
1	Jan	14 (0 to 32)	0.03 (0.00 to 0.07)	4 (0 to 10)	0.01 (0.00 to 0.02)	10 (0 to 23)	0.02 (0.00 to 0.05)	9.28	68.30%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
1	Feb	71 (31 to 119)	0.16 (0.07 to 0.26)	31 (13 to 52)	0.07 (0.03 to 0.11)	40 (18 to 67)	0.09 (0.04 to 0.15)	23.71	33.35%
1	Mar	149 (90 to 217)	0.33 (0.20 to 0.48)	38 (23 to 55)	0.08 (0.05 to 0.12)	111 (67 to 161)	0.25 (0.15 to 0.36)	32.75	21.92%
2	Apr	6 (0 to 20)	0.01 (0.00 to 0.04)	1 (0 to 2)	0.00 (0.00 to 0.00)	6 (0 to 18)	0.01 (0.00 to 0.04)	6.63	102.92%
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)	0.00	0.00%
2	Jun	7 (0 to 20)	0.01 (0.00 to 0.04)	5 (0 to 16)	0.01 (0.00 to 0.04)	1 (0 to 3)	0.00 (0.00 to 0.01)	6.67	102.21%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Dec	65 (19 to 118)	0.14 (0.04 to 0.26)	32 (9 to 59)	0.07 (0.02 to 0.13)	32 (9 to 59)	0.07 (0.02 to 0.13)	26.78	41.52%
2	Jan	7 (0 to 20)	0.01 (0.00 to 0.04)	3 (0 to 10)	0.01 (0.00 to 0.02)	3 (0 to 10)	0.01 (0.00 to 0.02)	6.52	97.27%
2	Feb	42 (14 to 73)	0.09 (0.03 to 0.16)	18 (6 to 32)	0.04 (0.01 to 0.07)	24 (8 to 41)	0.05 (0.02 to 0.09)	15.38	38.72%

Manx shearwater

Desk-based data

1.4.2.49 Manx shearwater is a medium-sized, long-lived (typical lifespan = 15, maximum = 55, Clark *et al*., 2003) seabird that glides low over the sea surface, feeding on fish such as herring, sardine and sprat. There are around 50 breeding colonies of Manx shearwater in the UK and there are an estimated 600,000 breeding pairs overall (JNCC 2021). Additionally, there are 536 pairs on the Isle of Man (JNCC, 2021). Nesting occurs in burrows on step, grassy slopes of offshore islands on the west coasts of mainland Britain and Ireland. During the breeding season, adults can regularly commute up to 1,346 km (mean maximum ±1018.7 SE, Woodward *et al*., 2019) between nesting sites and foraging grounds, and only return to their burrows at night. From July onwards, Manx shearwaters migrate to the South Atlantic and spend their winters mainly off the coasts of Brazil and Argentina.

1.4.2.50 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 1.16 and Figure 1.17). As expected, densities were low during the non-breeding season (September to March) as Manx shearwater overwinter off the coast of South America.

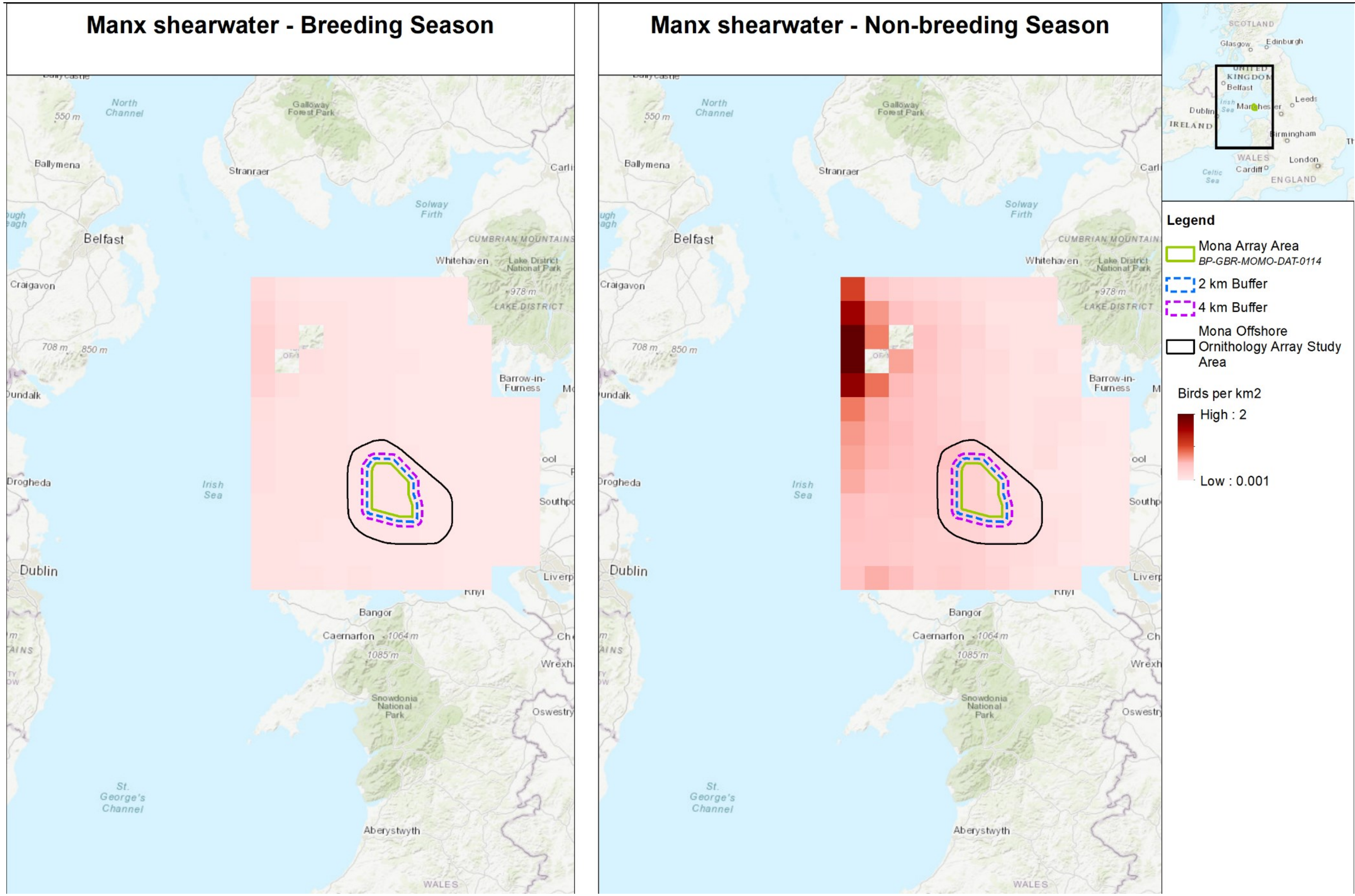

Figure 1.16: Spatial variation in predicted densities (animals per km^2) of Manx shearwater per season (extracted from Waggitt *et al*. (2020)).

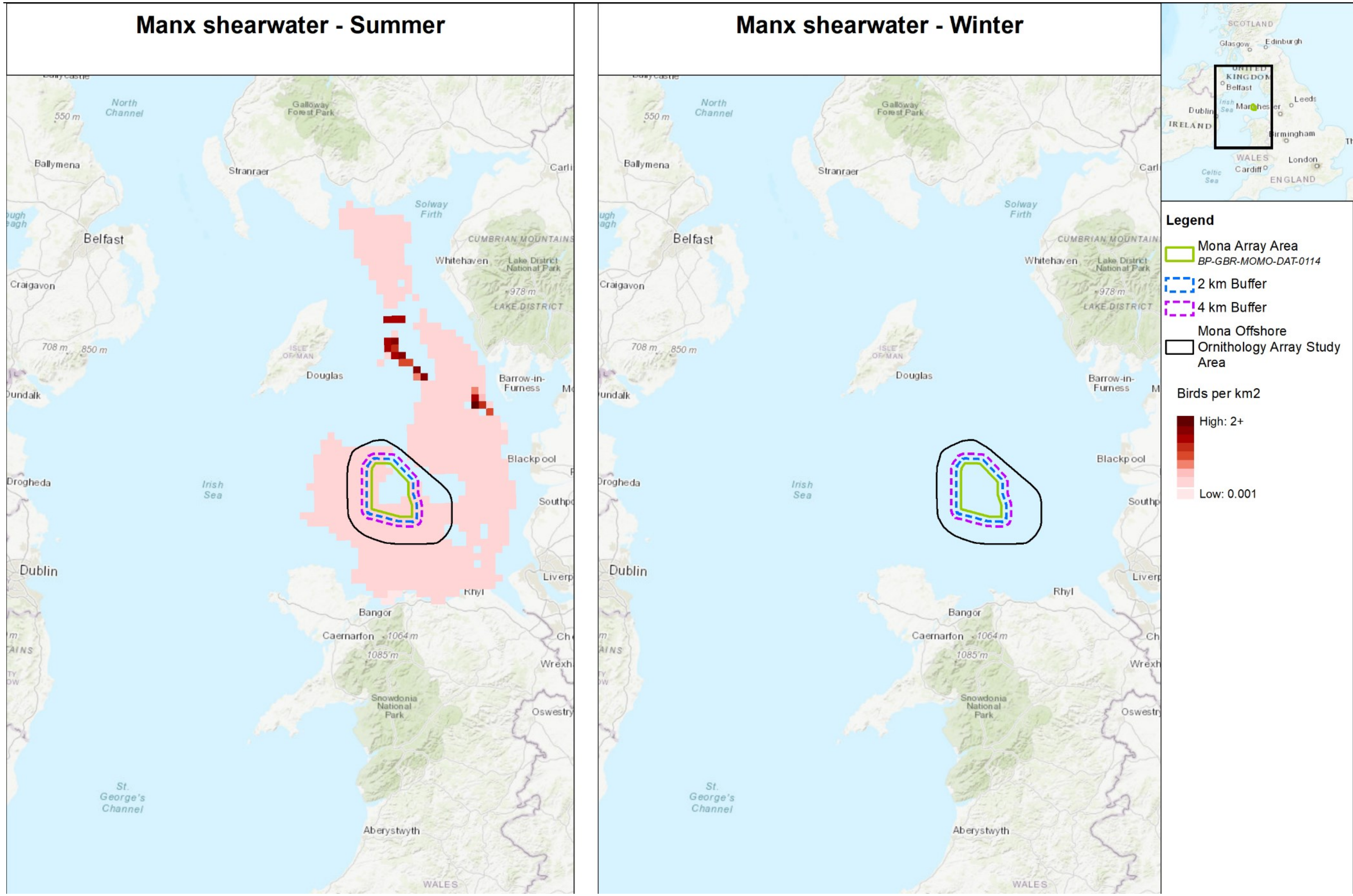

Figure 1.17: Spatial variation in predicted densities (animals per km^2) of Manx shearwater per season (extracted from Bradbury *et al*. (2014)).

Telemetry data

1.4.2.51 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 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 to 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)

Site Specific Digital Aerial Survey Results

1.4.2.52 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 (Table 1.42).

Table 1.42: Manx shearwater behaviours in birds observed during the surveys.

Survey	Flying	Sitting	Total	% Flying
2020-03	1	6	7	14.29
2020-04	0	0	0	0.00
2020-05	0	0	0	0.00
2020-06	6	13	19	31.58
2020-07	270	195	465	58.06
2020-08	22	0	22	100.00
2020-09	10	0	10	100.00
2020-10	0	0	0	0.00
2020-11	0	0	0	0.00
2020-12	0	0	0	0.00
2021-01	0	0	0	0.00
2021-02	0	0	0	0.00
2021-03	2	0	2	100.00
2021-04	7	8	15	46.67
2021-05	0	0	0	0.00
2021-06	714	555	1,269	56.26
2021-07	104	439	543	19.15
2021-08	107	31	138	77.54
2021-09	5	49	54	9.26
2021-10	0	0	0	0.00
2021-11	0	0	0	0.00
2021-12	0	0	0	0.00
2022-01	0	0	0	0.00
2022-02	0	0	0	0.00

1.4.2.53 Within the Mona Array Area study area, the highest abundance was recorded in June in 2021, with an estimated 1,209 birds (95% range: 386 to 2,785). MRSea estimates for each boundary area can be found in Appendix C. There was a hotspot of high densities to the southwest of the Mona Array Area in July 2020 (Figure 1.18). Further offshore, high densities were also recorded outside the Mona Array Area of up to 18 birds per km^2. Upper and Lower confidence interval spatial distribution maps for Manx shearwater are provided in Appendix F.

1.4.2.54 Within the Mona Array Area + 2 km, estimates peaked at 2,173 (589 to 5,538) in July 2021. Estimates (both MRSea and design-based) for each behaviour (sitting, flying and all behaviour) are given for the Mona Array Area and the Mona Array Area + 2 km (Table 1.43 to Table 1.48). MRSea and design-based estimates for the Mona Array Area + 4 km and the Mona Offshore Ornithology Array Area study area can be found in Appendix C and Appendix D respectively.

1.4.2.55 The presence of Manx shearwater in June and July suggested that these birds might be associated with the Welsh colonies and thus foraged within the Mona Offshore Ornithology Array Area study area.

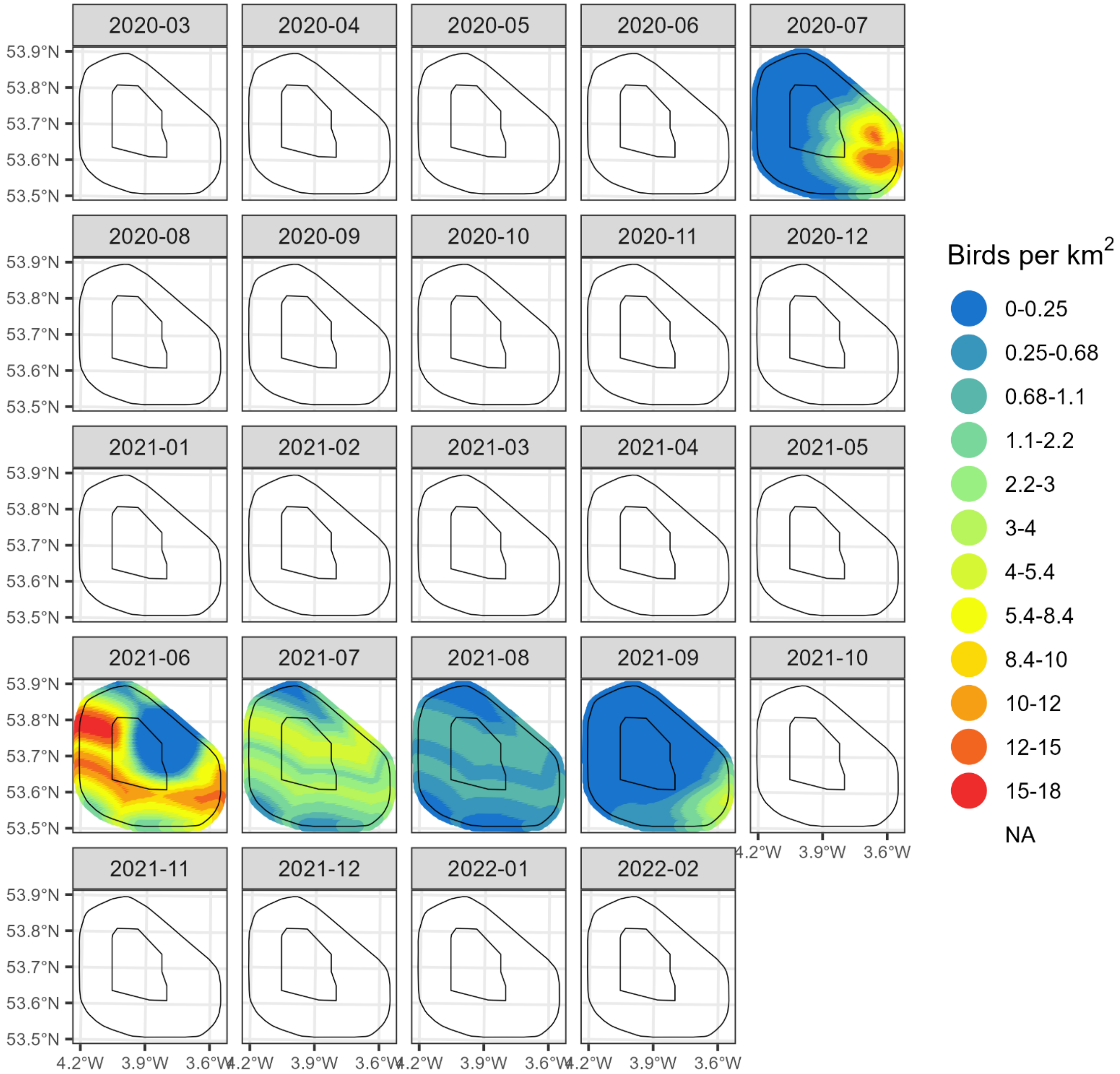

Figure 1.18: Manx shearwater monthly densities (birds per km²) and raw counts. Estimates are based on the MRSea model outputs.

Table 1.43: Manx shearwater (all behaviour) design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	N/A	N/A	N/A	N/A	6 (0 to 18)	0.02 (0.00 to 0.06)	5.98	99.00%
1	Apr	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	May	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jun	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jul	166 (45 to 401)	0.55 (0.15 to 1.34)	0.32 (0.09 to 0.55)	90.85	20 (0 to 47)	0.07 (0.00 to 0.16)	14.82	73.15%
1	Aug	N/A	N/A	N/A	N/A	25 (6 to 52)	0.08 (0.02 to 0.17)	12.71	50.05%
1	Sep	N/A	N/A	N/A	N/A	19 (0 to 44)	0.06 (0.00 to 0.15)	13.57	72.83%
1	Oct	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Dec	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jan	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Feb	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Mar	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Apr	N/A	N/A	N/A	N/A	7 (0 to 20)	0.02 (0.00 to 0.07)	6.31	97.71%
2	May	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jun	1,209 (386 to 2,785)	4.03 (1.29 to 9.29)	2.27 (0.72 to 0.51)	612.11	224 (27 to 427)	0.75 (0.09 to 1.42)	108.54	48.96%
2	Jul	946 (406 to 1,725)	3.16 (1.35 to 5.76)	0.60 (0.26 to 0.36)	336.69	432 (144 to 779)	1.44 (0.48 to 2.60)	181.50	42.48%
2	Aug	231 (84 to 464)	0.77 (0.28 to 1.55)	0.60 (0.22 to 0.42)	97.11	73 (32 to 121)	0.24 (0.10 to 0.40)	23.21	32.59%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
2	Sep	0 (0 to 2)	0.00 (0.00 to 0.01)	0.00 (0.00 to 4.71)	0.52	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Nov	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Dec	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jan	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Feb	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

Table 1.44: Manx shearwater (sitting) design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	N/A	N/A	5 (0 to 16)	0.02 (0.00 to 0.05)
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	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	70 (19 to 168)	0.23 (0.06 to 0.56)	8 (0 to 20)	0.03 (0.00 to 0.07)
1	Aug	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
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)

		MRSea estimates		Design-based estimates	
2	Mar	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	N/A	N/A	3 (0 to 11)	0.01 (0.00 to 0.04)
2	May	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	529 (169 to 1,218)	1.76 (0.56 to 4.06)	98 (12 to 187)	0.33 (0.04 to 0.62)
2	Jul	765 (328 to 1,395)	2.55 (1.09 to 4.65)	349 (116 to 630)	1.16 (0.39 to 2.10)
2	Aug	52 (19 to 104)	0.17 (0.06 to 0.35)	16 (7 to 27)	0.05 (0.02 to 0.09)
2	Sep	0 (0 to 2)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)
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 1.45: Manx shearwater (flying) design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	N/A	N/A	1 (0 to 3)	0.00 (0.00 to 0.01)
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	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	96 (26 to 233)	0.32 (0.09 to 0.55)	12 (0 to 28)	0.04 (0.00 to 0.09)
1	Aug	N/A	N/A	25 (6 to 52)	0.08 (0.02 to 0.17)
1	Sep	N/A	N/A	19 (0 to 44)	0.06 (0.00 to 0.15)

		MRSea estimates		Design-based estimates	
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	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	N/A	N/A	3 (0 to 9)	0.01 (0.00 to 0.03)
2	May	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	680 (217 to 1,567)	2.27 (0.72 to 0.51)	126 (15 to 240)	0.42 (0.05 to 0.80)
2	Jul	181 (78 to 330)	0.60 (0.26 to 0.36)	83 (28 to 149)	0.28 (0.09 to 0.50)
2	Aug	179 (65 to 360)	0.60 (0.22 to 0.42)	57 (25 to 94)	0.19 (0.08 to 0.31)
2	Sep	0 (0 to 0)	0.00 (0.00 to 4.71)	0 (0 to 0)	0.00 (0.00 to 0.00)
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 1.46: Manx shearwater (all behaviour) design-based and MRSea population estimates in the Mona Array Area + 2 km buffer.

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	N/A	N/A	N/A	N/A	6 (0 to 18)	0.01 (0.00 to 0.04)	5.93	98.87%
1	Apr	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
1	May	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jun	N/A	N/A	N/A	N/A	7 (0 to 20)	0.02 (0.00 to 0.04)	6.59	95.96%
1	Jul	324 (80 to 820)	0.72 (0.18 to 1.82)	188.80	58.25%	54 (13 to 93)	0.12 (0.03 to 0.21)	21.77	40.61%
1	Aug	N/A	N/A	N/A	N/A	32 (6 to 57)	0.07 (0.01 to 0.13)	14.21	44.76%
1	Sep	N/A	N/A	N/A	N/A	25 (0 to 55)	0.06 (0.00 to 0.12)	15.12	60.68%
1	Oct	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Dec	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jan	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Feb	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Mar	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Apr	N/A	N/A	N/A	N/A	6 (0 to 20)	0.01 (0.00 to 0.04)	6.26	97.69%
2	May	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jun	2,173 (589 to 5,538)	4.84 (1.31 to 12.32)	1,262.54	58.09%	371 (132 to 655)	0.83 (0.29 to 1.46)	135.56	36.94%
2	Jul	1,355 (550 to 2,575)	3.01 (1.22 to 5.73)	516.76	38.15%	569 (229 to 935)	1.27 (0.50 to 2.08)	192.69	34.24%
2	Aug	331 (115 to 685)	0.74 (0.26 to 1.52)	145.42	43.89%	137 (78 to 199)	0.30 (0.17 to 0.44)	30.46	22.92%
2	Sep	1 (0 to 9)	0.00 (0.00 to 0.02)	2.38	204.40%	7 (0 to 22)	0.02 (0.00 to 0.05)	6.48	98.41%
2	Oct	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Nov	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Dec	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jan	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Feb	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

Table 1.47: Manx shearwater (sitting) design-based and MRSea population estimates in the Mona Array Area + 2 km buffer.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	N/A	N/A	5 (0 to 16)	0.01 (0.00 to 0.04)
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	5 (0 to 13)	0.01 (0.00 to 0.03)
1	Jul	136 (33 to 344)	0.30 (0.07 to 0.77)	22 (5 to 39)	0.05 (0.01 to 0.09)
1	Aug	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
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	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	N/A	N/A	3 (0 to 11)	0.01 (0.00 to 0.02)
2	May	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	951 (258 to 2,422)	2.12 (0.57 to 5.39)	162 (58 to 286)	0.36 (0.13 to 0.64)
2	Jul	1,095 (444 to 2,082)	2.44 (0.99 to 4.63)	460 (185 to 756)	1.02 (0.41 to 1.68)
2	Aug	74 (26 to 154)	0.17 (0.06 to 0.34)	31 (18 to 45)	0.07 (0.04 to 0.10)
2	Sep	1 (0 to 8)	0.00 (0.00 to 0.02)	7 (0 to 20)	0.01 (0.00 to 0.04)
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)

		MRSea estimates		Design-based estimates	
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 1.48: Manx shearwater (flying) design-based and MRSea population estimates in the Mona Array Area+ 2 km buffer.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	N/A	N/A	1 (0 to 3)	0.00 (0.00 to 0.01)
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	2 (0 to 6)	0.00 (0.00 to 0.01)
1	Jul	188 (46 to 476)	0.42 (0.10 to 0.58)	31 (7 to 54)	0.07 (0.02 to 0.12)
1	Aug	N/A	N/A	32 (6 to 57)	0.07 (0.01 to 0.13)
1	Sep	N/A	N/A	25 (0 to 55)	0.06 (0.00 to 0.12)
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	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Apr	N/A	N/A	3 (0 to 9)	0.01 (0.00 to 0.02)
2	May	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Jun	1,223 (331 to 3,116)	2.72 (0.74 to 0.58)	209 (74 to 368)	0.46 (0.17 to 0.82)
2	Jul	259 (105 to 493)	0.58 (0.23 to 0.38)	109 (44 to 179)	0.24 (0.10 to 0.40)

		MRSea estimates		Design-based estimates	
2	Aug	257 (89 to 531)	0.57 (0.20 to 0.44)	106 (61 to 154)	0.24 (0.14 to 0.34)
2	Sep	0 (0 to 1)	0.00 (0.00 to 2.04)	1 (0 to 2)	0.00 (0.00 to 0.00)
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)

Northern gannet

Desk-based data

1.4.2.56 The northern gannet is the largest seabird in the North Atlantic. Northern gannet are endemic to the North Atlantic and most breed in Britain and Ireland. At total of 10 SPAs designated before 2000 for breeding gannets supported a total of 197,127 pairs at designation, and it was estimated to represent ca. 98% of the British breeding population (Stroud et al., 2001). Almost all of these populations have increased in numbers since designation, and smaller colonies have tended to increase more rapidly than the largest colonies. Gannets leave colonies mainly in August-October, however adults from colonies in the UK do not necessarily move directly southwards in autumn but may move to areas with abundant food for some time in late summer before heading towards their wintering area.

1.4.2.57 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. 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).

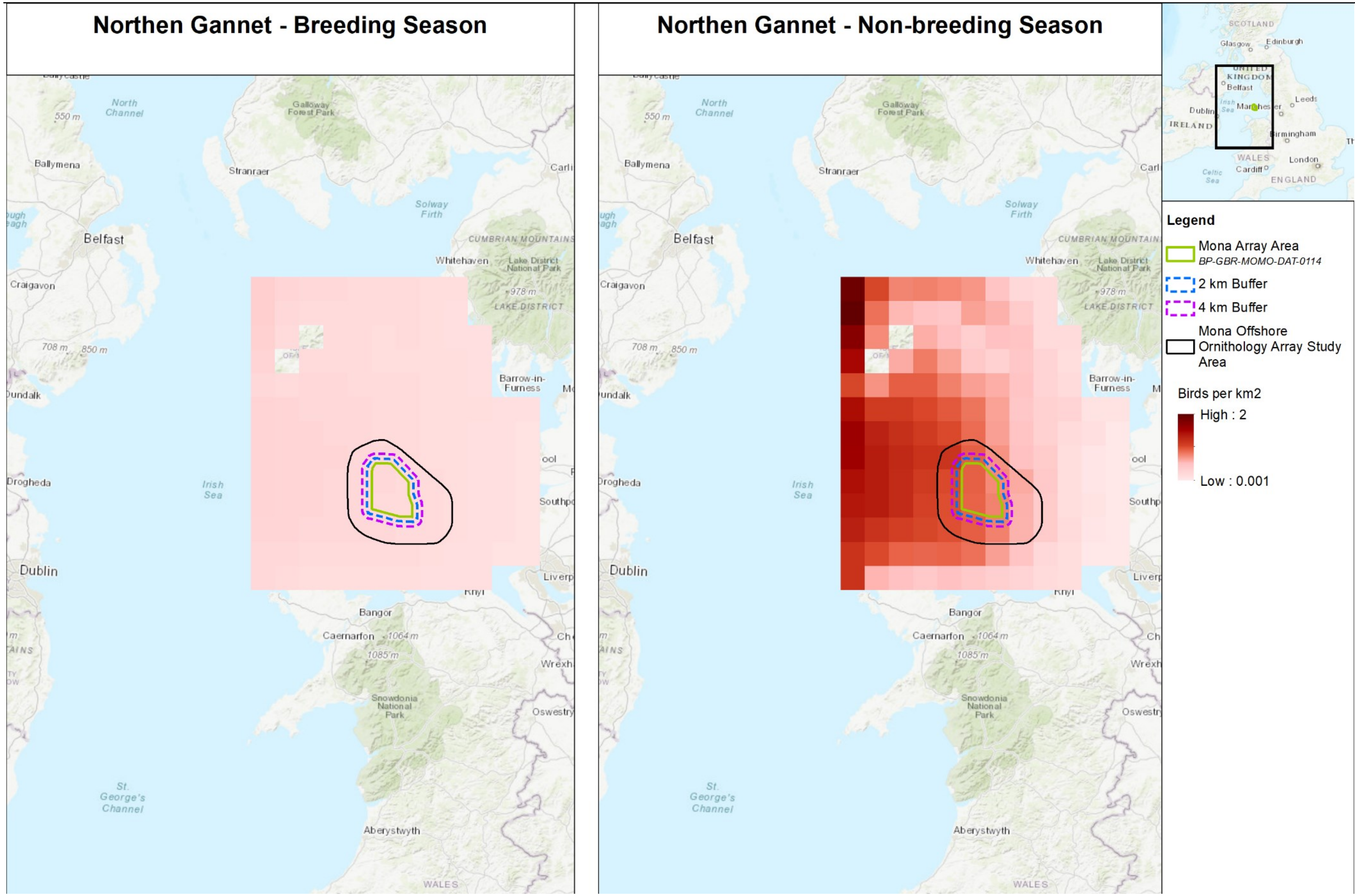

Figure 1.19: Spatial variation in predicted densities (animals per km²) of northern gannet per season (data extracted from Waggitt *et al.* (2020)).

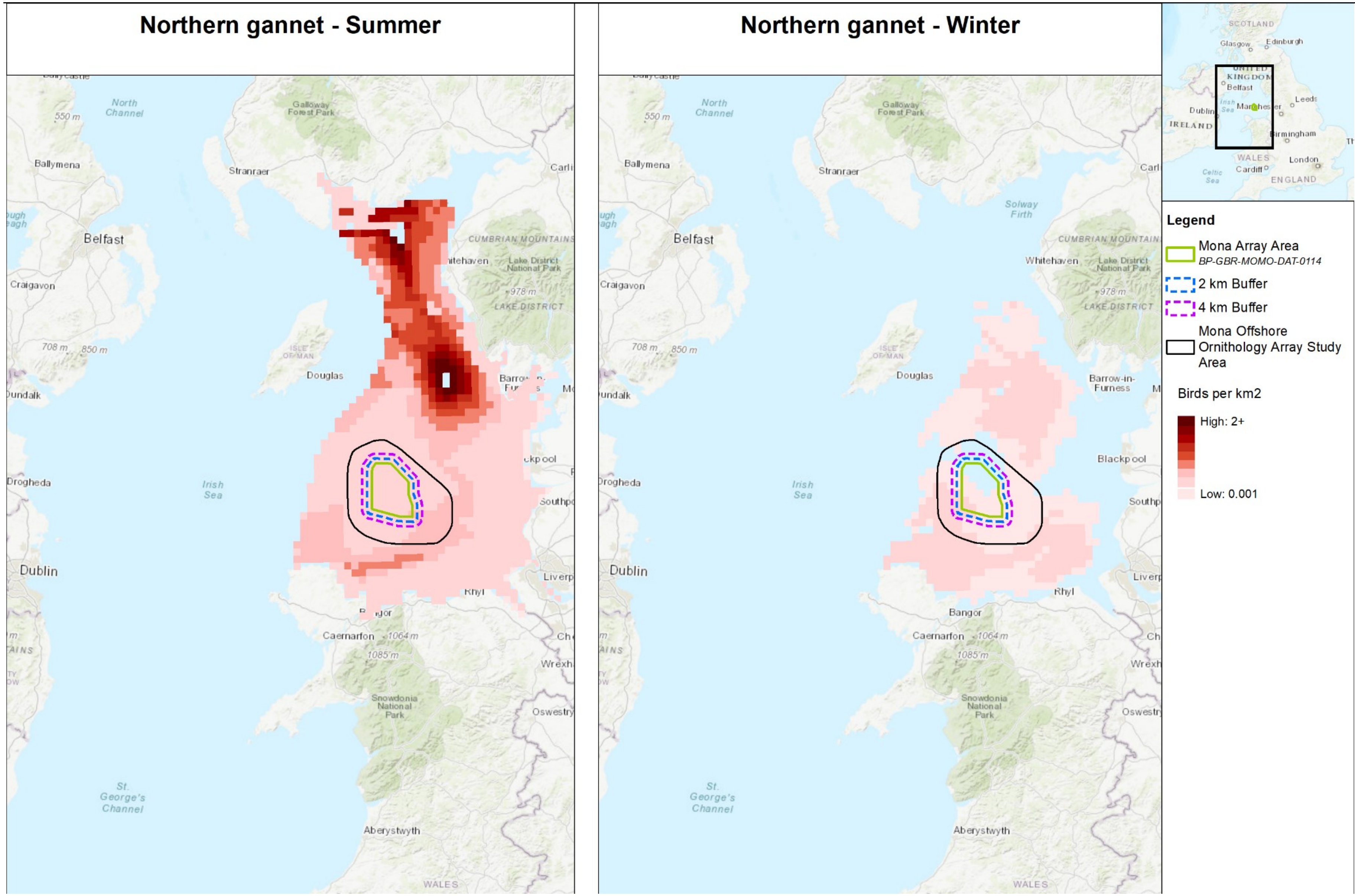

Figure 1.20: Spatial variation in predicted densities (animals per km^2) of Northern gannet per season (extracted from Bradbury *et al*. (2014)).

Telemetry data

1.4.2.58 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.

Site specific digital aerial survey results

1.4.2.59 As expected, abundance was low during the non-breeding season with the birds' departure to wintering grounds off West Africa. Out of those recorded during digital aerial surveys, on average 53.36% were observed in flight (Table 1.49).

Table 1.49: Northern gannet behaviours in birds observed during the surveys.

Survey	Flying	Sitting	Total	% Flying
2020-03	9	29	38	23.68
2020-04	7	12	19	36.84
2020-05	6	2	8	75.00
2020-06	8	5	13	61.54
2020-07	40	61	101	39.60
2020-08	27	51	78	34.62
2020-09	24	18	42	57.14
2020-10	26	15	41	63.41
2020-11	12	11	23	52.17
2020-12	1	0	1	100.00
2021-01	3	2	5	60.00
2021-02	0	0	0	0.00
2021-03	57	69	126	45.24
2021-04	29	59	88	32.95
2021-05	17	11	28	60.71
2021-06	24	14	38	63.16
2021-07	17	32	49	34.69
2021-08	37	29	66	56.06
2021-09	53	60	113	46.90
2021-10	24	34	58	41.38
2021-11	5	6	11	45.45
2021-12	2	0	2	100.00
2022-01	3	0	3	100.00
2022-02	3	3	6	50.00

1.4.2.60 In Year 1, the highest abundance in the Mona Array Area was recorded in July and August, with 140 individuals (95% range 96 to 188) and 86 (95% range 56 to 124) respectively. In contrast the highest abundance was recorded at the end of the breeding season in Year 2 with 206 individuals (95% range: 134 to 296) in September

2022 (Table 1.50). MRSea and design-based estimates for the Mona Array Area + 4 km and the Mona Offshore Ornithology Array Area study area can be found in Appendix C and Appendix DAppendix C respectively.

1.4.2.61 The distribution of northern gannet during the key breeding months was patchy, and the highest densities were found outside the Mona Array Area in all months (Figure 1.21). Upper and Lower confidence interval spatial distribution maps for northern gannet are provided in Appendix E.

1.4.2.62 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.

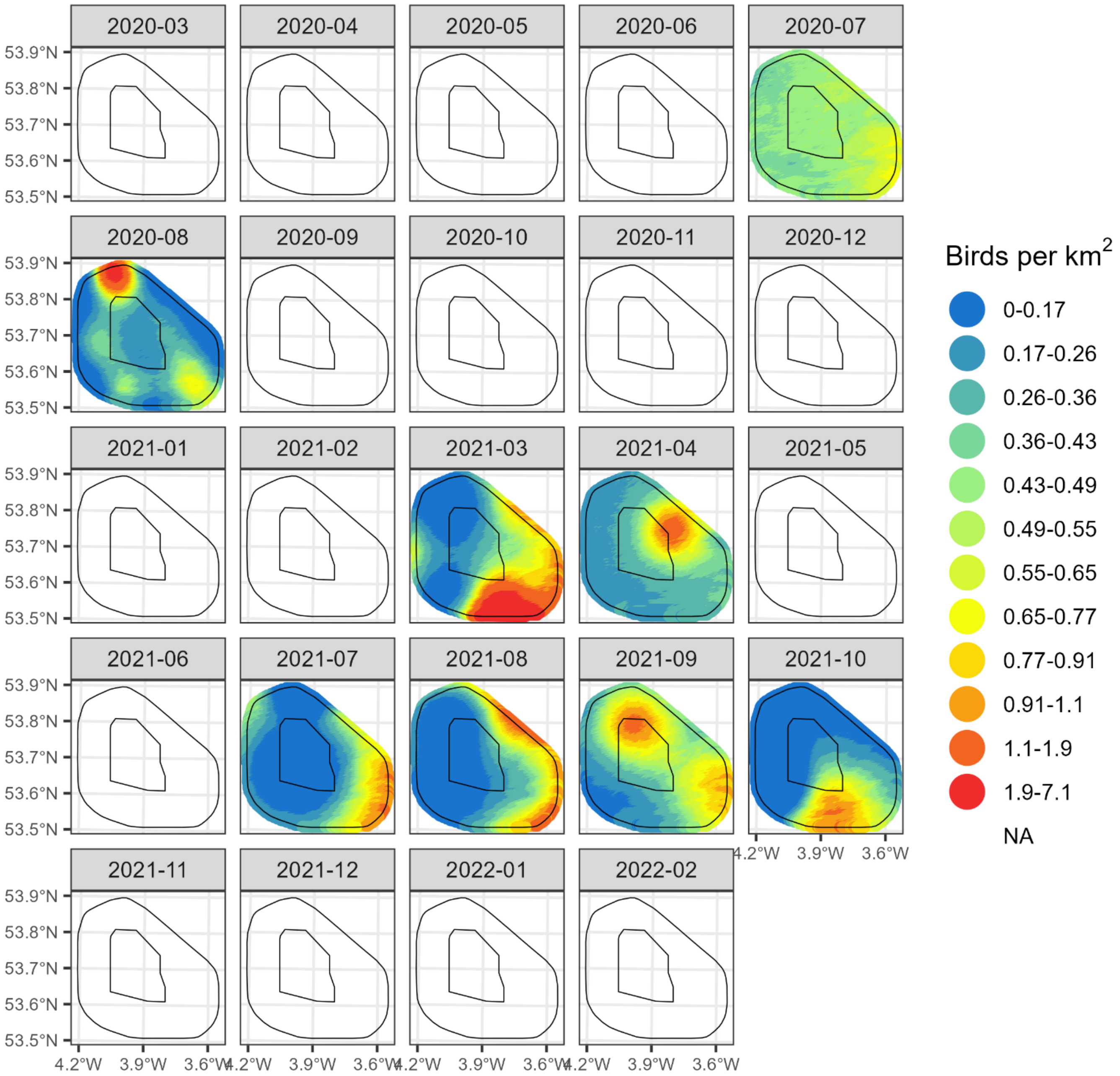

Figure 1.21: Northern gannet monthly densities (birds per km^2) and raw counts. Estimates are based on the MRSea model outputs.

Table 1.50: Northern gannet (all behaviour) design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	N/A	N/A	N/A	N/A	13 (0 to 30)	0.04 (0.00 to 0.10)	8.87	68.38%
1	Apr	N/A	N/A	N/A	N/A	46 (13 to 74)	0.15 (0.04 to 0.25)	16.78	36.57%
1	May	N/A	N/A	N/A	N/A	11 (0 to 26)	0.04 (0.00 to 0.09)	7.85	71.12%
1	Jun	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jul	140 (96 to 188)	0.47 (0.32 to 0.63)	23.65	16.90%	120 (63 to 192)	0.40 (0.21 to 0.64)	32.93	27.35%
1	Aug	86 (56 to 124)	0.29 (0.19 to 0.41)	17.34	20.05%	72 (25 to 114)	0.24 (0.08 to 0.38)	23.35	32.62%
1	Sep	N/A	N/A	N/A	N/A	19 (0 to 38)	0.06 (0.00 to 0.13)	10.71	55.52%
1	Oct	N/A	N/A	N/A	N/A	19 (0 to 39)	0.06 (0.00 to 0.13)	11.24	57.89%
1	Nov	N/A	N/A	N/A	N/A	20 (0 to 40)	0.07 (0.00 to 0.13)	11.23	56.72%
1	Dec	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jan	N/A	N/A	N/A	N/A	34 (7 to 61)	0.11 (0.02 to 0.21)	14.81	43.50%
1	Feb	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Mar	70 (38 to 115)	0.23 (0.13 to 0.38)	19.65	27.95%	39 (12 to 70)	0.13 (0.04 to 0.23)	15.80	40.28%
2	Apr	142 (94 to 200)	0.47 (0.31 to 0.67)	27.13	19.07%	128 (65 to 192)	0.43 (0.22 to 0.64)	32.45	25.41%
2	May	N/A	N/A	N/A	N/A	27 (6 to 53)	0.09 (0.02 to 0.18)	12.80	48.19%
2	Jun	N/A	N/A	N/A	N/A	13 (0 to 32)	0.04 (0.00 to 0.11)	9.53	70.75%
2	Jul	19 (8 to 37)	0.06 (0.03 to 0.12)	7.60	39.61%	32 (6 to 61)	0.11 (0.02 to 0.20)	14.76	45.48%
2	Aug	39 (18 to 70)	0.13 (0.06 to 0.23)	13.29	34.47%	26 (6 to 52)	0.09 (0.02 to 0.17)	13.17	49.98%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
2	Sep	206 (134 to 296)	0.69 (0.45 to 0.99)	41.42	20.07%	217 (134 to 308)	0.72 (0.45 to 1.03)	45.21	20.88%
2	Oct	56 (36 to 83)	0.19 (0.12 to 0.28)	11.98	21.47%	114 (67 to 170)	0.38 (0.22 to 0.57)	26.24	22.96%
2	Nov	N/A	N/A	N/A	N/A	13 (0 to 28)	0.04 (0.00 to 0.09)	8.80	67.99%
2	Dec	N/A	N/A	N/A	N/A	12 (0 to 38)	0.04 (0.00 to 0.13)	12.89	103.90%
2	Jan	N/A	N/A	N/A	N/A	6 (0 to 20)	0.02 (0.00 to 0.07)	6.57	101.88%
2	Feb	N/A	N/A	N/A	N/A	21 (0 to 42)	0.07 (0.00 to 0.14)	11.18	55.88%

Table 1.51: Northern gannet (sitting) design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	N/A	N/A	10 (0 to 23)	0.03 (0.00 to 0.08)
1	Apr	N/A	N/A	29 (8 to 47)	0.10 (0.03 to 0.16)
1	May	N/A	N/A	3 (0 to 7)	0.01 (0.00 to 0.02)
1	Jun	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	85 (58 to 114)	0.28 (0.19 to 0.38)	73 (38 to 116)	0.24 (0.13 to 0.39)
1	Aug	57 (37 to 81)	0.19 (0.12 to 0.27)	47 (16 to 75)	0.16 (0.05 to 0.25)
1	Sep	N/A	N/A	8 (0 to 16)	0.03 (0.00 to 0.05)
1	Oct	N/A	N/A	7 (0 to 14)	0.02 (0.00 to 0.05)
1	Nov	N/A	N/A	9 (0 to 19)	0.03 (0.00 to 0.06)
1	Dec	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	N/A	N/A	14 (3 to 25)	0.05 (0.01 to 0.08)

		MRSea estimates		Design-based estimates	
1	Feb	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Mar	39 (21 to 63)	0.13 (0.07 to 0.21)	21 (7 to 38)	0.07 (0.02 to 0.13)
2	Apr	95 (63 to 134)	0.32 (0.21 to 0.45)	86 (43 to 129)	0.29 (0.14 to 0.43)
2	May	N/A	N/A	10 (2 to 21)	0.03 (0.01 to 0.07)
2	Jun	N/A	N/A	5 (0 to 12)	0.02 (0.00 to 0.04)
2	Jul	13 (5 to 24)	0.04 (0.02 to 0.08)	21 (4 to 40)	0.07 (0.01 to 0.13)
2	Aug	17 (8 to 31)	0.06 (0.03 to 0.10)	12 (3 to 23)	0.04 (0.01 to 0.08)
2	Sep	110 (71 to 157)	0.37 (0.24 to 0.52)	115 (71 to 164)	0.38 (0.24 to 0.55)
2	Oct	33 (21 to 49)	0.11 (0.07 to 0.16)	67 (39 to 99)	0.22 (0.13 to 0.33)
2	Nov	N/A	N/A	7 (0 to 15)	0.02 (0.00 to 0.05)
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	11 (0 to 21)	0.04 (0.00 to 0.07)

Table 1.52: Northern gannet (flying) design-based and MRSea population estimates in the Mona Array Area.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	N/A	N/A	3 (0 to 7)	0.01 (0.00 to 0.02)
1	Apr	N/A	N/A	17 (5 to 27)	0.06 (0.02 to 0.09)
1	May	N/A	N/A	8 (0 to 20)	0.03 (0.00 to 0.07)
1	Jun	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jul	55 (38 to 75)	0.18 (0.13 to 0.17)	48 (25 to 76)	0.16 (0.08 to 0.25)
1	Aug	30 (19 to 43)	0.10 (0.06 to 0.20)	25 (9 to 40)	0.08 (0.03 to 0.13)

		MRSea estimates		Design-based estimates	
1	Sep	N/A	N/A	11 (0 to 22)	0.04 (0.00 to 0.07)
1	Oct	N/A	N/A	12 (0 to 25)	0.04 (0.00 to 0.08)
1	Nov	N/A	N/A	10 (0 to 21)	0.03 (0.00 to 0.07)
1	Dec	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	N/A	N/A	20 (4 to 37)	0.07 (0.01 to 0.12)
1	Feb	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Mar	32 (17 to 52)	0.11 (0.06 to 0.28)	18 (6 to 32)	0.06 (0.02 to 0.11)
2	Apr	47 (31 to 66)	0.16 (0.10 to 0.19)	42 (21 to 63)	0.14 (0.07 to 0.21)
2	May	N/A	N/A	16 (4 to 32)	0.05 (0.01 to 0.11)
2	Jun	N/A	N/A	9 (0 to 20)	0.03 (0.00 to 0.07)
2	Jul	7 (3 to 13)	0.02 (0.01 to 0.40)	11 (2 to 21)	0.04 (0.01 to 0.07)
2	Aug	22 (10 to 39)	0.07 (0.03 to 0.34)	15 (3 to 29)	0.05 (0.01 to 0.10)
2	Sep	97 (63 to 139)	0.32 (0.21 to 0.20)	102 (63 to 144)	0.34 (0.21 to 0.48)
2	Oct	23 (15 to 34)	0.08 (0.05 to 0.21)	47 (28 to 70)	0.16 (0.09 to 0.23)
2	Nov	N/A	N/A	6 (0 to 13)	0.02 (0.00 to 0.04)
2	Dec	N/A	N/A	12 (0 to 38)	0.04 (0.00 to 0.13)
2	Jan	N/A	N/A	6 (0 to 20)	0.02 (0.00 to 0.07)
2	Feb	N/A	N/A	11 (0 to 21)	0.04 (0.00 to 0.07)

Table 1.53: Northern gannet (all behaviour) design-based and MRSea population estimates in the Mona Array Area + 2 km buffer.

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	N/A	N/A	N/A	N/A	77 (31 to 124)	0.17 (0.07 to 0.28)	24.91	32.53%
1	Apr	N/A	N/A	N/A	N/A	52 (19 to 83)	0.12 (0.04 to 0.19)	17.39	33.50%
1	May	N/A	N/A	N/A	N/A	11 (0 to 27)	0.02 (0.00 to 0.06)	7.90	71.00%
1	Jun	N/A	N/A	N/A	N/A	13 (0 to 32)	0.03 (0.00 to 0.07)	9.28	70.03%
1	Jul	209 (142 to 282)	0.46 (0.32 to 0.63)	35.60	17.07%	185 (113 to 260)	0.41 (0.25 to 0.58)	38.63	20.84%
1	Aug	144 (91 to 211)	0.32 (0.20 to 0.47)	30.72	21.30%	164 (88 to 229)	0.36 (0.20 to 0.51)	36.13	22.04%
1	Sep	N/A	N/A	N/A	N/A	26 (6 to 50)	0.06 (0.01 to 0.11)	12.32	47.70%
1	Oct	N/A	N/A	N/A	N/A	26 (6 to 52)	0.06 (0.01 to 0.11)	13.12	50.36%
1	Nov	N/A	N/A	N/A	N/A	26 (6 to 53)	0.06 (0.01 to 0.12)	12.84	49.02%
1	Dec	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jan	N/A	N/A	N/A	N/A	34 (6 to 61)	0.08 (0.01 to 0.14)	14.69	43.47%
1	Feb	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Mar	117 (64 to 191)	0.26 (0.14 to 0.43)	32.38	27.62%	65 (25 to 103)	0.14 (0.06 to 0.23)	20.17	31.09%
2	Apr	212 (138 to 302)	0.47 (0.31 to 0.67)	41.97	19.81%	219 (144 to 303)	0.49 (0.32 to 0.68)	42.11	19.24%
2	May	N/A	N/A	N/A	N/A	59 (26 to 95)	0.13 (0.06 to 0.21)	19.04	32.52%
2	Jun	N/A	N/A	N/A	N/A	13 (0 to 32)	0.03 (0.00 to 0.07)	9.48	70.63%
2	Jul	34 (15 to 64)	0.08 (0.03 to 0.14)	12.53	36.68%	45 (13 to 78)	0.10 (0.03 to 0.17)	17.73	39.33%
2	Aug	66 (30 to 121)	0.15 (0.07 to 0.27)	23.02	35.12%	58 (25 to 97)	0.13 (0.05 to 0.22)	19.25	33.51%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
2	Sep	293 (188 to 422)	0.65 (0.42 to 0.94)	59.55	20.35%	301 (198 to 396)	0.67 (0.44 to 0.88)	51.13	16.97%
2	Oct	89 (59 to 131)	0.20 (0.13 to 0.29)	18.56	20.87%	127 (75 to 179)	0.28 (0.17 to 0.40)	27.15	21.45%
2	Nov	N/A	N/A	N/A	N/A	13 (0 to 27)	0.03 (0.00 to 0.06)	8.76	68.00%
2	Dec	N/A	N/A	N/A	N/A	12 (0 to 38)	0.03 (0.00 to 0.09)	12.88	103.80%
2	Jan	N/A	N/A	N/A	N/A	6 (0 to 20)	0.01 (0.00 to 0.04)	6.53	101.85%
2	Feb	N/A	N/A	N/A	N/A	21 (0 to 42)	0.05 (0.00 to 0.09)	11.15	55.87%

Table 1.54: Northern gannet (sitting) design-based and MRSea population estimates in the Mona Array Area + 2 km buffer.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	N/A	N/A	58 (23 to 95)	0.13 (0.05 to 0.21)
1	Apr	N/A	N/A	33 (12 to 53)	0.07 (0.03 to 0.12)
1	May	N/A	N/A	3 (0 to 7)	0.01 (0.00 to 0.01)
1	Jun	N/A	N/A	5 (0 to 12)	0.01 (0.00 to 0.03)
1	Jul	126 (86 to 170)	0.28 (0.19 to 0.38)	112 (68 to 157)	0.25 (0.15 to 0.35)
1	Aug	94 (59 to 138)	0.21 (0.13 to 0.31)	107 (58 to 150)	0.24 (0.13 to 0.33)
1	Sep	N/A	N/A	11 (3 to 22)	0.02 (0.01 to 0.05)
1	Oct	N/A	N/A	10 (2 to 19)	0.02 (0.00 to 0.04)
1	Nov	N/A	N/A	13 (3 to 25)	0.03 (0.01 to 0.06)
1	Dec	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	N/A	N/A	14 (3 to 24)	0.03 (0.01 to 0.05)
1	Feb	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)

		MRSea estimates		Design-based estimates	
2	Mar	64 (35 to 105)	0.14 (0.08 to 0.23)	36 (14 to 56)	0.08 (0.03 to 0.13)
2	Apr	142 (92 to 203)	0.32 (0.21 to 0.45)	147 (96 to 203)	0.33 (0.21 to 0.45)
2	May	N/A	N/A	23 (10 to 37)	0.05 (0.02 to 0.08)
2	Jun	N/A	N/A	5 (0 to 12)	0.01 (0.00 to 0.03)
2	Jul	22 (10 to 42)	0.05 (0.02 to 0.09)	29 (8 to 51)	0.07 (0.02 to 0.11)
2	Aug	29 (13 to 53)	0.06 (0.03 to 0.12)	25 (11 to 42)	0.06 (0.02 to 0.09)
2	Sep	155 (100 to 224)	0.35 (0.22 to 0.50)	160 (105 to 210)	0.36 (0.23 to 0.47)
2	Oct	52 (34 to 77)	0.12 (0.08 to 0.17)	74 (44 to 105)	0.17 (0.10 to 0.23)
2	Nov	N/A	N/A	7 (0 to 15)	0.02 (0.00 to 0.03)
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	11 (0 to 21)	0.02 (0.00 to 0.05)

Table 1.55: Northern gannet (flying) design-based and MRSea population estimates in the Mona Array Area + 2 km buffer.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	N/A	N/A	18 (7 to 29)	0.04 (0.02 to 0.07)
1	Apr	N/A	N/A	19 (7 to 31)	0.04 (0.02 to 0.07)
1	May	N/A	N/A	8 (0 to 20)	0.02 (0.00 to 0.04)
1	Jun	N/A	N/A	8 (0 to 20)	0.02 (0.00 to 0.04)
1	Jul	83 (56 to 112)	0.18 (0.13 to 0.17)	73 (45 to 103)	0.16 (0.10 to 0.23)
1	Aug	50 (31 to 73)	0.11 (0.07 to 0.21)	57 (30 to 79)	0.13 (0.07 to 0.18)
1	Sep	N/A	N/A	15 (4 to 29)	0.03 (0.01 to 0.06)

		MRSea estimates		Design-based estimates	
1	Oct	N/A	N/A	17 (4 to 33)	0.04 (0.01 to 0.07)
1	Nov	N/A	N/A	14 (3 to 27)	0.03 (0.01 to 0.06)
1	Dec	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jan	N/A	N/A	20 (4 to 37)	0.05 (0.01 to 0.08)
1	Feb	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Mar	53 (29 to 87)	0.12 (0.06 to 0.28)	29 (11 to 47)	0.07 (0.03 to 0.10)
2	Apr	70 (45 to 100)	0.16 (0.10 to 0.20)	72 (47 to 100)	0.16 (0.11 to 0.22)
2	May	N/A	N/A	36 (16 to 58)	0.08 (0.03 to 0.13)
2	Jun	N/A	N/A	8 (0 to 20)	0.02 (0.00 to 0.04)
2	Jul	12 (5 to 22)	0.03 (0.01 to 0.37)	16 (4 to 27)	0.03 (0.01 to 0.06)
2	Aug	37 (17 to 68)	0.08 (0.04 to 0.35)	32 (14 to 54)	0.07 (0.03 to 0.12)
2	Sep	137 (88 to 198)	0.31 (0.20 to 0.20)	141 (93 to 186)	0.31 (0.21 to 0.41)
2	Oct	37 (24 to 54)	0.08 (0.05 to 0.21)	52 (31 to 74)	0.12 (0.07 to 0.16)
2	Nov	N/A	N/A	6 (0 to 12)	0.01 (0.00 to 0.03)
2	Dec	N/A	N/A	12 (0 to 38)	0.03 (0.00 to 0.09)
2	Jan	N/A	N/A	6 (0 to 20)	0.01 (0.00 to 0.04)
2	Feb	N/A	N/A	11 (0 to 21)	0.04 (0.02 to 0.07)

Black-legged kittiwake

Desk-based data

1.4.2.63 Black-legged kittiwake belong to the group of small gulls in Britain and Ireland. Black-legged kittiwake are the most oceanic species of gulls and are mainly present far offshore during non-breeding periods. During the breeding season, this species nest on sheer cliffs but can also be found in man-made structures such as buildings, bridges, or offshore oil installations. Although black-legged kittiwakes are the most abundant gull species with approximately 205,000 pairs, they are included in the red list in the Birds of Conservation concern 5 (Stanbury *et al*., 2021).

1.4.2.64 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.

1.4.2.65 Although distribution in Waggitt *et al*. (2020) was similar during the non-breeding season, there was a net increase in densities across the area (Figure 1.22), 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 1.23).

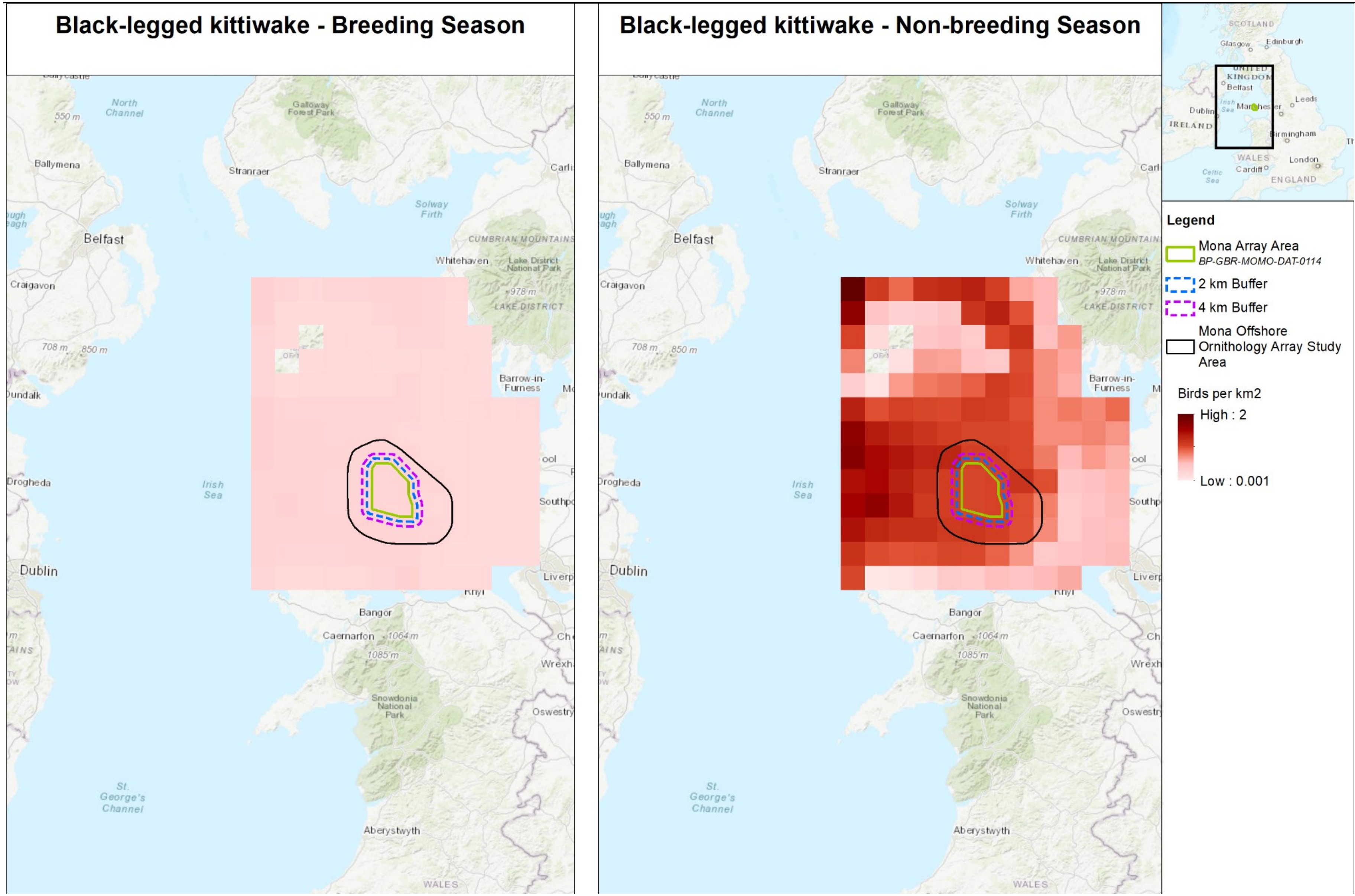

Figure 1.22: Spatial variation in predicted densities (animals per km²) of black-legged kittiwake per season (data extracted from Waggitt *et al.* (2020)).

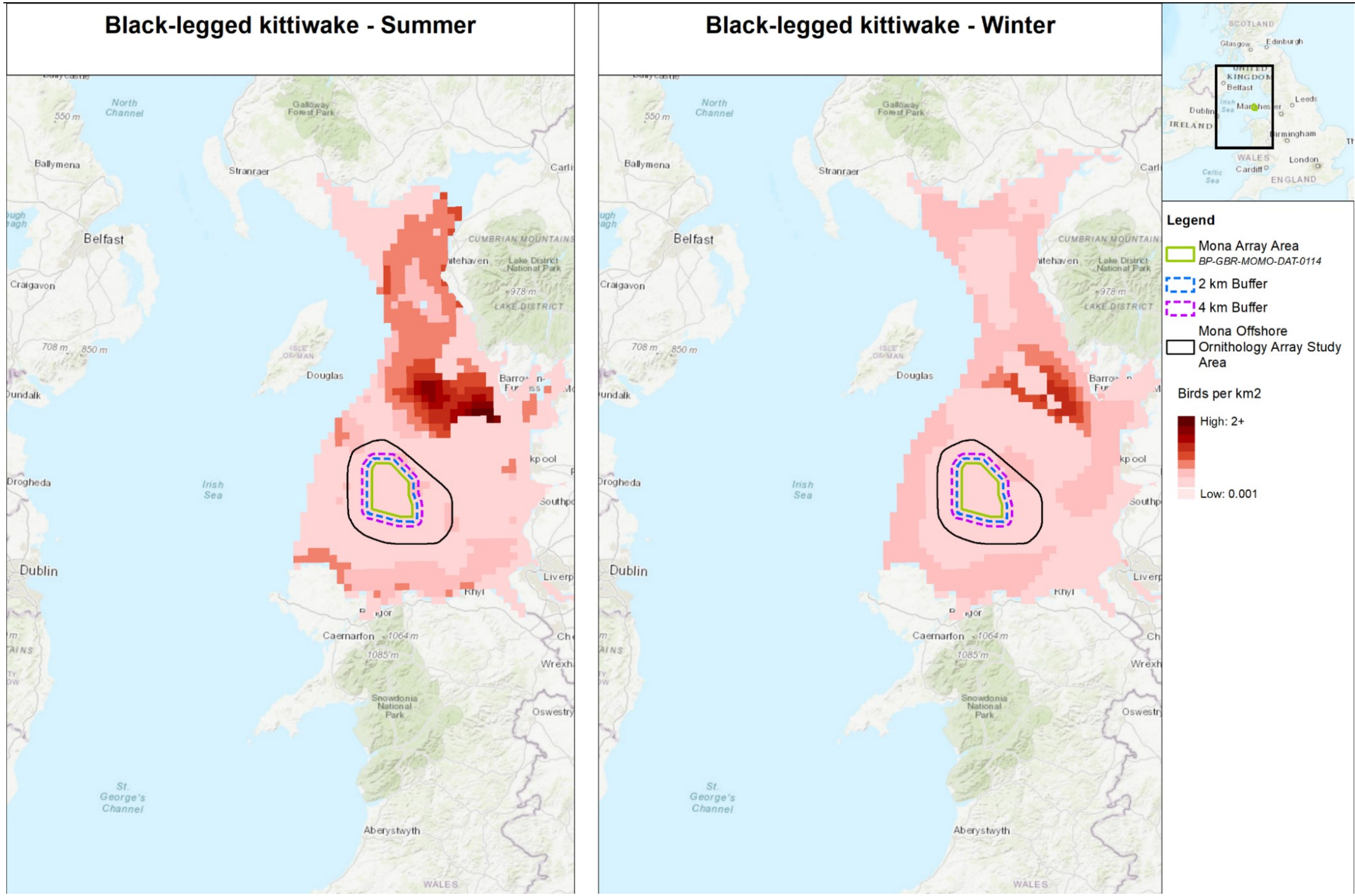

Figure 1.23: Spatial variation in predicted densities (animals per km^2) of black-legged kittiwake per season (data extracted from Bradbury *et al.* (2014)).

Telemetry data

1.4.2.66 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 (~200 km). 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.

Site specific digital aerial survey results

1.4.2.67 Black-legged kittiwake was the most abundant gull species recorded, with a total raw count of 3,466 observations across all surveys in the Mona Offshore Ornithology Array Area study area consisting of the Mona Array Area plus a buffer zone extending 7 km to 16.5 km of the array area. They are one of the more airborne species, with an average percentage of flying birds of 71.95% (Table 1.56).

Table 1.56: Black-legged kittiwake behaviours in birds observed during the surveys within the Mona Offshore Ornithology Array Area study.

Survey	Flying	Sitting	Total	% Flying
2020-03	186	169	355	52.39
2020-04	22	39	61	36.07
2020-05	9	1	10	90.00
2020-06	90	31	121	74.38
2020-07	51	6	57	89.47
2020-08	13	8	21	61.90
2020-09	14	6	20	70.00
2020-10	5	1	6	83.33
2020-11	133	35	168	79.17
2020-12	82	20	102	80.39
2021-01	103	29	132	78.03
2021-02	80	19	99	80.81
2021-03	377	236	613	61.50
2021-04	125	87	212	58.96
2021-05	51	3	54	94.44
2021-06	46	45	91	50.55
2021-07	147	128	275	53.45
2021-08	2	0	2	100.00
2021-09	3	1	4	75.00
2021-10	17	5	22	77.27
2021-11	66	12	78	84.62
2021-12	303	50	353	85.84
2022-01	132	144	276	47.83
2022-02	205	129	334	61.38

1.4.2.68 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) and the predicted distribution within the Mona Array Area appeared to be variable, with high inter-month variability recorded (Figure 1.24). Black-legged kittiwake were also present in moderate numbers throughout the non-breeding season, in particular in year two of the digital aerial survey. Upper and Lower confidence interval spatial distribution maps for black-legged kittiwake are provided in Appendix F.

1.4.2.69 MRSea estimates for monthly black-legged kittiwake numbers in the Mona Array Area peaked at 540 individuals (95% CI range: 397 to 715) in March 2021. This figure was validated by the design-based estimate of 635 individuals (95% CI range: 475 to 812). MRSea estimates for the Mona Array Area + 4 km and the Mona Offshore Ornithology Array Area study area can be found in Appendix C, while design-based estimates can be found in Appendix D.

1.4.2.70 Estimates (both MRSea and design-based) for each behaviour (sitting, flying and all behaviour) are given for the Mona Array Area and the Mona Array Area + 2 km (Table 1.57 to Table 1.62).

1.4.2.71 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 aireal surveys corroborated these findings.

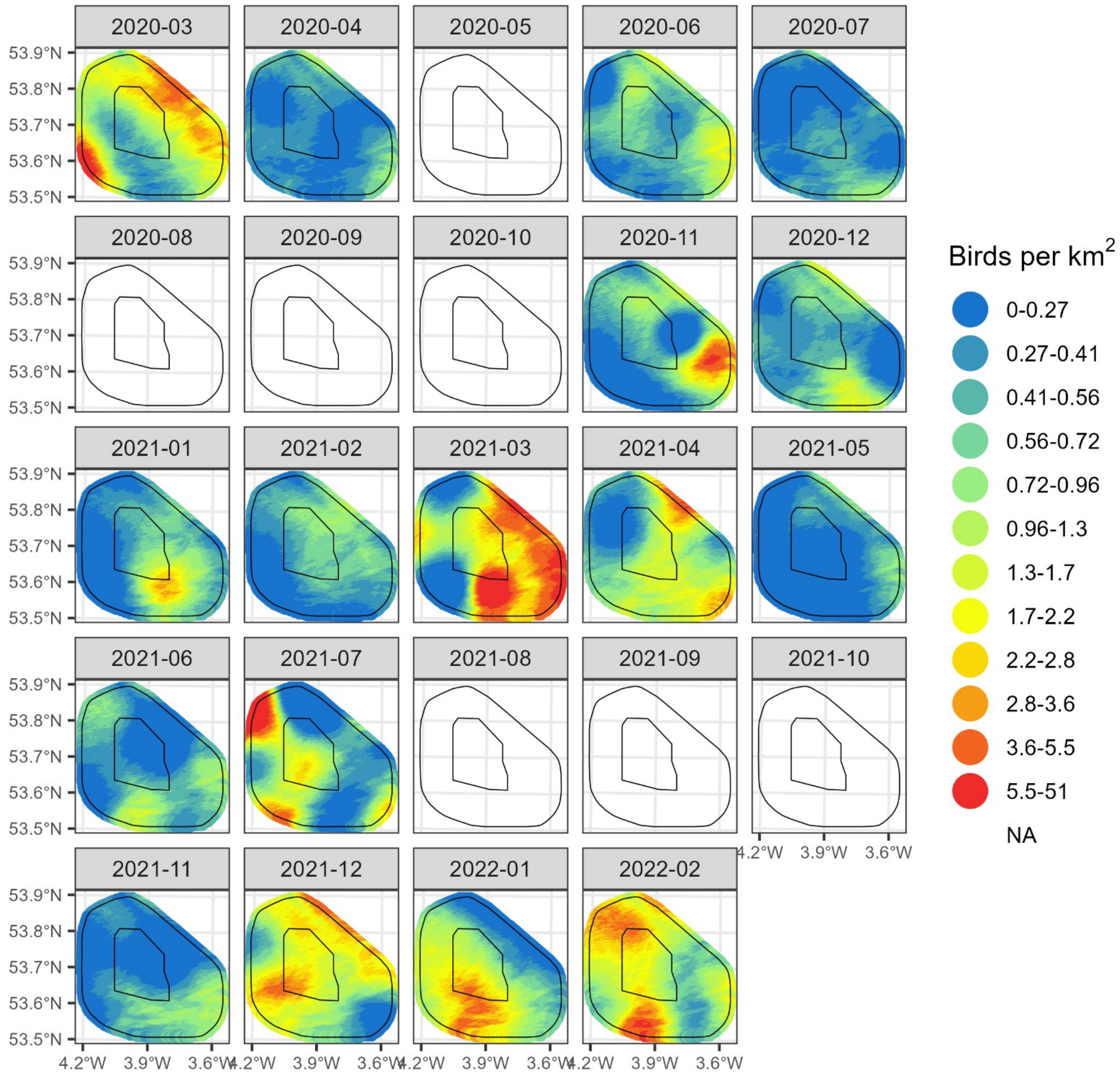

Figure 1.24: Black-legged kittiwake monthly densities (birds per km^2) and raw counts. Estimates are based on the MRSea model outputs.

Table 1.57: Black-legged kittiwake (all behaviour) design-based and MRSea population estimates (Pop) and Density (D) within the Mona Array Area.

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	347 (215 to 520)	1.16 (0.72 to 1.73)	77.69	22.36%	264 (166 to 362)	0.88 (0.55 to 1.21)	52.75	19.97%
1	Apr	90 (60 to 125)	0.30 (0.20 to 0.42)	16.75	18.69%	57 (21 to 97)	0.19 (0.06 to 0.32)	18.61	35.15%
1	May	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jun	182 (124 to 253)	0.61 (0.41 to 0.85)	32.98	18.08%	120 (63 to 180)	0.40 (0.20 to 0.60)	28.86	25.51%
1	Jul	88 (56 to 129)	0.29 (0.19 to 0.43)	18.62	21.13%	94 (45 to 146)	0.31 (0.15 to 0.49)	26.32	28.06%
1	Aug	N/A	N/A	N/A	N/A	21 (0 to 42)	0.07 (0.00 to 0.14)	11.67	58.25%
1	Sep	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Oct	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	167 (101 to 253)	0.56 (0.34 to 0.84)	38.77	23.23%	125 (70 to 182)	0.42 (0.23 to 0.61)	29.56	23.77%
1	Dec	138 (81 to 210)	0.46 (0.27 to 0.70)	32.71	23.71%	129 (68 to 191)	0.43 (0.22 to 0.64)	29.16	23.62%
1	Jan	177 (128 to 235)	0.59 (0.43 to 0.78)	27.10	15.29%	163 (86 to 235)	0.54 (0.28 to 0.78)	38.64	23.89%
1	Feb	178 (123 to 242)	0.60 (0.41 to 0.81)	30.28	16.97%	164 (96 to 227)	0.55 (0.31 to 0.76)	33.41	20.82%
2	Mar	540 (397 to 715)	1.80 (1.32 to 2.38)	81.15	15.04%	635 (475 to 812)	2.12 (1.58 to 2.71)	86.31	13.61%
2	Apr	246 (171 to 332)	0.82 (0.57 to 1.11)	41.11	16.68%	271 (178 to 361)	0.90 (0.59 to 1.20)	47.29	17.46%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
2	May	66 (34 to 110)	0.22 (0.11 to 0.37)	19.32	29.12%	54 (13 to 104)	0.18 (0.04 to 0.35)	25.09	46.59%
2	Jun	71 (42 to 113)	0.24 (0.14 to 0.38)	18.08	25.29%	34 (6 to 59)	0.11 (0.02 to 0.20)	14.30	42.68%
2	Jul	321 (184 to 511)	1.07 (0.61 to 1.70)	83.38	25.94%	340 (163 to 505)	1.13 (0.54 to 1.68)	89.70	26.68%
2	Aug	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Sep	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	N/A	N/A	N/A	N/A	21 (0 to 43)	0.07 (0.00 to 0.14)	11.76	58.17%
2	Nov	67 (38 to 107)	0.22 (0.13 to 0.36)	17.69	26.54%	40 (6 to 68)	0.13 (0.02 to 0.23)	16.12	41.78%
2	Dec	596 (398 to 856)	1.99 (1.33 to 2.86)	116.93	19.62%	605 (431 to 819)	2.02 (1.44 to 2.73)	103.50	17.13%
2	Jan	450 (277 to 688)	1.50 (0.93 to 2.29)	104.75	23.29%	604 (445 to 796)	2.02 (1.46 to 2.65)	89.48	15.08%
2	Feb	587 (414 to 809)	1.96 (1.38 to 2.70)	100.99	17.21%	610 (459 to 778)	2.04 (1.40 to 2.60)	74.93	13.47%

Table 1.58: Black-legged kittiwake (sitting) design-based and MRSea population estimates (Pop) and Density (D) within the Mona Array Area.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	165 (103 to 248)	0.55 (0.34 to 0.83)	126 (79 to 172)	0.42 (0.26 to 0.58)
1	Apr	57 (38 to 80)	0.19 (0.13 to 0.27)	37 (13 to 62)	0.12 (0.04 to 0.21)
1	May	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	47 (32 to 65)	0.16 (0.11 to 0.22)	31 (16 to 46)	0.10 (0.05 to 0.15)
1	Jul	9 (6 to 14)	0.03 (0.02 to 0.05)	10 (5 to 15)	0.03 (0.02 to 0.05)
1	Aug	N/A	N/A	8 (0 to 16)	0.03 (0.00 to 0.05)
1	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	35 (21 to 53)	0.12 (0.07 to 0.18)	26 (15 to 38)	0.09 (0.05 to 0.13)
1	Dec	27 (16 to 41)	0.09 (0.05 to 0.14)	25 (13 to 37)	0.08 (0.04 to 0.12)
1	Jan	39 (28 to 52)	0.13 (0.09 to 0.17)	36 (19 to 52)	0.12 (0.06 to 0.17)
1	Feb	34 (24 to 46)	0.11 (0.08 to 0.15)	32 (19 to 43)	0.11 (0.06 to 0.15)
2	Mar	208 (153 to 275)	0.69 (0.51 to 0.92)	245 (183 to 312)	0.82 (0.61 to 1.04)
2	Apr	101 (70 to 136)	0.34 (0.23 to 0.45)	111 (73 to 148)	0.37 (0.24 to 0.49)
2	May	4 (2 to 6)	0.01 (0.01 to 0.02)	3 (1 to 6)	0.01 (0.00 to 0.02)
2	Jun	35 (21 to 56)	0.12 (0.07 to 0.19)	17 (3 to 29)	0.06 (0.01 to 0.10)
2	Jul	150 (86 to 238)	0.50 (0.29 to 0.79)	158 (76 to 235)	0.53 (0.25 to 0.78)
2	Aug	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	N/A	N/A	5 (0 to 10)	0.02 (0.00 to 0.03)
2	Nov	10 (6 to 16)	0.03 (0.02 to 0.05)	6 (1 to 10)	0.02 (0.00 to 0.03)

		MRSea estimates		Design-based estimates	
2	Dec	84 (56 to 121)	0.28 (0.19 to 0.40)	86 (61 to 116)	0.29 (0.20 to 0.39)
2	Jan	235 (145 to 359)	0.78 (0.48 to 1.20)	315 (232 to 415)	1.05 (0.77 to 1.38)
2	Feb	227 (160 to 313)	0.76 (0.53 to 1.04)	236 (177 to 301)	0.42 (0.26 to 0.58)

Table 1.59: Black-legged kittiwake (flying) design-based and MRSea population estimates (Pop) and Density (D) within the Mona Array Area.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	182 (113 to 272)	0.61 (0.38 to 0.22)	138 (87 to 190)	0.46 (0.29 to 0.63)
1	Apr	32 (22 to 45)	0.11 (0.07 to 0.19)	21 (7 to 35)	0.07 (0.02 to 0.12)
1	May	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Jun	136 (92 to 188)	0.45 (0.31 to 0.18)	89 (47 to 134)	0.30 (0.16 to 0.45)
1	Jul	79 (50 to 115)	0.26 (0.17 to 0.21)	84 (40 to 130)	0.28 (0.13 to 0.44)
1	Aug	N/A	N/A	13 (0 to 26)	0.04 (0.00 to 0.09)
1	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	132 (80 to 200)	0.44 (0.27 to 0.23)	99 (56 to 144)	0.33 (0.19 to 0.48)
1	Dec	111 (66 to 169)	0.37 (0.22 to 0.24)	104 (54 to 153)	0.35 (0.18 to 0.51)
1	Jan	138 (100 to 183)	0.46 (0.33 to 0.15)	127 (67 to 183)	0.42 (0.22 to 0.61)
1	Feb	144 (100 to 195)	0.48 (0.33 to 0.17)	133 (78 to 183)	0.44 (0.26 to 0.61)
2	Mar	332 (244 to 440)	1.11 (0.81 to 0.15)	391 (292 to 499)	1.30 (0.97 to 1.66)
2	Apr	145 (101 to 196)	0.48 (0.34 to 0.17)	160 (105 to 213)	0.53 (0.35 to 0.71)
2	May	63 (32 to 104)	0.21 (0.11 to 0.29)	51 (12 to 98)	0.17 (0.04 to 0.33)

		MRSea estimates		Design-based estimates	
2	Jun	36 (21 to 57)	0.12 (0.07 to 0.25)	17 (3 to 30)	0.06 (0.01 to 0.10)
2	Jul	172 (98 to 273)	0.57 (0.33 to 0.26)	182 (87 to 270)	0.61 (0.29 to 0.90)
2	Aug	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	N/A	N/A	16 (0 to 33)	0.05 (0.00 to 0.11)
2	Nov	56 (32 to 91)	0.19 (0.11 to 0.27)	34 (5 to 57)	0.11 (0.02 to 0.19)
2	Dec	511 (342 to 735)	1.71 (1.14 to 0.20)	519 (370 to 703)	1.73 (1.23 to 2.35)
2	Jan	215 (133 to 329)	0.72 (0.44 to 0.23)	289 (213 to 380)	0.96 (0.71 to 1.27)
2	Feb	360 (254 to 497)	1.20 (0.85 to 0.17)	375 (282 to 478)	0.46 (0.29 to 0.63)

Table 1.60: Black-legged kittiwake (all behaviour) design-based and MRSea population estimates (Pop) and Density (D) within the Mona Array Area + 2 km buffer.

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
Year	Month	Pop	D	SD	CV	Pop	D	SD	CV
1	Mar	548 (337 to 822)	1.22 (0.75 to 1.83)	123.69	22.57%	657 (482 to 847)	1.46 (1.07 to 1.88)	96.78	14.73%
1	Apr	132 (85 to 190)	0.29 (0.19 to 0.42)	26.67	20.18%	92 (41 to 145)	0.21 (0.08 to 0.32)	25.52	29.90%
1	May	N/A	N/A	N/A	N/A	5 (0 to 16)	0.01 (0.00 to 0.04)	5.29	97.08%
1	Jun	264 (176 to 374)	0.59 (0.39 to 0.83)	50.52	19.12%	216 (146 to 297)	0.48 (0.31 to 0.66)	38.17	18.70%
1	Jul	127 (80 to 188)	0.28 (0.18 to 0.42)	27.44	21.55%	120 (64 to 178)	0.27 (0.14 to 0.40)	29.86	24.87%
1	Aug	N/A	N/A	N/A	N/A	55 (20 to 92)	0.12 (0.04 to 0.20)	18.66	35.65%
1	Sep	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
1	Oct	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	242 (146 to 367)	0.54 (0.32 to 0.82)	56.52	23.40%	204 (130 to 279)	0.45 (0.29 to 0.62)	37.89	18.69%
1	Dec	214 (126 to 326)	0.48 (0.28 to 0.73)	50.93	23.81%	163 (97 to 228)	0.36 (0.20 to 0.51)	32.84	21.15%
1	Jan	287 (204 to 385)	0.64 (0.45 to 0.86)	46.10	16.06%	324 (225 to 432)	0.72 (0.50 to 0.96)	51.93	16.15%
1	Feb	258 (175 to 356)	0.57 (0.39 to 0.79)	45.96	17.80%	250 (175 to 335)	0.56 (0.38 to 0.75)	40.89	16.73%
2	Mar	907 (644 to 1,239)	2.02 (1.43 to 2.76)	151.74	16.73%	917 (733 to 1,127)	2.04 (1.63 to 2.51)	100.31	10.95%
2	Apr	391 (274 to 526)	0.87 (0.61 to 1.17)	64.40	16.46%	395 (281 to 503)	0.88 (0.63 to 1.12)	57.40	14.54%
2	May	99 (51 to 167)	0.22 (0.11 to 0.37)	29.52	29.75%	86 (32 to 147)	0.19 (0.07 to 0.33)	30.50	35.35%
2	Jun	124 (73 to 195)	0.28 (0.16 to 0.43)	31.23	25.26%	60 (25 to 97)	0.13 (0.06 to 0.22)	19.30	32.07%
2	Jul	445 (240 to 744)	0.99 (0.53 to 1.66)	128.55	28.87%	404 (225 to 587)	0.90 (0.50 to 1.31)	93.46	23.35%
2	Aug	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Sep	N/A	N/A	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	N/A	N/A	N/A	N/A	28 (7 to 56)	0.06 (0.01 to 0.13)	13.37	50.28%
2	Nov	112 (65 to 179)	0.25 (0.14 to 0.40)	29.07	25.95%	79 (39 to 128)	0.18 (0.08 to 0.29)	22.61	29.45%
2	Dec	879 (574 to 1,285)	1.96 (1.28 to 2.86)	181.40	20.65%	1,082 (812 to 1,351)	2.41 (1.80 to 3.01)	138.56	12.82%
2	Jan	676 (428 to 1,014)	1.50 (0.95 to 2.26)	149.42	22.11%	750 (574 to 952)	1.67 (1.25 to 2.12)	96.78	13.15%

		MRSea estimates		Standard Deviation	Coefficient of Variation	Design-based estimates		Standard Deviation	Coefficient of Variation
2	Feb	861 (592 to 1,208)	1.92 (1.32 to 2.69)	157.20	18.27%	829 (623 to 994)	1.84 (1.26 to 2.21)	86.15	11.41%

Table 1.61: Black-legged kittiwake (sitting) design-based and MRSea population estimates (Pop) and Density (D) within the Mona Array Area+ 2 km buffer.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	261 (160 to 391)	0.58 (0.36 to 0.87)	313 (229 to 403)	0.70 (0.51 to 0.90)
1	Apr	84 (55 to 121)	0.19 (0.12 to 0.27)	59 (26 to 93)	0.13 (0.06 to 0.21)
1	May	N/A	N/A	1 (0 to 2)	0.00 (0.00 to 0.00)
1	Jun	68 (45 to 96)	0.15 (0.10 to 0.21)	55 (37 to 76)	0.12 (0.08 to 0.17)
1	Jul	13 (8 to 20)	0.03 (0.02 to 0.04)	13 (7 to 19)	0.03 (0.02 to 0.04)
1	Aug	N/A	N/A	21 (8 to 35)	0.05 (0.02 to 0.08)
1	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	50 (30 to 76)	0.11 (0.07 to 0.17)	42 (27 to 58)	0.09 (0.06 to 0.13)
1	Dec	42 (25 to 64)	0.09 (0.06 to 0.14)	32 (19 to 45)	0.07 (0.04 to 0.10)
1	Jan	63 (45 to 85)	0.14 (0.10 to 0.19)	71 (49 to 95)	0.16 (0.11 to 0.21)
1	Feb	50 (34 to 68)	0.11 (0.07 to 0.15)	48 (34 to 64)	0.11 (0.07 to 0.14)
2	Mar	349 (248 to 477)	0.78 (0.55 to 1.06)	353 (282 to 434)	0.79 (0.63 to 0.97)
2	Apr	161 (112 to 216)	0.36 (0.25 to 0.48)	162 (115 to 207)	0.36 (0.26 to 0.46)
2	May	6 (3 to 9)	0.01 (0.01 to 0.02)	5 (2 to 8)	0.01 (0.00 to 0.02)
2	Jun	61 (36 to 97)	0.14 (0.08 to 0.21)	30 (12 to 48)	0.07 (0.03 to 0.11)

		MRSea estimates		Design-based estimates	
2	Jul	207 (112 to 346)	0.46 (0.25 to 0.77)	188 (105 to 273)	0.42 (0.23 to 0.61)
2	Aug	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	N/A	N/A	6 (1 to 13)	0.01 (0.00 to 0.03)
2	Nov	17 (10 to 27)	0.04 (0.02 to 0.06)	12 (6 to 20)	0.03 (0.01 to 0.04)
2	Dec	124 (81 to 182)	0.28 (0.18 to 0.41)	153 (115 to 191)	0.34 (0.26 to 0.43)
2	Jan	353 (223 to 529)	0.78 (0.50 to 1.18)	391 (299 to 497)	0.87 (0.67 to 1.11)
2	Feb	332 (229 to 467)	0.74 (0.51 to 1.04)	320 (241 to 384)	0.71 (0.54 to 0.85)

Table 1.62: Black-legged kittiwake (flying) design-based and MRSea population estimates (Pop) and Density (D) within the Mona Array Area + 2 km buffer.

		MRSea estimates		Design-based estimates	
Year	**Month**	**Pop**	**D**	**Pop**	**D**
1	Mar	287 (177 to 431)	0.64 (0.39 to 0.23)	344 (253 to 444)	0.77 (0.56 to 0.99)
1	Apr	48 (31 to 68)	0.11 (0.07 to 0.20)	33 (15 to 52)	0.07 (0.03 to 0.12)
1	May	N/A	N/A	5 (0 to 15)	0.01 (0.00 to 0.03)
1	Jun	197 (131 to 278)	0.44 (0.29 to 0.19)	161 (108 to 221)	0.36 (0.24 to 0.49)
1	Jul	114 (72 to 168)	0.25 (0.16 to 0.22)	107 (58 to 160)	0.24 (0.13 to 0.36)
1	Aug	N/A	N/A	34 (12 to 57)	0.08 (0.03 to 0.13)
1	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Oct	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
1	Nov	191 (115 to 291)	0.43 (0.26 to 0.23)	161 (103 to 221)	0.36 (0.23 to 0.49)
1	Dec	172 (102 to 262)	0.38 (0.23 to 0.24)	131 (78 to 184)	0.29 (0.17 to 0.41)

		MRSea estimates		Design-based estimates	
1	Jan	224 (159 to 300)	0.50 (0.35 to 0.16)	253 (176 to 337)	0.56 (0.39 to 0.75)
1	Feb	209 (142 to 287)	0.46 (0.32 to 0.18)	202 (141 to 271)	0.45 (0.31 to 0.60)
2	Mar	558 (396 to 762)	1.24 (0.88 to 0.17)	564 (451 to 693)	1.26 (1.00 to 1.54)
2	Apr	231 (161 to 310)	0.51 (0.36 to 0.16)	233 (166 to 297)	0.52 (0.37 to 0.66)
2	May	94 (48 to 157)	0.21 (0.11 to 0.30)	81 (30 to 139)	0.18 (0.07 to 0.31)
2	Jun	62 (37 to 99)	0.14 (0.08 to 0.25)	30 (13 to 49)	0.07 (0.03 to 0.11)
2	Jul	238 (128 to 398)	0.53 (0.29 to 0.29)	216 (120 to 314)	0.48 (0.27 to 0.70)
2	Aug	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Sep	N/A	N/A	0 (0 to 0)	0.00 (0.00 to 0.00)
2	Oct	N/A	N/A	21 (5 to 44)	0.05 (0.01 to 0.10)
2	Nov	95 (55 to 151)	0.21 (0.12 to 0.26)	67 (33 to 108)	0.15 (0.07 to 0.24)
2	Dec	754 (493 to 1,103)	1.68 (1.10 to 0.21)	929 (697 to 1,159)	2.07 (1.55 to 2.58)
2	Jan	323 (205 to 485)	0.72 (0.46 to 0.22)	358 (274 to 455)	0.80 (0.61 to 1.01)
2	Feb	528 (363 to 741)	1.18 (0.81 to 0.18)	509 (382 to 610)	1.13 (0.85 to 1.36)

European herring gull

Desk-based data

1.4.2.72 European herring gulls are distributed extensively across Britain. While they have a wide range of breeding grounds, European herring gulls show a preference for coastal sites such as cliffs, islets, and offshore islands. However, they can also be found in various other habitats, including sand dunes, shingle banks, and increasingly, rooftops of buildings in urban areas. European herring gulls are colonial species, especially when breeding in natural habitats, and they often form mixed colonies with lesser black-backed gulls. The estimated total number of breeding pairs in the UK is 130,000. In the winter, the total population of European herring gulls can reach up to 640,000 (Furness, 2015). European herring gull is red listed in Birds of Conservation Concern 4.

1.4.2.73 European 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 1.25). 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 1.26).

1.4.2.74 The HiDef Aerial Survey Limited (2023) confirmed that European herring gull were more abundant during the non-breeding as opposed to the breeding season, with densities varying between 0.18 to 2.61 birds per km^2 in the Liverpool Bay SPA.

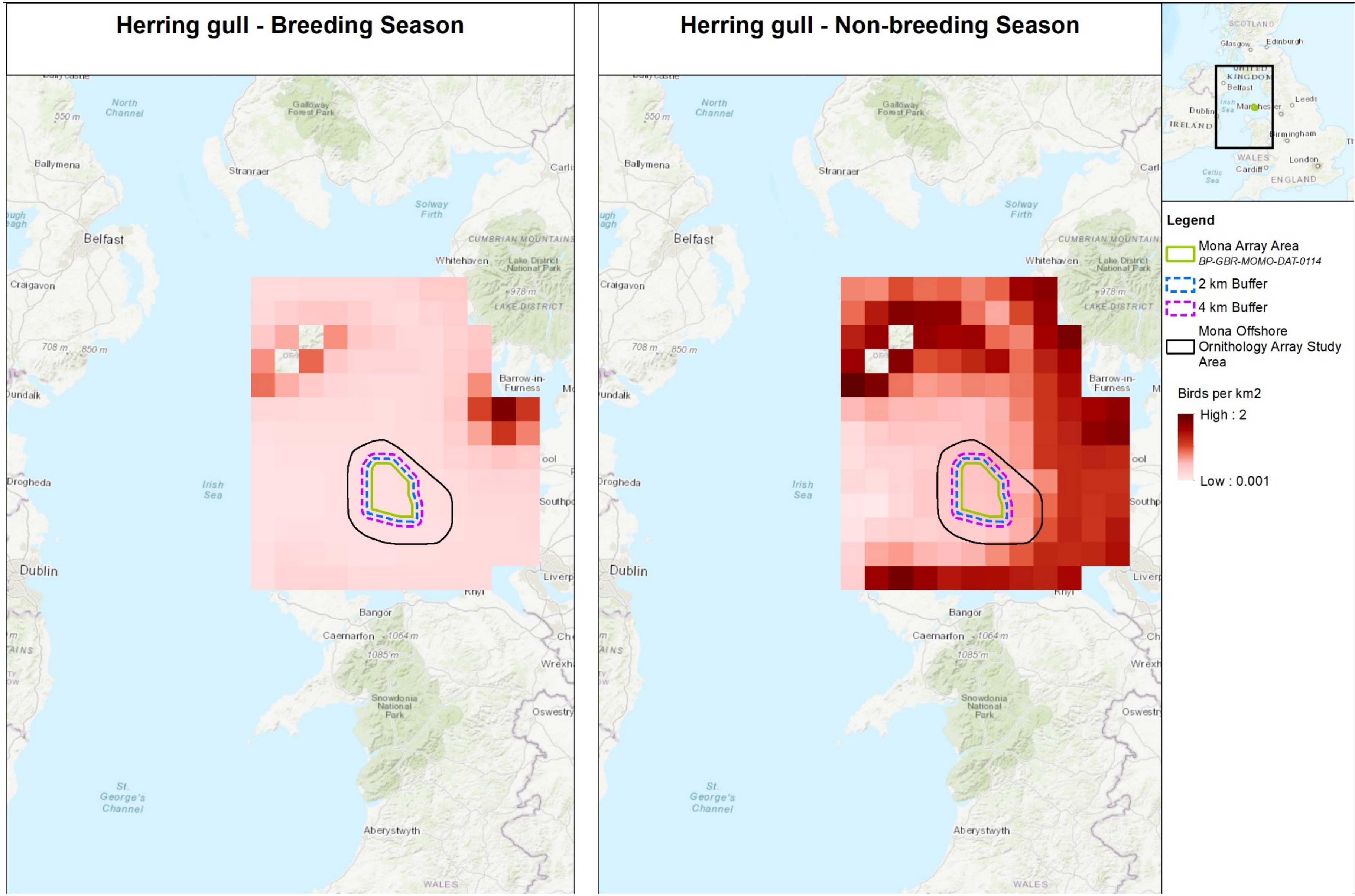

Figure 1.25: Spatial variation in predicted densities (animals per km^2) of European herring gull per season (data extracted from Waggitt *et al*. (2020)).

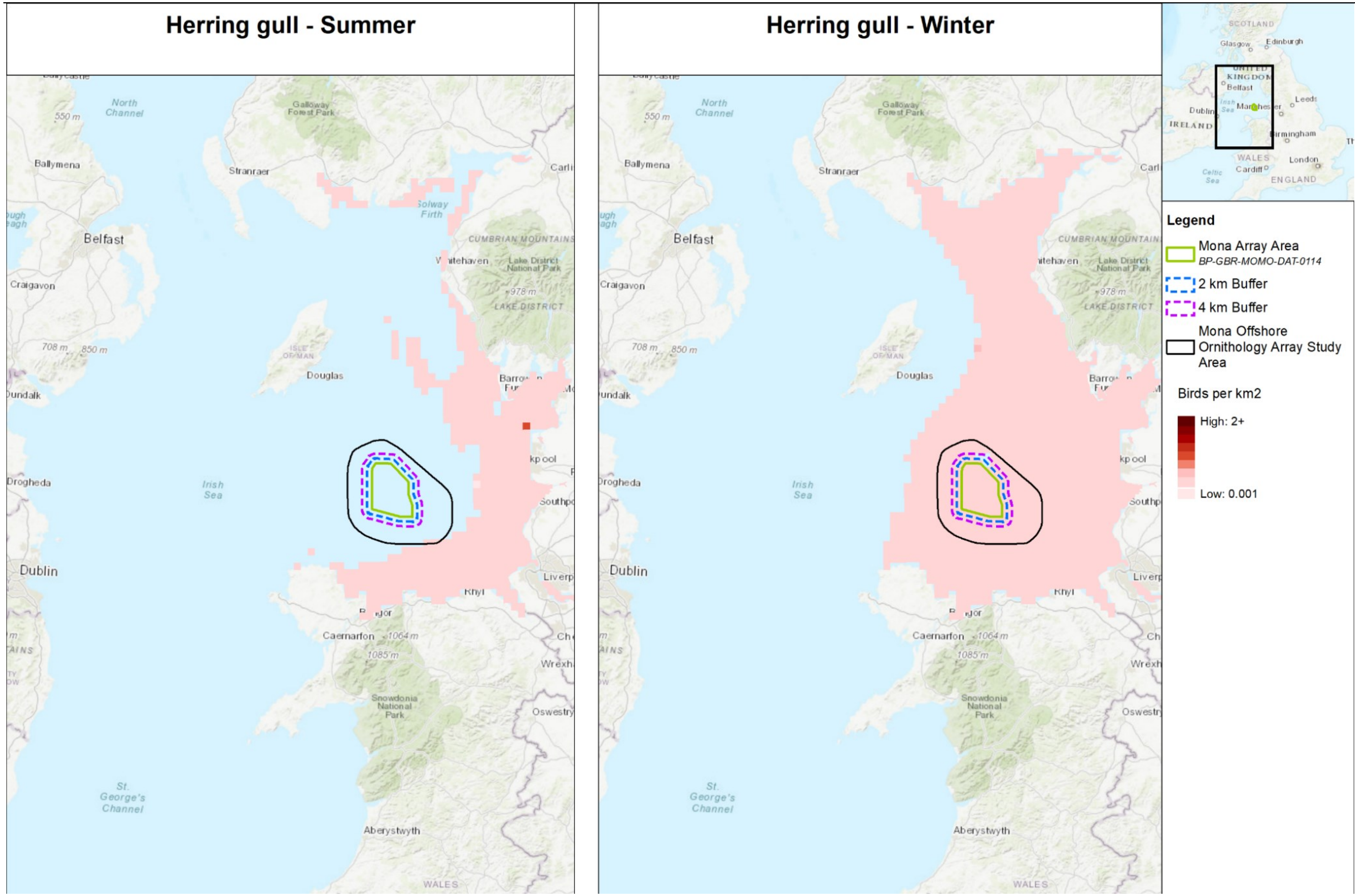

Figure 1.26: Spatial variation in predicted densities (animals per km²) of European herring gull per season (data extracted from Bradbury *et al*. (2014)).

Telemetry data

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

Site specific digital aerial survey results

1.4.2.76 European 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.

1.4.2.77 The digital aerial survey results confirmed this patten of usage, with only 72 confirmed sightings of European herring gull recorded between March 2020 and February 2022 (Table 1.63).

Table 1.63: European herring gull behaviours in birds observed during the surveys

Survey	Flying	Sitting	Total	% Flying
2020-03	1	7	8	12.50
2020-04	1	1	2	50.00
2020-05	0	1	1	0.00
2020-06	1	1	2	50.00
2020-07	0	0	0	0.00
2020-08	0	1	1	0.00
2020-09	3	1	4	75.00
2020-10	4	0	4	100.00
2020-11	2	0	2	100.00
2020-12	0	0	0	0.00
2021-01	2	1	3	66.67
2021-02	6	15	21	28.57
2021-03	0	0	0	0.00
2021-04	3	2	5	60.00
2021-05	0	0	0	0.00
2021-06	1	0	1	100.00
2021-07	2	0	2	100.00
2021-08	0	0	0	0.00
2021-09	1	0	1	100.00
2021-10	0	0	0	0.00
2021-11	1	0	1	100.00
2021-12	0	0	0	0.00
2022-01	5	0	5	100.00
2022-02	3	6	9	33.33

1.4.2.78 Despite the small sample size, design-based estimates were produced by behaviour (sitting, flying and all behaviour) and given for the Mona Array Area and the Mona Array Area + 2 km in Table 1.64 and Table 1.65, with estimates for the Mona Array Area + 4 km and the Mona Offshore Ornithology Array Area study area provided in Appendix DAppendix C.

Table 1.64: Design-based European herring gull 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	6 (0 to 19)	0.02 (0.00 to 0.06)	5 (0 to 17)	0.02 (0.00 to 0.06)	1 (0 to 2)	0.00 (0.00 to 0.01)	6.22	103.60%
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)	0.00	0.00%
1	May	5 (0 to 16)	0.02 (0.00 to 0.05)	5 (0 to 16)	0.02 (0.00 to 0.05)	0 (0 to 0)	0.00 (0.00 to 0.00)	5.12	100.48%
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Sep	7 (0 to 20)	0.02 (0.00 to 0.07)	2 (0 to 5)	0.01 (0.00 to 0.02)	5 (0 to 15)	0.02 (0.00 to 0.05)	6.22	100.91%
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Jan	7 (0 to 24)	0.02 (0.00 to 0.08)	2 (0 to 8)	0.01 (0.00 to 0.03)	5 (0 to 16)	0.02 (0.00 to 0.05)	6.84	107.22%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
1	Feb	21 (0 to 41)	0.07 (0.00 to 0.14)	15 (0 to 30)	0.05 (0.00 to 0.10)	6 (0 to 12)	0.02 (0.00 to 0.04)	11.43	57.48%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Jan	8 (0 to 22)	0.03 (0.00 to 0.07)	0 (0 to 0)	0.00 (0.00 to 0.00)	8 (0 to 22)	0.03 (0.00 to 0.07)	6.66	94.88%
2	Feb	68 (14 to 123)	0.23 (0.04 to 0.41)	45 (9 to 82)	0.15 (0.03 to 0.27)	23 (5 to 41)	0.08 (0.02 to 0.14)	25.64	43.33%

Table 1.65: Design-based European herring gull 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	19 (0 to 45)	0.04 (0.00 to 0.10)	16 (0 to 39)	0.04 (0.00 to 0.09)	2 (0 to 6)	0.01 (0.00 to 0.01)	13.93	74.61%
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)	0.00	0.00%
1	May	5 (0 to 16)	0.01 (0.00 to 0.04)	5 (0 to 16)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	5.16	100.46%
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Sep	14 (0 to 34)	0.03 (0.00 to 0.08)	3 (0 to 9)	0.01 (0.00 to 0.02)	10 (0 to 26)	0.02 (0.00 to 0.06)	9.16	72.03%
1	Oct	6 (0 to 19)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.01 (0.00 to 0.04)	6.54	100.75%
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)	0.00	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)	0.00	0.00%
1	Jan	7 (0 to 23)	0.02 (0.00 to 0.05)	2 (0 to 8)	0.01 (0.00 to 0.02)	5 (0 to 16)	0.01 (0.00 to 0.03)	6.79	107.18%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
1	Feb	34 (6 to 69)	0.08 (0.01 to 0.15)	24 (5 to 49)	0.05 (0.01 to 0.11)	10 (2 to 20)	0.02 (0.00 to 0.04)	16.84	51.53%
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)	0.00	0.00%
2	Apr	7 (0 to 20)	0.02 (0.00 to 0.04)	3 (0 to 8)	0.01 (0.00 to 0.02)	4 (0 to 12)	0.01 (0.00 to 0.03)	6.56	97.12%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Jan	23 (0 to 44)	0.05 (0.00 to 0.10)	0 (0 to 0)	0.00 (0.00 to 0.00)	23 (0 to 44)	0.05 (0.00 to 0.10)	11.46	56.44%
2	Feb	68 (14 to 122)	0.15 (0.03 to 0.27)	45 (10 to 82)	0.10 (0.02 to 0.18)	23 (5 to 41)	0.05 (0.01 to 0.09)	25.57	43.30%

Lesser black-backed gull

Desk-based data

1.4.2.79 Lesser black-backed gulls are only found in Europe. There are 130,000 wintering individuals in the UK and 111,960 breeding pairs, accounting for 38.4% of the European population (JNCC, 2021). Lesser black-backed gulls can be seen all year round on all British and Irish coastlines, but more than half of the UK population are found at fewer than 10 sites, one of which is the colony of Walney Island, Cumbria, where a third of the population reside with other large colonies situated in Lancashire. They are predominantly a marine species, nesting on cliffs of coastal islands, but are increasingly found inland nesting on high, flat roofs. The breeding season runs from April to September. As omnivores they exploit a range of food sources including fish, crustaceans, fruit, mammals, birds, eggs and food waste produced by humans. Their mean maximum foraging range is 127 km (data from 18 colonies, Woodward *et al*., 2019).

1.4.2.80 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). Lesser black-backed gull were found predominantly in the east part of the Irish Sea and inshore of the Mona Array Area (Figure 1.27 and Figure 1.28).

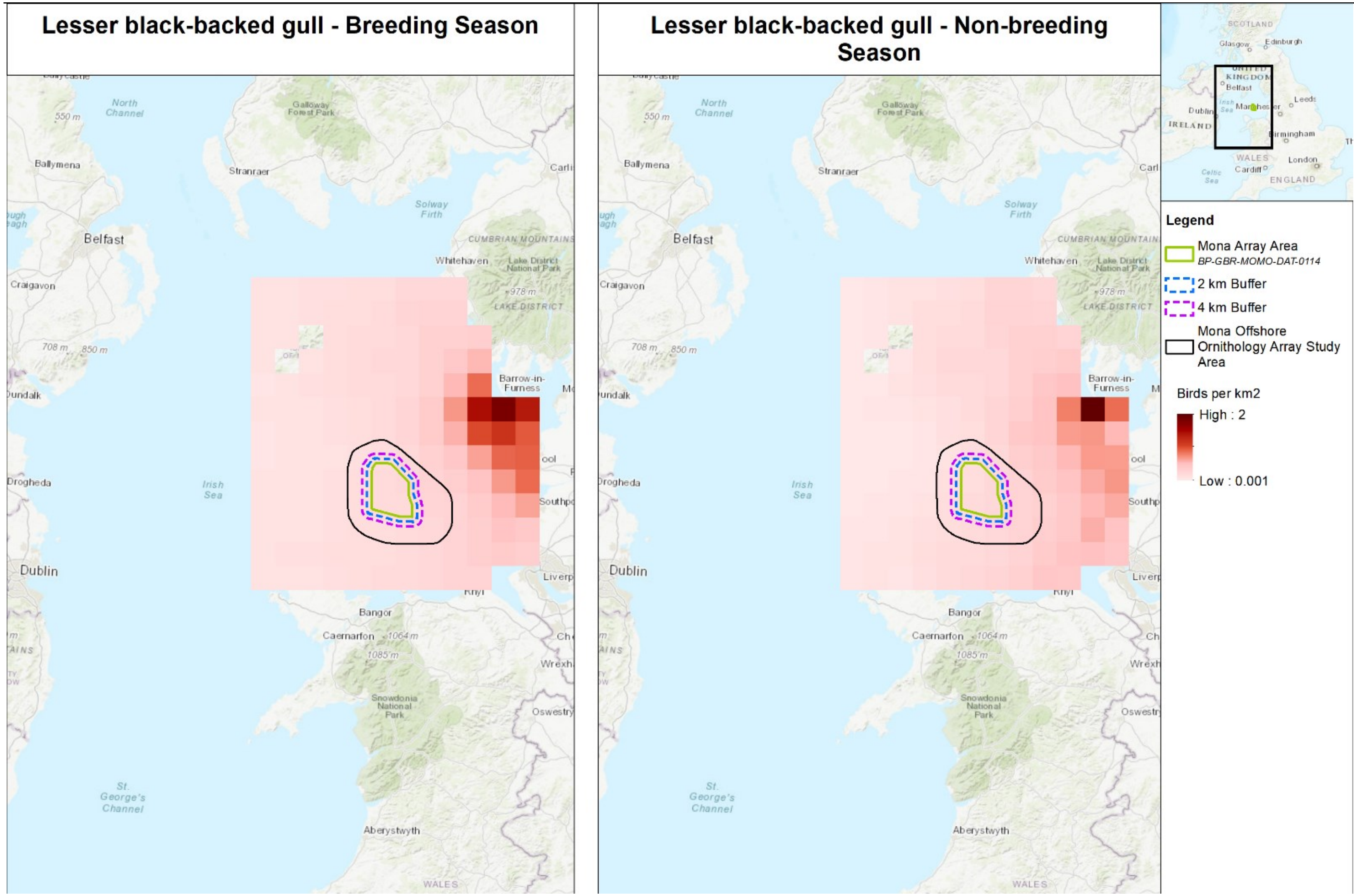

Figure 1.27: Spatial variation in predicted densities (animals per km^2) of lesser black-backed gull per season (data extracted from Waggitt *et al.* (2020)).

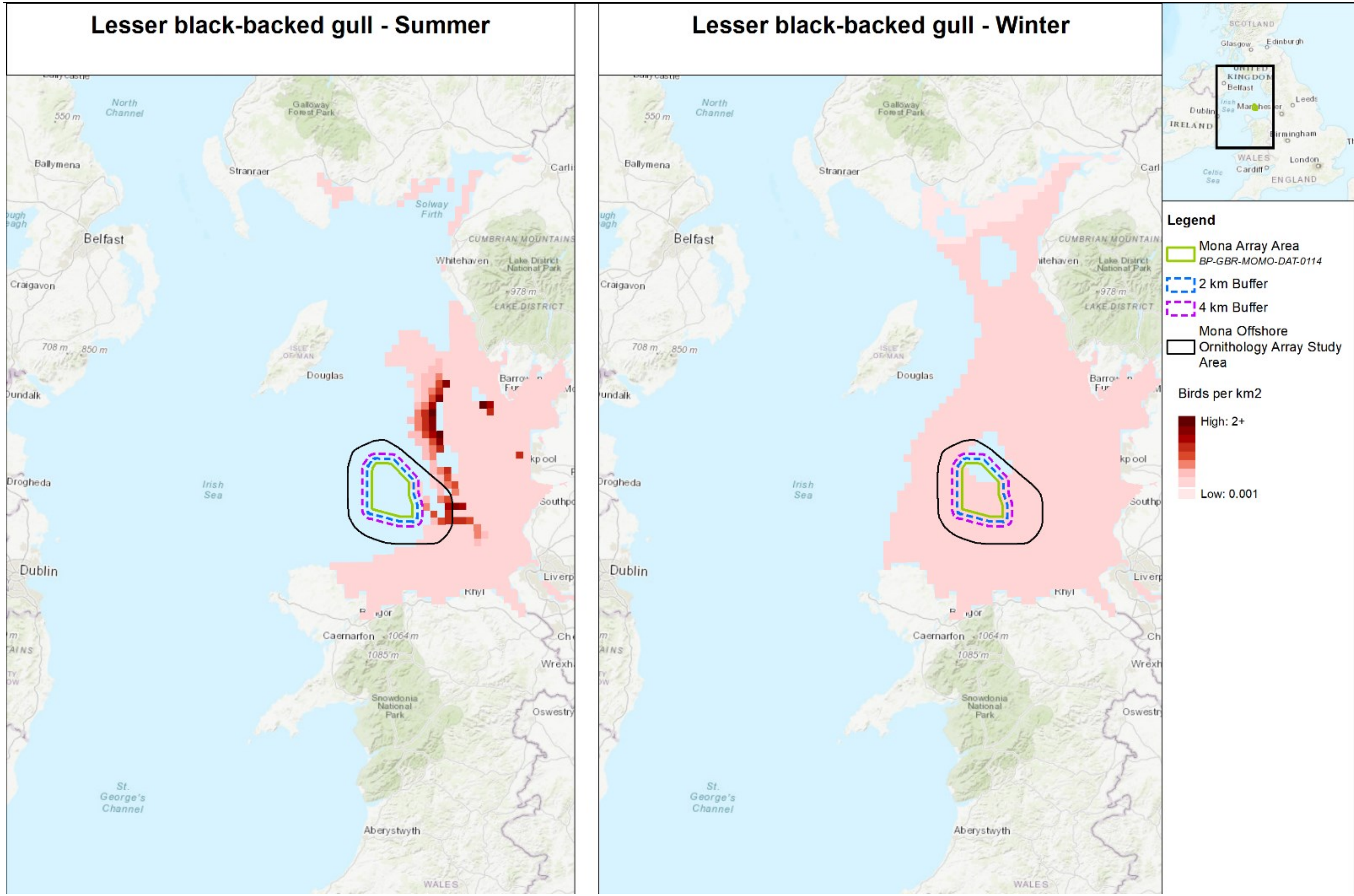

Figure 1.28: Spatial variation in predicted densities (animals per km²) of lesser-black-backed gull per season (data extracted from Bradbury *et al.* (2014)).

Telemetry data

1.4.2.81 Over the 2016 to 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 to 2019 breeding seasons (Clewley *et al*., 2021) which suggest birds in land (such as those at Bowland Fells) make little use of the marine environment where the Mona Offshore Wind Project is situated.

Site specific digital aerial survey results

1.4.2.82 Similarly to European 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.

1.4.2.83 There were 55 sightings of lesser black-backed gull recorded during the March 2020 to February 2022 digital aerial surveys (Table 1.66). 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).

Table 1.66: Lesser black-backed gull behaviours in birds observed during the surveys.

Survey	Flying	Sitting	Total	% Flying
2020-03	3	7	10	30.00
2020-04	0	0	0	0.00
2020-05	0	0	0	0.00
2020-06	4	7	11	36.36
2020-07	1	0	1	100.00
2020-08	1	2	3	33.33
2020-09	0	0	0	0.00
2020-10	0	0	0	0.00
2020-11	2	0	2	100.00
2020-12	0	0	0	0.00
2021-01	0	0	0	0.00
2021-02	0	0	0	0.00
2021-03	7	0	7	100.00
2021-04	2	0	2	100.00
2021-05	2	0	2	100.00
2021-06	0	1	1	0.00
2021-07	1	0	1	100.00
2021-08	5	0	5	100.00
2021-09	1	0	1	100.00
2021-10	0	0	0	0.00
2021-11	4	1	5	80.00
2021-12	0	0	0	0.00
2022-01	0	0	0	0.00
2022-02	1	3	4	25.00

1.4.2.84 Despite the small sample size, design-based estimates were produced by behaviour (sitting, flying, and all behaviour) and given for the Mona Array Area and the Mona Array Area + 2 km below (Table 1.67 to Table 1.68), with estimates for the Mona Array Area + 4 km and the Mona Offshore Ornithology Array Area study area provided in Appendix D.

Table 1.67: Design-based lesser black-backed gull 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Jun	25 (0 to 60)	0.08 (0.0 to 0.20)	16 (0 to 38)	0.05 (0.00 to 0.13)	9 (0 to 22)	0.03 (0.00 to 0.07)	14.64	72.86%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	0.00%
1	Mar	26 (0 to 54)	0.09 (0.00 to 0.18)	0 (0 to 0)	0.00 (0.00 to 0.00)	26 (0 to 54)	0.09 (0.00 to 0.18)	15.51	59.84%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Nov	28 (0 to 67)	0.09 (0.00 to 0.22)	6 (0 to 13)	0.02 (0.00 to 0.04)	22 (0 to 53)	0.07 (0.00 to 0.18)	21.84	79.90%
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)	0.00	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)	0.00	0.00%
2	Feb	23 (0 to 46)	0.08 (0.00 to 0.15)	17 (0 to 35)	0.06 (0.00 to 0.12)	6 (0 to 12)	0.02 (0.00 to 0.04)	11.61	58.17%

Table 1.68: Design-based lesser black-backed gull 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	13 (0 to 26)	0.03 (0.00 to 0.06)	9 (0 to 18)	0.02 (0.00 to 0.04)	4 (0 to 8)	0.01 (0.00 to 0.02)	8.78	67.25%
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)	0.00	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)	0.00	0.00%
1	Jun	25 (0 to 59)	0.06 (0.00 to 0.13)	16 (0 to 37)	0.04 (0.00 to 0.08)	9 (0 to 21)	0.02 (0.00 to 0.05)	14.50	72.90%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	0.00%
1	Mar	26 (0 to 53)	0.06 (0.00 to 0.12)	0 (0 to 0)	0.00 (0.00 to 0.00)	26 (0 to 53)	0.06 (0.00 to 0.12)	15.41	59.95%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Nov	27 (0 to 66)	0.06 (0.00 to 0.15)	5 (0 to 13)	0.01 (0.00 to 0.03)	22 (0 to 53)	0.05 (0.00 to 0.12)	21.77	79.97%
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)	0.00	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)	0.00	0.00%
2	Feb	23 (0 to 46)	0.05 (0.00 to 0.10)	17 (0 to 34)	0.04 (0.00 to 0.08)	6 (0 to 11)	0.01 (0.00 to 0.03)	11.57	58.09%

Great black-backed gull

Desk-based data

1.4.2.85 The great black-backed gull breeding range is more limited compared to other gull species, mainly concentrated in the western half of Britain, scattered across the southern coast of England, Welsh coast, Outer and Inner Hebrides, and the Northern Isles of Scotland. Great black-backed gulls primarily nest in coastal habitats, although they occasionally nest inland at freshwater sites and even on the roofs of buildings. The estimated number of nesting pairs in Britain and Ireland is around 15,000, which increases to 77,000 individuals during the winter when they are more widely distributed around Britain's coastline. The population remains relatively stable but is listed as amber in the Birds of Conservation Concern 5 (Stanbury *et al*., 2021).

1.4.2.86 During the surveys carried out by Waggitt et *al*. (2020) and Bradbury *et al*. (2014), great black-backed gull were not observed in any of the seasons within the Mona Offshore Ornithology study area.

1.4.2.87 The HiDef Aerial Survey Limited (2023) report confirmed low densities of great black-backed gull in the non-breeding period in the Liverpool Bay SPA, with densities varying between 0.11 to 0.26 birds per km^2.

Telemetry data

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

Site specific digital aerial survey results

1.4.2.89 Design-based estimates were produced despite the very low total sample size (128 sightings recorded between March 2020 and February 2022; Table 1.69).

Table 1.69: Great black-backed gull behaviours in birds observed during the surveys.

Survey	Flying	Sitting	Total	% Flying
2020-03	2	8	10	20.00
2020-04	0	0	0	0.00
2020-05	1	0	1	100.00
2020-06	13	7	20	65.00
2020-07	0	0	0	0.00
2020-08	1	6	7	14.29
2020-09	1	0	1	100.00
2020-10	1	2	3	33.33
2020-11	1	2	3	33.33
2020-12	2	3	5	40.00
2021-01	1	2	3	33.33
2021-02	12	11	23	52.17
2021-03	3	0	3	100.00
2021-04	0	0	0	0.00
2021-05	0	0	0	0.00
2021-06	0	0	0	0.00
2021-07	1	0	1	100.00

Survey	Flying	Sitting	Total	% Flying
2021-08	1	0	1	100.00
2021-09	0	0	0	0.00
2021-10	1	0	1	100.00
2021-11	1	3	4	25.00
2021-12	2	0	2	100.00
2022-01	3	10	13	23.08
2022-02	6	21	27	22.22

1.4.2.90 Design-based estimates produced by behaviour (sitting, flying, and all behaviour) are given for each boundary (Table 1.70 and Table 1.71Table 1.70). The highest population estimate was recorded in February 2022 with 40 individuals (95% CI range: 13 to 74) for the Mona Array Area (Table 1.70Table 1.70). The species was most frequently recorded during the non-breeding period (Table 1.69Table 1.69).

1.4.2.91 Design-based estimates for all behaviours (flying and sitting) for the Mona Array Area and the Mona Array Area + 2 km are provided in Table 1.70 and Table 1.71, with estimates for the Mona Array Area + 4 km and the Mona Offshore Ornithology Array Area provided in Appendix D.

Table 1.70: Design-based great black-backed gull 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	6 (0 to 19)	0.02 (0.00 to 0.06)	5 (0 to 15)	0.02 (0.00 to 0.05)	1 (0 to 4)	0.00 (0.00 to 0.01)	6.33	102.62%
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)	0.00	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)	0.00	0.00%
1	Jun	33 (8 to 64)	0.11 (0.02 to 0.21)	12 (3 to 22)	0.04 (0.01 to 0.08)	22 (5 to 42)	0.07 (0.02 to 0.14)	12.81	48.04%
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Aug	7 (0 to 22)	0.02 (0.00 to 0.07)	6 (0 to 19)	0.02 (0.00 to 0.06)	1 (0 to 3)	0.00 (0.00 to 0.01)	6.71	98.98%
1	Sep	7 (0 to 20)	0.02 (0.00 to 0.07)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.02 (0.00 to 0.07)	6.22	100.91%
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)	0.00	0.00%
1	Nov	13 (0 to 28)	0.04 (0.00 to 0.09)	9 (0 to 18)	0.03 (0.00 to 0.06)	4 (0 to 9)	0.01 (0.00 to 0.03)	9.00	70.17%
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
1	Feb	40 (13 to 74)	0.14 (0.04 to 0.25)	19 (6 to 35)	0.06 (0.02 to 0.12)	21 (7 to 39)	0.07 (0.02 to 0.13)	15.90	41.07%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Aug	7 (0 to 22)	0.02 (0.00 to 0.07)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 22)	0.02 (0.00 to 0.07)	6.54	101.69%
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)	0.00	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)	0.00	0.00%
2	Nov	13 (0 to 28)	0.04 (0.00 to 0.09)	9 (0 to 21)	0.03 (0.00 to 0.07)	3 (0 to 7)	0.01 (0.00 to 0.02)	9.09	72.47%
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)	0.00	0.00%
2	Jan	51 (14 to 85)	0.17 (0.04 to 0.28)	39 (11 to 65)	0.13 (0.04 to 0.22)	12 (3 to 20)	0.04 (0.01 to 0.07)	17.41	37.93%
2	Feb	137 (30 to 283)	0.46 (0.09 to 0.94)	106 (23 to 220)	0.35 (0.08 to 0.73)	30 (7 to 63)	0.10 (0.02 to 0.21)	60.99	51.09%

Table 1.71: Design-based great black-backed gull 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	6 (0 to 19)	0.01 (0.00 to 0.04)	5 (0 to 15)	0.01 (0.00 to 0.03)	1 (0 to 4)	0.00 (0.00 to 0.01)	6.29	102.66%
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)	0.00	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)	0.00	0.00%
1	Jun	84 (16 to 170)	0.19 (0.03 to 0.38)	30 (6 to 59)	0.07 (0.01 to 0.13)	55 (10 to 110)	0.12 (0.02 to 0.25)	35.33	52.12%
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)	0.00	0.00%
1	Aug	7 (0 to 21)	0.02 (0.00 to 0.05)	6 (0 to 18)	0.01 (0.00 to 0.04)	1 (0 to 3)	0.00 (0.00 to 0.01)	6.69	98.97%
1	Sep	7 (0 to 20)	0.01 (0.00 to 0.05)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.05)	6.20	100.97%
1	Oct	13 (0 to 38)	0.03 (0.00 to 0.09)	9 (0 to 26)	0.02 (0.00 to 0.06)	4 (0 to 13)	0.01 (0.00 to 0.03)	13.08	100.75%
1	Nov	13 (0 to 27)	0.03 (0.00 to 0.06)	9 (0 to 18)	0.02 (0.00 to 0.04)	4 (0 to 9)	0.01 (0.00 to 0.02)	9.00	70.16%
1	Dec	6 (0 to 20)	0.01 (0.00 to 0.04)	4 (0 to 12)	0.01 (0.00 to 0.03)	3 (0 to 8)	0.01 (0.00 to 0.02)	6.38	100.31%
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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
1	Feb	53 (20 to 90)	0.12 (0.04 to 0.20)	25 (9 to 43)	0.06 (0.02 to 0.10)	28 (10 to 47)	0.06 (0.02 to 0.10)	18.21	35.75%
1	Mar	6 (0 to 20)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.01 (0.00 to 0.04)	6.47	100.37%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Aug	7 (0 to 21)	0.02 (0.00 to 0.05)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.02 (0.00 to 0.05)	6.45	101.63%
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)	0.00	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)	0.00	0.00%
2	Nov	13 (0 to 28)	0.03 (0.00 to 0.06)	9 (0 to 21)	0.02 (0.00 to 0.05)	3 (0 to 7)	0.01 (0.00 to 0.02)	9.08	72.64%
2	Dec	65 (0 to 158)	0.15 (0.00 to 0.35)	0 (0 to 0)	0.00 (0.00 to 0.00)	65 (0 to 158)	0.15 (0.00 to 0.35)	9.16	70.24%
2	Jan	51 (14 to 84)	0.11 (0.03 to 0.19)	39 (11 to 65)	0.09 (0.02 to 0.14)	12 (3 to 19)	0.03 (0.01 to 0.04)	17.29	37.88%
2	Feb	174 (59 to 334)	0.39 (0.11 to 0.74)	135 (46 to 260)	0.30 (0.10 to 0.58)	39 (13 to 74)	0.09 (0.03 to 0.17)	63.73	41.94%

Black-headed gull

Desk-based data

1.4.2.92 Black-headed gull are present in Britain and Ireland throughout the year. They exhibit colonial breeding behaviour and can be found nesting in open grounds near both coastal and inland water bodies. Black-headed gull are amber listed on the Birds of Conservation Concern 5 (Stanbury *et al.*, 2021). The breeding population is estimated to be around 140,000 pairs based on data from the British Trust for Ornithology (BTO) collected between 1998 and 2002. During the winter, the population increases exponentially with the arrival of continental birds and the UK can hold up to 2,2 million of birds.

1.4.2.93 Bradbury *et al.* (2014) showed that during the winter, black-headed gulls were recorded in consistently low densities. During the summer, breeding black-headed gulls were further restricted to coastal areas and were largely absent further offshore (Figure 1.29).

1.4.2.94 The HiDef Aerial Survey Limited (2023) report confirmed low densities of black-headed gull in the non-breeding period, with densities varying between 0.01 to 0.31 birds per km^2 in the Liverpool Bay SPA.

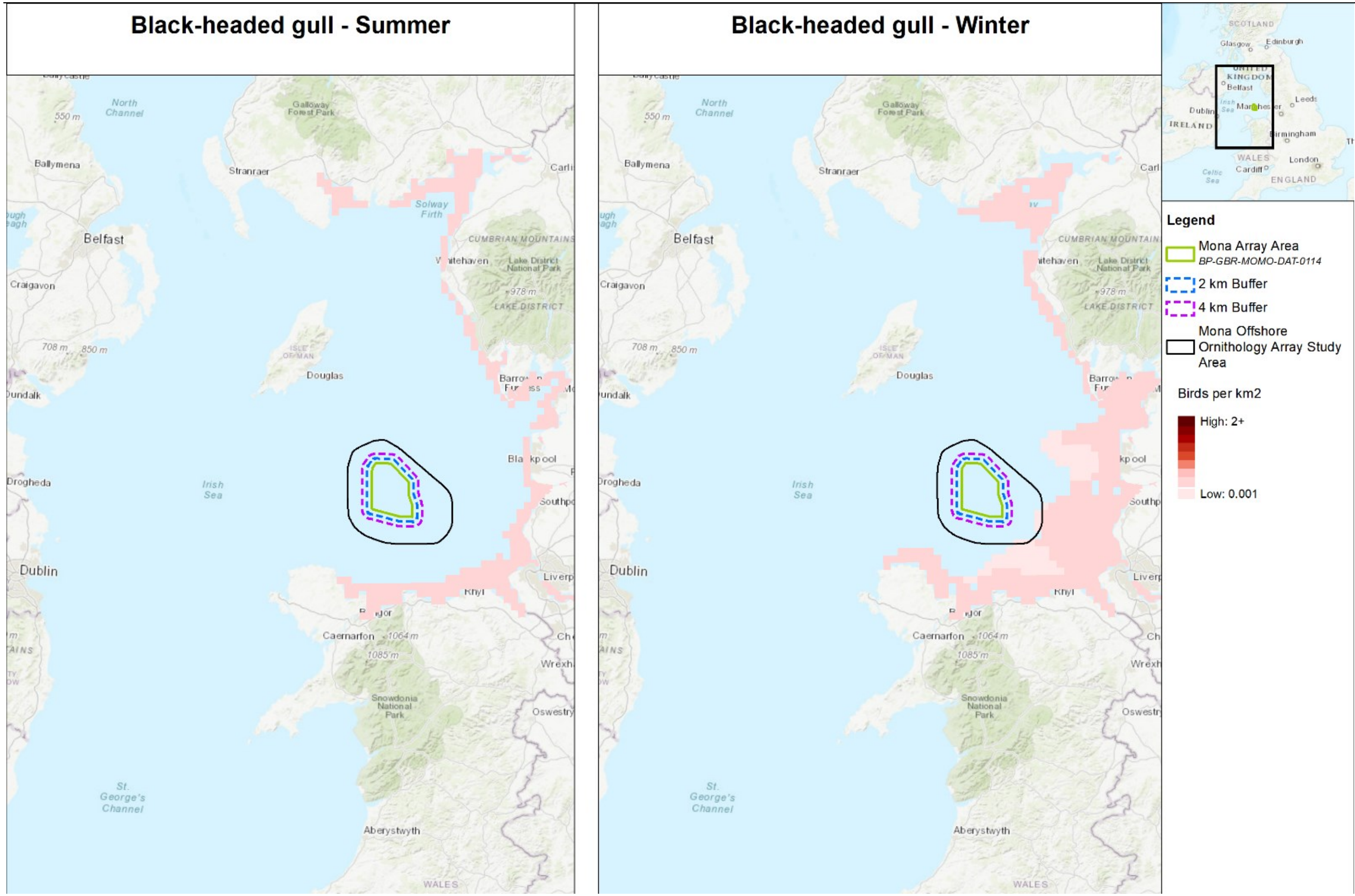

Figure 1.29: Spatial variation in predicted densities (animals per km²) of black-headed gull per season (data extracted from Bradbury *et al*. (2014)).

Telemetry data

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

Site specific digital aerial survey results

1.4.2.96 During digital aerial surveys of the Mona Offshore Ornithology Array Area Study Area, nine records of Black-headed gull were made in August 2020, October 2020, July 2021 and November 2021. Out of those recorded, all nine birds were recorded in flight.

1.4.2.97 Design-based abundance for black-headed gull for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.72 and Table 1.73. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.72: Design-based black-headed gull 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Oct	7 (0 to 20)	0.02 (0.00 to 0.07)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.02 (0.00 to 0.07)	6.68	101.25%
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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Table 1.73: Design-based black-headed gull 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Oct	7 (0 to 19)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 19)	0.01 (0.00 to 0.04)	6.61	101.24%
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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Common gull

Desk-based data

1.4.2.98 Common gull are widely distributed across Britain during the non-breeding season. However, during the breeding season, these birds are confined to the northern and western regions of Scotland and Ireland. According to the last census conducted between 1998 and 2002, it is estimated that Britain and Ireland host approximately 49,000 breeding pairs, with 50% of them suggested to be inland breeders (JNCC, 2021). The arrival of a large influx of continental birds in the autumn increases the wintering population to up to 710,000 individuals. Common gull are amber listed in the Birds of Conservation Concern 5 (Stanbury *et al*., 2021).

1.4.2.99 Bradbury *et al.* (2014) showed the density of wintering common gull is generally relatively low (Figure 1.30). During the summer, the population of common gull is concentrated along the coast and inland areas. It is very likely that the population recorded during the summer months includes passage birds.

1.4.2.100 The HiDef Aerial Survey Limited (2023) report confirmed low densities of common gull in the non-breeding period, with densities varying between 0.22 to 2.50 birds per km^2 in the Liverpool Bay SPA.

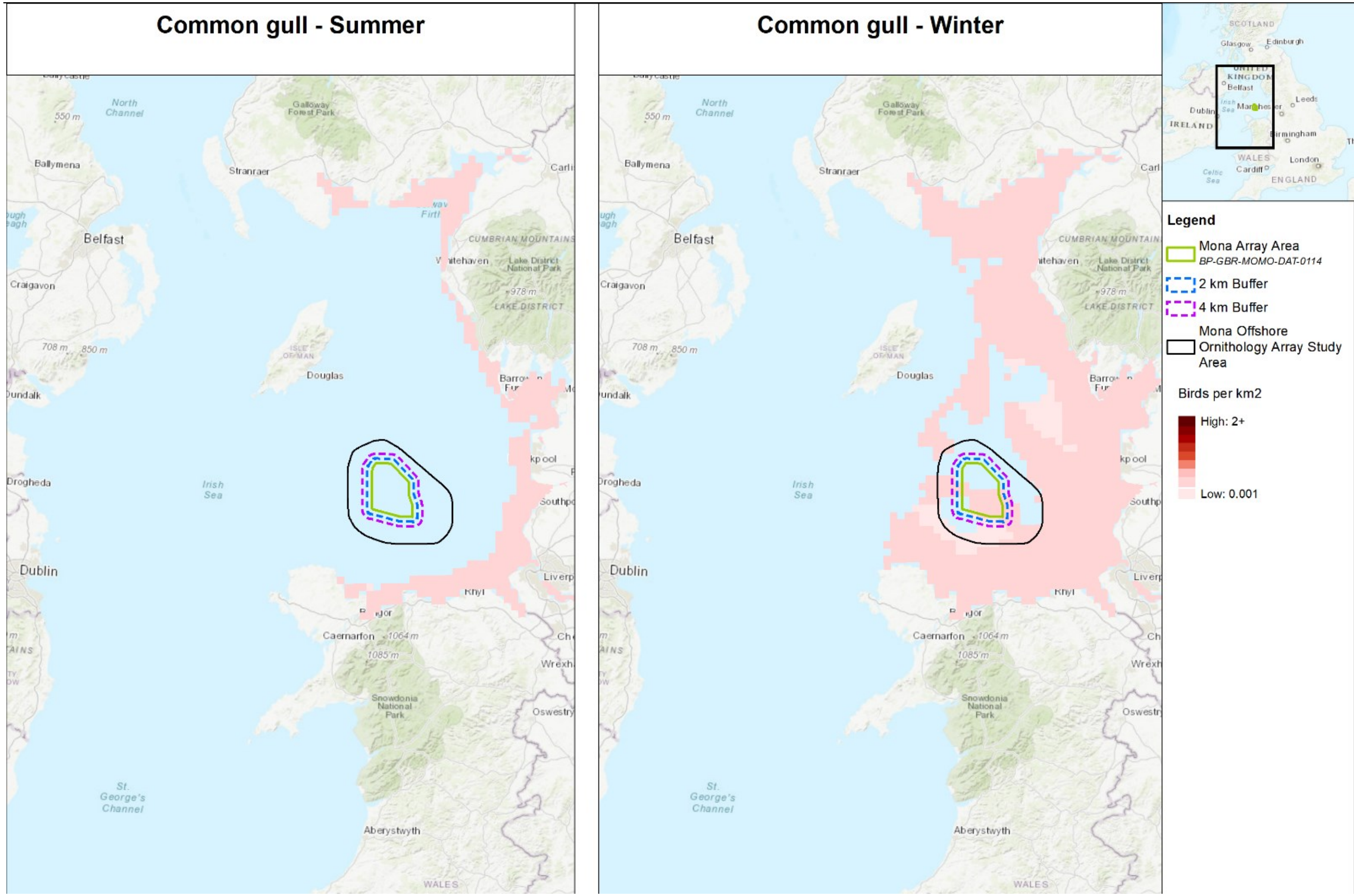

Figure 1.30: Spatial variation in predicted densities (animals per km^2) of common gull per season (data extracted from Bradbury *et al*. (2014)).

Telemetry data

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

Site Specific Digital Aerial Survey Results

1.4.2.102 During the digital aerial surveys of the Mona Offshore Ornithology Array Area Study Area, 60 records of common gull were made in March 2020, November 2020, February 2021 to March 2021, November 2021 to December 2021 and January 2022 to February 2022. This confirms the results of the desk-based data from Bradbury *et al*. (2014), that common gull are more abundant within the Mona Array Area and surrounding site (within 7 km to 16.5 km of the array area) during the non-breeding period compared to the breeding period. Out of those recorded, only nine birds were recorded in flight.

1.4.2.103 Design-based abundance for common gull for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.74 and Table 1.75. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.74: Design-based common gull 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
1	Feb	20 (0 to 40)	0.07 (0.00 to 0.13)	3 (0 to 7)	0.01 (0.00 to 0.02)	16 (0 to 34)	0.05 (0.00 to 0.11)	11.12	57.53%
1	Mar	6 (0 to 19)	0.02 (0.00 to 0.06)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.02 (0.00 to 0.06)	6.53	100.99%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Jan	7 (0 to 20)	0.02 (0.00 to 0.07)	2 (0 to 5)	0.01 (0.00 to 0.02)	5 (0 to 15)	0.02 (0.00 to 0.05)	6.49	100.99%
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)	0.00	0.00%

Table 1.75: Design-based common gull 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) in the Mona Array Area + 2 kim buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
1	Feb	20 (0 to 40)	0.04 (0.00 to 0.09)	3 (0 to 7)	0.01 (0.00 to 0.01)	16 (0 to 34)	0.04 (0.00 to 0.07)	11.12	57.65%
1	Mar	6 (0 to 19)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.01 (0.00 to 0.04)	6.49	101.14%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Jan	7 (0 to 20)	0.01 (0.00 to 0.04)	2 (0 to 5)	0.00 (0.00 to 0.01)	5 (0 to 15)	0.01 (0.00 to 0.03)	6.46	101.01%
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)	0.00	0.00%

Little gull

Desk-based data

1.4.2.104 Little gull are the smallest species of gull. They breed in northern Europe, forming colonies on freshwater marsh habitat where they nest on the ground and produce 2-6 eggs, and many spend their winters north of Africa, in the Mediterranean or Atlantic Ocean. Some little gulls overwinter in the UK and can be seen along coasts here from July to April. Little gulls feed on small fish and will also pick up invertebrates near the water surface or catch them in flight. The Liverpool Bay SPA is of international importance for non-breeding little gull.

1.4.2.105 Bradbury *et al.* (2014) showed that winter little gull densities were concentrated within the northern part of the Liverpool Bay SPA (Figure 1.31). No little gulls were recorded in the study area during the summer months (Figure 1.31). The HiDef Aerial Survey limited (2023) report further confirmed peak densities of little gull to be occurring in the northern part of the Liverpool Bay SPA, with high densities occurring along the coast, with densities varying between 0.00 to 0.70 birds per km^2.

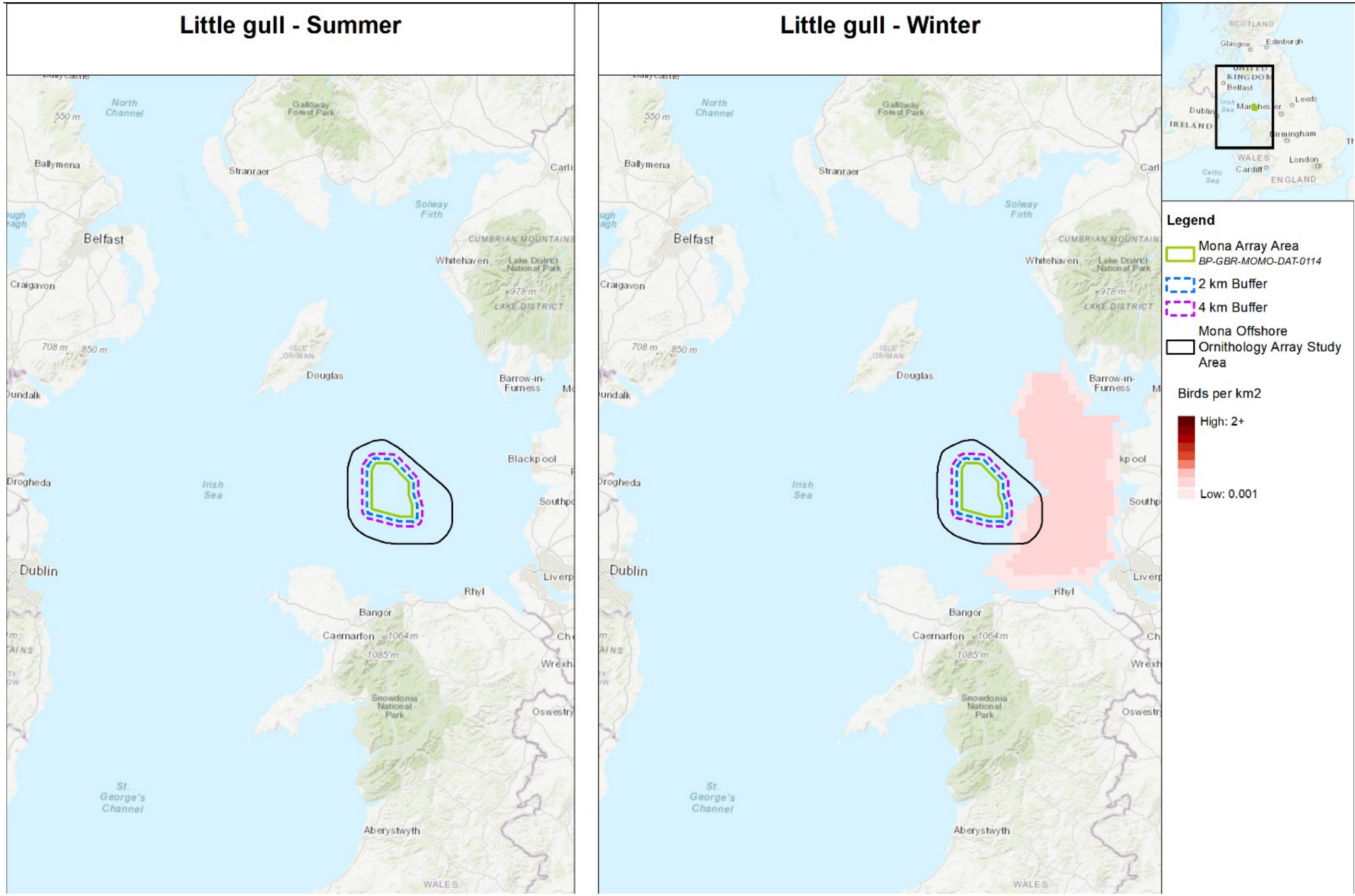

Figure 1.31: Spatial variation in predicted densities (animals per km^2) of little gull per season (data extracted from Bradbury *et al.* (2014)).

Telemetry data

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

Site specific digital aerial survey results

1.4.2.107 28 records of little gull were recorded in December 2020 to February 2021 in November 2021 and January 2022 to February 2022 during the digital aerial surveys of the Mona Offshore Ornithology Array Area Study Area. Out of those recorded, 21 birds were recorded in flight.

1.4.2.108 Design-based abundance for little gull for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.76 and Table 1.77 . Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.76: Design-based little gull 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
1	Feb	7 (0 to 20)	0.02 (0.00 to 0.07)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.02 (0.00 to 0.07)	6.50	102.18%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Table 1.77: Design-based little gull 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
1	Feb	6 (0 to 20)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.01 (0.00 to 0.04)	6.47	102.12%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Jan	7 (0 to 20)	0.02 (0.00 to 0.04)	1 (0 to 4)	0.00 (0.00 to 0.01)	5 (0 to 16)	0.01 (0.00 to 0.04)	6.41	96.56%
2	Feb	14 (0 to 43)	0.03 (0.00 to 0.10)	14 (0 to 43)	0.03 (0.00 to 0.10)	0 (0 to 0)	0.00 (0.00 to 0.00)	12.73	97.91%

Great skua

Desk-based data

1.4.2.109 Great skua is large seabird which can be seen throughout the UK coast during the non-breeding season. However, during the breeding season, their distribution becomes highly restricted, particularly in Scotland, where they are concentrated in Shetland and Orkney. The great skua is an offshore opportunistic omnivorous predator that often feeds on fisheries, particularly outside of the breeding season. It can also be a specialist feeder that primarily preys on seabirds near the breeding colony.

1.4.2.110 Great skua was recorded in low densities across both the winter and summer periods (Figure 1.32).

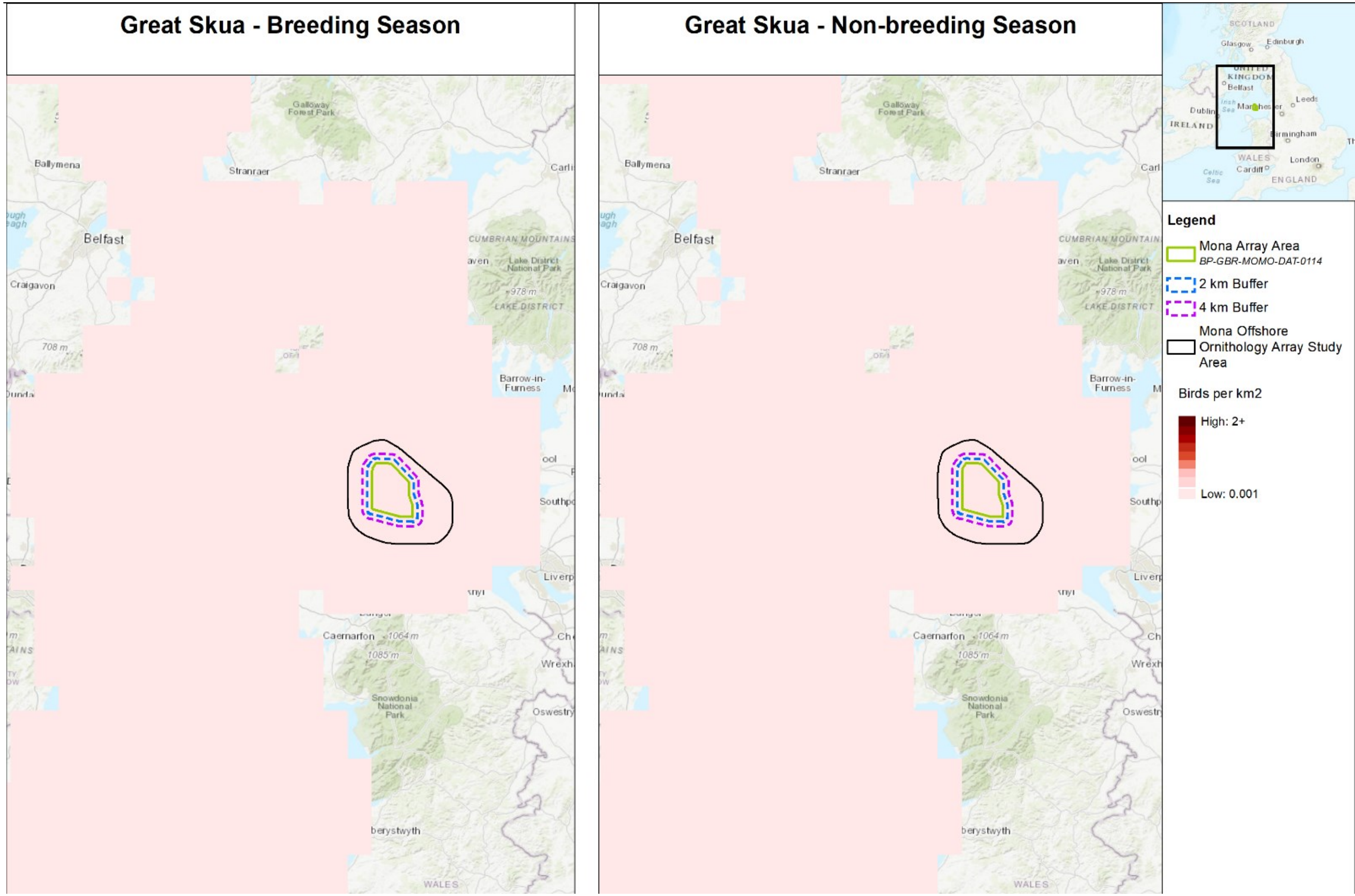

Figure 1.32: Spatial variation in predicted densities (animals per km^2) of great skua per season (data extracted from Bradbury *et al.* (2014))

Telemetry data

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

Site specific digital aerial survey results

1.4.2.112 During digital aerial surveys of the Mona Offshore Ornithology Array Area Study Area, only three sightings of great skua were recorded in November 2020 and April 2021. Out of those recorded, all three birds were recorded in flight.

1.4.2.113 Design-based abundance for great skua for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.78 and Table 1.79. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.78: Design-based great skua 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Table 1.79: Design-based great skua 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) in the Mona Array Area + 2km buffer

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	0.00%
2	Apr	7 (0 to 20)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.04)	6.72	101.78%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Arctic skua

Desk-based data

1.4.2.114 Similar to other species of skuas, arctic skua are highly migratory, and they can be seen offshore throughout the coast of Britain, although they are less common in Ireland. Breeding arctic skua have an even more restricted distribution compared to great skuas. The UK represents the southwestern end of their breeding range, with concentrations in Scotland, particularly in the Northern Isles, Caithness and Sutherland, the Outer Hebrides, St Kilda, and a few southern Inner Hebridean islands.

1.4.2.115 During the surveys carried out by Waggitt *et al.* (2020) and Bradbury *et al.* (2014), Arctic skua were not observed in any of the seasons.

Telemetry data

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

Site specific digital aerial survey results

1.4.2.117 Only two records of Arctic skua were recorded during digital aerial surveys of the Mona Offshore Ornithology Array Area Study Area in May 2020 and September 2020. Out of those recorded, both birds were recorded in flight.

1.4.2.118 Design-based abundance for Arctic skua for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.80 and Table 1.81. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.80: Design-based Arctic skua 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	0.00%
1	May	11 (0 to 32)	0.04 (0.00 to 0.11)	0 (0 to 0)	0.00 (0.00 to 0.00)	11 (0 to 32)	0.04 (0.00 to 0.11)	5.54	101.43%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Table 1.81: Design-based Arctic skua 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	0.00%
1	May	11 (0 to 32)	0.02 (0.00 to 0.07)	0 (0 to 0)	0.00 (0.00 to 0.00)	11 (0 to 32)	0.02 (0.00 to 0.07)	5.60	101.59%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Common tern

Desk-based data

1.4.2.119 Common tern breed in the temperate and subarctic areas of Europe, Asia and North America and migrate south to tropical and subtropical regions, such as the coasts of Spain and Africa, to spend the winter. Common tern are present along much of the British and Irish coastlines. There are 11,000 breeding pairs (2015) in the UK. Individuals arrive from mid-April and nest on rocky islands, shingle beaches, saltmarshes and industrial areas (JNCC, 2021). Common tern forage in a range of habitats such as open sea, lagoons, estuaries. Inland they will feed over freshwater bodies and along rivers.

Telemetry data

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

Site specific digital aerial survey results

1.4.2.121 A total of 13 records of common tern were recorded during the digital aerial surveys in June 2020 and May 2021. Out of those recorded, all birds were recorded in flight.

1.4.2.122 Design-based abundance for common tern for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.82 and Table 1.83Table 1.76. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.82: Design-based common tern 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Table 1.83: Design-based common tern 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Jun	7 (0 to 21)	0.02 (0.00 to 0.05)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.02 (0.00 to 0.05)	6.49	102.67%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Sandwich tern

Desk-based data

1.4.2.123 Sandwich terns are medium-large seabirds that predominantly feed on fish such as sand eels, sprats and whiting. These terns breed in the Palearctic, from Europe to the Caspian Sea, and overwinter in India, South Africa and Sri Lanka. The UK breeding population is 14,000 pairs (JNCC, 2021). The species is amber listed in the UK. Sandwich terns breed on coasts and islands, from March to October, laying 1-3 eggs in ground scrape nests. In the UK, sandwich tern breeding colonies are scattered across the coastline.

1.4.2.124 During the summer period, sandwich terns were found relatively close to the coastline (Figure 1.33). Clusters of high densities are found relatively close to the shore since sandwich terns prefer to feed in shallow waters with sandy bottoms (Cabot and Nisbet, 2013; Perrow *et al.*, 2011).

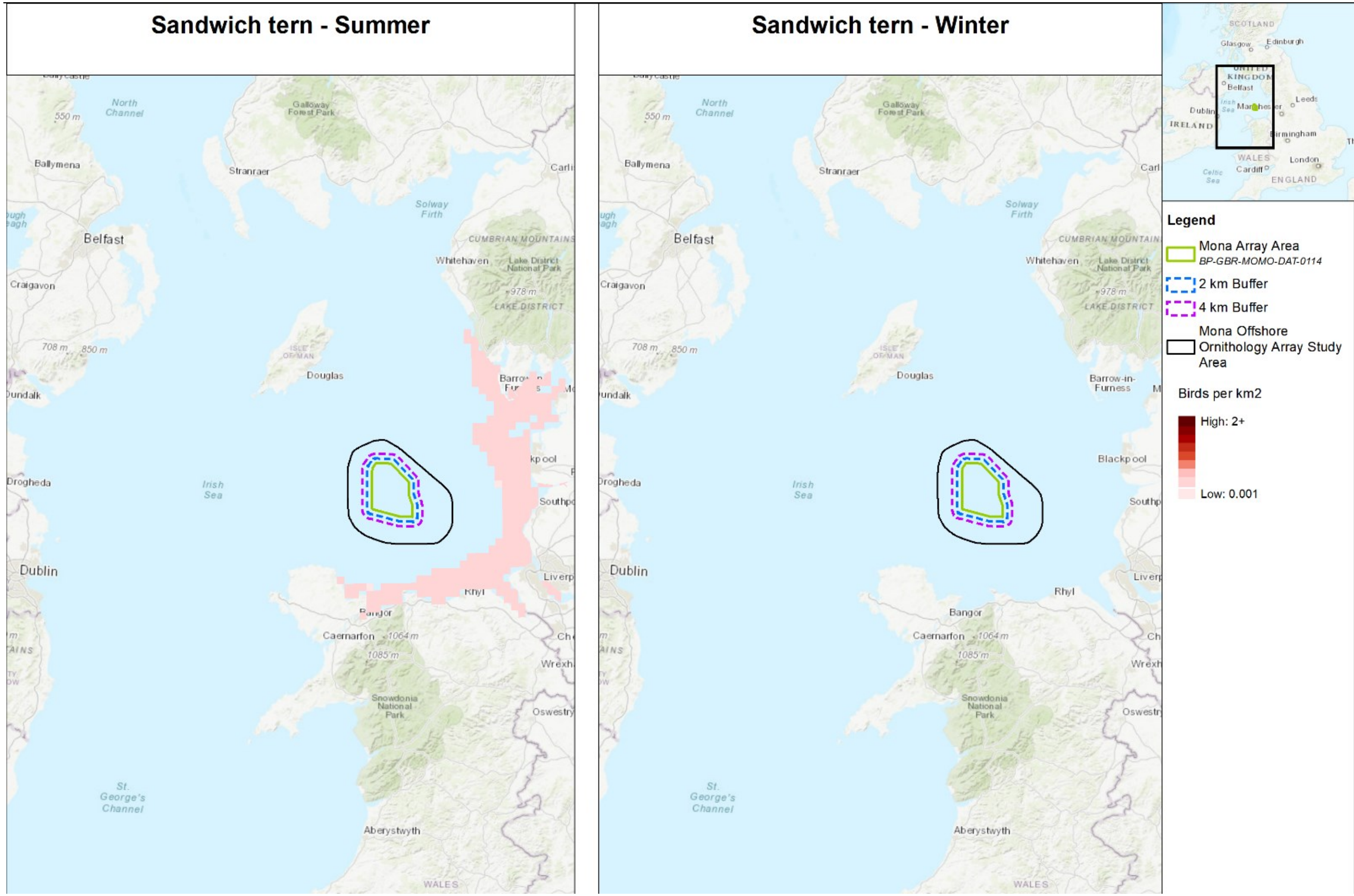

Figure 1.33: Spatial variation in predicted densities (animals per km^2) of sandwich tern per season (data extracted from Bradbury *et al*. (2014)).

Telemetry data

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

Site specific digital aerial survey results

1.4.2.126 A total of 10 records of sandwich tern were recorded during the digital aerial surveys in June 2020, August 2021, April 2021 and July 2021. Out of those recorded, all birds were recorded in flight.

1.4.2.127 Design-based abundance for sandwich tern for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.84 and Table 1.85. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.84: Design-based sandwich tern 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
2	Jul	15 (0 to 46)	0.05 (0.00 to 0.15)	0 (0 to 0)	0.00 (0.00 to 0.00)	15 (0 to 46)	0.05 (0.00 to 0.15)	12.67	15 (0 to 46)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)
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)	0.00	0 (0 to 0)

Table 1.85: Design-based sandwich tern 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Jul	15 (0 to 46)	0.03 (0.00 to 0.10)	0 (0 to 0)	0.00 (0.00 to 0.00)	15 (0 to 46)	0.03 (0.00 to 0.10)	12.60	99.06%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Arctic tern

Desk-based data

1.4.2.128 Arctic terns are the most oceanic and have the longest migration of all the genus *Sterna*. Migration is mostly offshore or coastal; however, hundreds cross Britain every year and can be seen resting in lakes and reservoirs. Arctic tern remain on the amber list of Birds of Conservation Concern (Stanbury *et al*., 2021). Arctic terns lay one to two eggs once a year and do not reach breeding age until they are four years old. Like most seabirds, Arctic terns are long-lived, with an average lifespan of 13 years. Arctic tern will likely only occur within the Mona Array Area during short periods during the year whilst undergoing migration between the breeding and wintering grounds. Bradbury *et al*. (2014) did not report arctic terns during the breeding and migration periods.

Telemetry data

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

Site Specific Digital Aerial Survey Results

1.4.2.130 Only five records of Arctic tern were recorded during the digital aerial surveys with all records made in May 2021. Out of those recorded, all birds were recorded in flight.

1.4.2.131 Design-based abundance for Arctic tern for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.86 and Table 1.87. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D

Table 1.86: Design-based Arctic tern 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Table 1.87: Design-based Arctic tern 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Black-tailed godwit

Desk-based data

1.4.2.132 During the last 50 years, the breeding population of Continental Black-tailed Godwits in the United Kingdom has been relatively small (below 60 pairs) and largely concentrated in two locations in eastern England (Verhoeven *et al.,* 2021). In The Netherlands, where approximately 87% of the godwits in the East Atlantic Flyway breed, the population has declined from 120,000 breeding pairs in 1967 to 33,000 in 2015 (Kentie *et al.,* 2016).

1.4.2.133 Godwits are medium-sized migratory waders that live to six years old on average (Kentie *et al*. 2016). They show a high degree of natal philopatry and breeding site-fidelity (Kentie *et al.,* 2014). Godwits lay their clutch, usually consisting of four eggs, in a shallow nest cup on the ground (Haverschmidt 1963, Verhoeven *et al.,* 2019).

1.4.2.134 Bradbury *et al*. (2014) did not report black-tailed godwit within the Mona Offshore Ornithology Array Area study area during the breeding and migration periods.

Telemetry data

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

Site specific digital aerial survey results

1.4.2.136 13 black-tailed godwit were recorded during the digital aerial survey in November 2022. Out of those recorded, all birds were recorded in flight. These birds were presumably on passage through the study area as birds migrate between their breeding grounds in Iceland and non-breeding grounds in the British Isles and continental Europe.

1.4.2.137 Design-based abundance for black-tailed godwit for the Mona Array Area and the Mona Array Area + 2 km buffer are shown in Table 1.88 and Table 1.89. Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.88: Design-based black-tailed godwit 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) in the Mona Array Area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Table 1.89: Design-based black-tailed godwit 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) in the Mona Array Area + 2 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard Deviation	Coefficient of Variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Other species recorded

1.4.2.138 There were seven species groups containing records that could not be identified down to individual species level (Table 1.90). Design-based estimates were produced for these species groups for the Mona Array Area and the Mona Array Area + 2 km (Table 1.91 to Table 1.97). Design-based estimate for the Mona Array Area + 4 km buffer and the Mona Offshore Ornithology Array Area Study Area are presented in Appendix D.

Table 1.90: Other species/groups recorded during digital aerial surveys of the Mona Offshore Ornithology Array Area study area from March 2020 to February 2022 ranked by abundance.

Species/Groups	Flying	Sitting	Total
Unidentified bird species	3	58	61
Unidentified thrush species	57	0	57
'Commic' tern (unidentified arctic tern/common tern)	13	13	26
Unidentified wader species	25	0	25
Unidentified tern species	1	1	2
Unidentified skua species	0	1	1
Unidentified storm-petrel species	0	1	1

Table 1.91: 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).

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	55 (0 to 151)	0.12 (0.00 to 0.34)	50.53	91.79%
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

Table 1.92: 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).

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

Table 1.93: 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).

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

Table 1.94: Design-based skua 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).

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

Table 1.95: Design-based tern 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).

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
1	Jun	7 (0 to 20)	0.02 (0.00 to 0.07)	6.53	96.68%	7 (0 to 20)	0.01 (0.00 to 0.04)	6.45	96.54%
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

Table 1.96: Design-based commic tern 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).

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
Year	**Month**	**Pop**	**D**	**SD**	**CV**	**Pop**	**D**	**SD**	**CV**
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	20 (0 to 46)	0.04 (0.00 to 0.10)	14.14	72.44%
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

Table 1.97: Design-based unidentified bird 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).

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
Year	Month	Pop	D	SD	CV	Pop	D	SD	CV
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Apr	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Feb	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
1	Mar	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Apr	7 (0 to 20)	0.02 (0.00 to 0.07)	6.63	97.63%	7 (0 to 20)	0.02 (0.00 to 0.04)	6.60	97.76%
2	May	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jun	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%

		Design-based abundances (all behaviours) in the Mona Array Area	Design-based densities (all behaviours) in the Mona Array Area	Standard Deviation	Coefficient of Variation	Design-based abundances (all behaviours) in the Mona Array Area + 2 km buffer	Design-based densities (all behaviours) in the Mona Array Area + 2 km buffer	Standard Deviation	Coefficient of Variation
2	Jul	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Aug	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Sep	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Oct	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Nov	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Dec	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%
2	Jan	0 (0 to 0)	0.00 (0.00 to 0.00)	0.00	0.00%	6 (0 to 20)	0.01 (0.00 to 0.04)	6.60	104.85%
2	Feb	241 (26 to 485)	0.80 (0.09 to 1.62)	128.71	53.39%	241 (32 to 494)	0.54 (0.07 to 1.10)	129.06	53.60%

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

1.5.1 Desktop studies associated with the Liverpool Bay SPA

1.5.1.1 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 (Cranswick et al., 2004). The boundary of Liverpool Bay SPA extends beyond 12 nm and therefore lies partly in Welsh and English territorial waters and partly in offshore waters.

1.5.1.2 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 10 km of the coastline) of the Mona Offshore Cable Corridor and Access Areas intersects with one of the common scoter aggregations during the non-breeding season (Lawson et al., 2016).

1.5.1.3 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 2 km 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).

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

1.5.1.5 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.

1.5.2 Mapping seabirds at sea data sources

1.5.2.1 For true seabirds, densities did not exceed one bird per kilometre square in the Mona Offshore Cable Corridor and Access Areas (Figure 1.34 to Figure 1.42).

1.5.2.2 As for red-throated diver and common scoter, Bradbury *et al*. (2014) highlighted an overlap between relatively high densities of both species within the Mona Offshore Cable Corridor and Access Areas. The overlap was however confined to the very nearshore areas (Figure 1.43 and Figure 1.44). It is of note that the densities of red-throated diver were low in the Mona Offshore Cable Corridor and Access Areas (<1 birds per km^2; Bradbury *et al.* 2014). Within the HiDef (2023) report, a peak density of 1.22 birds per km^2 was estimated across the Liverpool Bay/ Bae Lerpwl SPA

1.5.2.3 Updated data from HiDef (2023) showed peak densities of common scoter to be 56.51 birds per km^2 across the Liverpool Bay/ Bae Lerpwl SPA. Digital data from HiDef (2023) was not available and so could not be downloaded and mapped alongside Bradbury *et al.* (2014).

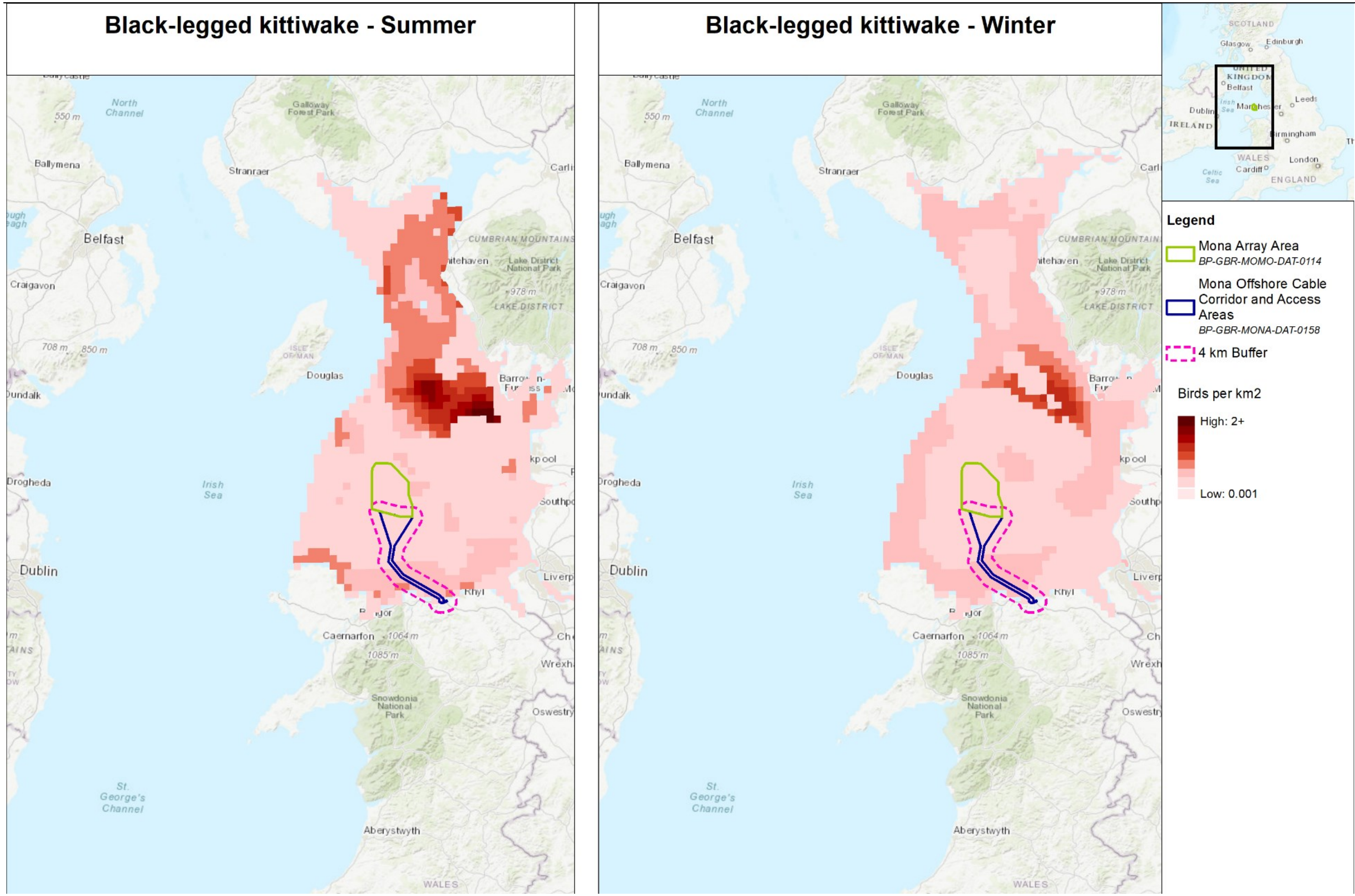

Figure 1.34: Spatial variation in predicted densities (animals per km²) of black-legged kittiwake per season (extracted from Bradbury *et al*. (2014)) within the Mona Offshore Cable Corridor and Access Areas.

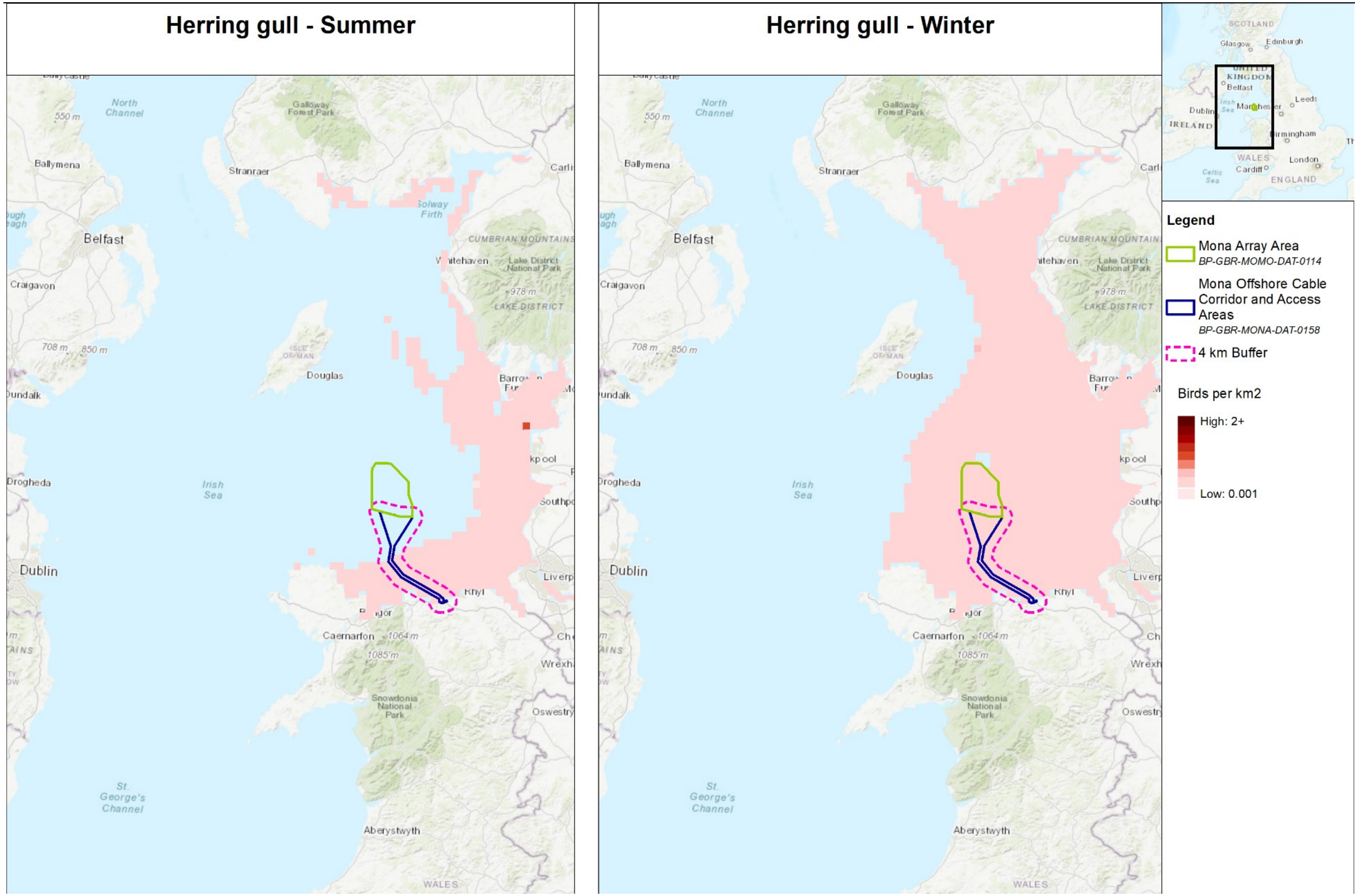

Figure 1.35: Spatial variation in predicted densities (animals per km²) of European herring gull per season (extracted from Bradbury *et al*. (2014)) within the Mona Offshore Cable Corridor and Access Areas.

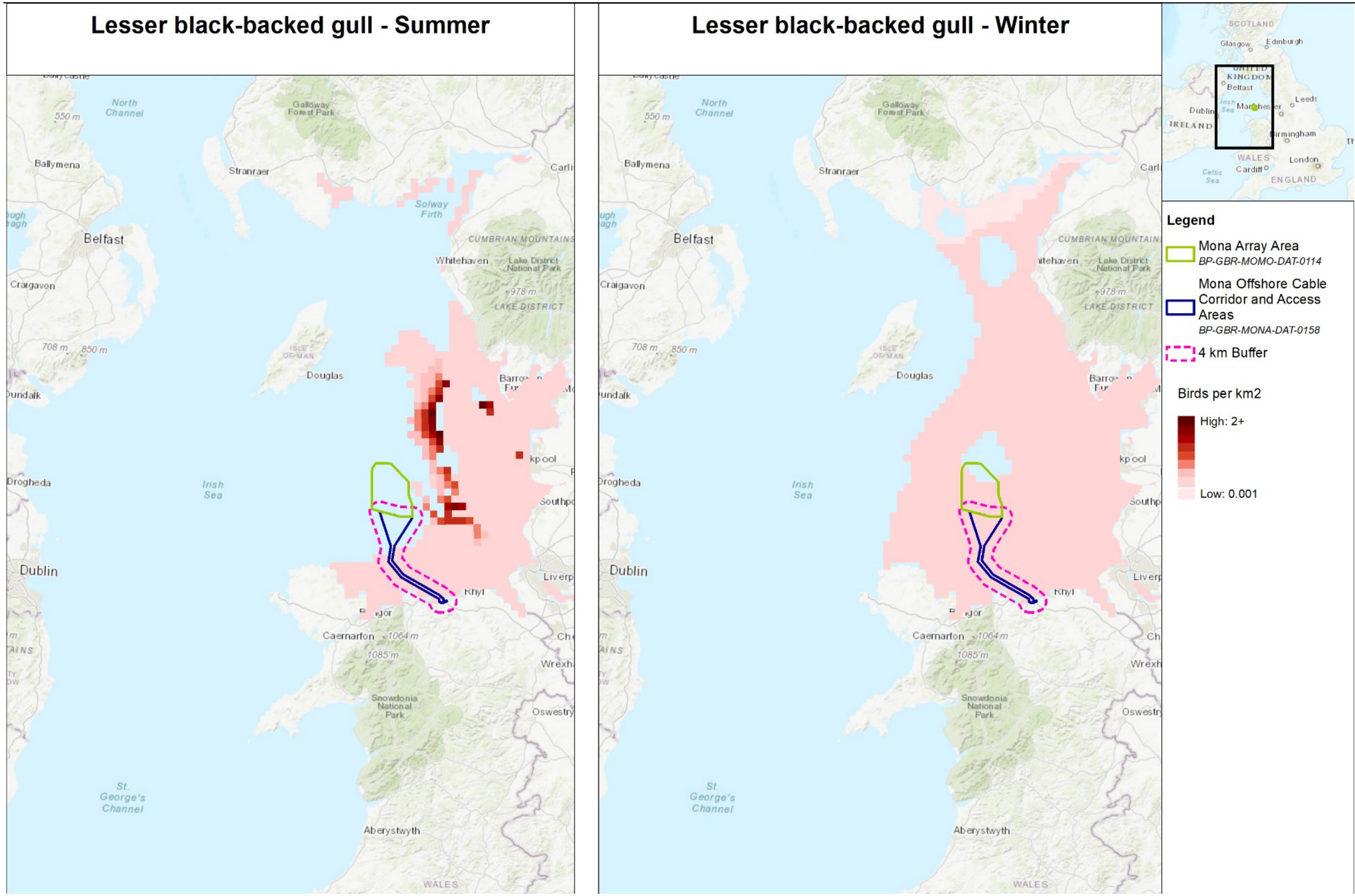

Figure 1.36: Spatial variation in predicted densities (animals per km2) of lesser black-backed gull per season (extracted from Bradbury et al. (2014)) within the Mona Offshore Cable Corridor and Access Areas.

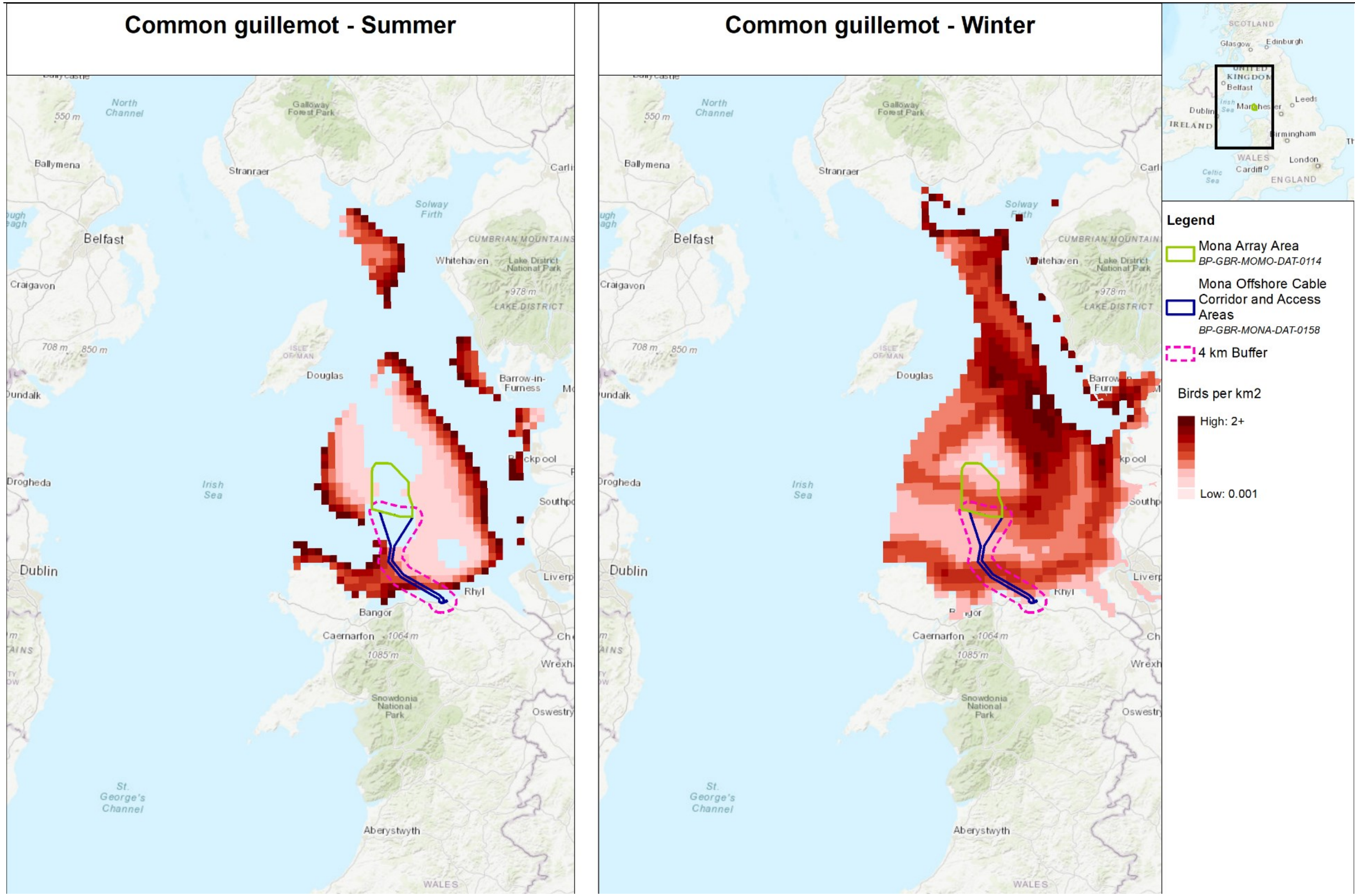

Figure 1.37: Spatial variation in predicted densities (animals per km²) of common guillemot per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor and Access Areas.

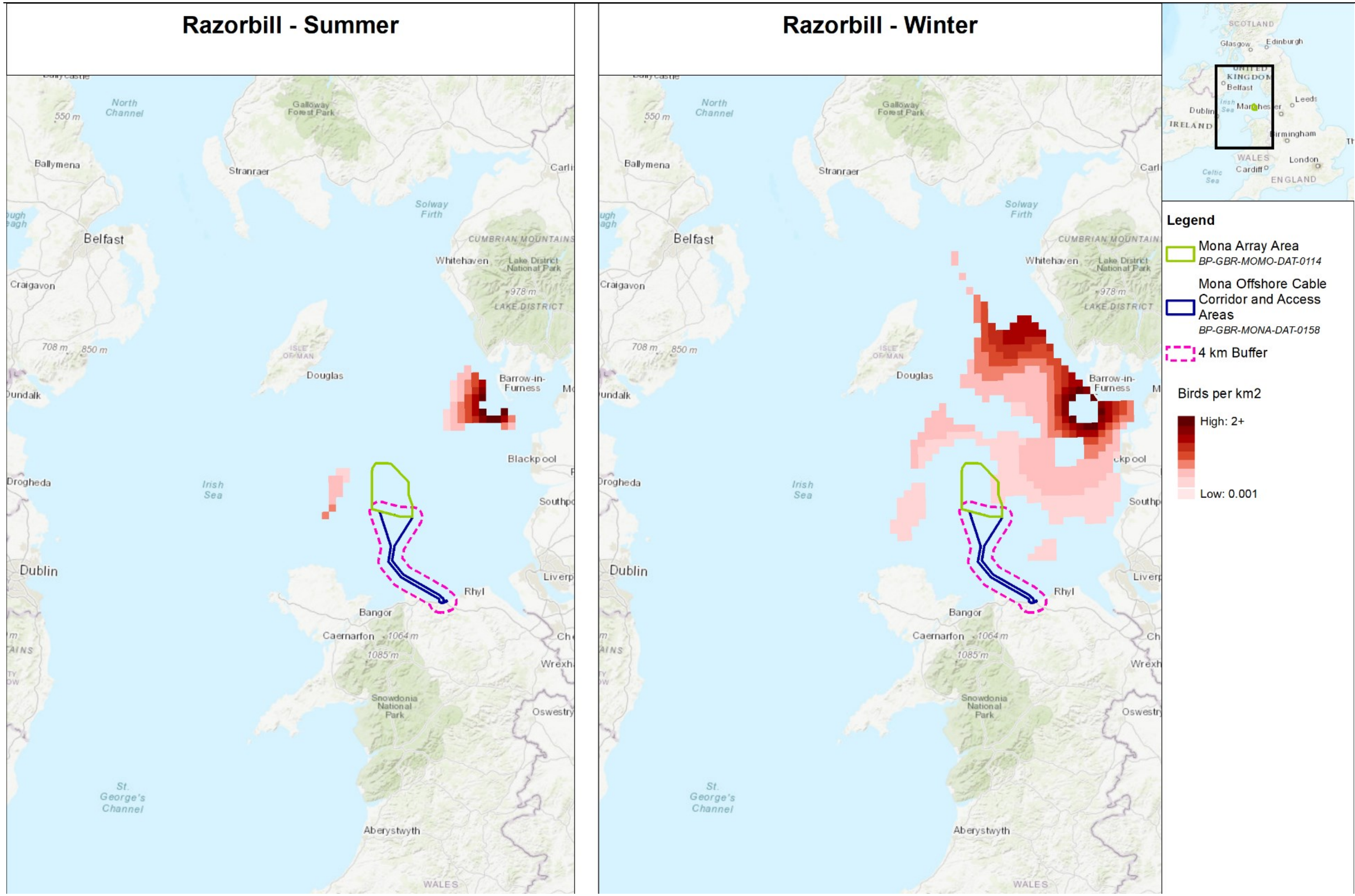

Figure 1.38: Spatial variation in predicted densities (animals per km^2) of razorbill per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor and Access Areas.

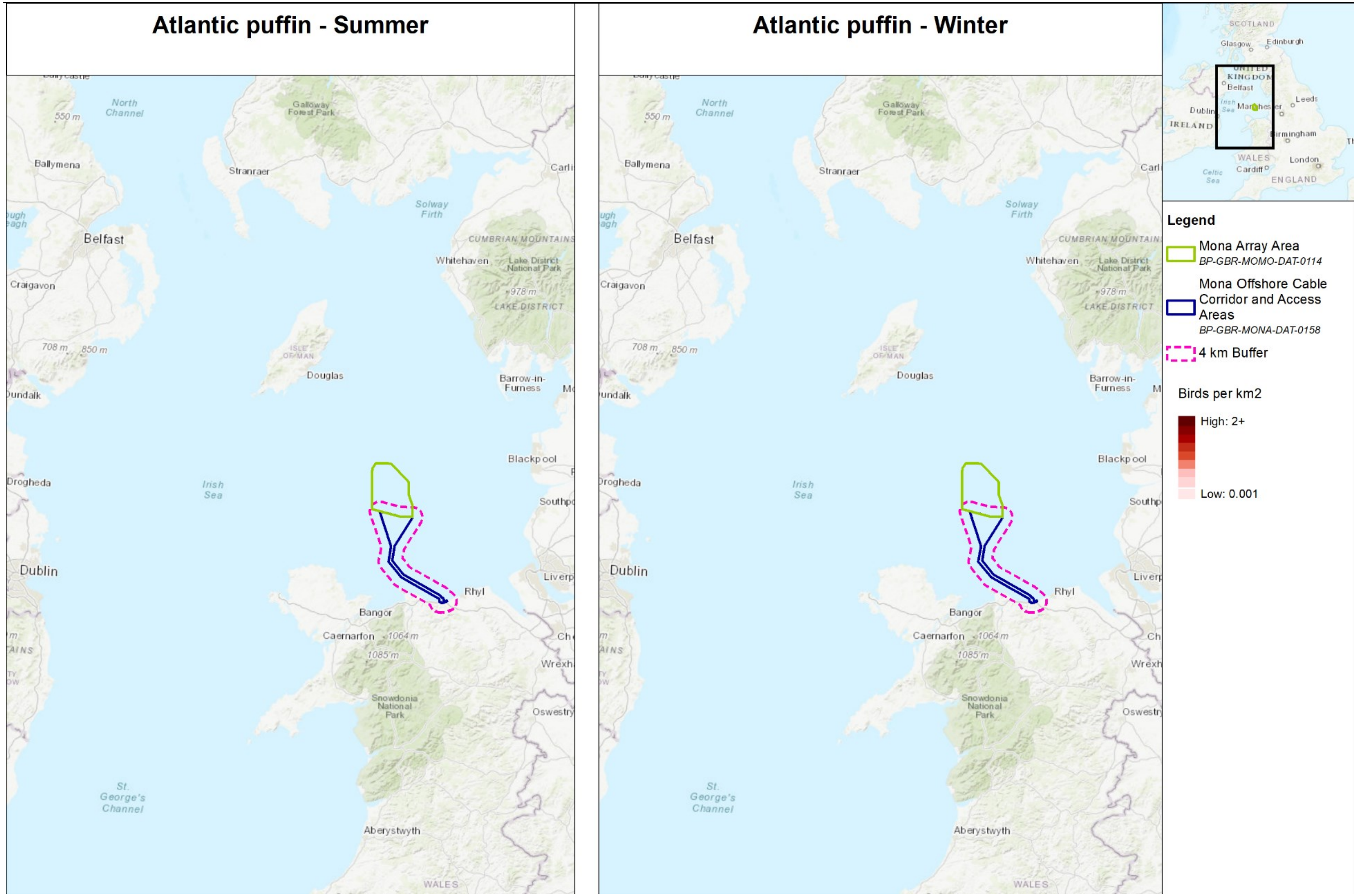

Figure 1.39: Spatial variation in predicted densities (animals per km2) of Atlantic puffin per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor and Access Areas.

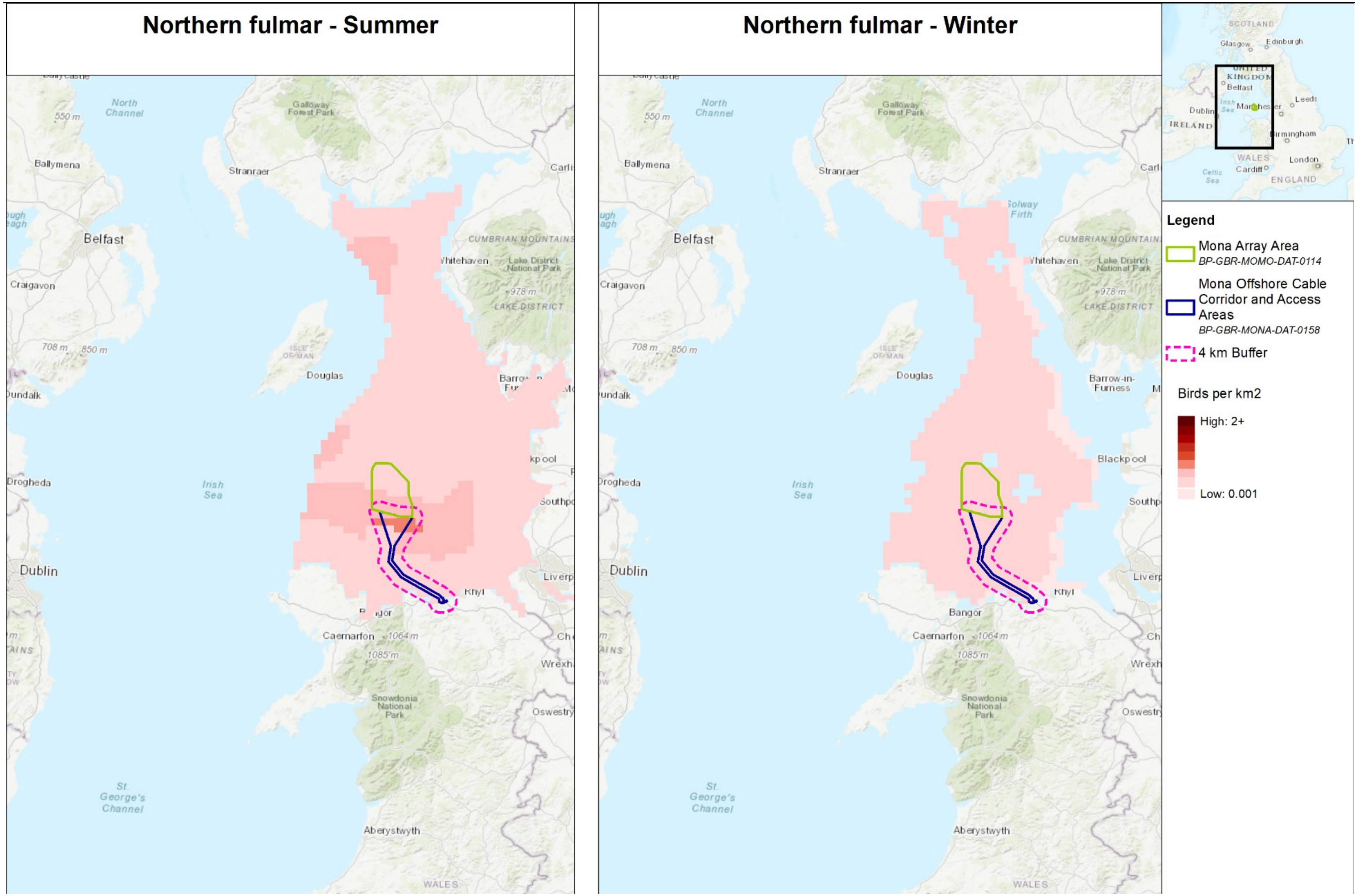

Figure 1.40: Spatial variation in predicted densities (animals per km^2) of Northern fulmar per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor and Access Areas.

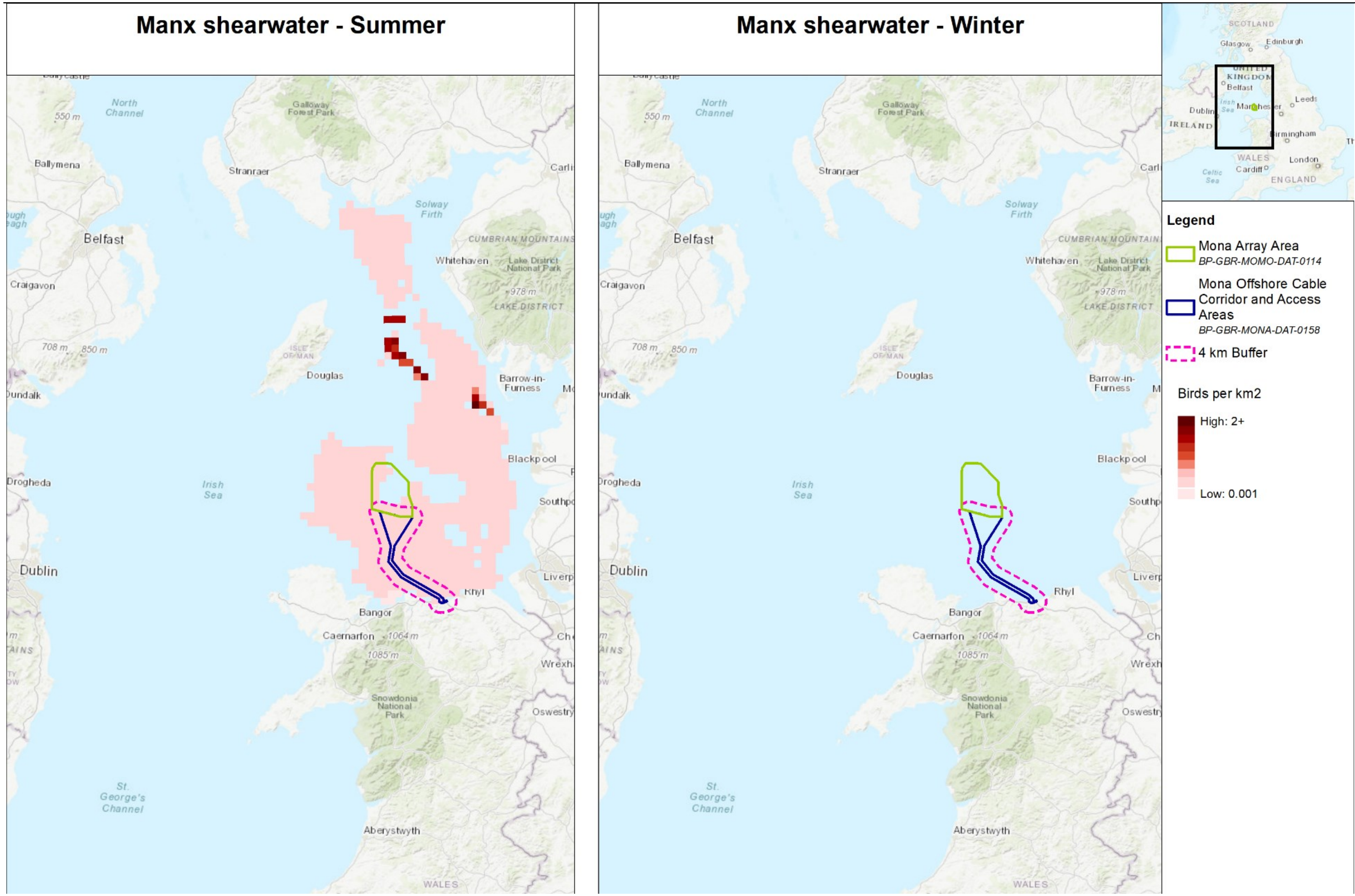

Figure 1.41: Spatial variation in predicted densities (animals per km^2) of Manx shearwater per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor and Access Areas.

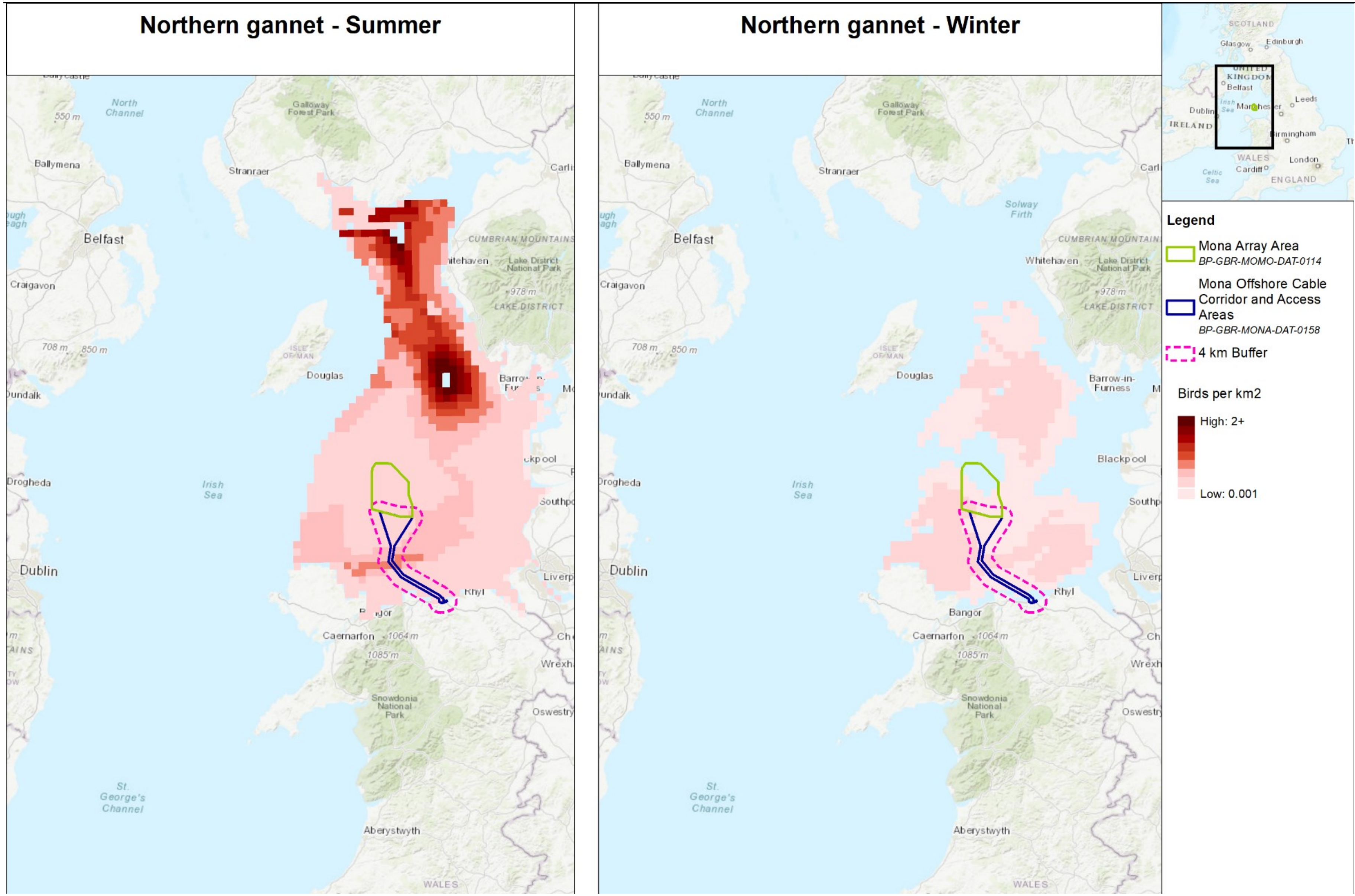

Figure 1.42: Spatial variation in predicted densities (animals per km^2) of northern gannet per season (extracted from Bradbury *et al*. (2014)) within the Mona Offshore Cable Corridor and Access Areas.

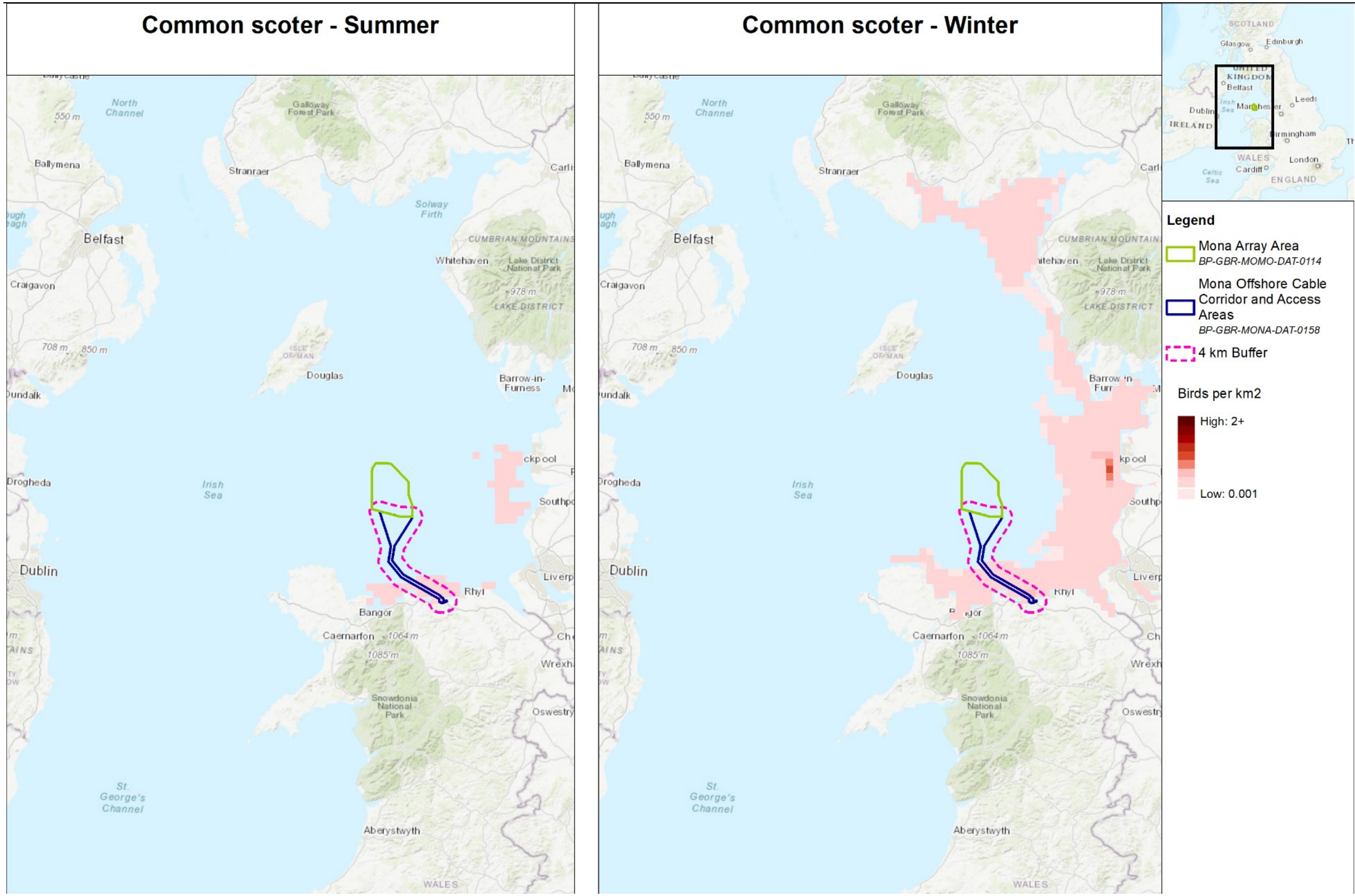

Figure 1.43: Spatial variation in predicted densities (animals per km²) of common scoter per season (extracted from Bradbury *et al.* (2014)) within the Mona Offshore Cable Corridor and Access Areas

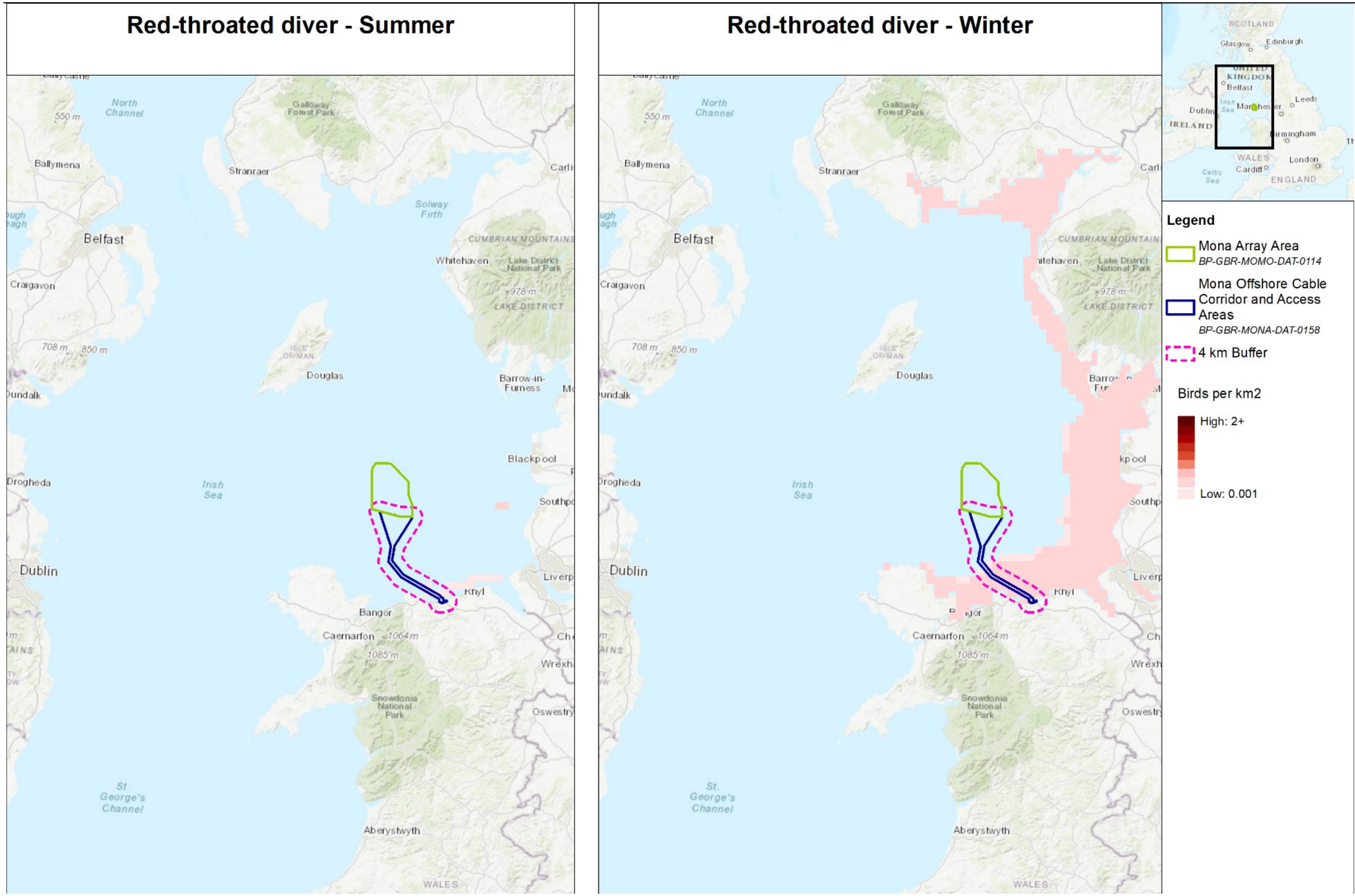

Figure 1.44: Spatial variation in predicted densities (animals per km²) of red-throated diver per season (extracted from Bradbury *et al*. (2014)) within the Mona Offshore Cable Corridor and Access Areas.

1.6 References

Austin, G.E., Calbrade, N.A., Birtles, G.A., Peck, K., Wotton, S.R., Shaw, J.M., Balmer, D.E. and Frost, T.M. (2023) Waterbirds in the UK 2021/22: The Wetland Bird Survey and Goose & Swan Monitoring Programme. BTO, RSPB, JNCC and NatureScot. British Trust for Ornithology, Thetford.

BirdLife International (2022) Seabird Tracking Database. Available at: http://seabirdtracking.org/ Accessed: July 2022.

Bradbury, G., Trinder, M., Furness, B., Banks, A.N., Caldow, R.W. and Hume, D. (2014) Mapping seabird sensitivity to offshore wind farms. PloS one, 9(9), p.e106366.

Brown, P. and Grice, P. (2005) Birds in England. T&AD Poyser, London, UK: 694pp. ISBN 0 7136 6530 0.

Bundesamt für Seeschifffahrt und Hydrographie (BSH) (2013) Investigation of the Impacts of Offshore Wind Turbines on the Marine Environment. StUK4.

Cabot, D. and Nisbet, I. (2013) Terns. Harper Collins, London: 461pp.

Clark, J.A., Robinson, R.A., Balmer, D.E., Adams, S.Y., Collier, M.O., Grantham, M.J., Blackburn, J.R. and Griffin, B.M. (2004) Bird ringing in Britain and Ireland in 2003. Ringing and Migration. 22(2), 114. doi:10.1080/03078698.2004.9674318.

Cleasby, I. R., Owen, E., Wilson, L., Wakefield, E. D., O'Connell, P. and Bolton, M. (2020) Identifying important at-sea areas for seabirds using species distribution models and hotspot mapping. Biological Conservation,241, 108375.

Clewley, G.D., Thaxter, C.B., Humphreys, E.M., Scragg, E.S., Bowgen, K.M., Bouten, W., Masden, E.A. and Burton, N.H. (2021) Assessing movements of Lesser Black-backed Gulls using GPS tracking devices in relation to the Walney Extension and Burbo Bank Extension Offshore Wind Farms. BTO Research Report 738.

CMACS (2012) West of Duddon Sands offshore wind farm ornithology survey report 2012. Prepared for DONG Energy.

CMACS (2014) Walney I & III & II Ornithology Final Report. Prepared for: Walney (UK) Offshore Wind Farms Ltd.

Coppack, T., McGovern, S., Rehfisch, M. and Clough, S. (2017) Estimating wintering populations of waterbirds by aerial high-resolution imaging. Vogelvelt, 137, pp.149-155.

Cranswick, P.A., Hall, C. and Smith, L. (2004) All Wales Common Scoter survey: report on 2002/03 work programme. WWT Wetlands Advisory Service report to Countryside Council for Wales, CCW Contract Science Report no 615.

Dean, B., Freeman, R., Kirk, H., Leonard, K., Phillips, R. A., Perrins, C. M., and Guilford, T. (2013) Behavioural mapping of a pelagic seabird: combining multiple sensors and a hidden Markov model reveals the distribution of at-sea behaviour. Journal of the Royal Society Interface, 10(78), 20120570.

Duckworth, J., O'Brien, S., Petersen, I.K., Petersen, A., Benediktsson, G., Johnson, L. Lehikoinen, P., Okill, D., Väisänen, R., Williams, J., Williams, S. and Daunt, F. (2021) Spatial and temporal variation in foraging of breeding red-throated divers. Journal of Avian Biology 52(6).

Fayet and Guilford. (2007-2014) BirdLife International Seabird Tracking Database. Available at: http://seabirdtracking.org/ Accessed: August 2023.

Frost, T.M., Calbrade, N.A., Birtles, G.A., Hall, C., Robinson, A.E., Wotton, S.R., Balmer, D.E. and Austin, G.E. (2021) Waterbirds in the UK 2019/20: The Wetland Bird Survey. BTO, RSPB and JNCC, in association with WWT. British Trust for Ornithology, Thetford. Available at: https://www.bto.org/our-science/publications/waterbirds-uk/waterbirds-uk-201920.

Furness, R.W. (2015) Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS). Natural England Commissioned Reports, Number 164.

Garthe, S. and Hüppop, O. (2004) Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology, 41, 724–741.

Garthe, S., Benvenuti, S., and Montevecchi, W. A. (2000) Pursuit plunging by northern gannets (*Sula bassana*) feeding on capelin (*Mallotus villosus*). Proceedings of the Royal Society of London. Series B: Biological Sciences, 267(1454), 1717–1722.

Garthe, S., Benvenuti, S., and Montevecchi, W. A. (2003) Temporal patterns of foraging activities of northern gannets, Morus bassanus, in the northwest Atlantic Ocean. Canadian Journal of Zoology, 81, 453–461.

Garthe, S., Guse, N., Montevecchi, W. A., Rail, J.-F., and Grégoire, F. (2014) The daily catch: Flight altitude and diving behavior of northern gannets feeding on Atlantic mackerel. Journal of Sea Research, 85, 456–462.

Garthe, S., Montevecchi, W. A., Chapdelaine, G., Rail, J.-F., and Hedd, A. (2007) Contrasting foraging tactics by northern gannets (Sula bassana) breeding in different oceanographic domains with different prey fields. Marine Biology, 151(2), 687–694.

Garthe, S., Peschko, V., Kubetzki, U., and Corman, A.-M. (2016) Seabirds as samplers of the marine environment – a case study in Northern Gannets [Preprint]. Surface/In situ Observations/Shelf Seas/Biological Processes.

Grémillet, D., Pichegru, L., Siorat, F., and Georges, J.-Y. (2006) Conservation implications of the apparent mismatch between population dynamics and foraging effort in French northern gannets from the English Channel. Marine Ecology Progress Series, 319, 15–25.

Guilford, T., Meade, J., Freeman, R., Biro, D., Evans, T., Bonadonna, F., and Perrins, C. M. (2008) GPS tracking of the foraging movements of Manx Shearwaters Puffinus breeding on Skomer Island, Wales. Ibis, 150(3), 462-473.

Haverschmidt, F. (1963) The Black-tailed Godwit. Brill, Leiden, The Netherlands.

HiDef Aerial Surveying Limited (2023) Densities of qualifying species within Liverpool Bay/ Bae Lerpwl SPA: 2015 to 2020. Natural England Commissioned Report 440, Natural England.

Joint Nature Conservation Committee (2013) JNCC Expert Statement on Ornithological Issues for Written Representations in Respect of East Anglia ONE Offshore Windfarm by Dr Sophy Allen. Joint Nature Conservation Committee, Aberdeen.

Joint Nature Conservation Committee (JNCC) (2021) European herring gull (Larus argentatus), Accessed on: July 2023. Available at: https://jncc.gov.uk/our-work/herring-gull-larus-argentatus/.

Joint Nature Conservation Committee (JNCC) (2021) European storm-petrel (*Hydrobates pelagicus*). Accessed on: July 2023. Available at: https://jncc.gov.uk/our-work/european-storm-petrel-hydrobates-pelagicus/#uk-population-estimates-and-change-1969-2002-census-data.

Joint Nature Conservation Committee (JNCC) (2021) Northern gannet (*Morus bassanus*) Available at: https://jncc.gov.uk/our-work/northern-gannet-morus-bassanus/#uk-population-estimates-and-change-1969-2013-15-census-data Accessed: July 2023.

Joint Nature Conservation Committee (JNCC) (2021) Seabird Population Trends and Causes of Change: 1986–2019 Report (https://jncc.gov.uk/our-work/smp-report-1986-2019). Joint Nature Conservation Committee, Peterborough. Updated 20 May 2021.

Joint Nature Conservation Committee (JNCC) (2021) Seabird Population Trends and Causes of Change: 1986–2019 Report (https://jncc.gov.uk/our-work/smp-report-1986-2019). Joint Nature Conservation Committee, Peterborough. Updated 20 May 2021.

Joint Nature Conservation Committee (JNCC) (2022) Joint SNCB Note Interim Displacement Advice Note.

Joint Nature Conservation Committee (JNCC) (2023) Seabird Monitoring Programme. Available at: https://app.bto.org/seabirds

Joint Nature Conservation Committee (JNCC) and Natural England. (2022). Nature Conservation Considerations and Environmental Best Practice for subsea cable for English Inshore and UK Offshore Waters. Available by request from neoffshorewindstrategicsolutions@naturalengland.org.uk.

Kaiser, M. J., Galanidi, M., Showler, D. A., Elliot, A. J., Caldow, R.W.G., Rees, E.I.S., Stillman, R.A. and Sutherland, W.J. (2006) Distribution and behaviour of Common Scoter *Melanitta nigra* relative to prey resources and environmental parameters. Ibis, 148 (Suppl 1), 110-128. https://doi.org/10.1111/j.1474-919X.2006.00517.x.

Kentie, R., C. Both, J.C.E.W. Hooijmeijer and T. Piersma. (2014) Age-dependent dispersal and habitat choice in black-tailed godwits *Limosa limosa limosa* across a mosaic of traditional and modern grassland habitats. Journal of Avian Biology 45: 396–405.

Kentie, R., N.R. Senner, J.C.E.W. Hooijmeijer, R. Márquez-Ferrando, J. Figuerola, J.A. Masero, M.A. Verhoeven and T. Piersma. (2016) Estimating the size of the Dutch breeding population of Continental Black-tailed Godwits from 2007–2015 using resighting data from spring staging sites. Ardea 114: 213–225.

Kober, K., Webb, A., Win, I., Lewis, M., O'Brien, S., Wilson, L.J. & Reid, J.B. (2010) An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs, JNCC Report No. 431. JNCC, Peterborough, ISSN 0963-8091

Lawson, J., Kober, K., Win, I., Allcock, Z., Black, J. Reid, J.B., Way, L. and O'Brien, S.H. (2016) An assessment of the numbers and distribution of wintering waterbirds and seabirds in Liverpool Bay/Bae Lerpwl area of search. JNCC Report No 576. JNCC, Peterborough.

Lawson, J., Kober, K., Win, I., Allcock, Z., Black, J. Reid, J.B., Way, L. and O'Brien, S.H. (2015) An assessment of the numbers and distribution of wintering waterbirds and seabirds in Liverpool Bay / Bae Lerpwl area of search. JNCC Report No 576. JNCC, Peterborough.

Mackey and Giménez (2006) SEA678 Data Report for Offshore Seabird Populations. Coastal & Marine Resources Centre Environmental Research Institute University College Cork.

Marine Industry Group for Ornithology (MIG-Birds) (2022) Joint SNCB Interim Advice on the Treatment of Displacement for Red-Throated Diver (2022).

Mitchell, P.I., Newton, S.F, Ratcliffe, N. and Dunn, T.E. (2004) Seabird Populations of Britain and Ireland. Results of the Seabird 2000 Census (1998-2002). London, T. & A.D. Poyser.

Mitchell, P.I., Newton, S.F., Ratcliffe, N. and Dunn, T.E. (eds.) (2004) Seabird Populations of Britain and Ireland. Poyser, London.

Natural England. (2022) Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards. Phase III: Expectations for data analysis and presentation at examination for offshore wind applications.

NatureScot (2023) Guidance Note 3: Guidance to support Offshore Wind applications: Marine Birds - Identifying theoretical connectivity with breeding site Special Protection Areas using breeding season foraging ranges. Updated January 2023.

Nelson, J.B. (2005) Pelicans, Cormorants and their relatives. Oxford: Oxford University Press.

Paiva, V.H., Ramos, J.A., Martins, J., Almeida, A. and Carvalho, A. (2008) Foraging habitat selection by Little Terns Sternula albifrons in an estuarine lagoon system of southern Portugal. Ibis 150: 18–31.

Perrow, M.R., Skeate, E.R. and Gilroy, J.J. (2011) Visual tracking from a rigid-hulled inflatable boat to determine foraging movements of breeding terns. Journal of Field Ornithology 82: 68–79.

Puffin Island Seabird Research (2010) Puffin Island Seabird Research – Meet the Birds. Available at: https://sites.google.com/site/puffinislandseabirdresearch/meet-the-birds

R Core Team (2021) R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

Saltee Islands SPA Site Synopsis (n.d.) Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004002.pdf Accessed: July 2023.

Schamel, D. and Tracy, D.M. (1985) Replacement clutches in the Red-throated Loon. Journal of Field Ornithology, 56(3), 282–83.

Scott-Hayward, L.A.S., Mackenzie, M.L., Donovan, C.R., Walker, C.G. and Ashe, E. (2014) Complex Region Spatial Smoother (CReSS). Journal of Computational and Graphical Statistics, 23(2), 340–360. https://doi.org/10.1080/10618600.2012.762920.

Scott-Hayward, L.A.S., Oedekoven, C.S., Mackenzie, M.L. and Rexstad, E.A. (2013) Statistical Modelling of bird and cetacean distributions in offshore renewables development areas. University of St. Andrews: Contract with Marine Scotland: SB9 (CR/2012/05), 109.

Spencer, S. M. (2012) Diving Behavior and Identification of Sex of Breeding Atlantic Puffins (*Fratercula arctica*), and Nest-Site Characteristics of Alcids on Petit Manan Island, Maine. MSc Thesis University of Massachusetts Amherst, 1–65.

Stanbury, A.J., Eaton, M.A., Aebischer, N.J., Balmer, D., Brown, A.F., Douse, A., Lindley, P., McCulloch, N., Noble, D.G. & Win, I. (2021) The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114.

Stroud, D.A., Bainbridge, I.P., Maddock, A., Anthony, S., Baker, H., Buxton, N., Chambers, D., Enlander, I., Hearn, R.D., Jennings, K.R, Mavor, R., Whitehead, S. & Wilson, J.D. - on behalf of the UK SPA & Ramsar Scientific Working Group (eds.) (2016) The status of UK SPAs in the 2000s: the Third Network Review. [c.1,108] pp. JNCC, Peterborough.

Thaxter, C.B., Wanless, S., Daunt, F., Harris, M.P., Benvenuti, S., Watanuki, Y., Grémillet, D., and Hamer, K.C. (2010) Influence of wing loading on the trade-off between pursuit-diving and flight in common guillemots and razorbills. Journal of Experimental Biology, 213(7), 1018–1025. https://doi.org/10.1242/jeb.037390.

Verhoeven, M.A., Loonstra, A.H.J., McBride, A.D., Tinbergen, J.M., Kentie, R., Hooijmeijer, J.C.E.W., Both, C., Senner, N.R. and Piersma, T. (2019) Variation in egg size of Black-tailed Godwits. Ardea 107: 291–302.

Verhoeven, M.A., Smart, J., Kitchin, C., Schmitt, S., Whiffin, M., Burgess, M. and Ratcliffe, N. (2021) Diagnosing the recent population decline of Black-tailed Godwits in the United Kingdom. Wader Study, 128(1): 65–76.

Waggit, J.J and Green, J. (2022). BirdLife International Seabird Tracking Database. Available at: http://seabirdtracking.org/ Accessed: August 2023.

Waggitt, J.J., Evans, P.G., Andrade, J., Banks, A.N., Boisseau, O., Bolton, M., Bradbury, G., Brereton, T., Camphuysen, C.J., Durinck, J. and Felce, T. (2020) Distribution maps of cetacean and seabird populations in the North-East Atlantic. Journal of Applied Ecology, 57(2), pp. 253-269.

Wakefield, E.D., Owen, E., Baer, J., Carroll, M.J., Daunt, F., Dodd, S.G., Green, J.A., Guilford, T., Mavor, R.A., Miller, P.I., Newell, M.A., Newton, S.F., Robertson, G.S., Shoji, A., Soanes, L.M., Votier, S.C., Wanless, S. and Bolton, M. (2017) Breeding density, fine-scale tracking, and large-scale modelling reveal the regional distribution of four seabird species. Ecological Applications 27: 2074-91.

Walsh, P.M., Halley, D.J., Harris, M.P., del Nevo, A., Sim, I.M.W. and Tasker, M.L. (1995) Seabird monitoring handbook for Britain and Ireland. JNCC / RSPB / ITE / Seabird Group, Peterborough. ISBN 1 873701 73 X.

Webb, A., McSorley, C.A., Dean, B.J., Reid, J.B., Cranswick, P.A., Smith, L. and Hall, C. (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. JNCC Report No. 373, JNCC, Peterborough.

Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. and Noble, D. (2020) Population estimates of birds in Great Britain and the United Kingdom. British Birds 113: 69–104.

Woodward, I., Thaxter, C.B., Owen, E. and Cook, A.S.C.P. (2014) Desk-based revision of seabird foraging ranges used for HRA screening. BTO Project Report No. 724. British Trust for Ornithology, Thetford.

Woodward, I., Thaxter, C.B., Owen, E. and Cook, A.S.C.P. (2019) Desk-based revision of seabird foraging ranges used for HRA screening, Report of work carried out by the British Trust for Ornithology on behalf of NIRAS and The Crown Estate. BTO Research Report No. 724. The British Trust for Ornithology, Thetford.

Appendix A. Raw counts

Table A. 1 Raw count data for the Mona Offshore Ornithology survey area between March 2020 and February 2021.

Species	Mar-20	April-20	May-20	Jun-20	Jul-20	Aug-20	Sept-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21
Arctic Skua	0	0	1	0	0	0	1	0	0	0	0	0
Arctic Tern	0	0	0	0	0	0	0	0	0	0	0	0
Auk species	0	0	1	7	2	1	0	0	8	14	10	2
Auk/Shearwater species	0	0	0	0	0	0	0	0	0	0	0	0
Black-backed Gull species	0	0	0	0	0	0	0	0	1	0	0	0
Black-headed Gull	0	0	0	0	0	1	0	4	0	0	0	2
Black-tailed Godwit	0	0	0	0	13	0	0	0	0	0	0	0
Commic Tern	0	0	3	0	1	3	0	0	0	0	0	0
Common Gull	1	0	0	0	0	0	0	0	5	0	0	18
Common Tern	0	0	0	12	0	0	0	0	0	0	0	0
Cormorant	0	0	0	0	0	0	0	0	0	0	0	0
Fulmar	17	13	1	4	4	0	4	0	5	27	10	23
Gannet	38	19	8	13	101	78	43	41	23	1	5	0
Great Black-backed Gull	10	0	1	20	0	7	1	3	3	5	3	23
Great Skua	0	0	0	0	0	0	0	0	1	0	0	0
Guillemot	1,806	246	76	262	201	227	119	104	243	76	158	787
Guillemot/Razorbill	422	26	8	109	8	1	12	3	124	225	228	765
Gull species	0	1	0	5	0	0	2	0	0	0	1	4
European herring gull	8	2	1	2	0	1	4	4	2	0	3	21
Kittiwake	355	61	10	121	57	21	20	6	168	102	132	99
Large Gull species	0	1	0	7	0	1	0	0	0	0	1	1

Species	Mar-20	April-20	May-20	Jun-20	Jul-20	Aug-20	Sept-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21
Lesser Black-backed Gull	10	0	0	11	1	3	0	0	2	0	0	0
Little Gull	0	0	0	0	0	0	0	0	0	2	3	11
Manx Shearwater	7	0	0	19	465	22	10	0	0	0	0	0
Puffin	14	3	0	0	4	1	1	1	0	0	0	0
Razorbill	540	18	22	15	35	20	48	8	22	32	79	364
Red-throated Diver	0	0	0	0	0	1	0	1	1	0	0	0
Sandwich Tern	0	0	0	1	0	1	0	0	0	0	0	0
Shag	0	0	0	0	0	0	0	0	0	0	0	0
Skua species	0	0	1	0	0	0	0	0	0	0	0	0
Small Gull species	0	4	0	3	0	1	1	0	1	5	0	0
Storm-Petrel species	0	0	1	0	0	0	0	0	0	0	0	0
Tern species	0	0	0	1	0	0	0	0	0	0	0	0
Thrush species	0	0	0	0	0	0	0	0	42	0	0	0
Unidentified Bird species	0	0	0	0	0	0	0	0	0	0	0	0
Wader species	0	0	11	0	0	1	0	0	0	0	0	0

Table A. 2 Raw count data for the Mona Offshore Ornithology survey area between March 2021 and February 2022.

Species	Mar-20	Apri-20	May-20	Jun-20	Jul-20	Aug-20	Sept-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21
Arctic Skua	0	0	0	0	0	0	0	0	0	0	0	0
Arctic Tern	0	0	5	0	0	0	0	0	0	0	0	0
Auk species	62	0	1	7	4	2	0	1	0	0	3	0
Auk/Shearwater species	0	13	0	17	10	6	11	0	0	0	0	0
Black-backed Gull species	0	0	0	0	0	0	0	0	0	0	0	0
Black-headed Gull	0	0	0	0	0	0	0	0	2	0	0	0
Black-tailed Godwit	0	0	0	0	0	0	0	0	0	0	0	0
Commic Tern	0	0	3	16	0	0	0	0	0	0	0	0
Common Gull	1	0	0	0	0	0	0	0	1	11	19	4
Common Tern	0	0	1	0	0	0	0	0	0	0	0	0
Cormorant	0	1	0	0	0	0	0	0	0	0	0	0
Fulmar	47	12	0	6	4	1	5	0	0	38	2	16
Gannet	126	88	28	38	49	66	113	58	11	2	3	6
Great Black-backed Gull	3	0	0	0	1	1	0	1	4	2	13	27
Great Skua	0	2	0	0	0	0	0	0	0	0	0	0
Guillemot	576	996	88	263	407	80	35	363	51	449	846	346
Guillemot/Razorbill	1236	80	16	12	7	6	11	34	37	244	241	273
Gull species	1	0	0	0	2	1	0	0	0	0	0	12
European herring gull	0	5	0	1	2	0	1	0	1	0	5	9
Kittiwake	613	212	54	91	275	2	4	22	78	353	276	334
Large Gull species	0	0	0	1	0	0	0	0	0	8	2	2
Lesser Black-backed Gull	7	2	2	1	1	5	1	0	5	0	0	4
Little Gull	0	0	0	0	0	0	0	0	1	0	5	6

Species	Mar-20	April-20	May-20	Jun-20	Jul-20	Aug-20	Sept-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21
Manx Shearwater	2	15	0	1269	543	138	54	0	0	0	0	0
Puffin	1	0	0	4	0	1	0	0	0	2	0	0
Razorbill	283	73	3	8	12	22	3	9	6	268	266	118
Red-throated Diver	0	0	0	0	0	0	0	0	0	1	0	0
Sandwich Tern	0	2	0	0	6	0	0	0	0	0	0	0
Shag	0	0	0	0	0	0	0	0	0	2	0	0
Skua species	0	0	0	0	0	0	0	0	0	0	0	0
Small Gull species	0	0	0	0	1	0	0	1	2	0	5	1
Storm-Petrel species	0	0	0	0	0	0	0	0	0	0	0	0
Tern species	0	0	0	0	1	0	0	0	0	0	0	0
Thrush species	0	0	0	0	0	0	0	0	15	0	0	0
Unidentified Bird species	0	1	0	0	0	1	0	0	1	1	2	55
Wader species	0	0	4	0	0	4	0	0	5	0	0	0

Appendix B. Colony counts (Source: JNCC Seabird Monitoring

B.1. Northern gannet

Table B. 3 Northern gannet colony counts (no. of Apparently Occupied Sites (AOS)/Apparently Occupied Nest (AON)).

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of AOS/AON	Year
	SPA			
Puffin island, Middle Mouse	Anglesey Terns / Morwenoliaid Ynys MÃ´n SPA	No	21	2022-07-22
Lambay	Lambay Island SPA	No	926	2015-06-02
Ireland's Eye	Ireland's Eye SPA	No	185	2015-06-17
Ailsa Craig	Ailsa Craig SPA	Yes	33,226	2014-06-16
Grassholm	Grassholm SPA	Yes	36,011	2015-01-01
Great Saltee Island	Saltee Islands SPA	Yes	4,722	2013-08-06
Clare Island 12, Clare Whole Island	Clare Island SPA	No	619	2015-05-05
Berneray	Mingulay and Berneray SPA	No	15	2021-06-01
The Bull	The Bull and the Cow Rocks SPA	Yes	6,388	2014-06-01
Little Skellig - Whole Island	Skelligs SPA	Yes	35,294	2014-07-15
Rockall, Boreray and Stacs	St Kilda SPA	Yes	60,318	2014-06-04
	SSSI			
Big Scar	Scare Rocks SSSI	Yes	2,376	2014-07-23
	Designated TOTAL		**180,101**	
	Non-designated			
Garvan Isles	Garvan Islands	No	30	2021-06-03
Ortac, Les Etacs	Alderney	No	8,540	2022-07-22
	Non-designated TOTAL		**8,570**	
	TOTAL		**188,671**	

B.2. Manx shearwater

Table B. 4 Manx shearwater colony counts (no. of Apparently Occupied Sites (AOS)/Apparently Occupied Nest (AON)).

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of AOS/AON	Year
	SPA			
Bardsey Island	Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA	Yes	16,183	2001-01-01
Big Copeland Island, Lighthouse Island,	Copeland Islands SPA	Yes	4,850	2007-01-01
Inishshark, High Island	High Island, Inishshark and Davillaun SPA	No	869	2015-07-07
Cruagh	Cruagh Island SPA	Yes	3,286	2001-01-01
Inishtooskert, Inishnabro, Inishvickillane, Great Blasket	Blasket Islands SPA	Yes	19,534	2001-01-01
Great Skellig Whole Island	Skelligs SPA	Yes	738	2001-01-01
Puffin Island Whole	Puffin Island SPA	No	6,329	2000-07-01
Scariff, Deenish	Deenish Island and Scariff Island SPA	Yes	2,311	2000-01-01
Great Saltee Island, Little Saltee	Saltee Islands SPA	No	250	2002-06-15
Lunga and Sgeir a' Chaisteil	Treshnish Isles SPA	No	1,992	2018-05-27
Rum	Rum SPA	Yes	120,000	2001-01-01
Ailsa Craig	Ailsa Craig SPA	No	20	2018-06-01
Ramsey Island RSPB	Ramsey and St David's Peninsula Coast SPA	No	6,225	2022-06-01
Skomer, Skokholm, Midland Island (Middleholm)	Skomer, Skokholm and the Seas off Pembrokeshire SPA	Yes	455,156	2018-06-01
Annet, Shipman Head, St Agnes, Bryher, Gugh, St Helen's, Tresco, Round Island, St Martin's	Isles of Scilly SPA	No	726	2022-06-17
	SSSI			
Sanda Islands	Sanda Islands SSSI	Yes	300	2006-06-07
Lundy	Lundy SSSI	Yes	5,504	2017-06-03
	MNR			

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of AOS/AON	Year
Calf of Man	Calf and Wart Bank MNR	Yes	424	2014-05-01
	Designated TOTAL		**644,697**	
	TOTAL		**644,697**	

B.3. Common guillemot

Table B. 5 Common guillemot colony counts (no. of individuals).

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
	SPA			
Puffin Island, Middle Mouse	Anglesey Terns / Morwenoliaid Ynys MÃ´n SPA	No	13,247	2023-06-12
Abraham's Bosom, South Stack Cliffs RSPB	Glannau Ynys Gybi / Holy Island Coast SPA	No	10,605	2021-06-01
Trwyn Cilan, St Tudwal's Island West, St Tudwal's Island East	Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA	No	6,061	2023-06-15
	SSSI			
Great Orme	Pen y Gogarth / Great Ormes Head SSSI	Yes	3,578	2023-06-15
St Bees Head RSPB	St. Bees Head SSSI	Yes	18,599	2022-06-01
Carreg y Llam	Carreg y Llam SSSI	Yes	18,170	2023-06-13
Little Orme	Creigiau Rhiwledyn / Little Ormes Head SSSI	Yes	1,298	2023-06-15
	MNR			
Port St Mary - Sound	Baie ny Carrickey MNR	Yes	5,308	2017-06-13
Calf of Man	Calf and Wart Bank MNR	No	166	2017-06-13
Ramsey - Port Mooar	Ramsey Bay MNR	No	631	2017-06-13
Glen Maye - Peel	West Coast MNR	Yes	888	2017-06-13
	Designated TOTAL		**78,552**	
	TOTAL		**78,552**	

B.4. Razorbill colony

Table B. 6 Razorbill colony counts (no. of individuals).

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
	SPA			
The Skerries RSPB, Middle Mouse	Anglesey Terns / Morwenoliaid Ynys MÃ´n SPA	No	614	2017-06-01
Gogarth, South Stack Cliffs RSPB, Abraham's Bosom	Glannau Ynys Gybi / Holy Island Coast SPA	No	1,982	2021-06-01
Penymynydd, Trwyn Cilan, St Tudwal's Island West, St Tudwal's Island East	Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA	No	331	2023-06-15
Balcary Point 1, Cow's Snout – Mon	Solway Firth SPA	No	193	2020-06-15
Bardsey Island, Maen Du, Braich Anelog, Ynysoedd Gwylan (Fawr and Bach Total), Trwyn Penrhyn	Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA	No	3,990	2019-01-01
Puffin Island	Ynys Seiriol / Puffin Island SPA	No	697	2023-06-12
	SSSI			
Great Orme	Pen y Gogarth / Great Ormes Head SSSI	Yes	496	2023-06-15
Burrow Head	West Burrow Head SSSI	No	8	2020-06-17
St Bees Head RSPB	St. Bees Head SSSI	Yes	228	2022-06-01
Carreg y Llam	Carreg y Llam SSSI	Yes	492	2023-06-13
Little Orme	Creigiau Rhiwledyn / Little Ormes Head SSSI	Yes	39	2023-06-15
Laggantalluch Head, Dunman – Crammag Head, Port Mona, Lythe Mead to Carrick-Kee, Mull Of Galloway RSPB	Mull of Galloway SSSI	Yes	442	2022-06-01
Meikle Ross	Borgue Coast SSSI	No	4	2018-06-25
Port o' Warren	Port o' Warren SSSI	No	38	2020-06-15
Porth Llanlleiana	Llanbadrig – Dinas Gynfor SSSI	No	3	2016-06-09
Bwrdd Arthur to Fedw Fawr	Arfordir Gogleddol Penmon SSSI	No	14	2016-06-07
	MNR			

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Port St Mary – Sound	Baie ny Carrickey MNR	Yes	393	2017-06-13
Calf of Man	Calf and Wart Bank MNR	No	145	2017-06-13
Ramsey – Port Mooar	Ramsey Bay MNR	No	48	2017-06-13
Glen Maye – Peel	West Coast MNR	Yes	135	2017-06-13
Sound – Port Erin, Bradda - Fleshwick	Port Erin Bay MNR	No	55	2017-06-13
Fleshwick - Stroin Vuigh	Niarbyl Bay MNR	No	4	2017-06-13
Port Soderick - Port Grenaugh	Langness MNR	No	59	2017-06-13
Marine Drive	Little Ness MNR	No	75	2017-06-13
	Designated TOTAL		**10,483**	
	TOTAL		**10,483**	

B.5. Lesser black-backed gull

Table B.7. Lesser black-backed gull colony counts (no. of individuals).

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
	SPA			
Puffin Island	Ynys Seiriol / Puffin Island SPA	No	1,052	2017-05-22
Porth Diana, Rhoscolyn Beacon, The Skerries RSPB	Anglesey Terns / Morwenoliaid Ynys MÃ´n SPA	No	268	2022-06-01
Ynys Traws	Glannau Ynys Gybi / Holy Island Coast SPA	No	28	2016-06-09
Ribble Estuary	Ribble & Alt Estuaries SPA	Yes	8,978	2021-05-20
Fleetwood Town, Walney Urban Gulls, Millom (urban), Chapel Island, Heysham Power Station 1, Askam-in-Furness (urban), Haverigg Prison (urban), Park Road Ind. Est., Rampside Gas Terminal, South Walney, Centre and Island (urban)	Morecambe Bay and Duddon Estuary SPA	Yes	4,874	2023-05-25
West wall to W&SW of Weston Point	Mersey Estuary SPA	No	100	2022-06-19
Langden Head, Tarnbrook Fell	Bowland Fells SPA	Yes	29,254	2018-06-01
Morecambe Bay and Duddon Estuary SPA4874Mersey Estuary SPA1002022-06-19Craig yr Aderyn	Craig yr Aderyn (Bird's Rock) SPA	No	14	2018-06-12
Islands of Fleet, Maryport, Hestan Island, Rockcliffe Marsh	Solway Firth SPA	No	1,472	2021-05-31
Bardsey Island	Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA	No	328	2019-01-01
Killard Point, Strangford Lough	Strangford Lough SPA	No	698	2022-05-18
Lambay	Lambay Island SPA	Yes	952	2010-06-04
Lighthouse Island, Big Copeland Island, Mew Island	Copeland Islands SPA	No	2,666	2022-05-14

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Dalkey Island	Dalkey Islands SPA	No	70	2016-05-16
Ailsa Craig	Ailsa Craig SPA	Yes	378	2019-06-01
Shallow Flat, Croaghan Island, Taylor's Rock, Gawley's Bay 2, Coney Island Flat, Gawley's Bay 1, Phil Roe's Flat, Tolan's Flat, Cormorant Rock, Derrywarragh Flat, Padian, Skady Tower Islands, Scaddy Island	Lough Neagh and Lough Beg SPA	No	2,429	2022-06-24
Penpleidau, Porthlysgi, Carreg yr Esgob, Greenscar, Ramsey Island RSPB	Ramsey and St David's Peninsula Coast SPA	No	334	2018-05-28
Rathlin Island	Rathlin Island SPA	Seabird assemblage	1,038	2021-05-25
Sheep Island	Sheep Island SPA	No	176	2021-06-18
Sharpness (urban)	Severn Estuary SPA	No	126	2009-01-01
Midland Island (Middleholm), Green Bridge of Wales to Flimston Bay (Elegug Stacks), Skokholm, Skomer	Skomer, Skokholm and the Seas off Pembrokeshire SPA	Yes	16,214	2023-05-21
Grassholm	Grassholm SPA	No	76	2018-06-05
Mountblow Bonded Warehouse	Inner Clyde SPA	No	60	2001-01-01
	SSSI			
Caernarfon (urban)	Afon Seiont SSSI	No	34	2019-05-14
Llyn Brenig	Mynydd Hiraethog SSSI	No	36	2016-05-13
Llyn Trwsfynydd Rese	Coed y Rhygen SSSI	No	158	2018-05-30
Derwent Water, Workington Town	River Derwent and Tributaries SSSI	No	52	2019-06-12
Haweswater Wooded Island	Naddle Forest SSSI	No	70	2018-05-30
Ceibwr2, Cemaes Head/Poppit, Cardigan Island	Aberarth - Carreg Wylan SSSI	Yes	690	2019-05-15
Maylord Orchards, Hereford City	River Wye SSSI	No	10	2019-05-04

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Sanda Islands	Sanda Islands SSSI	No	46	2019-06-28
Talla Reservoir	Tweedsmuir Hills SSSI	No	37	2018-06-14
Maenmelyn (incl. Pen Brush island), Pwll Deri (incl. Ynys: Ddu, y Dinas & Melyn)	Strumble Head - Llechdafad Cliffs SSSI	Yes	58	2018-06-05
Mitcheldean (urban)	Stenders Quarry SSSI	No	464	2010-05-01
Gloucester Business Park	Hucclecote Meadows SSSI	No	52	2002-05-29
St Margaret's Island	St. Margaret's Island SSSI	Yes	94	2022-04-30
Industrial Estate near Kenfig (urban)	Cynffig / Kenfig SSSI	No	28	2002-05-31
Lambhill (urban)	Possil Marsh SSSI	No	34	2001-01-01
Newport - Monsanto (urban)	River Usk (Lower Usk) / Afon Wysg (Wysg Isaf) SSSI	No	1,200	2004-01-01
Blairlinn Industrial Estate	North Bellstane Plantation SSSI	No	134	2001-01-01
	MNR			
Calf of Man	Calf and Wart Bank MNR	No	54	2017-06-10
	SAC			
Muck Island	North Channel SAC	No	38	2022-06-20
The Maidens 1	The Maidens SAC	No	14	2000-06-07
Pembroke Port, Waterloo Ind. Est. (north), Waterloo Ind. Est. (south) (urban)	Pembrokeshire Marine / Sir Benfro Forol SAC	No	78	2023-06-02
Caldey Island	Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC	No	830	2022-05-19
Little Skerries, Large Skerries	Skerries and Causeway SAC	No	1,068	2021-06-06
	MPA			
Pladda (Arran)	South Arran MPA	No	250	2016-06-01
Ynys Barry – Trefin, Thorn Island, Cwta Aber (incl. Ynys Meicel & Onnen), Stack Rocks, Bishops & Clerks Islands RSPB	West Wales Marine / Gorllewin Cymru Forol MPA	No	124	2018-06-05
	Designated TOTAL		**77,238**	
	Non-designated			

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Layton Industrial Estate	Blackpool	No	10	2001-07-22
Liverpool 2 (urban), Liverpool 3 (urban)	Seaforth Nature Reserve and Liverpool City	No	22	2019-05-13
Furness General Hospital	Barrow-in-Furness	No	18	2019-05-27
Sellafield BNFL	Sellafield	No	300	2009-01-01
Cleator Moor (urban)	Cleator Moor	No	16	2013-05-15
Hensingham, Whitehaven Town Centre	Whitehaven (Buildings)	No	106	2018-06-21
Salter Hall Quarry	Salterhall Quarry	No	36	2018-05-21
Salterbeck (urban), Mossbay (urban)	Workington	No	24	2019-05-09
Dublin City South	Dublin City Centre, Skerries and Balbriggan	No	10	2002-06-15
Belfast Harbour, Belfast City Centre	Belfast	No	482	2019-06-01
Antrim Town 1	Antrim Town	No	1200	2016-05-20
Birmingham City Centre	Birmingham	No	80	2002-06-15
Lough Egish	Monaghan Lakes	No	13	2000-05-30
Post Office Sorting Office, Inco Alloys, Bulmers Cider Factory, North	Hereford City	No	118	2019-05-06
Worcester City Centre	Worcester City Centre	No	744	2005-01-01
Lady Isle 1	Lady Isle	No	492	2018-05-18
Tredegar Tip and Ponds, Ebbw Vale (urban)	Blaenau Gwent	No	92	2017-06-01
Carstairs Junction State Hospital	Carstairs Junction	No	80	2002-01-01
Horse Isle	Horse Island	No	1802	2017-01-01
Pembrey Buildings	Pembrey	No	68	2002-05-31
Near Alcoa and Crazy Macs (urban)	Waunarlwydd	No	100	2002-05-31

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Stonehouse, Ashchurch and Northway, Quedgeley East, Cheltenham, Ashchurch Army Depot	Gloucestershire Urban Gulls	No	2628	2011-01-01
Little Cumbrae 1	Little Cumbrae	No	264	2021-06-06
RAF Quedgeley, Gloucester	Gloucester City	No	6338	2009-01-01
Maesteg (urban)	Maesteg	No	74	2004-01-01
BP Baglan Bay (urban), Raymond Joseph Eng. (urban)	Port Talbot	No	60	2002-05-31
Bellshill Industrial Estate	Bellshill	No	50	2000-01-01
Newhouse Industrial Estate	Newhouse	No	12	2002-01-01
Brockworth (urban)	Brockworth	No	112	2009-01-01
Lydney (urban)	Lydney	No	208	2011-01-01
Greenhill Road (urban), Phoenix Road Industrial Estate, Airlink Industrial Estate, Stanely Castle, Murray Business Area (urban)	Paisley	No	234	2019-05-26
River Park Industrial Estate	Linwood	No	16	2019-05-26
Caerphilly (urban)	Caerphilly	No	70	2012-07-17
Queenzlie Industrial Estate, Merchant City, Springburn (urban), Hogganfield (urban), Finnieston (urban), St Rollox Works (urban), Thornliebank, Drumchapel Industrial Estate, Hamiltonhill Industrial Estate, Possil Park Industrial Estate, Possil Cross (urban)	Glasgow	No	1082	2019-05-28
Scotstoun (Bae Systems)	Clydebank	No	80	2001-01-01

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Inchmarnock (West)	Inchmarnock Island, Bute	No	400	2002-06-11
Llanwern Steelworks (urban)	Newport	No	142	2017-06-01
Bridgend (urban)	Bridgend	No	488	2005-01-01
Westerhill Road (urban)	Bishopbriggs	No	420	2002-06-11
Woodilee Industrial Estate	Kirkintilloch	No	54	2017-06-01
	Non-designated TOTAL		**17,463**	
	TOTAL		**94,805**	

B.6. European Herring gull

Table B.8. European herring gull colony counts (no. of individuals).

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
	SPA			
Point Lynas Bay, East Mouse, Ynys Dulas , Ynys Moelfre, Middle Mouse, Puffin Island, Fedw Fawr to Trwyn Du, Bychan to Benllech, St Davids, Pant yr Eglwys, The Skerries RSPB, Porth y Bribys, Porth Diana, Rhoscolyn Beacon	Anglesey Terns / Morwenoliaid Ynys MÃ´n SPA	No	3,274	2022-06-01
Llawndy	The Dee Estuary SPA	No	14	2001-01-01
Gogarth, South Stack Cliffs RSPB, Ynys Traws	Glannau Ynys Gybi / Holy Island Coast SPA	No	322	2021-06-01
Ribble Estuary	Ribble & Alt Estuaries SPA	No	1,710	2021-05-20
South Walney, Walney Urban Gulls, Fleetwood Town, Centre and Island (urban), Rampside Gas Terminal, Park Road Ind. Est., Haverigg Prison (urban), Haverigg Town, Millom (urban), Askam-in-Furness (urban), Heysham Power Station 1, Chapel Island	Morecambe Bay and Duddon Estuary SPA	Yes	3,188	2023-05-25
West wall to W&SW of Weston Point	Mersey Estuary SPA	No	20	2022-06-19
	SSSI			
Llandudno Town (urban)	Pen y Gogarth / Great Ormes Head SSSI	No	98	2019-05-21
Porth Llanlleiana	Llanbadrig - Dinas Gynfor SSSI	No	36	2016-06-09
Deganwy Town (urban), Conwy Town (urban)	Aber Afon Conwy SSSI	No	192	2019-05-16
Bwrdd Arthur to Fedw Fawr	Arfordir Gogleddol Penmon SSSI	No	82	2016-06-07
Beaumaris (urban)	Baron Hill Park SSSI	No	86	2019-05-24

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Bangor buildings (urban)	Coedydd Afon Menai SSSI	No	82	2019-05-22
Pontins Holiday Park	Sefton Coast SSSI	No	10	2020-06-15
Caernarfon (urban)	Afon Seiont SSSI	No	204	2019-05-14
Bodorgan Head	Penrhynoedd Llangadwaladr SSSI	Yes	100	2018-05-24
Llyn Brenig	Mynydd Hiraethog SSSI	No	88	2016-05-13
Llyn Trwsfynydd Rese	Coed y Rhygen SSSI	No	816	2018-05-30
St Bees Head RSPB, Kells/Woodhouse	St. Bees Head SSSI	Yes	396	2022-06-01
	MNR			
Marine Drive	Little Ness MNR	No	248	2017-05-23
Clay Head - Douglas	Douglas Bay MNR	No	102	2017-05-23
Port Soderick - Port Grenaugh, Port Grenaugh – Derbyhaven, Langness, Castletown (urban)	Langness MNR	No	270	2017-06-12
Dhoon - Laxey Bay	Laxey Bay MNR	No	44	2017-05-23
Port St Mary - Sound	Baie ny Carrickey MNR	No	64	2017-05-25
Sound - Port Erin, Bradda - Fleshwick	Port Erin Bay MNR	Yes	154	2017-05-26
Kitterland, Calf of Man	Calf and Wart Bank MNR	No	626	2017-07-03
Ramsey - Port Mooar, Phurt - Ramsey	Ramsey Bay MNR	No	248	2017-06-01
Niarbyl - Glen Maye, Glen Maye – Peel, Peel (urban), Peel - Glen Mooar, The Ayres NNR, Isle of Man (Point of Ayre to Rue Point)	West Coast MNR	No	468	2017-06-15
	Designated TOTAL		**12,942**	
	Non-designated			
Colwyn Bay Town (urban)	Colwyn Bay	No	48	2019-05-16
West Quarry, East Quarry	Llanddulas Quarries	No	88	2017-06-01
Kinmel Bay (urban)	Kinmel Bay	No	38	2019-05-15

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Rhyl (urban)	Rhyl	No	148	2019-05-14
Prestatyn (urban)	Prestatyn	No	100	2019-05-15
Douglas Town, Port Mooar - Dhoon	East Island	No	262	2017-06-09
Layton Industrial Estate, Victoria Hospital	Blackpool	No	95	2001-07-22
Liverpool 2 (urban)	Seaforth Nature Reserve and Liverpool City	No	10	2019-05-12
Llyn Elsi	Inland Gwynedd	No	44	2023-05-17
Furness General Hospital	Barrow-in-Furness	No	34	2019-05-27
Sellafield BNFL	Sellafield	No	300	2009-01-01
Cleator Moor (urban)	Cleator Moor	No	42	2013-05-15
Mirehouse, Corcickle, Hensingham, Hill Crest/High Meadows, Whitehaven Town Centre	Whitehaven (Buildings)	No	784	2019-06-30
	Non-designated TOTAL		**1,993**	
	TOTAL		**14,935**	

B.7. Great black-backed gull

Table B.9 Great black-backed gull colony counts (no. of individuals).

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
	SPA			
Porth Diana, Rhoscolyn Beacon, The Skerries RSPB, Middle Mouse, East Mouse, Ynys Moelfre	Anglesey Terns / Morwenoliaid Ynys MÃ´n SPA	No	112	2022-06-01
South Stack Cliffs RSPB, Ynys Traws	Glannau Ynys Gybi / Holy Island Coast SPA	No	10	2022-06-01
Llyn Conwy	Migneint-Arenig-Dduallt SPA	No	2	2016-05-13
Hodbarrow RSPB, Walney Urban Gulls, Centre and Island (urban), Askam-in-Furness (urban), South Walney, Chapel Island, Fleetwood Town	Morecambe Bay and Duddon Estuary SPA	No	92	2023-05-25
Ribble Estuary	Ribble & Alt Estuaries SPA	No	34	2021-05-20
Gayton Sands	The Dee Estuary SPA	No	2	2015-05-22
Puffin Island	Ynys Seiriol / Puffin Island SPA	No	214	2017-05-22
	SSSI			
Llyn Maelog	Llyn Maelog SSSI	No	2	2011-01-01
Valley Wetlands RSPB	Llynnau y Fali - Valley Lakes SSSI	No	6	2022-06-01
Llyn Brenig	Mynydd Hiraethog SSSI	No	6	2016-05-13
Ynys yr Adar	Newborough Warren - Ynys Llanddwyn SSSI	No	4	2018-05-24
Bodorgan Head	Penrhynoedd Llangadwaladr SSSI	No	4	2018-05-24
	MNR			
Port St Mary - Sound	Baie ny Carrickey MNR	No	4	2017-05-25
Calf of Man, Kitterland	Calf and Wart Bank MNR	No	80	2017-06-10
Clay Head - Douglas	Douglas Bay MNR	No	12	2017-05-23
Langness, Port Grenaugh - Derbyhaven	Langness MNR	No	4	2017-06-20
Dhoon - Laxey Bay	Laxey Bay MNR	No	2	2017-05-23
Marine Drive	Little Ness MNR	No	10	2017-05-23

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Fleshwick - Stroin Vuigh	Niarbyl Bay MNR	No	2	2017-05-25
Sound - Port Erin, Bradda - Fleshwick	Port Erin Bay MNR	No	8	2017-05-25
Ramsey - Port Mooar	Ramsey Bay MNR	No	12	2017-05-23
The Ayres NNR, Isle of Man (Point of Ayre to Rue Point), Niarbyl - Glen Maye, Glen Maye – Peel, Peel - Glen Mooar	West Coast MNR	No	34	2017-06-15
	Designated TOTAL		**656**	
	Non-designated			
Llyn Elsi	Llyn Elsi	No	2	2000-06-06
Llyn yr Adar	Llyn yr Adar	No	2	2017-05-23
Port Mooar - Dhoon	Port Mooar - Dhoon	No	2	2023-05-25
	Non-designated TOTAL		**6**	
	TOTAL		**662**	

B.8. Black-legged kittiwake

Table B.10 Black-legged kittiwake colony counts (no. of individuals).

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
	SPA			
Ynys Moelfre	Anglesey Terns / Morwenoliaid Ynys MÃ´n SPA	No	312	2016-06-07
South Stack Cliffs RSPB	Glannau Ynys Gybi / Holy Island Coast SPA	No	22	2022-06-01
Puffin Island	Ynys Seiriol / Puffin Island SPA	No	254	2023-06-12
Lambay	Lambay Island SPA	Yes	6,640	2015-06-02
Horn Head 6, Horn Head 5, Horn Head 4, Horn Head 2	Horn Head to Fanad Head SPA	Yes	1,468	2015-07-02
Inishtrahull	Inishtrahull SPA	Yes	14	2016-06-08
Sheep Island	Sheep Island SPA	No	460	2021-06-18
Rathlin Island RSPB (West Light Seabird Centre and Nature Reserve), Rathlin Island	Rathlin Island SPA	Yes	27,534	2021-06-01
Ireland's Eye	Ireland's Eye SPA	Yes	3,100	2015-06-17
Howth Head	Howth Head Coast SPA	Yes	3,586	2015-06-12
Rockabill	Rockabill SPA	Yes	266	2018-06-01
Wicklow Head	Wicklow Head SPA	Yes	1,348	2022-06-22
Helvick Head 1	Helvick Head to Ballyquin SPA	Yes	130	2018-06-09
Great Saltee Island	Saltee Islands SPA	Yes	1,690	2013-06-18
Islay 53	Rinns of Islay SPA	No	782	2023-06-08
The Oa RSPB	The Oa SPA	No	150	2022-06-01
Pigs Paradise 16, Pigs Paradise 15, Pigs Paradise 13, Pigs Paradise 12, Pigs Paradise 11, Pigs Paradise 9, Pigs Paradise 10, Pigs Paradise 7, Pigs Paradise 6, Pigs Paradise 5, Uragaig Cliffs	North Colonsay and Western Cliffs SPA	Yes	9,361	2023-05-26
Ailsa Craig	Ailsa Craig SPA	Yes	980	2021-06-18
Bardsey Island	Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA	No	242	2019-01-01

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Trwyn Cilan, St Tudwal's Island East	Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA	No	516	2023-06-15
Ramsey Island RSPB	Ramsey and St David's Peninsula Coast SPA	No	92	2022-06-01
Skomer	Skomer, Skokholm and the Seas off Pembrokeshire SPA	Seabird assemblage	2,014	2022-05-19
Worms Head	Bae Caerfyrddin / Carmarthen Bay SPA		22	2018-06-27
	SSSI			
Great Orme	Pen y Gogarth / Great Ormes Head SSSI	Yes	1,128	2023-06-15
Glac Na Criche	Glac na Criche SSSI	No	20	2019-06-06
Sanda Islands	Sanda Islands SSSI	Yes	66	2019-06-26
Port Mona, Lythe Mead to Carrick-Kee, Mull Of Galloway RSPB	Mull of Galloway SSSI	Yes	814	2022-06-01
Big Scar	Scare Rocks SSSI	No	104	2022-06-01
Balcary Point 1	Abbey Burn Foot to Balcary Point SSSI	Yes	228	2018-06-25
St Bees Head RSPB	St. Bees Head SSSI	Yes	1,144	2022-06-01
Carreg y Llam	Carreg y Llam SSSI	Yes	1,448	2023-06-13
Little Orme	Creigiau Rhiwledyn / Little Ormes Head SSSI	Yes	56	2023-06-15
Grassholm	Grassholm / Ynys Gwales SSSI	Yes	60	2018-06-05
New Quay Head	Aberarth – Carreg Wylan SSSI	Yes	664	2018-06-05
St Margaret's Island	St. Margaret's Island SSSI	Yes	452	2022-04-30
Lundy	Lundy SSSI	Yes	568	2021-06-03
Mumbles Head 1	Bracelet Bay SSSI	No	180	2018-06-19
Cow and Calf, Wringapeak	West Exmoor Coast and Woods SSSI	No	390	2023-06-01
	MNR			
Port St Mary – Sound	Baie ny Carrickey MNR	Yes	1,106	2017-06-20
Calf of Man	Calf and Wart Bank MNR	No	26	2013-05-01
Ramsey – Port Mooar	Ramsey Bay MNR	No	156	2017-06-14
Glen Maye – Peel	West Coast MNR	Yes	108	2017-06-21
	SAC			
Gobbins, Muck Island	North Channel SAC	No	874	2023-06-06

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Portrush 1C, Portrush 1, Little Skerries, Dunluce 1	Skerries and Causeway SAC	No	3,712	2022-06-20
	NNR			
Maggy's Leap 1/Donnard Cove, Maggy's Leap to Newcastle 1	Murlough NNR	No	1,700	2021-07-10
	Designated TOTAL		**75,987**	
	Non-designated			
Castlerock	Downhill	No	234	2023-06-02
Larribane 2, Carrick-a-rede	Causeway Coast	No	635	2021-05-18
Mullaghmore Head, Castlegal	Sligo Bay	No	56	2018-06-20
Bray Head	Bray	No	2,946	2010-06-15
Dunmore East to Red Head	Dunmore East to Red Head	No	884	2014-06-09
Ardnamult	Creadan Head to Foilakipeen	No	52	2018-06-11
Portally	Portally to Benlea Head	No	200	2018-06-11
Douglas Complex (Offshore), Hamilton North (Offshore), Hamilton (Offshore)	Offshore – Irish Sea	No	1,234	2022-06-10
Morecambe Gas Platform	Morecambe Central Gas Platform	No	1,112	2020-08-15
	Non-designated TOTAL		**7,353**	
	TOTAL		**83,340**	

B.9. Atlantic puffin

Table B.11 Atlantic puffin colony counts (no. of Apparently Occupied Sites (AOS)/Apparently Occupied Nest (AON)).

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of AOS/AON	Year
	SPA			
Puffin Island	Ynys Seiriol / Puffin Island SPA	No	13	2021-06-12
Porth Diana, Rhoscolyn Beacon, The Skerries RSPB	Anglesey Terns / Morwenoliaid Ynys MÃ´n SPA	No	741	2022-06-01
South Stack Cliffs RSPB	Glannau Ynys Gybi / Holy Island Coast SPA	No	5	2022-06-01
Bardsey Island, Ynysoedd Gwylan (Fawr and Bach Total)	Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA	No	760	2019-01-01
St Tudwal's Island East	Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA	No	1	2019-06-19
Lighthouse Island	Copeland Islands SPA	No	53	2022-04-22
Ailsa Craig	Ailsa Craig SPA	No	125	2021-06-18
Ramsey Island RSPB	Ramsey and St David's Peninsula Coast SPA	No	55	2021-06-01
Skomer, Skokholm, Midland Island	Skomer, Skokholm and the Seas off Pembrokeshire SPA	Yes	47,920	2022-06-01
	SSSI			
Sanda Islands	Sanda Islands SSSI	Yes	54	2019-06-27
St. Bees Head	St Bees Head SSSI	Yes	8	2022-06-01
	SAC			
Gobbins	North Channel SAC	No	54	2022-06-20
	MNR			
Glen Maye - Peel	West Coast MNR	Yes	8	2017-07-05
	MPA			
Bishops & Clerks Islands RSPB	West Wales Marine / Gorllewin Cymru Forol MPA	No	40	2018-05-20
	Designated TOTAL		**49,838**	
	TOTAL		**49,838**	

B.10. Northern fulmar

Table B.12 Northern fulmar colony counts (No. of individuals)

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
	SPA			
Bryntirion, Bychan to Bellech, Traeth Bychan, Porth Wren	Anglesey Terns / Morwenoliaid Ynys Mon SPA	No	308	2016
Berryslade to Wind Bay, Crickmail Point to The Castle, Saddle Head to St Govan's Chapel, Saddle Point to Griffth Lorts Hole, St Govan's Chapel to New Quay, Trevallen to Broad Haven, Wind Bay to Linney Head	Castlemartin Coast SPA	No	98	2023
Big Copeland Island, Lighthouse Island	Copeland Islands SPA	No	80	2021
South Cornwall Coast 1, South Cornwall Coast 10, South Cornwall Coast 2, South Cornwall Coast 7, South Cornwall Coast 8, South Cornwall Coast 9	Falmouth Bay to St Austell Bay SPA	No	194	2023
Bardsey (Ynys Enlli), Ebolion	Glannau Aberdaron and Ynys Enlli / Aberdaron Coast and Bardsey Island SPA	No	28	2019
South Stack Cliffs RSPB	Glannau Ynys Gybi/ Holy Island Coast	No	14	2016
Ballymacart Eas, Ballymacart to Crobally, Ballynamona, Crobally to Paulsworth, Mine Head East, Seaview to Ballycurreen 1, Seaview to Ballycurreen 2	Helvick Head to Ballyquin SPA	No	142	2018
Howth Head 3	Howth Head Coast SPA	No	24	2016
Mincarlo	Isles of Scilly SPA	No	468	2022
Lambay Coastal 1, Lambay Coastal 2, Lambay Coastal 3, Lambay Coastal 5, Lambay Coastal 6, Lambay Coastal 7	Lambay Island SPA	Yes	750	2015

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Annestown, Dunbrattin Head West, Kilmurrin East, Ballydowane to Stradbally1, Bunmahon to Ballydowane1, Kilfarassy Stack, Kilmurrin to Bunmahon 2, Kilmurrin to Bunmahon 3, Ballyvoile Head 2, East of Island 1, Island, Stradbally West, Great Newtown Head East	Mid-Waterford Coast SPA	No	416	2018
Old Head of Kinsale 4	Old Head of Kinsale SPA	No	68	2015
Puffin Island	Ynys Seiriol / Puffin Island SPA	No	26	2018
RAMSEY E, RAMSEY N, RAMSEY NE, RAMSEY SE, RAMSEY W	Ramsey and St David's Peninsula Coast SPA	No	52	2018
Great Saltee Island, Little Saltee	Saltee Islands SPA	Yes	878	2013
Seven Heads	Seven Heads SPA	No	36	2002
Brow Head 3, Mizen Head 1	Sheep's Head to Toe Head SPA	No	416	2016
Shenicks Island St Patricks Island	Skerries Islands SPA	No	62	2010
Flimston Bay to Mewsford Arches, Green Bridge of Wales to Flimston Bay, New Quay to Trevallen, The Castle, The Castle to Saddle Head, The Wash to Green Bridge of Wales, Skokholm 4, Skomer	Skomer, Skokholm and the Seas off Pembrokeshire SPA	No	1,536	2022
Wicklow Head 2, Wicklow Head 3, Wicklow Head 4, Wicklow Head 5,	Wicklow Head SPA	No	30	2022
Ailsa Craig (Whole Island)	Ailsa Craig SPA	No	238	2021
Inishtrahull	Inishtrahull Island SPA	No	194	2016

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Cantruan East Light Skerriagh East Stacknacally	Rathlin Island SPA	Seabird assemblage	2,090	2021
ISLAY 16, ISLAY 17, ISLAY 18, ISLAY 20, ISLAY 21, ISLAY 25, ISLAY 41, ISLAY 42, ISLAY 50, ISLAY 52, ISLAY 53, ISLAY 54, ISLAY 58, ISLAY 63	Rinns of Islay SPA	No	220	2018
ISLAY 9, ISLAY 16, ISLAY 17, ISLAY 18, ISLAY 20, ISLAY 21, ISLAY 38	The Oa SPA	No	680	2023
Killard Point	Strangford Lough SPA	No	4	2000
Ardskenish 1, Pigs Paradise 11, Pigs Paradise 5, Pigs Paradise 6, Pigs Paradise 7, Pigs Paradise 8	North Colonsay and Western Cliffs SPA	No	514	2023
BAUGH QUARRY GUNNA SOA, RUAIG 2	Sleibhtean agus Cladach Thiriodh (Tiree Wetlands and Coast) SPA	No	2,092	2018
Bac Beag 27, Fladda 20, Fladda 21, Lunga 11, Lunga 3, Lunga 6a	Treshnish Isles SPA	No	640	2022
Kings Cave	Arran Moors SPA	No	22	2021
Rum 1, Rum 17, Rum 27, Rum 28, Rum 30, Rum 31, Rum 40, Rum 8	Rum SPA	No	24	2021
Skye	Cuillins SPA	No	44	2021
Berneray1, Mingulay	Mingulay and Berneray SPA	Yes	2,906	2021
Ceann Ear 4, Ceann Ear 5, Ceann Ear 6, Ceann Ear 7, Ceann Iar 3, Shillay, Shivinish 2, Stockay	Monach Islands SPA	No	78	2021
	SSSI			
Barlocco 1	Abbey Burn Foot to Balcary Point SSSI	Yes	18	2021

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Mwnt 1, Mwnt 3, Gilfach Yr Halen 1, Penpeles 4, Penmoelciliau 3, Caemes Head, Ceibwr2, Treath Y Rhedyn	Aberarth - Carreg Wylan SSSI	No	608	2018
Botallack1 Gurnards 3 Morvah 2 Morvah 3 St. Ives 1	Aire Point to Carrick Du SSSI	No	236	2023
Mull	Ardmeanach SSSI	No	1,174	2000
Broad Haven to Newgale	Arfordir Niwgwl - Aber Bach / Newgale - Little Haven Coast SSSI	No	146	2017
Sheep Island	Arfordir Penrhyn Angle / Angle Peninsula Coast SSSI	No	272	2021
Baulk Head/Mullion 4	Baulk Head to Mullion SSSI	No	78	2017
BERRY HEAD 1	Berry Head to Sharkham Point SSSI	No	4	2021
Meikle Ross and Little Ross	Borgue Coast SSSI	No	4	2021
Penally to Cornakey	Boscastle to Widemouth SSSI	No	114	2018
Cadgwith - Helford River (East Lizard), Church Cove 2 Church Cove 1	Caerthillian to Kennack SSSI	No	80	2021
Carreg Y Llam	Carreg y Llam SSSI	Yes	82	2023
Cligga Bay	Cligga Head SSSI	No	38	2018
Ben Feall, Coll 2	Crossapol and Gunna SSSI	No	110	2018
Cudden Point, Mount's Bay	Cudden Point to Prussia Cove SSSI	No	12	2001
Wooltack Point Borough Head	Dale and South Marloes Coast SSSI	No	70	2018
Grianan Ardrie, Rubha Duin Bhain, Uamh Ropa	Dun Ban SSSI	No	4	2021
West Cliffs 1, West Cliffs 2	Eigg - An Sgurr and Gleann Charadail SSSI	No	72	2015
Manorbier Bay to Skrinkle Haven	Freshwater East Cliffs to Skrinkle Haven SSSI	No	162	2018
Kennedy's Pass Pinbain Quarry	Girvan to Ballantrae Coast Section SSSI	No	2	2018

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Glenthorne Beach	Glenthorne SSSI	No	12	2018
Carvannet - Portreath 1, Carvannet , Portreath 3, North Cliffs 1, North Cliffs 3	Godrevy Head to St Agnes SSSI	No	6	2007
Rhossils, South West Gower	Gower Coast: Rhossili to Port Eynon SSSI	No	6	2018
Babbacombe 1 Babbacombe 3	Hope's Nose to Wall's Hill SSSI	No	34	2019
Lundy F	Lundy SSSI	No	530	2021
Culzean	Maidens to Doonfoot SSSI	No	18	2018
Clovelly 2, Clovelly 3, Clovelly 4, Clovelly 6, Hartland 4	Marsland to Clovelly Coast SSSI	No	44	2017
Nash Point West	Monknash Coast SSSI	No	32	2018
Port Mona, Devil's Bridge, Laggantulloch Head	Mull of Galloway SSSI	No	30	2021
Eilean Nan Ron 1, Eilean Nan Ron 2, Eilean Nan Ron 3	Oronsay and South Colonsay SSSI	No	506	2021
Great Orme	Great Ormes Head SSSI	No	80	2023
Kelsey Head Ligger Point - Holywell	Penhale Dunes SSSI	No	194	2017
Com Head, Pentire Point, Ramparts, Round Hill	Pentire Peninsula SSSI	Yes	62	2018
Port O'warren 1	Port o' Warren SSSI	No	18	2020
Trewavas	Porthcew SSSI	No	20	2021
Causamul, Haskeir	Small Seal Islands SSSI	No	618	2021
Staffa	Staffa SSSI	Yes	54	2021
Carreg Dandy, Penbwchdy, Penbwchdy N, Penbwchdy S	Strumble Head - Llechdafad Cliffs SSSI	No	76	2018
St Bees Head/Sb1 St Bees Head/Sb2	St Bee's Head SSSI	Yes	158	2022
	SAC			
Blackhead 1, Muck Island, Gobbins	North Channel SAC	No	550	2022

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
	MNR			
Sorel Point, Wolf's Caves, L'etaquerez Fort, Tete Des Hougues, Agois, G. Becquete, Grosnez, Lecqe, Plemont, Plemont E.	Jersey Coast MNR	No	80	2017
Ascrib Islands	Ascrib, Isay and Dunvegan MNR	No	162	2000
Cow And Calf, Elwill Bay, Woody Bay 2 Bull Point to Rillage Point, Lynton To Foreland Point	Bideford to Foreland Point MNR	No	222	2023
Backways Cove, Bounds Cliff, Carnweather Point, Seal Hole to Trevaunance Cove, Trevellas to Gadger (Pen A Grader), Crookmoyle Rock, Portreath - Porthtowan 2, Portreath , Porthtowan 4, Long And Short Island, North Cornwall 2, North Cornwall 3, Cam Strand, Crackington, Penhallic Point, Trerubies Cove, Tresungers Point, Trevan Point, Park Head to Porthmeor, Wills Rcok – Treyarnon, Varley Head, Skrinkle Haven to Skomer	Bristol Channel Approaches / Dynesfeydd Mor Hafren MNR	No	712	2017
A Chuli (Group), Eilean An Naiohh Nw Cliffs, Garb Eileach Nw Cliffs, Guirasdeal	Firth of Lorn MNR	No	14	2019
Iona S.W. 1, MUCK, SKYE - STRATHAIRD	Inner Hebrides and the Minches MNR	No	466	2021
Rubhanam Pleac	Loch nam Madadh MNR	No	338	2002
Leonard's Cove A	Lyme Bay and Torbay MNR	No	80	2017
Stroin Voigh - Niarbyl	Niarbyl Bay MNR	Yes	57	2017
Dinas Fach, Ogof-Y-Felin, Solva East St. Nons	Pembrokeshire Marine / Sir Benfro Forol MNR	No	94	2018

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Bradda - Fleshwick	Port Erin Bay MNR	Yes	142	2017
Dunsevrick, Giant's Causeway 4, Dunluce 1, Giant's Causeway 1, Giant's Causeway 2, Giant's Causeway 3, Runkerry, White Rocks, Large Skerries, Little Skerries, Ramore Head, Portrush 3, Portrush 4	Skerries and Causeway MNR	No	2,280	2021
Rubha Dubh - Am Camas	Sound of Barra MNR	No	148	2002
Glen Maye – Peel, Glen Mooar - Peel	West Coast MNR	Yes	83	2017
Porthgain, Pwll Llong, Trwyn Llwynog, Cwm Ceirw, Penderi 3, Carreg Bica, Maenmelyn, Pwll Deri, Pwllcrochan, Ynys Y Dinas, Fishguard to Pwllgwaelod 3, Needle Rock, to Newport	West Wales Marine / Gorllewin Cymru Forol MNR	No	326	2018
	Designated TOTAL		**26,910**	
	Non designated sites			
Ardoggina 1, Ardoggina 2, Ram Head	Ardmore to Whiting Bay	No	96	2018
Balcary Point	Balcary Point	No	14	2018
Caolis-Tresivick, Caragrich-Creagmhor, Cleat-Traigh Ealis, Greian Head	Barra & Vatersay	No	82	2021
Burgh Island, Woolman Point	Bigbury Bay	No	8	2021
Binevenagh North, Binevenagh South, Gorthore Mid, Gorthore North	Binevenagh	No	32	2022
Bray Head North, Bray Head South	Bray Head	No	92	2010
Rubha Mor	Brenish To Valtos - Lewis	No	1,950	2019
Rubha Dubh	Butt Of Lewis to Gress - Lewis	No	1,070	2023
Cape Clear 1, Cape Clear 2, Cape Clear 3	Cape Clear Island	No	208	2022

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Alderney, Brecqhou Guernsey (East), Guernsey (West), Herm, Jethou, Sark	Channel Islands	No	252	2023
Ballycotton, Ballycroneen (East), Ballylanders, Ballypherode, Ballyshane, Ballytrasna, Capel Island, Glenawilling, Gyleen (West), Knockadoon, Lahard, Power Head, Roche's Point, Warren, White Bay, Youghal	Cork Harbour to Youghal Harbour	No	182	2018
CRAIGAIG	Craigaig, Kintyre.	No	2	2021
Ardnamult, Ardnamult to Foilakipeen, Creadan Head 1, Creadan Head 2, Foilakipeen	Creadan Head to Foilakipeen	No	56	2018
Dawlish 2, Dawlish 3	Dawlish Warren To Teignmouth	No	34	2018
Castlerock, Downhill East, Downhill Mid Downhill West, Mussenden, Umbra	Downhill	No	222	2023
Plas Newydd	Dulas Valley	No	2	2002
Dun-Aarn	Dun-Aarn - Harris	No	4	2018
Dyserth	Dyserth Quarry	No	6	2002
Balleygalley Head, Caranure, Carrivemurphy, Crearlargh, Galboly, Park Head, Whitebay	East Antrim Coast	No	68	2022
Cara 2, West Gigha 1	Gigha	No	32	2021
Inchmarnock (West)	Inchmarnock Island, Bute	No	22	2002
Dunaff Head, Lenan Head	Inishowen (NW)	No	200	2015
Eilean Mor	Inland And Coastal Locations - Highland	No	8	2000
Conwy Mountain	Inland Gwynedd	No	8	2000
Brunerican, Dunaverty, Keil Point 1	Keil Point to Kilmanshennachan	No	44	2021
Leckpatrick	Leckpatrick, S. of Torr Head	No	26	2014

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Little Cumbrae 1	Little Cumbrae	No	44	2021
East Quarry, West Quarry	Llanddulas Quarries	No	50	2017
Clachan	Loch Ryan, Mochram Lochs, Gennoch Rocks	No	4	2021
Eilean Mor	Loch Torridon	No	8	2021
Killiney, Loughshinny Cliffs	Loughshinny to Killiney	No	96	2014
Lye Rock	Lye Rock, North Cornwall	No	16	2015
Monrieth Cliffs	Monrieth Cliffs + Scar Rocks	No	8	2021
Nash Point West, Nash Point East	Nash Point	No	32	2018
Bull Point to Rillage Point, Lynton to Foreland Point, Rillage Point to Ramsay Beach, Westward Ho to Croyde Bay	North Devon Coast	No	92	2017
Saldangha Head	North Donegal	No	32	2018
Pine Haven	Pine Haven, North Cornwall	No	20	2018
Port Isaac	Port Isaac, North Cornwall	No	120	2017
Ballymacaw West, Benlea, Portally to Rathmoylan 1, Portally to Rathmoylan 2, Rathmoylan to Bally Macaw	Portally to Benlea Head	No	42	2018
Portpatrick North, Portpatrick South	Portpatrick	No	176	2021
Reedy Cliff	Reedy Cliff, North Cornwall	No	34	2017
Cruggleton Cliff	Rigg Bay + Cruggleton	No	8	2020
Barry's Head, Big Doon, Carrigadda Bay, Flat Head Frower Point, Newfoundland Bay, Nohoval Cove, Preghane Point, Reannies Bay, Ringabella 1, Ringabella 2, Roberts Cove, Roberts Head	Ringabella To Kinsale	No	200	2017
Sidmouth 3	Sidmouth To Beer	No	4	2021

Colonies	Colony location (SPA/SSSI/MNR/SAC/MPA)	Listed in citation (Yes/No)	No. of individuals	Year
Flodday, Greanamul, Lingay, Muldoanich, Rosinish, Sandray	Sound Of Pabbay	No	210	2021
Stac Mhi, Mhurchaidh	Stac Mhic Mhurchaidh, Reidh Eilean, Eilean Annraidh, Eilean Chalba	No	76	2021
Burn Foot - Currarie Port, Currarie Port - Downan Point, Dyke Foot - March Burn, March Burn - Burn Foot, Starling Knowe	Starling Knowe to Downan Point	No	14	2021
Brandy Head T, Chiselbury Bay, Chiselbury Bay to Ladram Bay, Otterton Ledge to Brandy Head, Straight Point	Straight Point and Otterton Ledge to Ladram Bay	No	10	2019
Coppet Hall Point to Amroth, Bowman's Point, First and Second Bay, Monkstone Point to Saundersfoot Harbour, Waterwynch to Monkstone Point	Tenby To Amroth	No	38	2017
Bray Head	Valencia Island	No	612	2018
Welcombe 4	Welcombe Mouth to Hartland Quay	No	6	2021
	Non-designated TOTAL		**6,672**	
	TOTAL		**33,582**	

Appendix C. MRSea estimates for the Mona Array Area + 4 km and the Mona Offshore Ornithology Array Area study area boundaries

C.1. Black-legged kittiwake

Table C. 13: Black-legged kittiwake MRSea estimates for the Mona Array Area + 4 km.

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
1	Mar	791 (481 to 1,193)	1.27 (0.77 to 1.91)	376 (229 to 568)	0.60 (0.37 to 0.91)	414 (252 to 625)	0.66 (0.40 to 0.23)	181.72	22.98%
1	Apr	181 (113 to 269)	0.29 (0.18 to 0.43)	116 (72 to 172)	0.19 (0.12 to 0.28)	65 (41 to 97)	0.10 (0.07 to 0.22)	39.72	21.91%
1	May	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	Jun	351 (228 to 508)	0.56 (0.37 to 0.81)	90 (58 to 130)	0.14 (0.09 to 0.21)	261 (170 to 378)	0.42 (0.27 to 0.20)	71.48	20.38%
1	Jul	170 (106 to 253)	0.27 (0.17 to 0.40)	18 (11 to 27)	0.03 (0.02 to 0.04)	152 (95 to 226)	0.24 (0.15 to 0.22)	37.45	22.06%
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	326 (195 to 499)	0.52 (0.31 to 0.80)	68 (41 to 104)	0.11 (0.07 to 0.17)	258 (155 to 395)	0.41 (0.25 to 0.24)	77.40	23.75%
1	Dec	302 (176 to 465)	0.48 (0.28 to 0.75)	59 (35 to 91)	0.10 (0.06 to 0.15)	243 (142 to 374)	0.39 (0.23 to 0.24)	73.67	24.35%
1	Jan	411 (287 to 559)	0.66 (0.46 to 0.90)	90 (63 to 123)	0.14 (0.10 to 0.20)	321 (224 to 436)	0.51 (0.36 to 0.17)	69.28	16.85%
1	Feb	341 (228 to 476)	0.55 (0.37 to 0.76)	65 (44 to 91)	0.10 (0.07 to 0.15)	275 (184 to 384)	0.44 (0.30 to 0.19)	63.18	18.55%

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	1,414 (959 to 2,000)	2.27 (1.54 to 3.21)	545 (369 to 770)	0.87 (0.59 to 1.23)	870 (590 to 1,230)	1.39 (0.94 to 0.19)	265.63	18.78%
2	Apr	561 (391 to 758)	0.90 (0.63 to 1.21)	230 (160 to 311)	0.37 (0.26 to 0.50)	331 (230 to 447)	0.53 (0.37 to 0.17)	93.60	16.69%
2	May	136 (69 to 234)	0.22 (0.11 to 0.38)	8 (4 to 13)	0.01 (0.01 to 0.02)	129 (65 to 221)	0.21 (0.10 to 0.31)	42.06	30.88%
2	Jun	191 (109 to 305)	0.31 (0.17 to 0.49)	94 (54 to 151)	0.15 (0.09 to 0.24)	96 (55 to 154)	0.15 (0.09 to 0.26)	49.97	26.23%
2	Jul	596 (298 to 1,058)	0.96 (0.48 to 1.70)	278 (139 to 493)	0.44 (0.22 to 0.79)	319 (160 to 566)	0.51 (0.26 to 0.33)	193.81	32.51%
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	168 (98 to 268)	0.27 (0.16 to 0.43)	26 (15 to 41)	0.04 (0.02 to 0.07)	142 (83 to 227)	0.23 (0.13 to 0.26)	43.57	25.94%
2	Dec	1,187 (759 to 1,767)	1.90 (1.22 to 2.83)	168 (107 to 250)	0.27 (0.17 to 0.40)	1,019 (651 to 1,517)	1.63 (1.04 to 0.22)	257.37	21.69%
2	Jan	919 (592 to 1,365)	1.47 (0.95 to 2.19)	480 (309 to 712)	0.77 (0.49 to 1.14)	440 (283 to 653)	0.70 (0.45 to 0.21)	197.29	21.46%
2	Feb	1,162 (774 to 1,667)	1.86 (1.24 to 2.67)	449 (299 to 644)	0.72 (0.48 to 1.03)	713 (475 to 1,023)	1.14 (0.76 to 0.20)	227.60	19.60%

Table C. 14 Black-legged kittiwake MRSea estimates for the Mona Offshore Ornithology Array Area study area.

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
1	Mar	2,303 (1,421 to 3,455)	1.58 (0.98 to 2.37)	1,096 (676 to 1,645)	0.75 (0.46 to 1.13)	1,206 (744 to 1,810)	0.83 (0.51 to 0.23)	518.91	22.54%
1	Apr	466 (260 to 752)	0.32 (0.18 to 0.52)	298 (166 to 481)	0.20 (0.11 to 0.33)	168 (94 to 271)	0.12 (0.06 to 0.27)	125.50	26.96%
1	May	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	Jun	865 (545 to 1,296)	0.59 (0.37 to 0.89)	222 (140 to 332)	0.15 (0.10 to 0.23)	643 (405 to 964)	0.44 (0.28 to 0.22)	191.47	22.14%
1	Jul	414 (242 to 646)	0.28 (0.17 to 0.44)	44 (25 to 68)	0.03 (0.02 to 0.05)	370 (217 to 578)	0.25 (0.15 to 0.25)	102.96	24.90%
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	1,139 (702 to 1,686)	0.78 (0.48 to 1.16)	237 (146 to 351)	0.16 (0.10 to 0.24)	902 (556 to 1,335)	0.62 (0.38 to 0.22)	251.11	22.05%
1	Dec	731 (400 to 1,184)	0.50 (0.28 to 0.81)	143 (79 to 232)	0.10 (0.05 to 0.16)	588 (322 to 952)	0.40 (0.22 to 0.27)	199.81	27.33%
1	Jan	904 (618 to 1,251)	0.62 (0.42 to 0.86)	199 (136 to 275)	0.14 (0.09 to 0.19)	706 (483 to 976)	0.49 (0.33 to 0.18)	161.35	17.84%
1	Feb	674 (448 to 951)	0.46 (0.31 to 0.65)	129 (86 to 182)	0.09 (0.06 to 0.13)	545 (362 to 768)	0.37 (0.25 to 0.19)	128.20	19.02%
1	Mar	4,083 (2,682 to 5,873)	2.81 (1.84 to 4.04)	1,572 (1,033 to 2,261)	1.08 (0.71 to 1.55)	2,511 (1,650 to 3,612)	1.73 (1.13 to 0.20)	814.03	19.94%
2	Apr	1,477 (1,004 to 2,058)	1.01 (0.69 to 1.41)	606 (412 to 844)	0.42 (0.28 to 0.58)	871 (592 to 1,213)	0.60 (0.41 to 0.18)	268.77	18.20%
2	May	365 (191 to 641)	0.25 (0.13 to 0.44)	20 (11 to 36)	0.01 (0.01 to 0.02)	345 (180 to 605)	0.24 (0.12 to 0.31)	114.77	31.46%

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
2	Jun	617 (311 to 1,050)	0.42 (0.21 to 0.72)	305 (154 to 519)	0.21 (0.11 to 0.36)	312 (157 to 531)	0.21 (0.11 to 0.31)	188.46	30.53%
2	Jul	2,119 (793 to 4,368)	1.46 (0.54 to 3.00)	986 (369 to 2,033)	0.68 (0.25 to 1.40)	1,133 (424 to 2,335)	0.78 (0.29 to 0.43)	912.14	43.05%
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	524 (308 to 838)	0.36 (0.21 to 0.58)	81 (47 to 129)	0.06 (0.03 to 0.09)	444 (260 to 709)	0.30 (0.18 to 0.26)	135.18	25.78%
2	Dec	2,387 (1,508 to 3,589)	1.64 (1.04 to 2.47)	338 (214 to 508)	0.23 (0.15 to 0.35)	2,049 (1,294 to 3,081)	1.41 (0.89 to 0.22)	530.95	22.24%
2	Jan	1,879 (1,209 to 2,804)	1.29 (0.83 to 1.93)	980 (631 to 1,463)	0.67 (0.43 to 1.01)	899 (578 to 1,341)	0.62 (0.40 to 0.22)	406.98	21.66%
2	Feb	2,486 (1,514 to 3,799)	1.71 (1.04 to 2.61)	960 (585 to 1,467)	0.66 (0.40 to 1.01)	1,526 (929 to 2,332)	1.05 (0.64 to 0.23)	583.02	23.45%

C.2. Common guillemot

Table C. 15 Common guillemot MRSea estimates in the Mona Array Area + 4 km.

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
1	Mar	8,064 (6,849 to 9,391)	12.92 (10.98 to 15.05)	7,921 (6,727 to 9,225)	12.69 (10.78 to 14.78)	143 (121 to 166)	0.23 (0.19 to 0.08)	648.57	8.04%
1	Apr	742 (536 to 978)	1.19 (0.86 to 1.57)	694 (501 to 914)	1.11 (0.80 to 1.47)	48 (35 to 64)	0.08 (0.06 to 0.15)	112.79	15.20%
1	May	213 (122 to 346)	0.34 (0.20 to 0.55)	199 (114 to 323)	0.32 (0.18 to 0.52)	14 (8 to 23)	0.02 (0.01 to 0.27)	57.09	26.76%
1	Jun	1,081 (718 to 1,518)	1.73 (1.15 to 2.43)	986 (655 to 1,385)	1.58 (1.05 to 2.22)	95 (63 to 133)	0.15 (0.10 to 0.19)	204.09	18.89%
1	Jul	624 (432 to 858)	1.00 (0.69 to 1.38)	606 (419 to 833)	0.97 (0.67 to 1.33)	19 (13 to 26)	0.03 (0.02 to 0.17)	108.64	17.40%
1	Aug	342 (214 to 516)	0.55 (0.34 to 0.83)	342 (214 to 516)	0.55 (0.34 to 0.83)	0 (0 to 0)	0.00 (0.00 to 0.23)	77.15	22.54%
1	Sep	309 (209 to 451)	0.50 (0.33 to 0.72)	309 (209 to 451)	0.50 (0.33 to 0.72)	0 (0 to 0)	0.00 (0.00 to 0.20)	61.68	19.94%
1	Oct	32 (3 to 182)	0.05 (0.00 to 0.29)	31 (3 to 180)	0.05 (0.00 to 0.29)	0 (0 to 2)	0.00 (0.00 to 1.44)	45.73	144.36%
1	Nov	1,597 (1,127 to 2,154)	2.56 (1.81 to 3.45)	1,518 (1,071 to 2,048)	2.43 (1.72 to 3.28)	79 (56 to 106)	0.13 (0.09 to 0.16)	262.00	16.40%
1	Dec	878 (636 to 1,147)	1.41 (1.02 to 1.84)	867 (628 to 1,131)	1.39 (1.01 to 1.81)	12 (8 to 15)	0.02 (0.01 to 0.15)	130.21	14.82%
1	Jan	1,443 (983 to 1,954)	2.31 (1.58 to 3.13)	1,388 (946 to 1,880)	2.22 (1.52 to 3.01)	55 (37 to 74)	0.09 (0.06 to 0.17)	247.75	17.17%
1	Feb	5,656 (4,780 to 6,675)	9.06 (7.66 to 10.70)	5,455 (4,610 to 6,437)	8.74 (7.39 to 10.32)	201 (170 to 237)	0.32 (0.27 to 0.09)	483.38	8.55%

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	3,867 (2,787 to 5,120)	6.20 (4.47 to 8.21)	3,814 (2,749 to 5,049)	6.11 (4.40 to 8.09)	54 (39 to 71)	0.09 (0.06 to 0.15)	595.13	15.39%
2	Apr	2,845 (2,378 to 3,353)	4.56 (3.81 to 5.37)	2,690 (2,249 to 3,171)	4.31 (3.60 to 5.08)	154 (129 to 182)	0.25 (0.21 to 0.09)	248.62	8.74%
2	May	294 (172 to 448)	0.47 (0.28 to 0.72)	267 (157 to 407)	0.43 (0.25 to 0.65)	27 (16 to 41)	0.04 (0.03 to 0.24)	70.24	23.90%
2	Jun	693 (511 to 904)	1.11 (0.82 to 1.45)	669 (494 to 873)	1.07 (0.79 to 1.40)	24 (18 to 31)	0.04 (0.03 to 0.14)	100.11	14.45%
2	Jul	1,263 (999 to 1,556)	2.02 (1.60 to 2.49)	1,256 (995 to 1,548)	2.01 (1.59 to 2.48)	6 (5 to 8)	0.01 (0.01 to 0.11)	141.97	11.24%
2	Aug	99 (39 to 204)	0.16 (0.06 to 0.33)	99 (39 to 204)	0.16 (0.06 to 0.33)	0 (0 to 0)	0.00 (0.00 to 0.42)	41.86	42.44%
2	Sep	26 (6 to 75)	0.04 (0.01 to 0.12)	26 (6 to 75)	0.04 (0.01 to 0.12)	0 (0 to 0)	0.00 (0.00 to 0.67)	17.68	66.82%
2	Oct	662 (480 to 888)	1.06 (0.77 to 1.42)	655 (475 to 878)	1.05 (0.76 to 1.41)	7 (5 to 10)	0.01 (0.01 to 0.16)	104.10	15.72%
2	Nov	75 (24 to 167)	0.12 (0.04 to 0.27)	69 (23 to 154)	0.11 (0.04 to 0.25)	6 (2 to 13)	0.01 (0.00 to 0.49)	36.30	48.56%
2	Dec	2,402 (1,972 to 2,875)	3.85 (3.16 to 4.61)	2,338 (1,920 to 2,798)	3.75 (3.08 to 4.48)	64 (53 to 77)	0.10 (0.08 to 0.10)	230.26	9.59%
2	Jan	3,983 (3,309 to 4,703)	6.38 (5.30 to 7.54)	3,931 (3,266 to 4,642)	6.30 (5.23 to 7.44)	52 (43 to 61)	0.08 (0.07 to 0.09)	355.52	8.93%
2	Feb	2,237 (1,822 to 2,702)	3.58 (2.92 to 4.33)	2,211 (1,801 to 2,671)	3.54 (2.89 to 4.28)	26 (21 to 31)	0.04 (0.03 to 0.10)	224.68	10.05%

Table C. 16 Common guillemot MRSea estimates in the Mona Offshore Ornithology Array Area study area.

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	16,213 (13,432 to 19,345)	11.14 (9.23 to 13.29)	15,925 (13,194 to 19,002)	10.95 (9.07 to 13.06)	287 (238 to 343)	0.20 (0.16 to 0.09)	1,508.28	9.30%
1	Apr	2,111 (1,507 to 2,818)	1.45 (1.04 to 1.94)	1,974 (1,409 to 2,635)	1.36 (0.97 to 1.81)	137 (98 to 183)	0.09 (0.07 to 0.16)	334.28	15.84%
1	May	555 (322 to 879)	0.38 (0.22 to 0.60)	519 (301 to 821)	0.36 (0.21 to 0.56)	37 (21 to 58)	0.03 (0.01 to 0.26)	141.99	25.57%
1	Jun	2,936 (1,981 to 4,074)	2.02 (1.36 to 2.80)	2,678 (1,807 to 3,717)	1.84 (1.24 to 2.55)	258 (174 to 358)	0.18 (0.12 to 0.18)	534.06	18.19%
1	Jul	1,679 (1,160 to 2,317)	1.15 (0.80 to 1.59)	1,629 (1,125 to 2,248)	1.12 (0.77 to 1.54)	50 (35 to 69)	0.03 (0.02 to 0.18)	295.19	17.58%
1	Aug	1,942 (1,281 to 2,863)	1.33 (0.88 to 1.97)	1,942 (1,281 to 2,863)	1.33 (0.88 to 1.97)	0 (0 to 0)	0.00 (0.00 to 0.21)	403.66	20.79%
1	Sep	1,023 (694 to 1,479)	0.70 (0.48 to 1.02)	1,023 (694 to 1,479)	0.70 (0.48 to 1.02)	0 (0 to 0)	0.00 (0.00 to 0.20)	200.39	19.59%
1	Oct	856 (508 to 1,531)	0.59 (0.35 to 1.05)	848 (503 to 1,516)	0.58 (0.35 to 1.04)	8 (5 to 15)	0.01 (0.00 to 0.30)	261.07	30.49%
1	Nov	2,832 (1,997 to 3,832)	1.95 (1.37 to 2.63)	2,692 (1,898 to 3,643)	1.85 (1.30 to 2.50)	140 (99 to 189)	0.10 (0.07 to 0.17)	468.21	16.53%
1	Dec	1,950 (1,396 to 2,559)	1.34 (0.96 to 1.76)	1,925 (1,378 to 2,525)	1.32 (0.95 to 1.74)	26 (18 to 34)	0.02 (0.01 to 0.15)	296.72	15.21%
1	Jan	2,508 (1,726 to 3,412)	1.72 (1.19 to 2.34)	2,412 (1,661 to 3,282)	1.66 (1.14 to 2.26)	95 (66 to 130)	0.07 (0.05 to 0.17)	429.98	17.15%
1	Feb	10,164 (8,397 to 12,200)	6.99 (5.77 to 8.39)	9,802 (8,099 to 11,766)	6.74 (5.57 to 8.09)	362 (299 to 434)	0.25 (0.21 to 0.10)	970.16	9.55%
1	Mar	11,351 (8,161 to 15,138)	7.80 (5.61 to 10.40)	11,193 (8,047 to 14,928)	7.69 (5.53 to 10.26)	158 (113 to 210)	0.11 (0.08 to 0.16)	1,779.89	15.68%

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
2	Apr	8,420 (7,021 to 9,946)	5.79 (4.83 to 6.84)	7,963 (6,640 to 9,407)	5.47 (4.56 to 6.47)	457 (381 to 539)	0.31 (0.26 to 0.09)	746.31	8.86%
2	May	825 (476 to 1,299)	0.57 (0.33 to 0.89)	750 (432 to 1,181)	0.52 (0.30 to 0.81)	75 (43 to 118)	0.05 (0.03 to 0.25)	209.99	25.47%
2	Jun	2,234 (1,617 to 2,942)	1.54 (1.11 to 2.02)	2,157 (1,562 to 2,841)	1.48 (1.07 to 1.95)	76 (55 to 101)	0.05 (0.04 to 0.15)	337.95	15.13%
2	Jul	3,397 (2,596 to 4,324)	2.33 (1.78 to 2.97)	3,381 (2,583 to 4,303)	2.32 (1.78 to 2.96)	17 (13 to 21)	0.01 (0.01 to 0.13)	440.85	12.98%
2	Aug	700 (337 to 1,235)	0.48 (0.23 to 0.85)	700 (337 to 1,235)	0.48 (0.23 to 0.85)	0 (0 to 0)	0.00 (0.00 to 0.33)	229.07	32.74%
2	Sep	407 (183 to 761)	0.28 (0.13 to 0.52)	407 (183 to 761)	0.28 (0.13 to 0.52)	0 (0 to 0)	0.00 (0.00 to 0.36)	147.55	36.25%
2	Oct	3,205 (2,418 to 4,176)	2.20 (1.66 to 2.87)	3,170 (2,391 to 4,130)	2.18 (1.64 to 2.84)	35 (27 to 46)	0.02 (0.02 to 0.14)	448.54	13.99%
2	Nov	675 (335 to 1,200)	0.46 (0.23 to 0.82)	622 (308 to 1,106)	0.43 (0.21 to 0.76)	53 (26 to 94)	0.04 (0.02 to 0.33)	220.81	32.69%
2	Dec	4,659 (3,712 to 5,715)	3.20 (2.55 to 3.93)	4,535 (3,612 to 5,562)	3.12 (2.48 to 3.82)	125 (99 to 153)	0.09 (0.07 to 0.11)	510.99	10.97%
2	Jan	8,210 (6,826 to 9,753)	5.64 (4.69 to 6.70)	8,103 (6,737 to 9,627)	5.57 (4.63 to 6.62)	107 (89 to 127)	0.07 (0.06 to 0.09)	746.76	9.10%
2	Feb	4,543 (3,658 to 5,563)	3.12 (2.51 to 3.82)	4,491 (3,616 to 5,499)	3.09 (2.49 to 3.78)	53 (42 to 64)	0.04 (0.03 to 0.11)	485.93	10.70%

C.3. Razorbill

Table C.17 Razorbill MRSea estimates in the Mona Array Area + 4 km buffer.

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	2,085 (1,487 to 2,817)	3.34 (2.38 to 4.51)	2,077 (1,481 to 2,807)	3.33 (2.37 to 4.50)	8 (6 to 10)	0.01 (0.01 to 0.16)	339.37	16.28%
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	42 (13 to 127)	0.07 (0.02 to 0.20)	41 (13 to 124)	0.07 (0.02 to 0.20)	1 (0 to 4)	0.00 (0.00 to 0.69)	29.10	69.18%
1	Aug	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	Sep	235 (80 to 562)	0.38 (0.13 to 0.90)	230 (78 to 551)	0.37 (0.13 to 0.88)	5 (2 to 12)	0.01 (0.00 to 0.52)	123.11	52.44%
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	100 (18 to 1,004)	0.16 (0.03 to 1.61)	72 (13 to 722)	0.12 (0.02 to 1.16)	28 (5 to 282)	0.05 (0.01 to 2.52)	251.57	251.86%
1	Jan	495 (228 to 922)	0.79 (0.37 to 1.48)	439 (202 to 817)	0.70 (0.32 to 1.31)	56 (26 to 105)	0.09 (0.04 to 0.36)	177.01	35.73%
1	Feb	2,731 (1,839 to 3,825)	4.38 (2.95 to 6.13)	2,716 (1,829 to 3,804)	4.35 (2.93 to 6.10)	15 (10 to 21)	0.02 (0.02 to 0.19)	506.54	18.55%
1	Mar	1,642 (1,151 to 2,221)	2.63 (1.85 to 3.56)	1,532 (1,074 to 2,072)	2.46 (1.72 to 3.32)	110 (77 to 149)	0.18 (0.12 to 0.17)	272.91	16.62%
2	Apr	203 (93 to 390)	0.33 (0.15 to 0.63)	189 (86 to 363)	0.30 (0.14 to 0.58)	14 (6 to 27)	0.02 (0.01 to 0.37)	75.89	37.42%
2	May	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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	875 (576 to 1,238)	1.40 (0.92 to 1.98)	858 (565 to 1,215)	1.38 (0.91 to 1.95)	16 (11 to 23)	0.03 (0.02 to 0.19)	168.95	19.31%
2	Jan	1,234 (802 to 1,788)	1.98 (1.29 to 2.86)	1,234 (802 to 1,788)	1.98 (1.29 to 2.86)	0 (0 to 0)	0.00 (0.00 to 0.20)	251.35	20.37%
2	Feb	686 (472 to 963)	1.10 (0.76 to 1.54)	628 (432 to 881)	1.01 (0.69 to 1.41)	58 (40 to 82)	0.09 (0.06 to 0.18)	125.23	18.25%

Table C.18 Razorbill MRSea estimates in the Mona Offshore Ornithology Array Area study area.

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
1	Mar	4,516 (3,276 to 6,052)	3.10 (2.25 to 4.16)	4,499 (3,264 to 6,030)	3.09 (2.24 to 4.14)	17 (12 to 22)	0.01 (0.01 to 0.16)	708.24	15.68%
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	270 (97 to 636)	0.19 (0.07 to 0.44)	263 (95 to 618)	0.18 (0.06 to 0.42)	8 (3 to 18)	0.01 (0.00 to 0.51)	137.38	50.80%
1	Aug	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	Sep	363 (119 to 912)	0.25 (0.08 to 0.63)	356 (117 to 893)	0.24 (0.08 to 0.61)	8 (2 to 19)	0.01 (0.00 to 0.56)	202.36	55.67%
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	735 (206 to 2,814)	0.51 (0.14 to 1.93)	528 (148 to 2,022)	0.36 (0.10 to 1.39)	207 (58 to 791)	0.14 (0.04 to 0.91)	665.31	90.52%
1	Jan	1,157 (538 to 2,119)	0.79 (0.37 to 1.46)	1,025 (477 to 1,877)	0.70 (0.33 to 1.29)	132 (61 to 241)	0.09 (0.04 to 0.35)	403.26	34.86%
1	Feb	4,416 (2,978 to 6,258)	3.03 (2.05 to 4.30)	4,392 (2,962 to 6,223)	3.02 (2.04 to 4.28)	24 (16 to 34)	0.02 (0.01 to 0.19)	836.60	18.95%
1	Mar	5,031 (3,447 to 6,842)	3.46 (2.37 to 4.70)	4,693 (3,216 to 6,383)	3.23 (2.21 to 4.39)	338 (231 to 459)	0.23 (0.16 to 0.17)	865.99	17.21%
2	Apr	594 (290 to 1,052)	0.41 (0.20 to 0.72)	553 (270 to 980)	0.38 (0.19 to 0.67)	41 (20 to 72)	0.03 (0.01 to 0.33)	194.37	32.74%
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

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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	2,604 (1,679 to 3,773)	1.79 (1.15 to 2.59)	2,555 (1,648 to 3,703)	1.76 (1.13 to 2.55)	49 (31 to 70)	0.03 (0.02 to 0.21)	534.28	20.52%
2	Jan	2,382 (1,528 to 3,506)	1.64 (1.05 to 2.41)	2,382 (1,528 to 3,506)	1.64 (1.05 to 2.41)	0 (0 to 0)	0.00 (0.00 to 0.21)	504.44	21.18%
2	Feb	1,424 (939 to 2,055)	0.98 (0.65 to 1.41)	1,303 (859 to 1,881)	0.90 (0.59 to 1.29)	121 (80 to 174)	0.08 (0.05 to 0.20)	284.62	19.99%

C.4. Manx shearwater

Table C.19 Manx shearwater MRSea estimates for the Mona Array Area + 4 km buffer.

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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	554 (125 to 1,466)	0.89 (0.20 to 2.35)	232 (52 to 615)	0.37 (0.08 to 0.99)	322 (73 to 851)	0.52 (0.12 to 0.62)	342.10	61.74%
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	3,337 (816 to 8,894)	5.35 (1.31 to 14.25)	1,459 (357 to 3,890)	2.34 (0.57 to 6.23)	1,877 (459 to 5,004)	3.01 (0.74 to 0.62)	2,060.58	61.75%
2	Jul	1,794 (704 to 3,500)	2.87 (1.13 to 5.61)	1,450 (569 to 2,830)	2.32 (0.91 to 4.53)	344 (135 to 670)	0.55 (0.22 to 0.40)	713.37	39.77%

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
2	Aug	439 (148 to 924)	0.70 (0.24 to 1.48)	99 (33 to 208)	0.16 (0.05 to 0.33)	340 (115 to 717)	0.55 (0.18 to 0.45)	197.97	45.13%
2	Sep	6 (0 to 29)	0.01 (0.00 to 0.05)	5 (0 to 27)	0.01 (0.00 to 0.04)	1 (0 to 3)	0.00 (0.00 to 1.25)	7.35	124.93%
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

Table C.20 Manx shearwater MRSea estimates in the Mona Offshore Ornithology Array Area study area.

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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	3,118 (477 to 9,915)	2.14 (0.33 to 6.81)	1,307 (200 to 4,158)	0.90 (0.14 to 2.86)	1,810 (277 to 5,757)	1.24 (0.19 to 0.77)	2,407.41	77.21%
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	8,490 (2,089 to 22,490)	5.83 (1.44 to 15.46)	3,713 (914 to 9,836)	2.55 (0.63 to 6.76)	4,777 (1,176 to 12,654)	3.28 (0.81 to 0.61)	5,204.20	61.30%
2	Jul	3,725 (1,409 to 7,620)	2.56 (0.97 to 5.24)	3,012 (1,139 to 6,160)	2.07 (0.78 to 4.23)	713 (270 to 1,459)	0.49 (0.19 to 0.43)	1,584.43	42.53%
2	Aug	911 (300 to 2,005)	0.63 (0.21 to 1.38)	205 (67 to 450)	0.14 (0.05 to 0.31)	706 (233 to 1,555)	0.49 (0.16 to 0.48)	435.01	47.75%

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
2	Sep	411 (24 to 1,961)	0.28 (0.02 to 1.35)	373 (22 to 1,779)	0.26 (0.02 to 1.22)	38 (2 to 182)	0.03 (0.00 to 1.20)	494.07	120.11%
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

C.5. Northern gannet

Table C.21 Northern gannet MRSea estimates for the Mona Array Area + 4 km buffer.

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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	288 (196 to 392)	0.46 (0.31 to 0.63)	174 (118 to 237)	0.28 (0.19 to 0.38)	114 (78 to 155)	0.18 (0.12 to 0.17)	49.99	17.36%
1	Aug	223 (136 to 335)	0.36 (0.22 to 0.54)	146 (89 to 219)	0.23 (0.14 to 0.35)	77 (47 to 116)	0.12 (0.08 to 0.23)	50.64	22.69%
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	181 (100 to 295)	0.29 (0.16 to 0.47)	99 (55 to 161)	0.16 (0.09 to 0.26)	82 (45 to 133)	0.13 (0.07 to 0.27)	49.63	27.38%
2	Apr	289 (185 to 416)	0.46 (0.30 to 0.67)	194 (124 to 279)	0.31 (0.20 to 0.45)	95 (61 to 137)	0.15 (0.10 to 0.20)	58.93	20.40%
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	57 (27 to 104)	0.09 (0.04 to 0.17)	37 (17 to 68)	0.06 (0.03 to 0.11)	20 (9 to 36)	0.03 (0.01 to 0.35)	19.81	34.61%

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
2	Aug	105 (47 to 198)	0.17 (0.07 to 0.32)	46 (20 to 87)	0.07 (0.03 to 0.14)	59 (26 to 111)	0.09 (0.04 to 0.37)	38.53	36.73%
2	Sep	382 (244 to 552)	0.61 (0.39 to 0.89)	203 (130 to 293)	0.33 (0.21 to 0.47)	179 (115 to 259)	0.29 (0.18 to 0.21)	78.56	20.55%
2	Oct	128 (85 to 188)	0.21 (0.14 to 0.30)	75 (50 to 110)	0.12 (0.08 to 0.18)	53 (35 to 78)	0.08 (0.06 to 0.21)	26.34	20.57%
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

Table C.22 Northern gannet MRSea estimates in the Mona Offshore Ornithology Array Area study area.

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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	684 (449 to 963)	0.47 (0.31 to 0.66)	413 (271 to 582)	0.28 (0.19 to 0.40)	271 (178 to 381)	0.19 (0.12 to 0.19)	131.17	19.18%
1	Aug	527 (281 to 875)	0.36 (0.19 to 0.60)	345 (184 to 572)	0.24 (0.13 to 0.39)	183 (97 to 303)	0.13 (0.07 to 0.29)	151.47	28.72%
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	842 (416 to 1,452)	0.58 (0.29 to 1.00)	461 (228 to 795)	0.32 (0.16 to 0.55)	381 (188 to 657)	0.26 (0.13 to 0.31)	264.43	31.42%
2	Apr	593 (360 to 888)	0.41 (0.25 to 0.61)	397 (241 to 595)	0.27 (0.17 to 0.41)	195 (119 to 293)	0.13 (0.08 to 0.23)	134.70	22.73%
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	362 (161 to 665)	0.25 (0.11 to 0.46)	237 (105 to 434)	0.16 (0.07 to 0.30)	126 (56 to 231)	0.09 (0.04 to 0.36)	128.65	35.52%
2	Aug	448 (182 to 875)	0.31 (0.12 to 0.60)	197 (80 to 384)	0.14 (0.05 to 0.26)	251 (102 to 490)	0.17 (0.07 to 0.40)	176.81	39.50%

		All behaviours		Sitting only		Flying only		Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
2	Sep	757 (445 to 1,154)	0.52 (0.31 to 0.79)	402 (236 to 613)	0.28 (0.16 to 0.42)	355 (209 to 541)	0.24 (0.14 to 0.24)	181.08	23.93%
2	Oct	381 (252 to 551)	0.26 (0.17 to 0.38)	223 (148 to 323)	0.15 (0.10 to 0.22)	157 (104 to 228)	0.11 (0.07 to 0.20)	76.40	20.07%
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

Appendix D. Design-based estimates

D.1. Black-legged kittiwake

Table D. 1 Design-based black-legged kittiwake 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) in the Mona Array Area + 4 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	869 (661 to 1,065)	1.39 (1.06 to 1.71)	414 (314 to 507)	0.66 (0.50 to 0.81)	455 (346 to 558)	0.73 (0.55 to 0.89)	106.37	12.24%
1	Apr	154 (83 to 220)	0.25 (0.12 to 0.35)	99 (53 to 140)	0.16 (0.08 to 0.23)	56 (30 to 79)	0.09 (0.05 to 0.13)	33.21	23.27%
1	May	11 (0 to 23)	0.02 (0.00 to 0.04)	1 (0 to 2)	0.00 (0.00 to 0.00)	10 (0 to 20)	0.02 (0.00 to 0.03)	7.56	68.19%
1	Jun	296 (205 to 387)	0.47 (0.31 to 0.62)	76 (52 to 99)	0.12 (0.08 to 0.16)	220 (152 to 288)	0.35 (0.24 to 0.46)	44.19	15.79%
1	Jul	146 (89 to 218)	0.23 (0.14 to 0.35)	15 (9 to 23)	0.02 (0.01 to 0.04)	131 (79 to 195)	0.21 (0.13 to 0.31)	34.17	23.42%
1	Aug	55 (20 to 91)	0.09 (0.03 to 0.15)	21 (8 to 35)	0.03 (0.01 to 0.06)	34 (12 to 56)	0.05 (0.02 to 0.09)	18.68	35.70%
1	Sep	23 (0 to 51)	0.04 (0.00 to 0.08)	7 (0 to 15)	0.01 (0.00 to 0.02)	16 (0 to 36)	0.03 (0.00 to 0.06)	14.48	72.28%
1	Oct	13 (0 to 31)	0.02 (0.00 to 0.05)	2 (0 to 5)	0.00 (0.00 to 0.01)	11 (0 to 26)	0.02 (0.00 to 0.04)	9.14	72.34%
1	Nov	340 (246 to 446)	0.55 (0.39 to 0.71)	71 (51 to 93)	0.11 (0.08 to 0.15)	270 (195 to 353)	0.43 (0.31 to 0.57)	51.88	15.33%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Dec	265 (185 to 358)	0.42 (0.28 to 0.57)	52 (36 to 70)	0.08 (0.06 to 0.11)	213 (149 to 288)	0.34 (0.24 to 0.46)	41.72	16.52%
1	Jan	422 (308 to 537)	0.68 (0.49 to 0.86)	93 (68 to 118)	0.15 (0.11 to 0.19)	329 (240 to 419)	0.53 (0.39 to 0.67)	58.53	13.97%
1	Feb	349 (256 to 449)	0.56 (0.40 to 0.72)	67 (49 to 86)	0.11 (0.08 to 0.14)	282 (207 to 363)	0.45 (0.33 to 0.58)	47.63	13.96%
1	Mar	1,477 (1,037 to 1,956)	2.37 (1.66 to 3.13)	569 (399 to 753)	0.91 (0.64 to 1.21)	908 (638 to 1,203)	1.46 (1.02 to 1.93)	240.85	16.33%
2	Apr	557 (434 to 701)	0.89 (0.70 to 1.12)	229 (178 to 288)	0.37 (0.29 to 0.46)	329 (256 to 413)	0.53 (0.41 to 0.66)	69.41	12.47%
2	May	131 (59 to 209)	0.21 (0.10 to 0.34)	7 (3 to 12)	0.01 (0.01 to 0.02)	124 (56 to 197)	0.20 (0.09 to 0.32)	39.47	30.16%
2	Jun	138 (65 to 212)	0.22 (0.10 to 0.34)	68 (32 to 105)	0.11 (0.05 to 0.17)	70 (33 to 107)	0.11 (0.05 to 0.17)	38.72	28.07%
2	Jul	481 (280 to 671)	0.77 (0.44 to 1.07)	224 (130 to 312)	0.36 (0.21 to 0.50)	257 (149 to 358)	0.41 (0.24 to 0.57)	99.92	21.01%
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)	0.00	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)	0.00	0.00%
2	Oct	55 (20 to 104)	0.09 (0.03 to 0.17)	13 (5 to 24)	0.02 (0.01 to 0.04)	43 (16 to 81)	0.07 (0.02 to 0.13)	21.38	40.28%
2	Nov	144 (86 to 207)	0.23 (0.13 to 0.33)	22 (13 to 32)	0.04 (0.02 to 0.05)	122 (73 to 175)	0.20 (0.12 to 0.28)	30.13	21.50%
2	Dec	1,318 (1,028 to 1,605)	2.11 (1.65 to 2.57)	187 (146 to 227)	0.30 (0.23 to 0.36)	1,131 (882 to 1,377)	1.81 (1.41 to 2.21)	153.06	11.62%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
2	Jan	860 (668 to 1,062)	1.38 (1.05 to 1.70)	449 (348 to 554)	0.72 (0.56 to 0.89)	411 (319 to 508)	0.66 (0.51 to 0.81)	100.29	11.87%
2	Feb	1,238 (1,009 to 1,492)	1.98 (1.47 to 2.39)	478 (390 to 576)	0.77 (0.62 to 0.92)	760 (619 to 916)	1.22 (0.99 to 1.47)	113.76	10.09%

Table D. 2 Design-based black-legged kittiwake 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) in in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	2,265 (1,761 to 2,717)	1.56 (1.21 to 1.87)	1,078 (838 to 1,294)	0.74 (0.58 to 0.89)	1,187 (923 to 1,424)	0.82 (0.63 to 0.98)	241.26	10.65%
1	Apr	439 (290 to 567)	0.30 (0.18 to 0.39)	281 (185 to 363)	0.19 (0.13 to 0.25)	158 (105 to 205)	0.11 (0.07 to 0.14)	65.19	16.05%
1	May	51 (22 to 86)	0.03 (0.02 to 0.06)	5 (2 to 9)	0.00 (0.00 to 0.01)	45 (20 to 77)	0.03 (0.01 to 0.05)	16.61	32.86%
1	Jun	859 (678 to 1,022)	0.59 (0.44 to 0.70)	220 (174 to 262)	0.15 (0.12 to 0.18)	639 (504 to 760)	0.44 (0.35 to 0.52)	82.90	10.20%
1	Jul	385 (270 to 494)	0.26 (0.19 to 0.34)	41 (28 to 52)	0.03 (0.02 to 0.04)	345 (242 to 442)	0.24 (0.17 to 0.30)	56.70	14.72%
1	Aug	150 (84 to 205)	0.10 (0.06 to 0.14)	57 (32 to 78)	0.04 (0.02 to 0.05)	93 (52 to 127)	0.06 (0.04 to 0.09)	31.16	21.73%
1	Sep	151 (88 to 224)	0.10 (0.05 to 0.15)	45 (26 to 67)	0.03 (0.02 to 0.05)	106 (62 to 157)	0.07 (0.04 to 0.11)	31.78	23.80%
1	Oct	40 (13 to 72)	0.03 (0.01 to 0.05)	7 (2 to 12)	0.00 (0.00 to 0.01)	33 (11 to 60)	0.02 (0.01 to 0.04)	16.28	40.89%
1	Nov	1,133 (928 to 1,357)	0.78 (0.63 to 0.93)	236 (193 to 283)	0.16 (0.13 to 0.19)	897 (735 to 1,074)	0.62 (0.50 to 0.74)	112.69	10.01%
1	Dec	719 (553 to 865)	0.49 (0.36 to 0.59)	141 (108 to 170)	0.10 (0.07 to 0.12)	578 (445 to 695)	0.40 (0.31 to 0.48)	74.90	10.92%
1	Jan	893 (730 to 1,056)	0.61 (0.50 to 0.73)	196 (160 to 232)	0.13 (0.11 to 0.16)	697 (569 to 824)	0.48 (0.39 to 0.57)	85.94	9.69%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Feb	678 (538 to 796)	0.47 (0.36 to 0.55)	130 (103 to 153)	0.09 (0.07 to 0.11)	548 (435 to 643)	0.38 (0.30 to 0.44)	64.33	9.71%
1	Mar	4,081 (3,407 to 4,822)	2.80 (2.34 to 3.31)	1,571 (1,312 to 1,856)	1.08 (0.90 to 1.28)	2,510 (2,095 to 2,965)	1.72 (1.44 to 2.04)	377.88	9.27%
2	Apr	1,435 (1,191 to 1,664)	0.99 (0.82 to 1.14)	589 (489 to 683)	0.40 (0.34 to 0.47)	846 (702 to 981)	0.58 (0.48 to 0.67)	119.10	8.30%
2	May	364 (257 to 477)	0.25 (0.18 to 0.33)	20 (14 to 27)	0.01 (0.01 to 0.02)	344 (242 to 451)	0.24 (0.17 to 0.31)	57.27	15.74%
2	Jun	619 (430 to 824)	0.43 (0.30 to 0.57)	306 (212 to 407)	0.21 (0.15 to 0.28)	313 (217 to 416)	0.22 (0.15 to 0.29)	100.99	16.31%
2	Jul	1,868 (1,161 to 2,633)	1.28 (0.79 to 1.81)	869 (541 to 1,226)	0.60 (0.37 to 0.84)	998 (621 to 1,408)	0.69 (0.43 to 0.97)	386.89	20.94%
2	Aug	15 (0 to 36)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	15 (0 to 36)	0.01 (0.00 to 0.02)	9.47	71.84%
2	Sep	27 (0 to 60)	0.02 (0.00 to 0.04)	7 (0 to 15)	0.00 (0.00 to 0.01)	20 (0 to 45)	0.01 (0.00 to 0.03)	17.13	62.86%
2	Oct	156 (78 to 240)	0.11 (0.05 to 0.16)	35 (18 to 55)	0.02 (0.01 to 0.04)	120 (60 to 185)	0.08 (0.04 to 0.13)	40.91	27.45%
2	Nov	529 (397 to 655)	0.36 (0.26 to 0.45)	81 (61 to 101)	0.06 (0.04 to 0.07)	448 (336 to 554)	0.31 (0.23 to 0.38)	65.15	12.69%
2	Dec	2,331 (1,941 to 2,659)	1.60 (1.33 to 1.83)	330 (275 to 377)	0.23 (0.19 to 0.26)	2,001 (1,666 to 2,282)	1.38 (1.14 to 1.57)	187.23	8.04%
2	Jan	1,870 (1,537 to 2,180)	1.28 (1.04 to 1.50)	975 (802 to 1,137)	0.67 (0.55 to 0.78)	894 (735 to 1,043)	0.61 (0.51 to 0.72)	160.71	8.75%
2	Feb	2,472 (2,064 to 2,904)	1.70 (1.29 to 2.00)	955 (797 to 1,122)	0.66 (0.55 to 0.77)	1,517 (1,267 to 1,782)	1.04 (0.87 to 1.22)	189.37	8.41%

D.2. Great black-backed gull

Table D. 3 Design-based great black-backed gull 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) in the Mona Array Area + 4 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	50 (12 to 83)	0.08 (0.02 to 0.13)	40 (10 to 67)	0.06 (0.02 to 0.11)	10 (2 to 17)	0.02 (0.00 to 0.03)	19.40	39.15%
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)	0.00	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)	0.00	0.00%
1	Jun	100 (24 to 187)	0.16 (0.03 to 0.30)	35 (8 to 66)	0.06 (0.01 to 0.11)	65 (15 to 122)	0.10 (0.02 to 0.20)	36.65	45.62%
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)	0.00	0.00%
1	Aug	7 (0 to 21)	0.01 (0.00 to 0.03)	6 (0 to 18)	0.01 (0.00 to 0.03)	1 (0 to 3)	0.00 (0.00 to 0.00)	6.68	98.96%
1	Sep	7 (0 to 20)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	6.19	101.03%
1	Oct	13 (0 to 38)	0.02 (0.00 to 0.06)	9 (0 to 26)	0.01 (0.00 to 0.04)	4 (0 to 13)	0.01 (0.00 to 0.02)	13.07	100.69%
1	Nov	13 (0 to 27)	0.02 (0.00 to 0.04)	9 (0 to 18)	0.01 (0.00 to 0.03)	4 (0 to 9)	0.01 (0.00 to 0.01)	8.97	70.15%
1	Dec	13 (0 to 32)	0.02 (0.00 to 0.05)	8 (0 to 19)	0.01 (0.00 to 0.03)	5 (0 to 13)	0.01 (0.00 to 0.02)	9.23	72.36%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%
1	Feb	60 (26 to 102)	0.10 (0.04 to 0.16)	29 (13 to 49)	0.05 (0.02 to 0.08)	31 (14 to 53)	0.05 (0.02 to 0.09)	19.22	33.30%
1	Mar	6 (0 to 19)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.01 (0.00 to 0.03)	6.45	100.25%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Aug	7 (0 to 21)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.01 (0.00 to 0.03)	6.41	101.59%
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)	0.00	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)	0.00	0.00%
2	Nov	13 (0 to 28)	0.02 (0.00 to 0.04)	9 (0 to 21)	0.02 (0.00 to 0.03)	3 (0 to 7)	0.01 (0.00 to 0.01)	9.04	72.58%
2	Dec	65 (0 to 158)	0.10 (0.00 to 0.25)	0 (0 to 0)	0.00 (0.00 to 0.00)	65 (0 to 158)	0.10 (0.00 to 0.25)	9.14	70.22%
2	Jan	51 (14 to 84)	0.08 (0.02 to 0.13)	39 (11 to 65)	0.06 (0.02 to 0.10)	12 (3 to 19)	0.02 (0.01 to 0.03)	17.26	37.93%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
2	Feb	173 (59 to 332)	0.28 (0.08 to 0.53)	135 (46 to 258)	0.22 (0.07 to 0.41)	39 (13 to 74)	0.06 (0.02 to 0.12)	63.48	41.91%

Table D. 4 Design-based great black-backed gull 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	64 (25 to 108)	0.04 (0.02 to 0.07)	51 (20 to 86)	0.04 (0.01 to 0.06)	13 (5 to 22)	0.01 (0.00 to 0.01)	22.11	34.69%
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)	0.00	0.00%
1	May	6 (0 to 17)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 17)	0.00 (0.00 to 0.01)	5.54	93.96%
1	Jun	169 (75 to 267)	0.12 (0.04 to 0.18)	59 (26 to 93)	0.04 (0.02 to 0.06)	110 (49 to 173)	0.08 (0.03 to 0.12)	43.11	31.72%
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)	0.00	0.00%
1	Aug	53 (0 to 111)	0.04 (0.00 to 0.08)	45 (0 to 95)	0.03 (0.00 to 0.07)	8 (0 to 16)	0.01 (0.00 to 0.01)	28.90	59.93%
1	Sep	7 (0 to 21)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)	6.46	101.04%
1	Oct	20 (0 to 46)	0.01 (0.00 to 0.03)	13 (0 to 31)	0.01 (0.00 to 0.02)	7 (0 to 15)	0.00 (0.00 to 0.01)	14.99	75.03%
1	Nov	20 (0 to 40)	0.01 (0.00 to 0.03)	13 (0 to 27)	0.01 (0.00 to 0.02)	7 (0 to 13)	0.00 (0.00 to 0.01)	11.56	57.98%
1	Dec	33 (7 to 61)	0.02 (0.00 to 0.04)	20 (4 to 37)	0.01 (0.00 to 0.03)	13 (3 to 24)	0.01 (0.00 to 0.02)	14.75	44.58%
1	Jan	24 (0 to 48)	0.02 (0.00 to 0.03)	16 (0 to 32)	0.01 (0.00 to 0.02)	8 (0 to 16)	0.01 (0.00 to 0.01)	11.33	55.65%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Feb	159 (91 to 233)	0.11 (0.06 to 0.16)	76 (44 to 112)	0.05 (0.03 to 0.08)	83 (48 to 122)	0.06 (0.03 to 0.08)	34.95	22.95%
1	Mar	20 (0 to 40)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	20 (0 to 40)	0.01 (0.00 to 0.03)	11.94	59.01%
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)	0.00	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)	0.00	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)	0.00	0.00%
2	Jul	7 (0 to 21)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)	6.88	100.19%
2	Aug	7 (0 to 22)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 22)	0.01 (0.00 to 0.02)	6.56	101.54%
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)	0.00	0.00%
2	Oct	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.95	101.79%
2	Nov	26 (6 to 54)	0.02 (0.00 to 0.04)	20 (5 to 40)	0.01 (0.00 to 0.03)	7 (2 to 13)	0.00 (0.00 to 0.01)	13.16	50.10%
2	Dec	67 (0 to 163)	0.05 (0.00 to 0.11)	0 (0 to 0)	0.00 (0.00 to 0.00)	67 (0 to 163)	0.05 (0.00 to 0.11)	9.40	70.21%
2	Jan	96 (44 to 151)	0.07 (0.03 to 0.10)	74 (34 to 116)	0.05 (0.02 to 0.08)	22 (10 to 35)	0.02 (0.01 to 0.02)	25.58	29.77%
2	Feb	207 (76 to 360)	0.14 (0.05 to 0.25)	161 (59 to 280)	0.11 (0.04 to 0.19)	46 (17 to 80)	0.03 (0.01 to 0.05)	67.08	37.01%

D.3. European herring gull

Table D. 5 Design-based European herring gull (all behaviours) 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) in the Mona Array Area + 4 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	19 (0 to 44)	0.03 (0.00 to 0.07)	16 (0 to 39)	0.03 (0.00 to 0.06)	2 (0 to 6)	0.00 (0.00 to 0.01)	13.92	74.63%
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)	0.00	0.00%
1	May	5 (0 to 16)	0.01 (0.00 to 0.03)	5 (0 to 16)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	5.19	100.38%
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Sep	21 (0 to 42)	0.03 (0.00 to 0.07)	5 (0 to 10)	0.01 (0.00 to 0.02)	15 (0 to 31)	0.02 (0.00 to 0.05)	11.19	58.61%
1	Oct	6 (0 to 19)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.01 (0.00 to 0.03)	6.54	100.69%
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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Jan	15 (0 to 38)	0.02 (0.00 to 0.06)	5 (0 to 13)	0.01 (0.00 to 0.02)	10 (0 to 25)	0.02 (0.00 to 0.04)	9.60	74.10%
1	Feb	41 (7 to 76)	0.07 (0.01 to 0.12)	29 (5 to 54)	0.05 (0.01 to 0.09)	12 (2 to 22)	0.02 (0.00 to 0.03)	18.18	46.27%
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)	0.00	0.00%
2	Apr	7 (0 to 20)	0.01 (0.00 to 0.03)	3 (0 to 8)	0.00 (0.00 to 0.01)	4 (0 to 12)	0.01 (0.00 to 0.02)	6.54	97.15%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Jan	23 (0 to 44)	0.04 (0.00 to 0.07)	0 (0 to 0)	0.00 (0.00 to 0.00)	23 (0 to 44)	0.04 (0.00 to 0.07)	11.44	56.50%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
2	Feb	67 (14 to 122)	0.11 (0.02 to 0.20)	45 (10 to 81)	0.07 (0.02 to 0.13)	22 (5 to 41)	0.04 (0.01 to 0.07)	25.47	43.26%

Table D. 6 Design-based European herring gull 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	51 (13 to 89)	0.04 (0.01 to 0.06)	45 (11 to 78)	0.03 (0.01 to 0.05)	6 (2 to 11)	0.00 (0.00 to 0.01)	20.04	38.96%
1	Apr	20 (0 to 41)	0.01 (0.00 to 0.03)	10 (0 to 21)	0.01 (0.00 to 0.01)	10 (0 to 21)	0.01 (0.00 to 0.01)	9.14	70.60%
1	May	5 (0 to 17)	0.00 (0.00 to 0.01)	5 (0 to 17)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	5.42	100.41%
1	Jun	16 (0 to 34)	0.01 (0.00 to 0.02)	8 (0 to 17)	0.01 (0.00 to 0.01)	8 (0 to 17)	0.01 (0.00 to 0.01)	9.28	71.00%
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)	0.00	0.00%
1	Aug	7 (0 to 22)	0.00 (0.00 to 0.02)	7 (0 to 22)	0.00 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.69	101.03%
1	Sep	29 (7 to 57)	0.02 (0.00 to 0.04)	7 (2 to 14)	0.00 (0.00 to 0.01)	22 (5 to 43)	0.01 (0.00 to 0.03)	13.37	50.25%
1	Oct	25 (6 to 53)	0.02 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	25 (6 to 53)	0.02 (0.00 to 0.04)	13.06	51.22%
1	Nov	14 (0 to 28)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	14 (0 to 28)	0.01 (0.00 to 0.02)	9.47	69.16%
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)	0.00	0.00%
1	Jan	24 (0 to 48)	0.02 (0.00 to 0.03)	8 (0 to 16)	0.01 (0.00 to 0.01)	16 (0 to 32)	0.01 (0.00 to 0.02)	12.06	59.34%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Feb	145 (55 to 241)	0.10 (0.04 to 0.17)	103 (39 to 172)	0.07 (0.03 to 0.12)	41 (16 to 69)	0.03 (0.01 to 0.05)	48.04	34.71%
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)	0.00	0.00%
2	Apr	34 (7 to 69)	0.02 (0.00 to 0.05)	13 (3 to 27)	0.01 (0.00 to 0.02)	20 (4 to 41)	0.01 (0.00 to 0.03)	17.61	52.53%
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)	0.00	0.00%
2	Jun	10 (0 to 30)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	10 (0 to 30)	0.01 (0.00 to 0.02)	6.58	96.71%
2	Jul	14 (0 to 34)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	14 (0 to 34)	0.01 (0.00 to 0.02)	9.80	71.83%
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)	0.00	0.00%
2	Sep	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.69	102.80%
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)	0.00	0.00%
2	Nov	6 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.00 (0.00 to 0.01)	6.39	99.55%
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)	0.00	0.00%
2	Jan	38 (7 to 68)	0.03 (0.00 to 0.05)	0 (0 to 0)	0.00 (0.00 to 0.00)	38 (7 to 68)	0.03 (0.00 to 0.05)	14.82	43.88%
2	Feb	69 (15 to 124)	0.05 (0.01 to 0.09)	46 (10 to 83)	0.03 (0.01 to 0.06)	23 (5 to 41)	0.02 (0.00 to 0.03)	26.03	43.35%

D.4. Lesser back-backed gull

Table D. 7 Design-based lesser black-backed gull (all behaviours) 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) in the Mona Array Area + 4 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	45 (0 to 87)	0.07 (0.00 to 0.14)	31 (0 to 61)	0.05 (0.00 to 0.10)	13 (0 to 26)	0.02 (0.00 to 0.04)	23.79	53.42%
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)	0.00	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)	0.00	0.00%
1	Jun	32 (0 to 71)	0.05 (0.00 to 0.11)	21 (0 to 45)	0.03 (0.00 to 0.07)	12 (0 to 26)	0.02 (0.00 to 0.04)	16.12	61.89%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	0.00%
1	Mar	26 (0 to 53)	0.04 (0.00 to 0.09)	0 (0 to 0)	0.00 (0.00 to 0.00)	26 (0 to 53)	0.04 (0.00 to 0.09)	15.40	59.94%
2	Apr	6 (0 to 20)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.01 (0.00 to 0.03)	6.79	106.78%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Nov	27 (0 to 66)	0.04 (0.00 to 0.11)	5 (0 to 13)	0.01 (0.00 to 0.02)	22 (0 to 53)	0.04 (0.00 to 0.08)	21.70	79.99%
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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
2	Feb	23 (0 to 45)	0.04 (0.00 to 0.07)	17 (0 to 34)	0.03 (0.00 to 0.05)	6 (0 to 11)	0.01 (0.00 to 0.02)	11.53	58.12%

Table D. 8 Design-based lesser black-backed gull 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	65 (12 to 116)	0.04 (0.01 to 0.08)	45 (9 to 81)	0.03 (0.01 to 0.06)	19 (4 to 35)	0.01 (0.00 to 0.02)	26.62	40.97%
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)	0.00	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)	0.00	0.00%
1	Jun	91 (41 to 150)	0.06 (0.02 to 0.10)	58 (26 to 95)	0.04 (0.02 to 0.07)	33 (15 to 55)	0.02 (0.01 to 0.04)	23.18	31.69%
1	Jul	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	7.05	102.08%
1	Aug	22 (0 to 58)	0.02 (0.00 to 0.04)	15 (0 to 39)	0.01 (0.00 to 0.03)	7 (0 to 19)	0.01 (0.00 to 0.01)	16.32	79.23%
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)	0.00	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)	0.00	0.00%
1	Nov	14 (0 to 33)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	14 (0 to 33)	0.01 (0.00 to 0.02)	9.39	68.70%
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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%
1	Mar	46 (13 to 86)	0.03 (0.01 to 0.06)	0 (0 to 0)	0.00 (0.00 to 0.00)	46 (13 to 86)	0.03 (0.01 to 0.06)	19.10	41.37%
2	Apr	13 (0 to 33)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 33)	0.01 (0.00 to 0.02)	9.66	73.30%
2	May	13 (0 to 33)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 33)	0.01 (0.00 to 0.02)	9.68	73.61%
2	Jun	10 (0 to 30)	0.01 (0.00 to 0.02)	10 (0 to 30)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.79	99.80%
2	Jul	6 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.00 (0.00 to 0.01)	6.53	102.89%
2	Aug	36 (0 to 81)	0.02 (0.00 to 0.06)	0 (0 to 0)	0.00 (0.00 to 0.00)	36 (0 to 81)	0.02 (0.00 to 0.06)	21.76	67.57%
2	Sep	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.57	98.56%
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)	0.00	0.00%
2	Nov	35 (0 to 78)	0.02 (0.00 to 0.05)	7 (0 to 16)	0.00 (0.00 to 0.01)	28 (0 to 63)	0.02 (0.00 to 0.04)	23.38	67.96%
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)	0.00	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)	0.00	0.00%
2	Feb	31 (7 to 68)	0.02 (0.00 to 0.05)	23 (6 to 51)	0.02 (0.00 to 0.03)	8 (2 to 17)	0.01 (0.00 to 0.01)	13.79	51.45%

D.5. Common guillemot

Table D. 9 Design-based common guillemot 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	8,795 (7,644 to 9,987)	14.09 (6.06 to 16.01)	8,675 (7,540 to 9,852)	13.90 (12.08 to 15.79)	119 (104 to 136)	0.19 (0.17 to 0.22)	388.77	6.81%
1	Apr	919 (738 to 1,143)	1.47 (0.64 to 1.83)	873 (701 to 1,085)	1.40 (1.12 to 1.74)	46 (37 to 58)	0.07 (0.06 to 0.09)	75.23	11.61%
1	May	154 (92 to 222)	0.25 (0.08 to 0.36)	146 (88 to 210)	0.23 (0.14 to 0.34)	8 (5 to 11)	0.01 (0.01 to 0.02)	24.33	22.31%
1	Jun	1,152 (862 to 1,448)	1.85 (0.58 to 2.32)	1,074 (803 to 1,349)	1.72 (1.29 to 2.16)	79 (59 to 99)	0.13 (0.09 to 0.16)	83.09	13.14%
1	Jul	581 (389 to 767)	0.93 (0.35 to 1.23)	568 (380 to 749)	0.91 (0.61 to 1.20)	13 (9 to 18)	0.02 (0.01 to 0.03)	72.02	16.83%
1	Aug	344 (209 to 486)	0.55 (0.19 to 0.78)	344 (209 to 486)	0.55 (0.33 to 0.78)	0 (0 to 0)	0.00 (0.00 to 0.00)	55.03	21.13%
1	Sep	267 (122 to 421)	0.43 (0.11 to 0.67)	267 (122 to 421)	0.43 (0.20 to 0.67)	0 (0 to 0)	0.00 (0.00 to 0.00)	56.04	29.51%
1	Oct	44 (8 to 77)	0.07 (0.01 to 0.12)	43 (8 to 77)	0.07 (0.01 to 0.12)	0 (0 to 1)	0.00 (0.00 to 0.00)	13.67	42.11%
1	Nov	2,077 (1,654 to 2,525)	3.33 (1.04 to 4.05)	1,998 (1,591 to 2,429)	3.20 (2.55 to 3.89)	79 (63 to 96)	0.13 (0.10 to 0.15)	115.39	10.79%
1	Dec	971 (656 to 1,271)	1.56 (0.19 to 2.04)	961 (650 to 1,258)	1.54 (1.04 to 2.02)	10 (7 to 13)	0.02 (0.01 to 0.02)	37.86	16.38%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Jan	1,746 (1,338 to 2,168)	2.80 (0.63 to 3.47)	1,695 (1,299 to 2,105)	2.72 (2.08 to 3.37)	51 (39 to 63)	0.08 (0.06 to 0.10)	82.22	12.27%
1	Feb	6,361 (5,575 to 7,118)	10.19 (3.14 to 11.41)	6,187 (5,422 to 6,924)	9.91 (8.69 to 11.10)	174 (153 to 195)	0.28 (0.24 to 0.31)	183.25	6.24%
1	Mar	4,176 (2,992 to 5,395)	6.69 (1.11 to 8.65)	4,132 (2,960 to 5,338)	6.62 (4.74 to 8.55)	44 (32 to 57)	0.07 (0.05 to 0.09)	189.60	14.90%
2	Apr	4,083 (3,299 to 4,960)	6.54 (2.86 to 7.95)	3,912 (3,160 to 4,752)	6.27 (5.06 to 7.62)	171 (138 to 208)	0.27 (0.22 to 0.33)	309.15	10.66%
2	May	368 (259 to 491)	0.59 (0.21 to 0.79)	342 (241 to 456)	0.55 (0.39 to 0.73)	26 (18 to 35)	0.04 (0.03 to 0.06)	40.01	16.56%
2	Jun	546 (393 to 706)	0.87 (0.34 to 1.13)	532 (382 to 687)	0.85 (0.61 to 1.10)	14 (10 to 19)	0.02 (0.02 to 0.03)	58.73	15.12%
2	Jul	1,359 (1,014 to 1,720)	2.18 (0.91 to 2.76)	1,354 (1,010 to 1,714)	2.17 (1.62 to 2.75)	5 (4 to 6)	0.01 (0.01 to 0.01)	130.95	13.08%
2	Aug	138 (45 to 226)	0.22 (0.04 to 0.36)	138 (45 to 226)	0.22 (0.07 to 0.36)	0 (0 to 0)	0.00 (0.00 to 0.00)	32.82	34.55%
2	Sep	49 (11 to 97)	0.08 (0.01 to 0.16)	49 (11 to 97)	0.08 (0.02 to 0.16)	0 (0 to 0)	0.00 (0.00 to 0.00)	13.19	50.15%
2	Oct	586 (420 to 755)	0.94 (0.36 to 1.21)	581 (416 to 748)	0.93 (0.67 to 1.20)	5 (4 to 6)	0.01 (0.01 to 0.01)	62.22	15.19%
2	Nov	82 (13 to 153)	0.13 (0.01 to 0.25)	77 (13 to 144)	0.12 (0.02 to 0.23)	5 (1 to 9)	0.01 (0.00 to 0.01)	18.24	47.22%
2	Dec	2,679 (2,303 to 3,053)	4.29 (1.61 to 4.89)	2,624 (2,256 to 2,990)	4.21 (3.62 to 4.79)	55 (47 to 63)	0.09 (0.08 to 0.10)	115.11	7.51%
2	Jan	4,639 (4,123 to 5,176)	7.43 (3.16 to 8.29)	4,593 (4,082 to 5,124)	7.36 (6.54 to 8.21)	46 (41 to 51)	0.07 (0.07 to 0.08)	166.08	5.71%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
2	Feb	2,497 (2,052 to 2,989)	4.00 (1.16 to 4.79)	2,475 (2,034 to 2,963)	3.97 (3.26 to 4.75)	22 (18 to 26)	0.04 (0.03 to 0.04)	113.91	9.85%

Table D. 10 Design-based common guillemot 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
1	Mar	17,739 (16,178 to 19,432)	12.19 (5.50 to 13.36)	17,499 (15,959 to 19,168)	12.03 (10.97 to 13.17)	241 (220 to 264)	0.17 (0.15 to 0.18)	553.17	4.80%
1	Apr	2,333 (2,028 to 2,693)	1.60 (0.75 to 1.85)	2,216 (1,926 to 2,557)	1.52 (1.32 to 1.76)	118 (102 to 136)	0.08 (0.07 to 0.09)	123.04	7.48%
1	May	612 (474 to 770)	0.42 (0.18 to 0.53)	581 (450 to 731)	0.40 (0.31 to 0.50)	31 (24 to 39)	0.02 (0.02 to 0.03)	54.22	12.49%
1	Jun	3,214 (2,734 to 3,754)	2.21 (0.79 to 2.58)	2,994 (2,547 to 3,497)	2.06 (1.75 to 2.40)	220 (187 to 257)	0.15 (0.13 to 0.18)	143.83	8.15%
1	Jul	1,835 (1,468 to 2,204)	1.26 (0.57 to 1.51)	1,793 (1,435 to 2,153)	1.23 (0.99 to 1.48)	42 (34 to 51)	0.03 (0.02 to 0.03)	142.38	10.53%
1	Aug	2,028 (1,496 to 2,615)	1.39 (0.59 to 1.80)	2,028 (1,496 to 2,615)	1.39 (1.03 to 1.80)	0 (0 to 0)	0.00 (0.00 to 0.00)	215.87	14.07%
1	Sep	1,108 (803 to 1,426)	0.76 (0.30 to 0.98)	1,108 (803 to 1,426)	0.76 (0.55 to 0.98)	0 (0 to 0)	0.00 (0.00 to 0.00)	114.71	14.55%
1	Oct	919 (669 to 1,174)	0.63 (0.26 to 0.81)	913 (664 to 1,165)	0.63 (0.46 to 0.80)	7 (5 to 9)	0.00 (0.00 to 0.01)	96.63	14.12%
1	Nov	3,174 (2,667 to 3,679)	2.18 (0.72 to 2.53)	3,053 (2,565 to 3,539)	2.10 (1.76 to 2.43)	121 (102 to 140)	0.08 (0.07 to 0.10)	136.14	8.33%
1	Dec	2,131 (1,663 to 2,624)	1.46 (0.21 to 1.80)	2,109 (1,646 to 2,598)	1.45 (1.13 to 1.79)	21 (17 to 26)	0.01 (0.01 to 0.02)	59.79	11.79%
1	Jan	2,802 (2,342 to 3,352)	1.93 (0.47 to 2.30)	2,720 (2,274 to 3,254)	1.87 (1.56 to 2.24)	82 (68 to 98)	0.06 (0.05 to 0.07)	99.86	9.28%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Feb	11,400 (10,320 to 12,476)	7.84 (2.50 to 8.57)	11,089 (10,037 to 12,135)	7.62 (6.90 to 8.34)	312 (282 to 341)	0.21 (0.19 to 0.23)	259.28	4.93%
1	Mar	12,565 (10,674 to 14,686)	8.64 (1.70 to 10.09)	12,432 (10,560 to 14,530)	8.54 (7.26 to 9.99)	134 (113 to 156)	0.09 (0.08 to 0.11)	316.25	8.26%
2	Apr	9,500 (8,385 to 10,700)	6.53 (3.12 to 7.35)	9,102 (8,034 to 10,252)	6.26 (5.52 to 7.05)	398 (351 to 448)	0.27 (0.24 to 0.31)	448.20	6.64%
2	May	901 (692 to 1,105)	0.62 (0.24 to 0.76)	837 (643 to 1,027)	0.58 (0.44 to 0.71)	64 (49 to 78)	0.04 (0.03 to 0.05)	70.53	11.92%
2	Jun	2,474 (1,980 to 2,954)	1.70 (0.74 to 2.03)	2,409 (1,928 to 2,876)	1.66 (1.32 to 1.98)	65 (52 to 78)	0.04 (0.04 to 0.05)	180.29	10.24%
2	Jul	3,746 (3,069 to 4,385)	2.57 (1.18 to 3.01)	3,732 (3,058 to 4,368)	2.56 (2.10 to 3.00)	14 (12 to 16)	0.01 (0.01 to 0.01)	246.67	8.94%
2	Aug	749 (431 to 1,075)	0.51 (0.16 to 0.74)	749 (431 to 1,075)	0.51 (0.30 to 0.74)	0 (0 to 0)	0.00 (0.00 to 0.00)	117.25	22.73%
2	Sep	436 (235 to 646)	0.30 (0.07 to 0.44)	436 (235 to 646)	0.30 (0.16 to 0.44)	0 (0 to 0)	0.00 (0.00 to 0.00)	58.54	24.81%
2	Oct	3,485 (3,005 to 3,987)	2.40 (1.10 to 2.74)	3,456 (2,980 to 3,953)	2.38 (2.05 to 2.72)	29 (25 to 34)	0.02 (0.02 to 0.02)	174.16	7.15%
2	Nov	724 (479 to 974)	0.50 (0.12 to 0.67)	680 (450 to 915)	0.47 (0.31 to 0.63)	44 (29 to 59)	0.03 (0.02 to 0.04)	56.96	16.76%
2	Dec	5,160 (4,585 to 5,729)	3.55 (1.37 to 3.94)	5,054 (4,491 to 5,612)	3.47 (3.09 to 3.86)	106 (94 to 118)	0.07 (0.06 to 0.08)	167.50	5.67%
2	Jan	9,043 (8,373 to 9,784)	6.22 (2.75 to 6.72)	8,953 (8,290 to 9,687)	6.15 (5.70 to 6.66)	90 (83 to 97)	0.06 (0.06 to 0.07)	231.80	4.09%
2	Feb	5,001 (4,398 to 5,613)	3.44 (1.07 to 3.86)	4,957 (4,359 to 5,564)	3.41 (3.00 to 3.82)	44 (39 to 50)	0.03 (0.03 to 0.03)	150.73	6.51%

D.6. Razorbill

Table D. 11 Design-based razorbill 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	2,455 (1,943 to 2,948)	3.93 (1.80 to 4.73)	2,447 (1,937 to 2,939)	3.92 (3.10 to 4.71)	8 (6 to 9)	0.01 (0.01 to 0.01)	180.63	10.50%
1	Apr	42 (0 to 93)	0.07 (0.00 to 0.15)	42 (0 to 93)	0.07 (0.00 to 0.15)	0 (0 to 0)	0.00 (0.00 to 0.00)	19.59	62.24%
1	May	49 (7 to 93)	0.08 (0.01 to 0.15)	49 (7 to 93)	0.08 (0.01 to 0.15)	0 (0 to 0)	0.00 (0.00 to 0.00)	17.89	48.01%
1	Jun	11 (0 to 34)	0.02 (0.00 to 0.05)	11 (0 to 34)	0.02 (0.00 to 0.05)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.68	101.16%
1	Jul	50 (8 to 93)	0.08 (0.01 to 0.15)	49 (8 to 90)	0.08 (0.01 to 0.14)	1 (0 to 2)	0.00 (0.00 to 0.00)	18.51	46.76%
1	Aug	62 (16 to 111)	0.10 (0.02 to 0.18)	60 (15 to 107)	0.10 (0.02 to 0.17)	3 (1 to 5)	0.00 (0.00 to 0.01)	21.15	40.95%
1	Sep	172 (48 to 307)	0.28 (0.05 to 0.49)	169 (47 to 301)	0.27 (0.08 to 0.48)	3 (1 to 5)	0.00 (0.00 to 0.01)	54.90	41.17%
1	Oct	8 (0 to 24)	0.01 (0.00 to 0.04)	8 (0 to 24)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.60	100.97%
1	Nov	246 (110 to 382)	0.39 (0.08 to 0.61)	246 (110 to 382)	0.39 (0.18 to 0.61)	0 (0 to 0)	0.00 (0.00 to 0.00)	39.66	29.22%
1	Dec	144 (0 to 308)	0.23 (0.00 to 0.49)	109 (0 to 233)	0.17 (0.00 to 0.37)	35 (0 to 75)	0.06 (0.00 to 0.12)	23.80	61.06%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Jan	580 (285 to 891)	0.93 (0.16 to 1.43)	525 (258 to 805)	0.84 (0.41 to 1.29)	56 (27 to 86)	0.09 (0.04 to 0.14)	67.14	27.52%
1	Feb	3,056 (2,574 to 3,671)	4.90 (1.69 to 5.88)	3,042 (2,562 to 3,654)	4.88 (4.11 to 5.86)	14 (12 to 17)	0.02 (0.02 to 0.03)	142.95	9.43%
1	Mar	1,783 (1,230 to 2,474)	2.86 (0.54 to 3.97)	1,683 (1,161 to 2,336)	2.70 (1.86 to 3.74)	100 (69 to 139)	0.16 (0.11 to 0.22)	106.55	17.95%
2	Apr	275 (172 to 376)	0.44 (0.17 to 0.60)	260 (162 to 355)	0.42 (0.26 to 0.57)	16 (10 to 22)	0.03 (0.02 to 0.03)	42.54	20.10%
2	May	10 (0 to 28)	0.02 (0.00 to 0.05)	10 (0 to 28)	0.02 (0.00 to 0.05)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.60	97.84%
2	Jun	17 (0 to 36)	0.03 (0.00 to 0.06)	17 (0 to 36)	0.03 (0.00 to 0.06)	0 (0 to 0)	0.00 (0.00 to 0.00)	8.97	70.59%
2	Jul	41 (0 to 98)	0.07 (0.00 to 0.16)	41 (0 to 98)	0.07 (0.00 to 0.16)	0 (0 to 0)	0.00 (0.00 to 0.00)	24.08	73.39%
2	Aug	43 (0 to 109)	0.07 (0.00 to 0.17)	43 (0 to 109)	0.07 (0.00 to 0.17)	0 (0 to 0)	0.00 (0.00 to 0.00)	25.92	79.91%
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)	0.00	0.00%
2	Oct	35 (0 to 104)	0.06 (0.00 to 0.17)	31 (0 to 94)	0.05 (0.00 to 0.15)	3 (0 to 10)	0.01 (0.00 to 0.02)	27.64	103.40%
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)	0.00	0.00%
2	Dec	1,004 (689 to 1,309)	1.61 (0.56 to 2.10)	989 (679 to 1,289)	1.58 (1.09 to 2.07)	16 (11 to 20)	0.02 (0.02 to 0.03)	100.62	16.21%
2	Jan	1,489 (970 to 1,990)	2.39 (0.87 to 3.19)	1,489 (970 to 1,990)	2.39 (1.55 to 3.19)	0 (0 to 0)	0.00 (0.00 to 0.00)	177.07	17.57%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
2	Feb	815 (362 to 1,277)	1.31 (0.24 to 2.05)	757 (336 to 1,186)	1.21 (0.54 to 1.90)	58 (26 to 91)	0.09 (0.04 to 0.15)	125.80	30.40%

Table D. 12 Design-based razorbill 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
1	Mar	4,867 (4,226 to 5,640)	3.35 (1.68 to 3.88)	4,853 (4,213 to 5,623)	3.34 (2.90 to 3.86)	15 (13 to 17)	0.01 (0.01 to 0.01)	253.39	7.43%
1	Apr	159 (61 to 265)	0.11 (0.03 to 0.18)	159 (61 to 265)	0.11 (0.04 to 0.18)	0 (0 to 0)	0.00 (0.00 to 0.00)	40.99	34.28%
1	May	165 (97 to 245)	0.11 (0.04 to 0.17)	165 (97 to 245)	0.11 (0.07 to 0.17)	0 (0 to 0)	0.00 (0.00 to 0.00)	29.04	23.30%
1	Jun	178 (68 to 297)	0.12 (0.02 to 0.20)	178 (68 to 297)	0.12 (0.05 to 0.20)	0 (0 to 0)	0.00 (0.00 to 0.00)	35.33	34.18%
1	Jul	299 (150 to 447)	0.21 (0.07 to 0.31)	292 (147 to 436)	0.20 (0.10 to 0.30)	7 (4 to 11)	0.00 (0.00 to 0.01)	60.10	25.21%
1	Aug	162 (74 to 247)	0.11 (0.03 to 0.17)	155 (71 to 237)	0.11 (0.05 to 0.16)	7 (3 to 10)	0.00 (0.00 to 0.01)	36.12	27.00%
1	Sep	387 (161 to 587)	0.27 (0.07 to 0.40)	380 (158 to 577)	0.26 (0.11 to 0.40)	7 (3 to 10)	0.00 (0.00 to 0.01)	85.93	28.73%
1	Oct	66 (8 to 147)	0.05 (0.00 to 0.10)	66 (8 to 147)	0.05 (0.01 to 0.10)	0 (0 to 0)	0.00 (0.00 to 0.00)	31.73	59.41%
1	Nov	265 (120 to 409)	0.18 (0.04 to 0.28)	265 (120 to 409)	0.18 (0.08 to 0.28)	0 (0 to 0)	0.00 (0.00 to 0.00)	41.51	28.45%
1	Dec	788 (344 to 1,288)	0.54 (0.05 to 0.89)	596 (260 to 974)	0.41 (0.18 to 0.67)	193 (84 to 315)	0.13 (0.06 to 0.22)	67.71	31.77%
1	Jan	1,181 (767 to 1,706)	0.81 (0.18 to 1.17)	1,068 (694 to 1,542)	0.73 (0.48 to 1.06)	113 (74 to 164)	0.08 (0.05 to 0.11)	101.42	20.42%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Feb	4,916 (4,223 to 5,633)	3.38 (1.19 to 3.87)	4,894 (4,204 to 5,607)	3.36 (2.89 to 3.85)	22 (19 to 26)	0.02 (0.01 to 0.02)	182.90	7.50%
1	Mar	5,671 (4,204 to 7,188)	3.90 (0.79 to 4.94)	5,352 (3,968 to 6,785)	3.68 (2.73 to 4.66)	318 (236 to 403)	0.22 (0.16 to 0.28)	256.84	13.61%
2	Apr	642 (480 to 819)	0.44 (0.21 to 0.56)	605 (452 to 772)	0.42 (0.31 to 0.53)	37 (27 to 47)	0.03 (0.02 to 0.03)	68.41	13.87%
2	May	29 (0 to 58)	0.02 (0.00 to 0.04)	29 (0 to 58)	0.02 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	11.45	56.19%
2	Jun	70 (26 to 127)	0.05 (0.01 to 0.09)	70 (26 to 127)	0.05 (0.02 to 0.09)	0 (0 to 0)	0.00 (0.00 to 0.00)	21.14	39.23%
2	Jul	103 (33 to 178)	0.07 (0.02 to 0.12)	103 (33 to 178)	0.07 (0.02 to 0.12)	0 (0 to 0)	0.00 (0.00 to 0.00)	31.83	38.90%
2	Aug	196 (51 to 382)	0.13 (0.02 to 0.26)	196 (51 to 382)	0.13 (0.04 to 0.26)	0 (0 to 0)	0.00 (0.00 to 0.00)	67.66	46.13%
2	Sep	35 (0 to 69)	0.02 (0.00 to 0.05)	35 (0 to 69)	0.02 (0.00 to 0.05)	0 (0 to 0)	0.00 (0.00 to 0.00)	11.51	55.80%
2	Oct	80 (0 to 162)	0.05 (0.00 to 0.11)	72 (0 to 147)	0.05 (0.00 to 0.10)	7 (0 to 15)	0.01 (0.00 to 0.01)	36.48	59.51%
2	Nov	77 (13 to 144)	0.05 (0.00 to 0.10)	77 (13 to 144)	0.05 (0.01 to 0.10)	0 (0 to 0)	0.00 (0.00 to 0.00)	17.81	46.13%
2	Dec	2,883 (2,376 to 3,388)	1.98 (0.83 to 2.33)	2,838 (2,339 to 3,335)	1.95 (1.61 to 2.29)	45 (37 to 52)	0.03 (0.03 to 0.04)	165.74	9.30%
2	Jan	2,631 (2,003 to 3,272)	1.81 (0.77 to 2.25)	2,631 (2,003 to 3,272)	1.81 (1.38 to 2.25)	0 (0 to 0)	0.00 (0.00 to 0.00)	223.78	12.57%
2	Feb	1,559 (1,024 to 2,178)	1.07 (0.30 to 1.50)	1,448 (951 to 2,024)	1.00 (0.65 to 1.39)	111 (73 to 155)	0.08 (0.05 to 0.11)	157.00	19.84%

D.7. Northern fulmar

Table D. 13 Design-based northern fulmar 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) in the Mona Array Area + 4 km buffer

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	56 (18 to 94)	0.09 (0.03 to 0.15)	26 (9 to 44)	0.04 (0.01 to 0.07)	30 (10 to 50)	0.05 (0.02 to 0.08)	19.91	35.40%
1	Apr	26 (0 to 53)	0.04 (0.00 to 0.08)	14 (0 to 29)	0.02 (0.00 to 0.05)	12 (0 to 24)	0.02 (0.00 to 0.04)	15.61	60.93%
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)	0.00	0.00%
1	Jun	7 (0 to 20)	0.01 (0.00 to 0.03)	3 (0 to 10)	0.01 (0.00 to 0.02)	3 (0 to 10)	0.01 (0.00 to 0.02)	6.29	95.06%
1	Jul	13 (0 to 27)	0.02 (0.00 to 0.04)	10 (0 to 20)	0.02 (0.00 to 0.03)	3 (0 to 7)	0.01 (0.00 to 0.01)	9.00	70.63%
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Nov	26 (6 to 52)	0.04 (0.01 to 0.08)	21 (5 to 42)	0.03 (0.01 to 0.07)	5 (1 to 10)	0.01 (0.00 to 0.02)	13.33	51.97%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Dec	110 (45 to 176)	0.18 (0.07 to 0.28)	81 (33 to 131)	0.13 (0.05 to 0.21)	28 (12 to 46)	0.05 (0.02 to 0.07)	34.88	31.80%
1	Jan	20 (0 to 40)	0.03 (0.00 to 0.06)	6 (0 to 12)	0.01 (0.00 to 0.02)	14 (0 to 28)	0.02 (0.00 to 0.04)	11.34	56.43%
1	Feb	77 (32 to 124)	0.12 (0.05 to 0.20)	34 (14 to 54)	0.05 (0.02 to 0.09)	44 (18 to 70)	0.07 (0.03 to 0.11)	24.36	31.45%
1	Mar	156 (95 to 224)	0.25 (0.15 to 0.36)	40 (24 to 57)	0.06 (0.04 to 0.09)	116 (71 to 167)	0.19 (0.11 to 0.27)	33.54	21.53%
2	Apr	6 (0 to 20)	0.01 (0.00 to 0.03)	1 (0 to 2)	0.00 (0.00 to 0.00)	6 (0 to 18)	0.01 (0.00 to 0.03)	6.61	102.99%
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)	0.00	0.00%
2	Jun	7 (0 to 20)	0.01 (0.00 to 0.03)	5 (0 to 16)	0.01 (0.00 to 0.03)	1 (0 to 3)	0.00 (0.00 to 0.01)	6.66	102.24%
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)	0.00	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)	0.00	0.00%
2	Sep	7 (0 to 20)	0.01 (0.00 to 0.03)	3 (0 to 8)	0.00 (0.00 to 0.01)	4 (0 to 12)	0.01 (0.00 to 0.02)	6.47	93.90%
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)	0.00	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)	0.00	0.00%
2	Dec	156 (64 to 269)	0.25 (0.10 to 0.43)	78 (32 to 135)	0.13 (0.05 to 0.22)	78 (32 to 135)	0.13 (0.05 to 0.22)	54.18	34.67%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
2	Jan	7 (0 to 20)	0.01 (0.00 to 0.03)	3 (0 to 10)	0.01 (0.00 to 0.02)	3 (0 to 10)	0.01 (0.00 to 0.02)	6.50	97.30%
2	Feb	49 (20 to 84)	0.08 (0.03 to 0.13)	21 (9 to 37)	0.03 (0.01 to 0.06)	28 (11 to 47)	0.04 (0.02 to 0.08)	16.75	36.37%

Table D. 14 Design-based northern fulmar 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	109 (63 to 167)	0.07 (0.04 to 0.11)	51 (30 to 78)	0.04 (0.02 to 0.05)	58 (33 to 88)	0.04 (0.02 to 0.06)	27.13	24.91%
1	Apr	87 (33 to 135)	0.06 (0.02 to 0.09)	47 (18 to 73)	0.03 (0.01 to 0.05)	40 (15 to 62)	0.03 (0.01 to 0.04)	27.90	32.09%
1	May	5 (0 to 17)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	5 (0 to 17)	0.00 (0.00 to 0.01)	5.37	97.92%
1	Jun	27 (7 to 54)	0.02 (0.00 to 0.04)	13 (3 to 27)	0.01 (0.00 to 0.02)	13 (3 to 27)	0.01 (0.00 to 0.02)	13.32	49.49%
1	Jul	27 (7 to 55)	0.02 (0.00 to 0.04)	20 (5 to 41)	0.01 (0.00 to 0.03)	7 (2 to 14)	0.00 (0.00 to 0.01)	13.30	49.91%
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)	0.00	0.00%
1	Sep	27 (0 to 53)	0.02 (0.00 to 0.04)	20 (0 to 40)	0.01 (0.00 to 0.03)	7 (0 to 13)	0.00 (0.00 to 0.01)	15.79	59.29%
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)	0.00	0.00%
1	Nov	33 (7 to 61)	0.02 (0.00 to 0.04)	26 (5 to 49)	0.02 (0.00 to 0.03)	7 (1 to 12)	0.00 (0.00 to 0.01)	15.12	46.03%
1	Dec	182 (99 to 257)	0.12 (0.07 to 0.18)	135 (73 to 191)	0.09 (0.05 to 0.13)	47 (26 to 67)	0.03 (0.02 to 0.05)	40.94	22.52%
1	Jan	69 (27 to 114)	0.05 (0.02 to 0.08)	21 (8 to 34)	0.01 (0.01 to 0.02)	48 (19 to 80)	0.03 (0.01 to 0.05)	23.69	34.43%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Feb	156 (94 to 236)	0.11 (0.06 to 0.16)	68 (41 to 103)	0.05 (0.03 to 0.07)	88 (53 to 134)	0.06 (0.04 to 0.09)	36.40	23.38%
1	Mar	315 (230 to 411)	0.22 (0.16 to 0.28)	80 (59 to 105)	0.06 (0.04 to 0.07)	235 (172 to 306)	0.16 (0.12 to 0.21)	46.89	14.88%
2	Apr	80 (7 to 164)	0.06 (0.00 to 0.11)	7 (1 to 14)	0.00 (0.00 to 0.01)	74 (6 to 151)	0.05 (0.00 to 0.10)	44.22	55.08%
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)	0.00	0.00%
2	Jun	41 (7 to 75)	0.03 (0.00 to 0.05)	34 (6 to 63)	0.02 (0.00 to 0.04)	7 (1 to 13)	0.00 (0.00 to 0.01)	19.32	47.68%
2	Jul	27 (7 to 55)	0.02 (0.00 to 0.04)	20 (5 to 41)	0.01 (0.00 to 0.03)	7 (2 to 14)	0.00 (0.00 to 0.01)	13.02	47.72%
2	Aug	6 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.00 (0.00 to 0.01)	6.52	100.71%
2	Sep	34 (7 to 68)	0.02 (0.00 to 0.05)	14 (3 to 27)	0.01 (0.00 to 0.02)	21 (4 to 41)	0.01 (0.00 to 0.03)	17.41	50.95%
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)	0.00	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)	0.00	0.00%
2	Dec	254 (129 to 400)	0.17 (0.09 to 0.28)	127 (65 to 200)	0.09 (0.04 to 0.14)	127 (65 to 200)	0.09 (0.04 to 0.14)	70.38	27.68%
2	Jan	14 (0 to 33)	0.01 (0.00 to 0.02)	7 (0 to 17)	0.00 (0.00 to 0.01)	7 (0 to 17)	0.00 (0.00 to 0.01)	9.46	69.26%
2	Feb	114 (57 to 172)	0.08 (0.04 to 0.12)	50 (25 to 75)	0.03 (0.02 to 0.05)	64 (32 to 97)	0.04 (0.02 to 0.07)	28.37	26.41%

D.8. Manx shearwater

Table D. 15 Design-based Manx shearwater 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) in the Mona Array Area + 4 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	6 (0 to 18)	0.01 (0.00 to 0.03)	5 (0 to 16)	0.01 (0.00 to 0.03)	1 (0 to 3)	0.00 (0.00 to 0.00)	5.92	98.83%
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)	0.00	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)	0.00	0.00%
1	Jun	32 (0 to 72)	0.05 (0.00 to 0.12)	22 (0 to 49)	0.03 (0.00 to 0.08)	10 (0 to 23)	0.02 (0.00 to 0.04)	22.36	70.74%
1	Jul	80 (32 to 126)	0.13 (0.05 to 0.20)	34 (14 to 53)	0.05 (0.02 to 0.08)	47 (19 to 73)	0.07 (0.03 to 0.12)	25.18	31.38%
1	Aug	32 (6 to 58)	0.05 (0.01 to 0.09)	0 (0 to 0)	0.00 (0.00 to 0.00)	32 (6 to 58)	0.05 (0.01 to 0.09)	14.20	44.78%
1	Sep	49 (12 to 90)	0.08 (0.02 to 0.14)	0 (0 to 0)	0.00 (0.00 to 0.00)	49 (12 to 90)	0.08 (0.02 to 0.14)	21.13	42.94%
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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	0.00%
2	Apr	20 (0 to 40)	0.03 (0.00 to 0.06)	11 (0 to 21)	0.02 (0.00 to 0.03)	9 (0 to 19)	0.01 (0.00 to 0.03)	11.09	56.68%
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)	0.00	0.00%
2	Jun	486 (197 to 796)	0.78 (0.31 to 1.28)	213 (86 to 348)	0.34 (0.14 to 0.56)	273 (111 to 448)	0.44 (0.18 to 0.72)	155.83	32.42%
2	Jul	685 (320 to 1,039)	1.10 (0.51 to 1.67)	554 (259 to 840)	0.89 (0.41 to 1.35)	131 (61 to 199)	0.21 (0.10 to 0.32)	195.20	28.78%
2	Aug	193 (122 to 265)	0.31 (0.19 to 0.43)	43 (27 to 60)	0.07 (0.04 to 0.10)	150 (95 to 206)	0.24 (0.15 to 0.33)	36.73	19.52%
2	Sep	7 (0 to 22)	0.01 (0.00 to 0.04)	7 (0 to 20)	0.01 (0.00 to 0.03)	1 (0 to 2)	0.00 (0.00 to 0.00)	6.46	98.24%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 16 Design-based Manx shearwater 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	44 (0 to 84)	0.03 (0.00 to 0.06)	38 (0 to 72)	0.03 (0.00 to 0.05)	6 (0 to 12)	0.00 (0.00 to 0.01)	22.39	50.63%
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)	0.00	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)	0.00	0.00%
1	Jun	125 (40 to 220)	0.09 (0.03 to 0.15)	86 (28 to 150)	0.06 (0.02 to 0.10)	39 (13 to 69)	0.03 (0.01 to 0.05)	46.95	37.57%
1	Jul	3,127 (573 to 6,672)	2.15 (0.39 to 4.59)	1,311 (240 to 2,798)	0.90 (0.17 to 1.92)	1,816 (333 to 3,874)	1.25 (0.23 to 2.66)	1,797.52	57.48%
1	Aug	147 (73 to 216)	0.10 (0.05 to 0.15)	0 (0 to 0)	0.00 (0.00 to 0.00)	147 (73 to 216)	0.10 (0.05 to 0.15)	36.84	25.14%
1	Sep	65 (26 to 113)	0.04 (0.02 to 0.08)	0 (0 to 0)	0.00 (0.00 to 0.00)	65 (26 to 113)	0.04 (0.02 to 0.08)	24.24	37.30%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%
1	Mar	13 (0 to 33)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 33)	0.01 (0.00 to 0.02)	9.48	70.70%
2	Apr	104 (41 to 176)	0.07 (0.03 to 0.12)	56 (22 to 94)	0.04 (0.01 to 0.06)	49 (19 to 82)	0.03 (0.01 to 0.06)	35.85	34.78%
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)	0.00	0.00%
2	Jun	8,481 (4,433 to 13,210)	5.83 (3.01 to 9.08)	3,709 (1,939 to 5,777)	2.55 (1.33 to 3.97)	4,772 (2,494 to 7,432)	3.28 (1.71 to 5.11)	2,375.97	28.32%
2	Jul	3,690 (2,242 to 5,371)	2.54 (1.53 to 3.69)	2,983 (1,813 to 4,343)	2.05 (1.25 to 2.98)	707 (429 to 1,029)	0.49 (0.30 to 0.71)	815.84	22.34%
2	Aug	918 (608 to 1,267)	0.63 (0.41 to 0.87)	206 (137 to 285)	0.14 (0.09 to 0.20)	712 (471 to 982)	0.49 (0.32 to 0.68)	175.10	19.61%
2	Sep	403 (30 to 806)	0.28 (0.02 to 0.55)	366 (27 to 731)	0.25 (0.02 to 0.50)	37 (3 to 75)	0.03 (0.00 to 0.05)	185.63	51.56%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

D.9. Northern gannet

Table D. 17 Design-based northern gannet population estimates (Pop) and density (D) with lower and upper (95%) confidece limits for each month surveyed between March 2020 and February 2021 (Year 1) and March 2021 and February 2022 (Year 2) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
1	Mar	145 (72 to 210)	0.23 (0.12 to 0.34)	111 (55 to 160)	0.18 (0.09 to 0.26)	34 (17 to 50)	0.06 (0.03 to 0.08)	36.32	25.04%
1	Apr	58 (25 to 93)	0.09 (0.04 to 0.15)	37 (16 to 59)	0.06 (0.03 to 0.09)	21 (9 to 34)	0.03 (0.01 to 0.05)	18.37	31.63%
1	May	11 (0 to 27)	0.02 (0.00 to 0.04)	3 (0 to 7)	0.00 (0.00 to 0.01)	8 (0 to 20)	0.01 (0.00 to 0.03)	7.98	71.18%
1	Jun	20 (0 to 40)	0.03 (0.00 to 0.06)	8 (0 to 15)	0.01 (0.00 to 0.02)	12 (0 to 24)	0.02 (0.00 to 0.04)	11.47	57.27%
1	Jul	238 (158 to 321)	0.38 (0.25 to 0.51)	144 (95 to 194)	0.23 (0.15 to 0.31)	94 (63 to 127)	0.15 (0.10 to 0.20)	42.71	17.94%
1	Aug	268 (184 to 353)	0.43 (0.30 to 0.57)	175 (121 to 231)	0.28 (0.19 to 0.37)	93 (64 to 122)	0.15 (0.10 to 0.20)	45.14	16.83%
1	Sep	77 (31 to 121)	0.12 (0.05 to 0.19)	33 (13 to 52)	0.05 (0.02 to 0.08)	44 (17 to 69)	0.07 (0.03 to 0.11)	23.96	31.17%
1	Oct	45 (12 to 84)	0.07 (0.02 to 0.14)	16 (5 to 31)	0.03 (0.01 to 0.05)	28 (8 to 53)	0.05 (0.01 to 0.09)	19.63	43.72%
1	Nov	53 (19 to 93)	0.08 (0.03 to 0.15)	25 (9 to 45)	0.04 (0.01 to 0.07)	27 (10 to 49)	0.04 (0.02 to 0.08)	20.63	39.15%
1	Dec	6 (0 to 19)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.01 (0.00 to 0.03)	6.21	96.35%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Jan	34 (6 to 61)	0.05 (0.01 to 0.10)	13 (3 to 24)	0.02 (0.00 to 0.04)	20 (4 to 36)	0.03 (0.01 to 0.06)	14.65	43.50%
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)	0.00	0.00%
1	Mar	188 (117 to 265)	0.30 (0.19 to 0.42)	103 (64 to 145)	0.16 (0.10 to 0.23)	85 (53 to 120)	0.14 (0.08 to 0.19)	38.34	20.42%
2	Apr	294 (177 to 403)	0.47 (0.28 to 0.65)	197 (119 to 271)	0.32 (0.19 to 0.43)	97 (58 to 133)	0.16 (0.09 to 0.21)	61.18	20.83%
2	May	84 (45 to 136)	0.13 (0.07 to 0.22)	33 (18 to 53)	0.05 (0.03 to 0.09)	51 (27 to 82)	0.08 (0.04 to 0.13)	23.22	27.63%
2	Jun	20 (0 to 40)	0.03 (0.00 to 0.06)	7 (0 to 15)	0.01 (0.00 to 0.02)	13 (0 to 25)	0.02 (0.00 to 0.04)	11.74	58.45%
2	Jul	64 (26 to 106)	0.10 (0.04 to 0.17)	42 (17 to 70)	0.07 (0.03 to 0.11)	22 (9 to 37)	0.04 (0.01 to 0.06)	20.64	32.26%
2	Aug	119 (70 to 175)	0.19 (0.11 to 0.28)	52 (31 to 77)	0.08 (0.05 to 0.12)	67 (39 to 98)	0.11 (0.06 to 0.16)	27.52	23.11%
2	Sep	399 (289 to 503)	0.64 (0.46 to 0.81)	212 (153 to 267)	0.34 (0.25 to 0.43)	187 (135 to 236)	0.30 (0.22 to 0.38)	55.34	13.87%
2	Oct	159 (101 to 217)	0.25 (0.16 to 0.35)	93 (59 to 127)	0.15 (0.09 to 0.20)	66 (42 to 90)	0.11 (0.07 to 0.14)	30.39	19.11%
2	Nov	19 (0 to 39)	0.03 (0.00 to 0.06)	10 (0 to 21)	0.02 (0.00 to 0.03)	9 (0 to 18)	0.01 (0.00 to 0.03)	10.88	57.52%
2	Dec	12 (0 to 38)	0.02 (0.00 to 0.06)	0 (0 to 0)	0.00 (0.00 to 0.00)	12 (0 to 38)	0.02 (0.00 to 0.06)	12.87	103.85%
2	Jan	13 (0 to 27)	0.02 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 27)	0.02 (0.00 to 0.04)	9.14	71.27%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
2	Feb	21 (0 to 42)	0.03 (0.00 to 0.07)	11 (0 to 21)	0.02 (0.00 to 0.03)	11 (0 to 21)	0.02 (0.00 to 0.03)	11.12	55.88%

Table D. 18 Design-based northern gannet 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
1	Mar	245 (159 to 336)	0.17 (0.11 to 0.23)	187 (122 to 256)	0.13 (0.08 to 0.18)	58 (38 to 80)	0.04 (0.03 to 0.05)	46.27	18.87%
1	Apr	126 (66 to 190)	0.09 (0.05 to 0.13)	79 (42 to 120)	0.05 (0.03 to 0.08)	46 (24 to 70)	0.03 (0.02 to 0.05)	31.31	24.87%
1	May	46 (17 to 79)	0.03 (0.01 to 0.05)	11 (4 to 20)	0.01 (0.00 to 0.01)	34 (13 to 59)	0.02 (0.01 to 0.04)	16.29	35.45%
1	Jun	88 (40 to 136)	0.06 (0.03 to 0.09)	34 (15 to 52)	0.02 (0.01 to 0.04)	54 (25 to 84)	0.04 (0.02 to 0.06)	25.69	29.27%
1	Jul	682 (514 to 832)	0.47 (0.35 to 0.57)	412 (310 to 502)	0.28 (0.21 to 0.35)	270 (203 to 329)	0.19 (0.14 to 0.23)	83.00	12.17%
1	Aug	527 (400 to 657)	0.36 (0.28 to 0.45)	345 (262 to 430)	0.24 (0.18 to 0.30)	182 (139 to 227)	0.13 (0.10 to 0.16)	65.86	12.49%
1	Sep	281 (186 to 388)	0.19 (0.13 to 0.27)	120 (80 to 166)	0.08 (0.05 to 0.11)	160 (106 to 222)	0.11 (0.07 to 0.15)	51.37	18.30%
1	Oct	269 (158 to 368)	0.19 (0.11 to 0.25)	99 (58 to 135)	0.07 (0.04 to 0.09)	171 (100 to 233)	0.12 (0.07 to 0.16)	55.26	20.52%
1	Nov	155 (73 to 254)	0.11 (0.05 to 0.17)	74 (35 to 122)	0.05 (0.02 to 0.08)	81 (38 to 133)	0.06 (0.03 to 0.09)	47.16	30.41%
1	Dec	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.44	96.26%
1	Jan	35 (7 to 62)	0.02 (0.00 to 0.04)	14 (3 to 25)	0.01 (0.00 to 0.02)	21 (4 to 37)	0.01 (0.00 to 0.03)	15.02	43.46%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%
1	Mar	837 (616 to 1,037)	0.57 (0.42 to 0.71)	458 (337 to 568)	0.31 (0.23 to 0.39)	378 (279 to 469)	0.26 (0.19 to 0.32)	111.80	13.36%
2	Apr	601 (438 to 758)	0.41 (0.30 to 0.52)	403 (294 to 508)	0.28 (0.20 to 0.35)	198 (144 to 250)	0.14 (0.10 to 0.17)	82.63	13.75%
2	May	187 (120 to 258)	0.13 (0.08 to 0.18)	73 (47 to 101)	0.05 (0.03 to 0.07)	114 (73 to 156)	0.08 (0.05 to 0.11)	36.01	19.25%
2	Jun	255 (118 to 432)	0.18 (0.08 to 0.30)	94 (44 to 159)	0.06 (0.03 to 0.11)	161 (75 to 273)	0.11 (0.05 to 0.19)	83.08	32.59%
2	Jul	335 (227 to 459)	0.23 (0.16 to 0.32)	219 (148 to 300)	0.15 (0.10 to 0.21)	116 (79 to 159)	0.08 (0.05 to 0.11)	58.89	17.59%
2	Aug	427 (318 to 535)	0.29 (0.22 to 0.37)	188 (140 to 235)	0.13 (0.10 to 0.16)	240 (178 to 300)	0.16 (0.12 to 0.21)	55.73	13.08%
2	Sep	761 (616 to 924)	0.52 (0.42 to 0.64)	404 (327 to 491)	0.28 (0.22 to 0.34)	357 (289 to 433)	0.25 (0.20 to 0.30)	77.10	10.13%
2	Oct	397 (303 to 499)	0.27 (0.21 to 0.34)	233 (178 to 293)	0.16 (0.12 to 0.20)	164 (125 to 207)	0.11 (0.09 to 0.14)	51.25	12.91%
2	Nov	73 (33 to 114)	0.05 (0.02 to 0.08)	40 (18 to 62)	0.03 (0.01 to 0.04)	33 (15 to 52)	0.02 (0.01 to 0.04)	21.90	30.18%
2	Dec	13 (0 to 39)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 39)	0.01 (0.00 to 0.03)	13.24	103.81%
2	Jan	20 (0 to 40)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	20 (0 to 40)	0.01 (0.00 to 0.03)	11.56	58.34%
2	Feb	43 (14 to 78)	0.03 (0.01 to 0.05)	22 (7 to 39)	0.01 (0.00 to 0.03)	22 (7 to 39)	0.01 (0.00 to 0.03)	16.54	40.74%

D.10. Black-tailed godwit

Table D. 19 Design-based Black-tail godwit 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 20 Design-based Black-tail godwit 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Jul	88 (0 to 226)	0.06 (0.00 to 0.16)	0 (0 to 0)	0.00 (0.00 to 0.00)	88 (0 to 226)	0.06 (0.00 to 0.16)	71.50	81.24%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

D.11. Unidentified wader species

Table D. 21 Design-based unidentified wader species 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	0.00%
1	May	61 (0 to 159)	0.10 (0.00 to 0.25)	0 (0 to 0)	0.00 (0.00 to 0.00)	61 (0 to 159)	0.10 (0.00 to 0.25)	51.37	84.86%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Aug	13 (0 to 38)	0.02 (0.00 to 0.06)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 38)	0.02 (0.00 to 0.06)	12.82	99.50%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 22 Design-based unidentified wader species 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	0.00%
1	May	63 (0 to 165)	0.04 (0.00 to 0.11)	0 (0 to 0)	0.00 (0.00 to 0.00)	63 (0 to 165)	0.04 (0.00 to 0.11)	53.66	84.94%
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)	0.00	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)	0.00	0.00%
1	Aug	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.95	97.83%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	0.00%
2	May	28 (0 to 80)	0.02 (0.00 to 0.06)	0 (0 to 0)	0.00 (0.00 to 0.00)	28 (0 to 80)	0.02 (0.00 to 0.06)	27.22	96.54%
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)	0.00	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)	0.00	0.00%
2	Aug	26 (0 to 64)	0.02 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	26 (0 to 64)	0.02 (0.00 to 0.04)	18.45	72.11%
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)	0.00	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)	0.00	0.00%
2	Nov	35 (0 to 100)	0.02 (0.00 to 0.07)	0 (0 to 0)	0.00 (0.00 to 0.00)	35 (0 to 100)	0.02 (0.00 to 0.07)	34.39	98.32%
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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	0.00%

D.12. Black-headed gull

Table D. 23 Design-based black-headed gull 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Aug	7 (0 to 21)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.01 (0.00 to 0.03)	6.63	102.02%
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)	0.00	0.00%
1	Oct	7 (0 to 19)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 19)	0.01 (0.00 to 0.03)	6.60	101.14%
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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	0.00%

Table D. 24 Design-based black-headed gull 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Aug	7 (0 to 21)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)	6.83	101.94%
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)	0.00	0.00%
1	Oct	26 (0 to 53)	0.02 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	26 (0 to 53)	0.02 (0.00 to 0.04)	15.25	58.96%
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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Feb	13 (0 to 28)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 28)	0.01 (0.00 to 0.02)	9.08	69.43%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Nov	14 (0 to 41)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	14 (0 to 41)	0.01 (0.00 to 0.03)	13.59	99.56%
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)	0.00	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)	0.00	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)	0.00	0.00%

D.13. Little gull

Table D. 25 Design-based little gull 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Dec	7 (0 to 20)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	6.73	105.81%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%
1	Feb	20 (0 to 40)	0.03 (0.00 to 0.06)	0 (0 to 0)	0.00 (0.00 to 0.00)	20 (0 to 40)	0.03 (0.00 to 0.06)	11.38	58.44%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Jan	26 (0 to 55)	0.04 (0.00 to 0.09)	5 (0 to 11)	0.01 (0.00 to 0.02)	21 (0 to 44)	0.03 (0.00 to 0.07)	15.50	60.63%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
2	Feb	44 (0 to 88)	0.07 (0.00 to 0.14)	44 (0 to 88)	0.07 (0.00 to 0.14)	0 (0 to 0)	0.00 (0.00 to 0.00)	23.07	57.85%

Table D. 26 Design-based little gull 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Dec	14 (0 to 35)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	14 (0 to 35)	0.01 (0.00 to 0.02)	9.78	74.56%
1	Jan	20 (0 to 48)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	20 (0 to 48)	0.01 (0.00 to 0.03)	14.97	75.08%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Feb	74 (20 to 129)	0.05 (0.01 to 0.09)	0 (0 to 0)	0.00 (0.00 to 0.00)	74 (20 to 129)	0.05 (0.01 to 0.09)	27.73	38.17%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Nov	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.79	100.25%
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)	0.00	0.00%
2	Jan	33 (7 to 74)	0.02 (0.00 to 0.05)	7 (1 to 15)	0.00 (0.00 to 0.01)	27 (5 to 59)	0.02 (0.00 to 0.04)	17.45	53.39%
2	Feb	45 (0 to 89)	0.03 (0.00 to 0.06)	45 (0 to 89)	0.03 (0.00 to 0.06)	0 (0 to 0)	0.00 (0.00 to 0.00)	23.54	57.88%

D.14. Common gull

Table D. 27 Design-based common gull 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%
1	Feb	20 (0 to 40)	0.03 (0.00 to 0.06)	3 (0 to 7)	0.01 (0.00 to 0.01)	16 (0 to 33)	0.03 (0.00 to 0.05)	11.09	57.52%
1	Mar	6 (0 to 19)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.01 (0.00 to 0.03)	6.49	101.20%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Dec	6 (0 to 19)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.01 (0.00 to 0.03)	6.39	99.78%
2	Jan	14 (0 to 33)	0.02 (0.00 to 0.05)	4 (0 to 9)	0.01 (0.00 to 0.01)	10 (0 to 24)	0.02 (0.00 to 0.04)	9.42	70.97%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
2	Feb	7 (0 to 22)	0.01 (0.00 to 0.03)	2 (0 to 5)	0.00 (0.00 to 0.01)	5 (0 to 16)	0.01 (0.00 to 0.03)	6.54	102.56%

Table D. 28 Design-based common gull 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	6 (0 to 19)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.00 (0.00 to 0.01)	6.47	100.61%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Nov	33 (7 to 69)	0.02 (0.00 to 0.05)	0 (0 to 0)	0.00 (0.00 to 0.00)	33 (7 to 69)	0.02 (0.00 to 0.05)	18.06	54.34%
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)	0.00	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)	0.00	0.00%
1	Feb	122 (68 to 187)	0.08 (0.05 to 0.13)	20 (11 to 31)	0.01 (0.01 to 0.02)	102 (56 to 156)	0.07 (0.04 to 0.11)	30.18	25.28%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
1	Mar	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.68	101.15%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Nov	7 (0 to 21)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.00 (0.00 to 0.01)	6.97	100.60%
2	Dec	73 (33 to 113)	0.05 (0.02 to 0.08)	0 (0 to 0)	0.00 (0.00 to 0.00)	73 (33 to 113)	0.05 (0.02 to 0.08)	21.39	29.44%
2	Jan	130 (74 to 200)	0.09 (0.05 to 0.14)	34 (19 to 53)	0.02 (0.01 to 0.04)	96 (55 to 147)	0.07 (0.04 to 0.10)	32.72	25.65%
2	Feb	29 (7 to 59)	0.02 (0.00 to 0.04)	7 (2 to 15)	0.01 (0.00 to 0.01)	22 (5 to 45)	0.02 (0.00 to 0.03)	13.30	49.48%

D.15. Sandwich tern

Table D. 29 Design-based sandwich tern 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Jul	31 (0 to 74)	0.05 (0.00 to 0.12)	0 (0 to 0)	0.00 (0.00 to 0.00)	31 (0 to 74)	0.05 (0.00 to 0.12)	18.57	71.01%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 30 Design-based sandwich tern 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Jun	7 (0 to 22)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 22)	0.00 (0.00 to 0.01)	6.80	101.61%
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)	0.00	0.00%
1	Aug	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.65	98.77%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	0.00%
2	Apr	14 (0 to 40)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	14 (0 to 40)	0.01 (0.00 to 0.03)	13.68	100.60%
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)	0.00	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)	0.00	0.00%
2	Jul	47 (8 to 97)	0.03 (0.00 to 0.07)	0 (0 to 0)	0.00 (0.00 to 0.00)	47 (8 to 97)	0.03 (0.01 to 0.07)	21.59	53.71%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

D.16. Common tern

Table D. 31 Design-based common tern 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Jun	77 (0 to 169)	0.12 (0.00 to 0.27)	0 (0 to 0)	0.00 (0.00 to 0.00)	77 (0 to 169)	0.12 (0.00 to 0.27)	45.45	63.80%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 32 Design-based common tern 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Jun	86 (0 to 182)	0.06 (0.00 to 0.12)	0 (0 to 0)	0.00 (0.00 to 0.00)	86 (0 to 182)	0.06 (0.00 to 0.12)	47.15	58.99%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	0.00%
2	May	10 (0 to 27)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	10 (0 to 27)	0.01 (0.00 to 0.02)	6.84	95.30%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

D.17. Arctic tern

Table D. 33 Design-based Arctic tern 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 34 Design-based Arctic tern 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	0.00%
2	May	48 (0 to 135)	0.03 (0.00 to 0.09)	0 (0 to 0)	0.00 (0.00 to 0.00)	48 (0 to 135)	0.03 (0.00 to 0.09)	34.19	95.30%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

D.18. Great skua

Table D. 35 Design-based Great skua 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	0.00%
2	Apr	7 (0 to 20)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	6.68	101.75%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 36 Design-based Great skua 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Nov	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.92	104.64%
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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	0.00%
2	Apr	14 (0 to 33)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	14 (0 to 33)	0.01 (0.00 to 0.02)	9.61	69.02%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

D.19. Arctic skua

Table D. 37 Design-based Arctic skua 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	0.00%
1	May	11 (0 to 33)	0.02 (0.00 to 0.05)	0 (0 to 0)	0.00 (0.00 to 0.00)	11 (0 to 33)	0.02 (0.00 to 0.05)	5.64	101.74%
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Sep	6 (0 to 19)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.01 (0.00 to 0.03)	6.11	95.28%
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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 38 Design-based Arctic skua 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	0.00%
1	May	12 (0 to 34)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	12 (0 to 34)	0.01 (0.00 to 0.02)	5.90	101.86%
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)	0.00	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)	0.00	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)	0.00	0.00%
1	Sep	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.40	95.38%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

D.20. Atlantic puffin

Table D. 39 Design-based Atlantic puffin 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	44 (7 to 80)	0.07 (0.01 to 0.13)	44 (7 to 80)	0.07 (0.01 to 0.13)	0 (0 to 0)	0.00 (0.00 to 0.00)	17.03	44.76%
1	Apr	8 (0 to 23)	0.01 (0.00 to 0.04)	8 (0 to 23)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	7.03	102.23%
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)	0.00	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)	0.00	0.00%
1	Jul	30 (0 to 63)	0.05 (0.00 to 0.10)	30 (0 to 63)	0.05 (0.00 to 0.10)	0 (0 to 0)	0.00 (0.00 to 0.00)	15.35	59.86%
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)	0.00	0.00%
1	Sep	8 (0 to 22)	0.01 (0.00 to 0.04)	8 (0 to 22)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.68	102.29%
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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Jun	16 (0 to 47)	0.03 (0.00 to 0.08)	16 (0 to 47)	0.03 (0.00 to 0.08)	0 (0 to 0)	0.00 (0.00 to 0.00)	13.42	100.08%
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)	0.00	0.00%
2	Aug	8 (0 to 23)	0.01 (0.00 to 0.04)	8 (0 to 23)	0.01 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.26	100.95%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 40 Design-based Atlantic puffin 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
1	Mar	105 (51 to 166)	0.07 (0.03 to 0.11)	105 (51 to 166)	0.07 (0.04 to 0.11)	0 (0 to 0)	0.00 (0.00 to 0.00)	25.09	27.91%
1	Apr	25 (0 to 53)	0.02 (0.00 to 0.04)	25 (0 to 53)	0.02 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	12.37	58.06%
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)	0.00	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)	0.00	0.00%
1	Jul	31 (0 to 64)	0.02 (0.00 to 0.04)	31 (0 to 64)	0.02 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	15.80	59.89%
1	Aug	8 (0 to 24)	0.01 (0.00 to 0.02)	8 (0 to 24)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.59	98.08%
1	Sep	8 (0 to 23)	0.01 (0.00 to 0.02)	8 (0 to 23)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.98	102.18%
1	Oct	8 (0 to 23)	0.01 (0.00 to 0.02)	8 (0 to 23)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.63	97.73%
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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%
1	Mar	7 (0 to 21)	0.01 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 21)	0.01 (0.00 to 0.01)	6.57	95.24%
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)	0.00	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)	0.00	0.00%
2	Jun	33 (0 to 80)	0.02 (0.00 to 0.06)	33 (0 to 80)	0.02 (0.00 to 0.06)	0 (0 to 0)	0.00 (0.00 to 0.00)	19.84	72.25%
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)	0.00	0.00%
2	Aug	8 (0 to 24)	0.01 (0.00 to 0.02)	8 (0 to 24)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.40	100.88%
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)	0.00	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)	0.00	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)	0.00	0.00%
2	Dec	16 (0 to 46)	0.01 (0.00 to 0.03)	16 (0 to 46)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	13.01	97.24%
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)	0.00	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)	0.00	0.00%

D.21. Red-throated diver

Table D. 41 Design-based red-throated diver 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 42 Design-based red-throated diver 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Aug	7 (0 to 20)	0.00 (0.00 to 0.01)	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.77	99.98%
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)	0.00	0.00%
1	Oct	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.65	99.65%
1	Nov	7 (0 to 20)	0.00 (0.00 to 0.01)	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.59	98.39%
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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Dec	7 (0 to 20)	0.00 (0.00 to 0.01)	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.78	97.03%
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)	0.00	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)	0.00	0.00%

D.22. Unidentified storm petrel species

Table D. 43 Design-based unidentified storm petrel species 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 44 Design-based unidentified storm-petrel species 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	0.00%
1	May	6 (0 to 17)	0.00 (0.00 to 0.01)	6 (0 to 17)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	5.71	99.44%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

D.23. Great cormorant

Table D. 45 Design-based great cormorant 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	0.00%
2	Apr	6 (0 to 20)	0.01 (0.00 to 0.03)	6 (0 to 20)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.13	97.88%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 46 Design-based great cormorant 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	0.00%
2	Apr	6 (0 to 20)	0.00 (0.00 to 0.01)	6 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.31	97.84%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

D.24. European shag

Table D. 47 Design-based European shag 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	0.00%

Table D. 48 Design-based European shag 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Dec	13 (0 to 40)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 40)	0.01 (0.00 to 0.03)	13.37	102.96%
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)	0.00	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)	0.00	0.00%

D.25. Unidentified thrush species

Table D. 49 Design-based unidentified thrush species 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 50 Design-based unidentified thrush species 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Nov	272 (0 to 640)	0.19 (0.00 to 0.44)	0 (0 to 0)	0.00 (0.00 to 0.00)	272 (0 to 640)	0.19 (0.00 to 0.44)	201.61	74.20%
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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Nov	100 (26 to 209)	0.07 (0.02 to 0.14)	0 (0 to 0)	0.00 (0.00 to 0.00)	100 (26 to 209)	0.07 (0.02 to 0.14)	51.02	51.32%
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)	0.00	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)	0.00	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)	0.00	0.00%

D.26. Commic tern

Table D. 51 Design-based commic tern 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) in the Mona Array Area + 4 km.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
1	Aug	19 (0 to 46)	0.03 (0.00 to 0.07)	0 (0 to 0)	0.00 (0.00 to 0.00)	19 (0 to 46)	0.03 (0.00 to 0.07)	14.11	72.39%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	May	13 (0 to 28)	0.02 (0.00 to 0.04)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 28)	0.02 (0.00 to 0.04)	9.21	73.08%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 52 Design-based commic tern 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	0.00%
1	May	17 (0 to 34)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	17 (0 to 34)	0.01 (0.00 to 0.02)	9.59	56.99%
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)	0.00	0.00%
1	Jul	6 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 20)	0.00 (0.00 to 0.01)	6.40	104.68%
1	Aug	20 (0 to 47)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	20 (0 to 47)	0.01 (0.00 to 0.03)	14.59	72.56%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	0.00%
2	May	13 (0 to 27)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	13 (0 to 27)	0.01 (0.00 to 0.02)	9.42	73.01%
2	Jun	111 (0 to 252)	0.08 (0.00 to 0.17)	83 (0 to 189)	0.06 (0.00 to 0.13)	28 (0 to 63)	0.02 (0.00 to 0.04)	76.45	69.17%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

D.27. Unidentified bird species

Table D. 53 Design-based unidentified bird species 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) in the Mona Array Area + 4 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	0.00%
2	Apr	7 (0 to 20)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.01 (0.00 to 0.03)	6.58	97.77%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%
2	Nov	6 (0 to 19)	0.01 (0.03 to 0.03)	6 (0 to 19)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.21	98.60%
2	Dec	7 (0 to 19)	0.01 (0.03 to 0.03)	7 (0 to 19)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.56	99.68%
2	Jan	6 (0 to 20)	0.01 (0.03 to 0.03)	6 (0 to 20)	0.01 (0.00 to 0.03)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.57	104.77%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
2	Feb	254 (45 to 514)	0.41 (0.81 to 0.82)	249 (44 to 504)	0.40 (0.07 to 0.81)	5 (1 to 9)	0.01 (0.00 to 0.01)	129.83	51.18%

Table D. 54 Design-based unidentified bird species 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	0.00%
2	Apr	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	7 (0 to 20)	0.00 (0.00 to 0.01)	6.77	97.77%
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)	0.00	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)	0.00	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)	0.00	0.00%
2	Aug	6 (0 to 19)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6 (0 to 19)	0.00 (0.00 to 0.01)	6.42	107.17%
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)	0.00	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)	0.00	0.00%
2	Nov	6 (0 to 20)	0.00 (0.01 to 0.01)	6 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.39	98.56%
2	Dec	7 (0 to 20)	0.00 (0.01 to 0.01)	7 (0 to 20)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	6.75	99.71%
2	Jan	13 (0 to 27)	0.01 (0.02 to 0.02)	13 (0 to 27)	0.01 (0.00 to 0.02)	0 (0 to 0)	0.00 (0.00 to 0.00)	9.34	70.68%
2	Feb	373 (111 to 643)	0.26 (0.44 to 0.44)	366 (109 to 632)	0.25 (0.08 to 0.43)	7 (2 to 12)	0.00 (0.00 to 0.01)	143.77	38.58%

D.28. Unidentified skua species

Table D. 55: Design-based unidentified skua species 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) in the Mona Array Area + 4 km buffer.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	**Month**	**Pop**	**D**	**Pop**	**D**	**Pop**	**D**	**SD**	**CV**
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	0.00%

Table D. 56: Design-based unidentified skua species 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) in the Mona Offshore Ornithology Array Area study area.

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
Year	Month	Pop	D	Pop	D	Pop	D	SD	CV
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)	0.00	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)	0.00	0.00%
1	May	6 (0 to 17)	0.00 (0.01 to 0.01)	6 (0 to 17)	0.00 (0.00 to 0.01)	0 (0 to 0)	0.00 (0.00 to 0.00)	5.86	94.27%
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

		Design-based abundances (all behaviours)	Design-based densities (all behaviours)	Design-based abundances (sitting only)	Design-based densities (sitting only)	Design-based abundances (flying only)	Design-based densities (flying only)	Standard deviation	Coefficient of variation
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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	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)	0.00	0.00%

Appendix E. MRSea extended methodology

E.1. MRSea modelling

E.1.1.1.1 In this section it is detailed what steps were taken in the MRSea analysis. Due to the large number of plots, we exemplify this procedure using the non-breeding model for guillemot.

E.1.1.1.2 Covariates were first checked for collinearity, which revealed distance variables (distance to coast) had strong collinearity issues with other predictors and were subsequently left out of further analysis (Table E. 1). Variance inflation factors for these variables were above 10, where any that are above 5 are considered unacceptable. After removal of 'distance to coast', variance inflation factors were all below two, which is an acceptable level (Table E. 2).

Table E. 1 Collinearity test between predictor variables led to exclusion of 'distance to coast.'

```
> car::vif(initialModel)
                        GVIF Df GVIF^(1/(2*Df))
as.factor(Month)    1.028533 23        1.000612
depth               1.393959  1        1.180660
d2coast         14100.766982  1      118.746650
x.pos            9577.558472  1       97.865001
y.pos             898.744427  1       29.979066
```

Table E. 2 Highlights correlation between variables after 'distance to coast' was removed.

```
> car::vif(initialModel)
                     GVIF Df GVIF^(1/(2*Df))
as.factor(Month) 1.002877 23        1.000062
depth            1.391795  1        1.179743
x.pos            1.923439  1        1.386881
y.pos            1.610617  1        1.269101
```

MRSea models were then constructed using these predictor variables. For each bird species, the basic model from which MRSea builds the more complex model has the following form:

Species Count ~ Month + offset(log(area)), family=quasipoisson

At each step of the modelling process, RPS performed diagnostic checks to confirm whether models are appropriate. Examples of these checks are given below for the guillemot model. First, it was checked whether the runs profiles were random, which they were not (Figure E. 1).

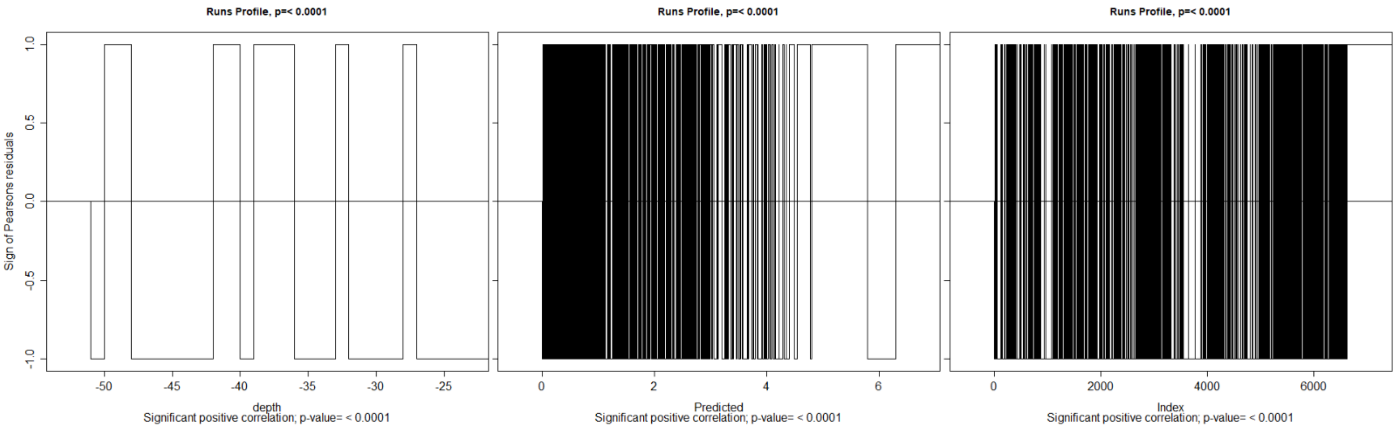

Figure E. 1: Runs profiles of Pearsons residuals.

Therefore, a blocking structure needed to be defined, which was done by giving each ‘transect by survey’ combination a unique ID. This means that the model considers data from within each ‘transect by survey’ as correlated. An auto-correlation function was then plotted to check whether this blocking structure was appropriate (Figure E. 2). Both the mean correlation and the correlation within each block dropped to zero, showing that this blocking structure was appropriate.

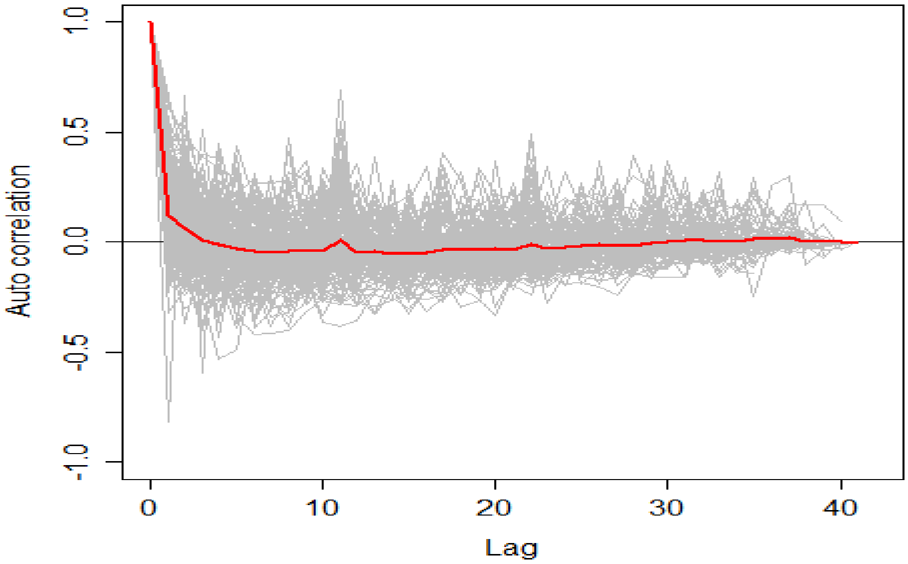

Figure E. 2: Auto-correlation plot of ‘transect by survey’ blocking structure. The grey lines indicate residual correlation within blocks, and the red line indicates the mean residual correlation.

Next, the cumulative residuals of the model were checked, demonstrating that there was significant over- and under-prediction (Figure E. 3). Therefore, a nonlinear model is warranted to break up some of this over-and under- prediction.

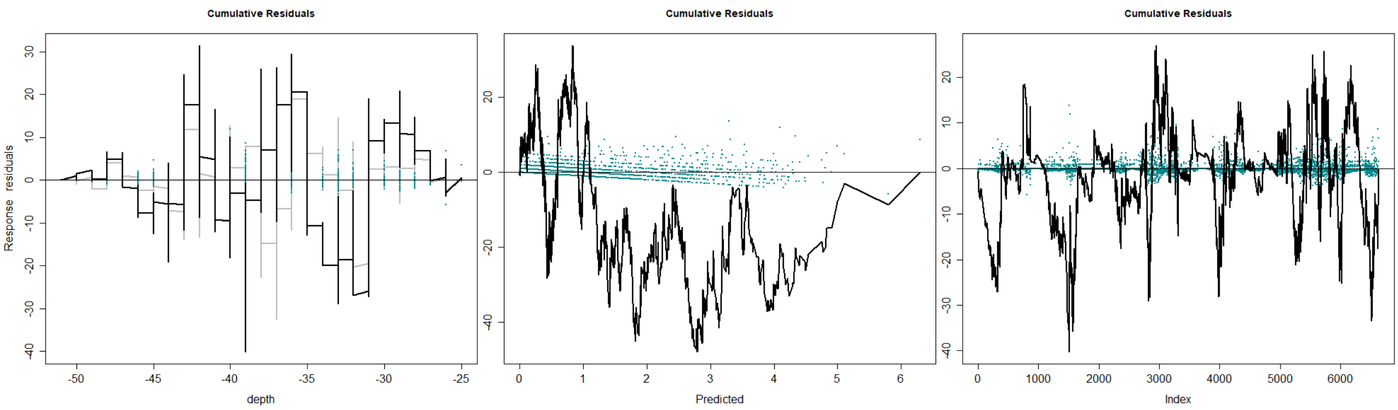

Figure E. 3: Cumulative residuals of environmental predictors.

In the first (1-dimensional) stage of the MRSea model, the basic model was expanded to include water depth as both linear and smoothed explanatory variables. In stage 1, RPS implemented tenfold cross validation (CV), which fits 1-dimensional splines for each environmental covariate through 90% of the data, and then uses this to predict the other 10% of the data. To get a robust estimate for each covariate, this process is repeated ten times.

In the second (2-dimensional) stage (the actual spatial model), the x-y coordinates were fitted to the best model from stage 1, using month as an interaction term, allowing for different density surfaces to be estimated for different months. For the model to run properly, a minimum number of birds is required in each month, and it was determined that a minimum of 30 observations was required for the model to converge. This means that for some species in some months, no distribution maps were generated. These are shown as blank in the results section.

In stage 2 (the spatial model), RPS opted for a model selection procedure using 10-fold cross validation (CV) again.

Partial fits of the final model were then checked for any irregularities (Figure E. 4). Confidence limits of the environmental parameters were very wide, implying that their initial significance in the first stage was altered by fitting the spatial model in stage 2.

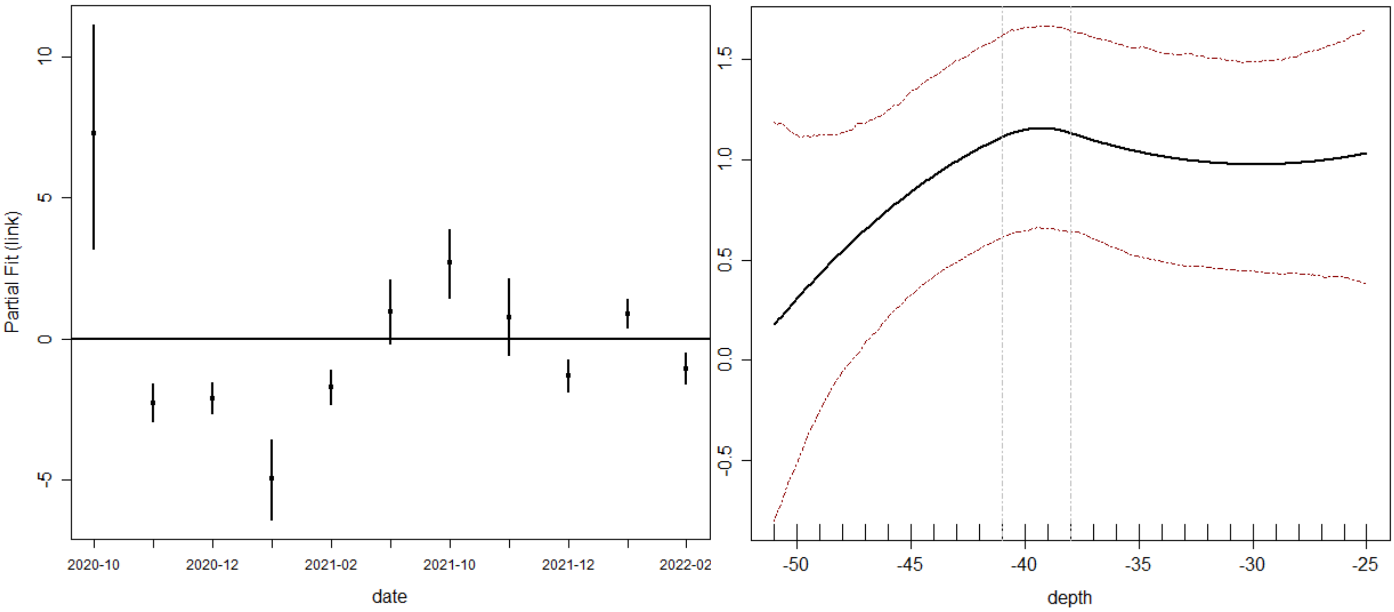

Figure E. 4: Partial model fits at the link scale for each parameter used in the final model.

When plotting observed versus fitted values however, the concordance correlation can be considered good (0.5247), the only deviation being that some of the higher data values were underpredicted by the model. However, this has not led to systematic underestimation of abundances.

The model made certain assumptions about the data. The most important assumption was that the effects of water depth 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 and distribution landscape is altered for each month in stage 2 by the 2-dimensional model by using 'survey date' as an interaction term.

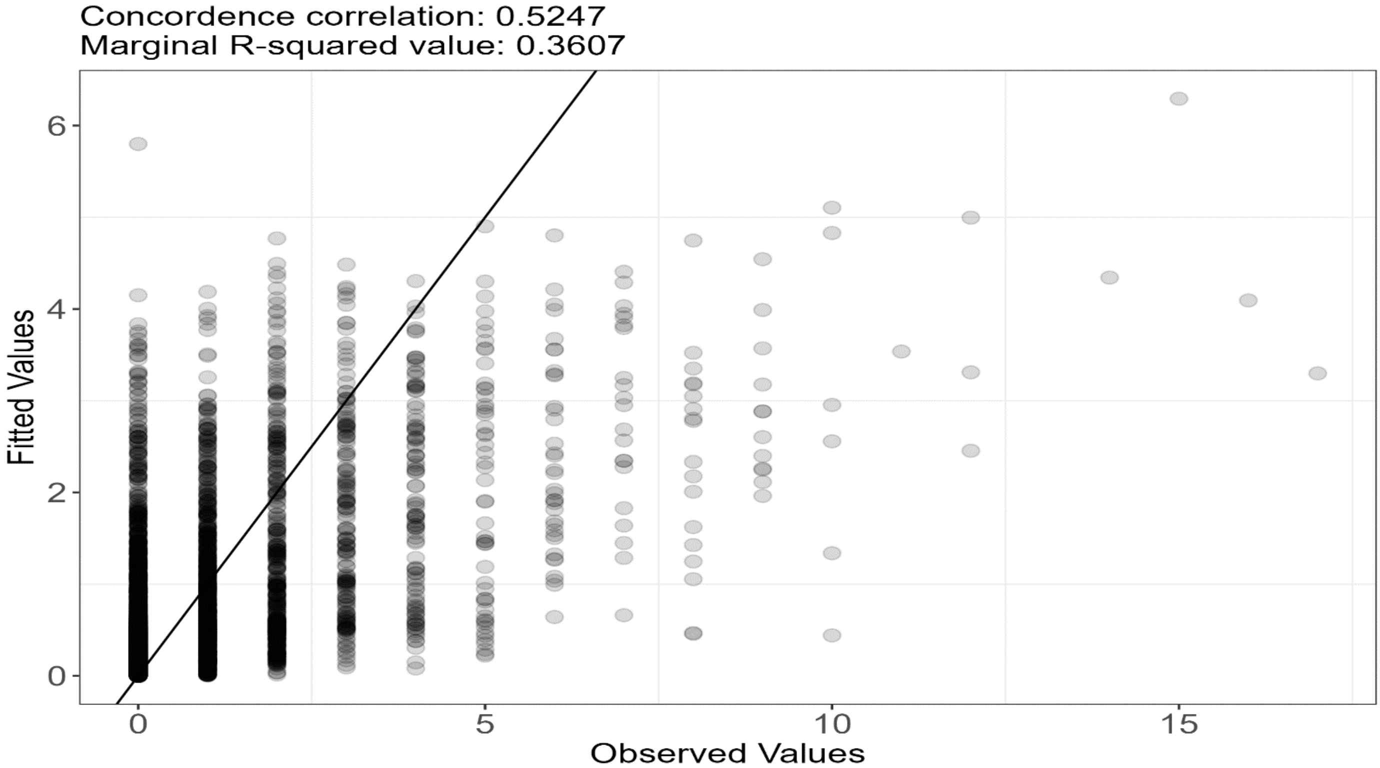

Figure E. 5: Plot of observed versus fitted values of the final model. Some high data values are underpredicted by the model, but this is not systematic.

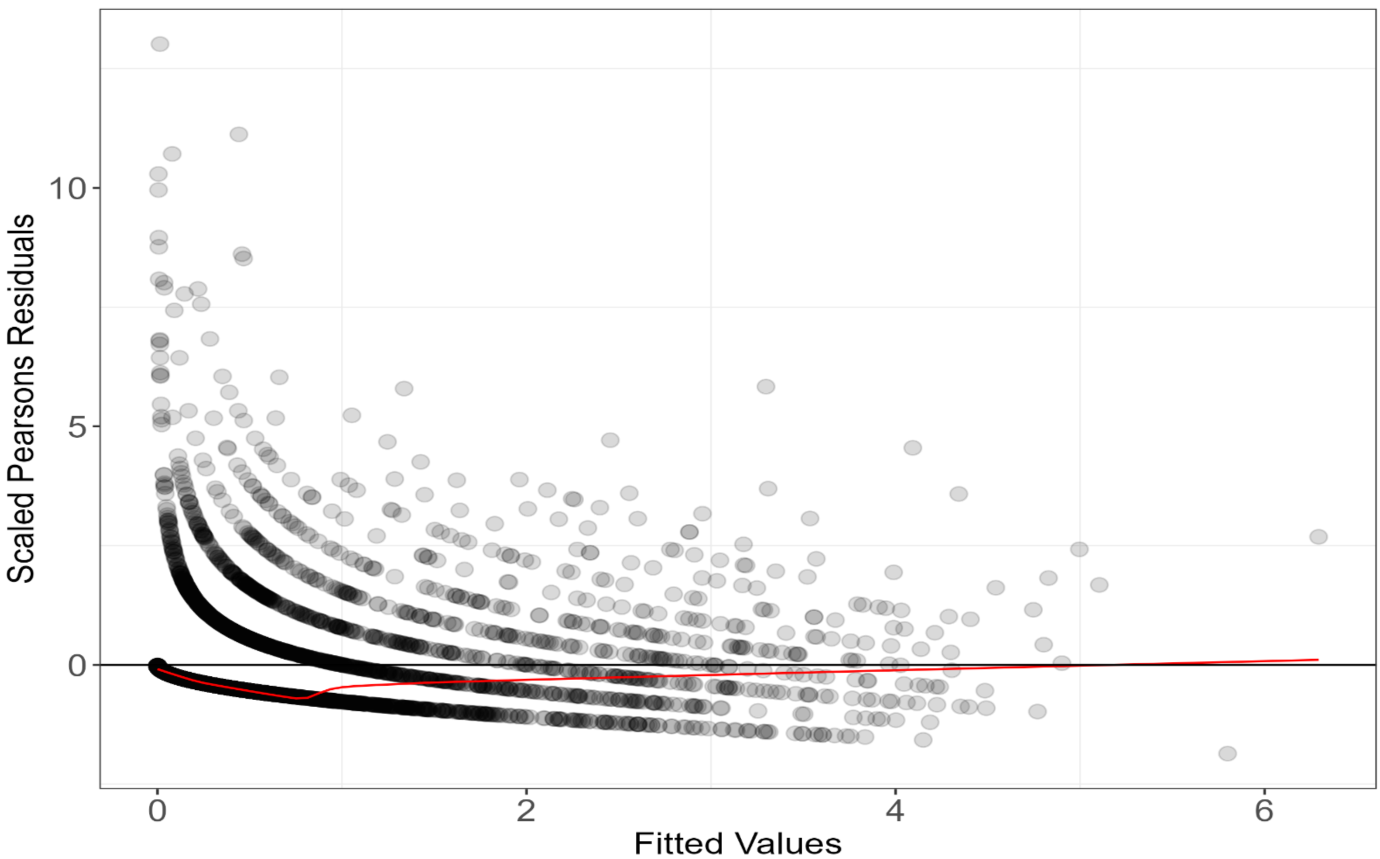

Figure E. 6: Fitted values versus scaled Pearsons Residuals, where no unusual patterns were revealed by locally weighted least squares regression.

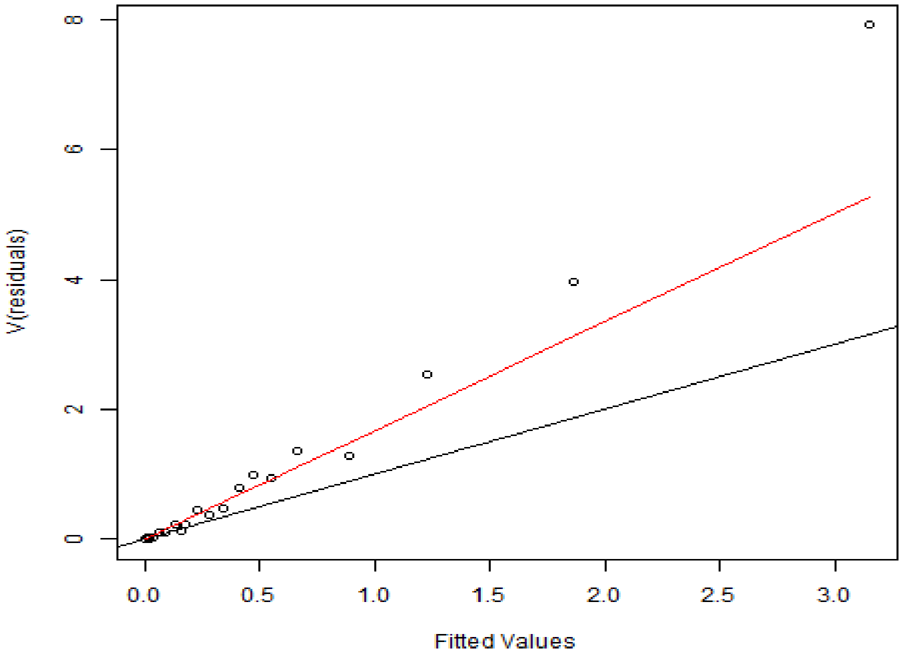

Figure E. 7: Plot of mean residual variance against mean fitted for each 5% quantile of fitted values. The black line is the 1:1 line while the red line has a gradient equal to the estimated dispersion parameter. A quasi-poisson model (as used) assumes variance is proportional to the mean and therefore ideally the points would be scattered about the red line.

Table E. 57 MRSea model output from the final model for non-breeding guillemot.

```
Call:
gamMRSea(formula = response ~ as.factor(date) + bs(depth, knots = splineParams[[2]]$knots,
    degree = splineParams[[2]]$degree, Boundary.knots = splineParams[[2]]$bd) +
    LRF.g(radiusIndices, dists, radii, aR) + offset(log(area)),
    family = quasipoisson(link = log), data = datsub, splineParams = splineParams)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-3.4057  -0.8064  -0.4377  -0.1045   6.5800

Coefficients:
                       Estimate Std. Error Robust S.E. t value Pr(>|t|)
(Intercept)              0.1766     0.5023      0.5023   0.352 0.725172
as.factor(date)2020-10   7.2975     1.9381      1.9381   3.765 0.000168 ***
as.factor(date)2020-11  -2.2645     0.3392      0.3392  -6.676 2.65e-11 ***
as.factor(date)2020-12  -2.1021     0.2851      0.2851  -7.372 1.88e-13 ***
as.factor(date)2021-01  -4.9788     0.7433      0.7433  -6.699 2.28e-11 ***
as.factor(date)2021-02  -1.6981     0.3027      0.3027  -5.610 2.10e-08 ***
as.factor(date)2021-09   0.9610     0.5884      0.5884   1.633 0.102466
as.factor(date)2021-10   2.7206     0.6090      0.6090   4.468 8.04e-06 ***
as.factor(date)2021-11   0.7719     0.6940      0.6940   1.112 0.266086
as.factor(date)2021-12  -1.3210     0.2946      0.2946  -4.484 7.44e-06 ***
as.factor(date)2022-01   0.8977     0.2678      0.2678   3.351 0.000808 ***
as.factor(date)2022-02  -1.0601     0.2674      0.2674  -3.964 7.44e-05 ***
s(depth)1                0.6798     0.5583      0.5583   1.218 0.223433
s(depth)2                1.0132     0.4285      0.4285   2.365 0.018075 *
s(depth)3                0.7070     0.4906      0.4906   1.441 0.149630
s(depth)4                0.8557     0.4685      0.4685   1.826 0.067847 .
s(x.pos, y.pos)b1       -3.2085     0.6081      0.6081  -5.276 1.36e-07 ***
s(x.pos, y.pos)b2       -5.6070     1.0836      1.0836  -5.175 2.35e-07 ***
s(x.pos, y.pos)b3        6.6678     1.2323      1.2323   5.411 6.50e-08 ***
s(x.pos, y.pos)b4      -24.0620     4.6451      4.6451  -5.180 2.28e-07 ***
s(x.pos, y.pos)b5       -3.5406     0.6627      0.6627  -5.343 9.45e-08 ***
s(x.pos, y.pos)b6        5.0985     0.5026      0.5026  10.143  < 2e-16 ***
s(x.pos, y.pos)b7        1.5922     0.3707      0.3707   4.295 1.77e-05 ***
s(x.pos, y.pos)b8        4.2264     0.7919      0.7919   5.337 9.76e-08 ***
s(x.pos, y.pos)b9        2.4815     0.4676      0.4676   5.307 1.15e-07 ***
s(x.pos, y.pos)b10       1.8805     0.2222      0.2222   8.464  < 2e-16 ***
s(x.pos, y.pos)b11       1.3211     0.2757      0.2757   4.791 1.70e-06 ***
s(x.pos, y.pos)b12       2.7160     0.2061      0.2061  13.178  < 2e-16 ***
s(x.pos, y.pos)b13      -5.7829     1.8563      1.8563  -3.115 0.001846 **
s(x.pos, y.pos)b14      -2.5107     0.5678      0.5678  -4.422 9.94e-06 ***
s(x.pos, y.pos)b15      -3.5499     0.5901      0.5901  -6.015 1.89e-09 ***
s(x.pos, y.pos)b16       3.0266     0.2857      0.2857  10.593  < 2e-16 ***
s(x.pos, y.pos)b17      -4.0995     0.7903      0.7903  -5.187 2.20e-07 ***
s(x.pos, y.pos)b18      -2.9653     0.9818      0.9818  -3.020 0.002536 **
s(x.pos, y.pos)b19       1.0177     0.2843      0.2843   3.579 0.000347 ***
s(x.pos, y.pos)b20       2.2194     0.2323      0.2323   9.554  < 2e-16 ***
s(x.pos, y.pos)b21      -1.5495     0.1987      0.1987  -7.797 7.30e-15 ***
s(x.pos, y.pos)b22      -2.9894     0.3232      0.3232  -9.249  < 2e-16 ***
s(x.pos, y.pos)b23       2.4256     0.2474      0.2474   9.804  < 2e-16 ***
s(x.pos, y.pos)b24       1.4339     0.2143      0.2143   6.690 2.41e-11 ***
s(x.pos, y.pos)b25      -5.8771     2.5979      2.5979  -2.262 0.023717 *
s(x.pos, y.pos)b26       2.5716     5.5219      5.5219   0.466 0.641443
s(x.pos, y.pos)b27      16.3774     7.1736      7.1736   2.283 0.022461 *
s(x.pos, y.pos)b28      -8.1643     7.4107      7.4107  -1.102 0.270636
s(x.pos, y.pos)b29      -5.2823     1.0327      1.0327  -5.115 3.22e-07 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.673539)

    Null deviance: 11484.3  on 6629  degrees of freedom
Residual deviance:  6576.2  on 6585  degrees of freedom
AIC:  NA

Max Panel Size = 1 (independence assumed); Number of panels = 6630
Number of Fisher Scoring iterations: 7
```

Appendix F. Upper and Lower MRSea spatial distribution maps

F.1. Black-legged kittiwake

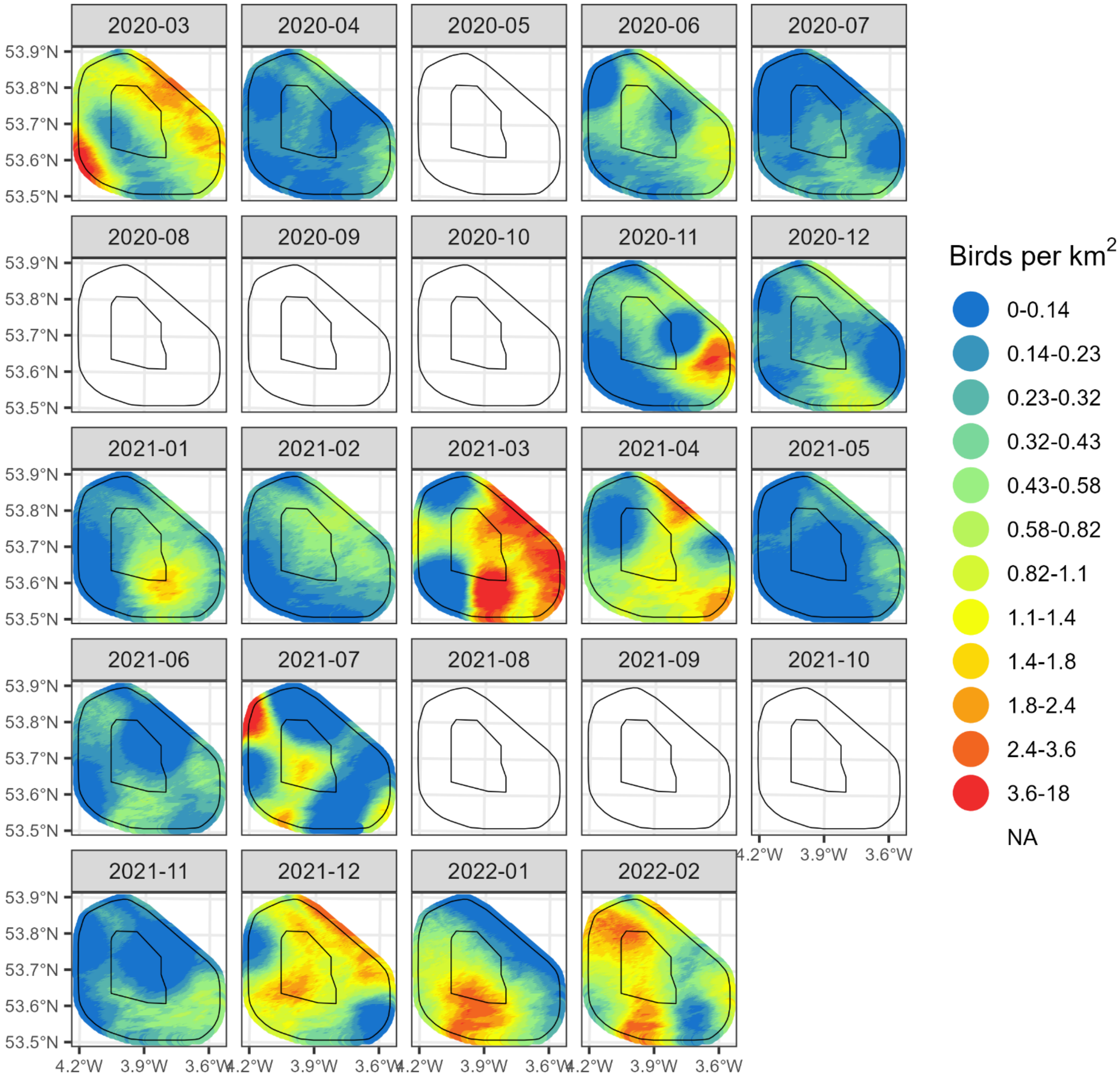

Figure F. 3: Black-legged kittiwake lower CI MRSea maps.

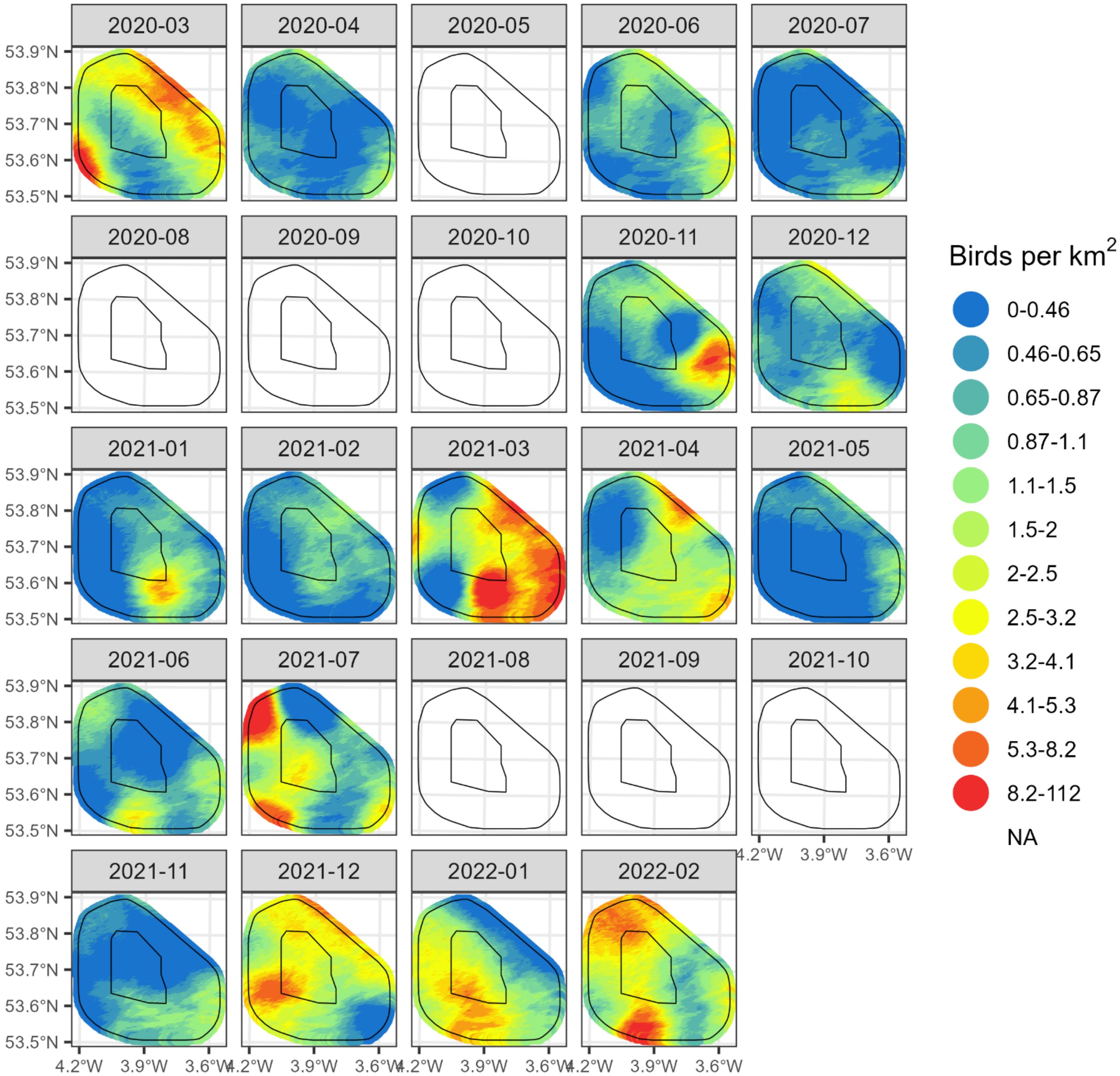

Figure F. 4: Black-legged kittiwake upper CI MRSea maps.

F.2. Common guillemot

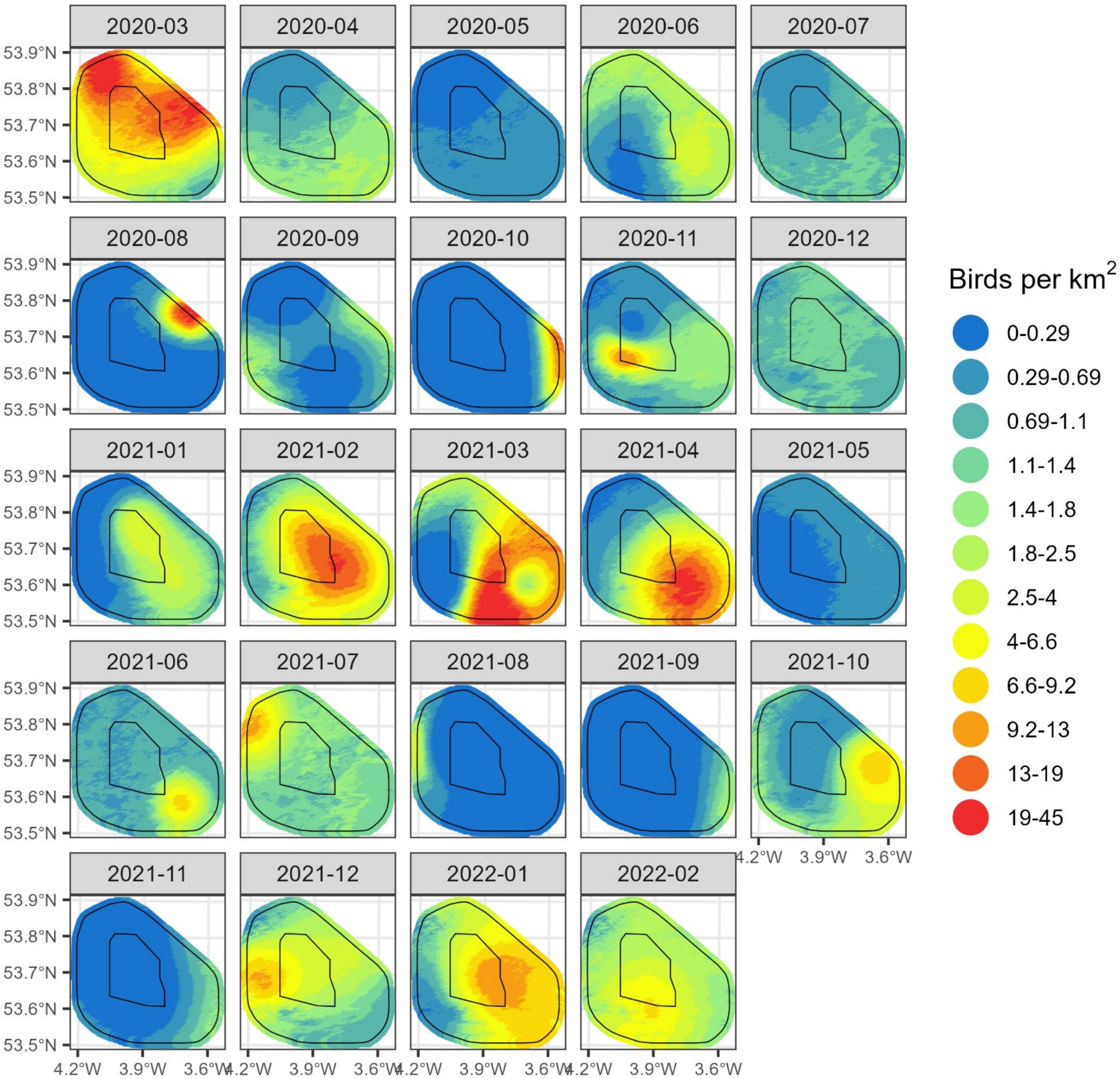

Figure F. 5: Common guillemot lower CI MRSea maps.

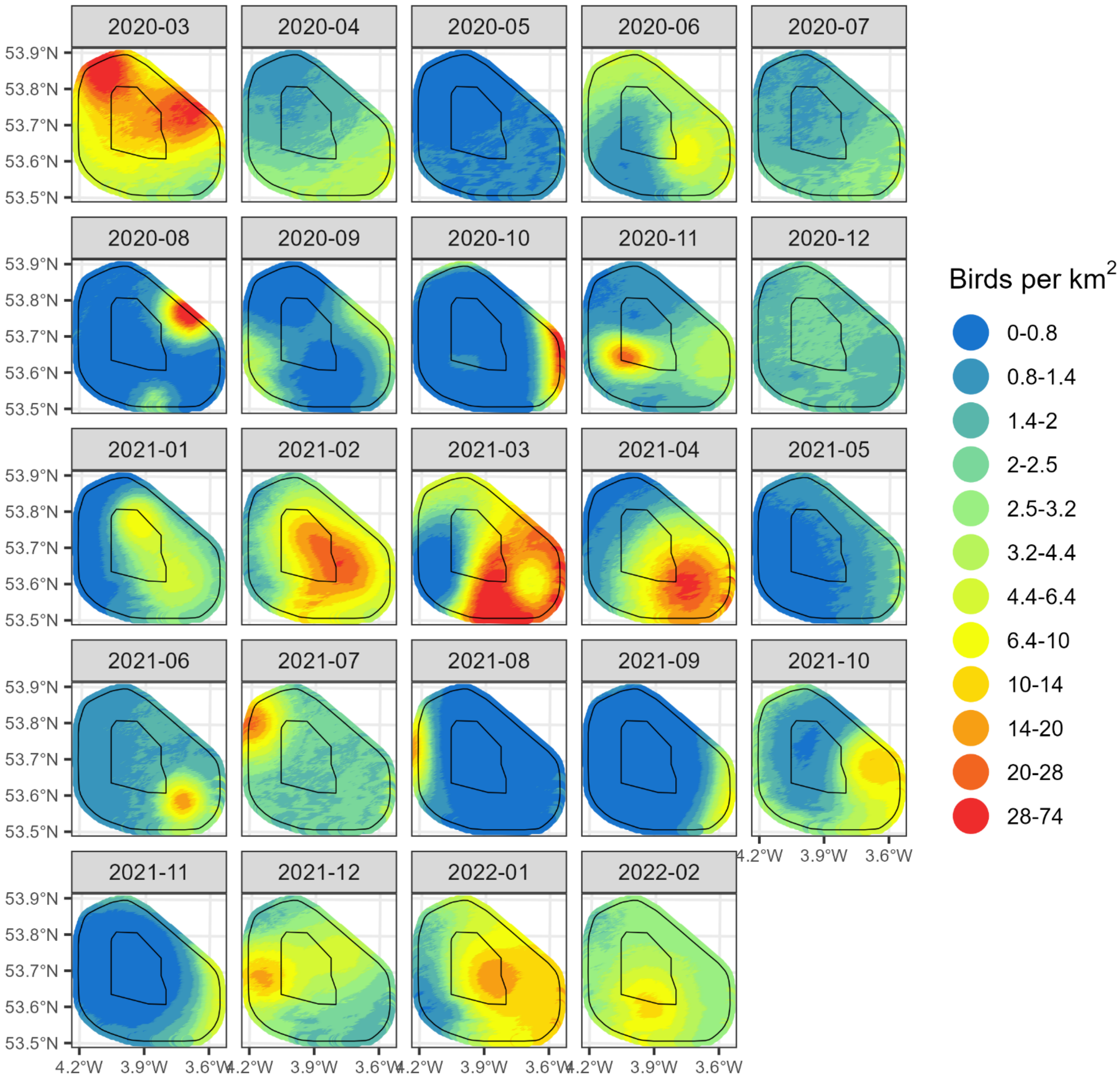

Figure F. 6: Common guillemot upper CI MRSea maps.

F.3. Razorbill

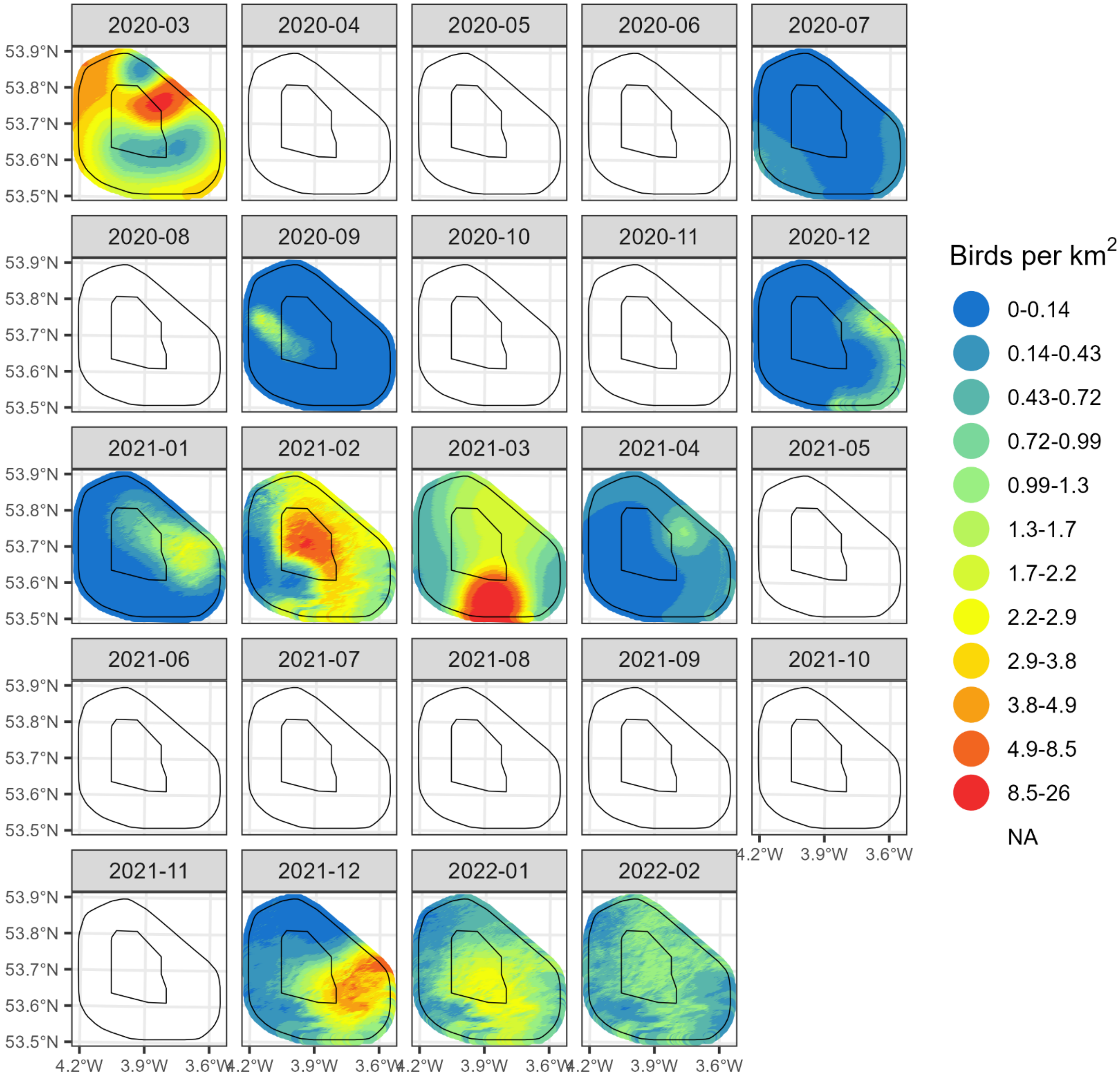

Figure F. 7: Razorbill lower CI MRSea maps.

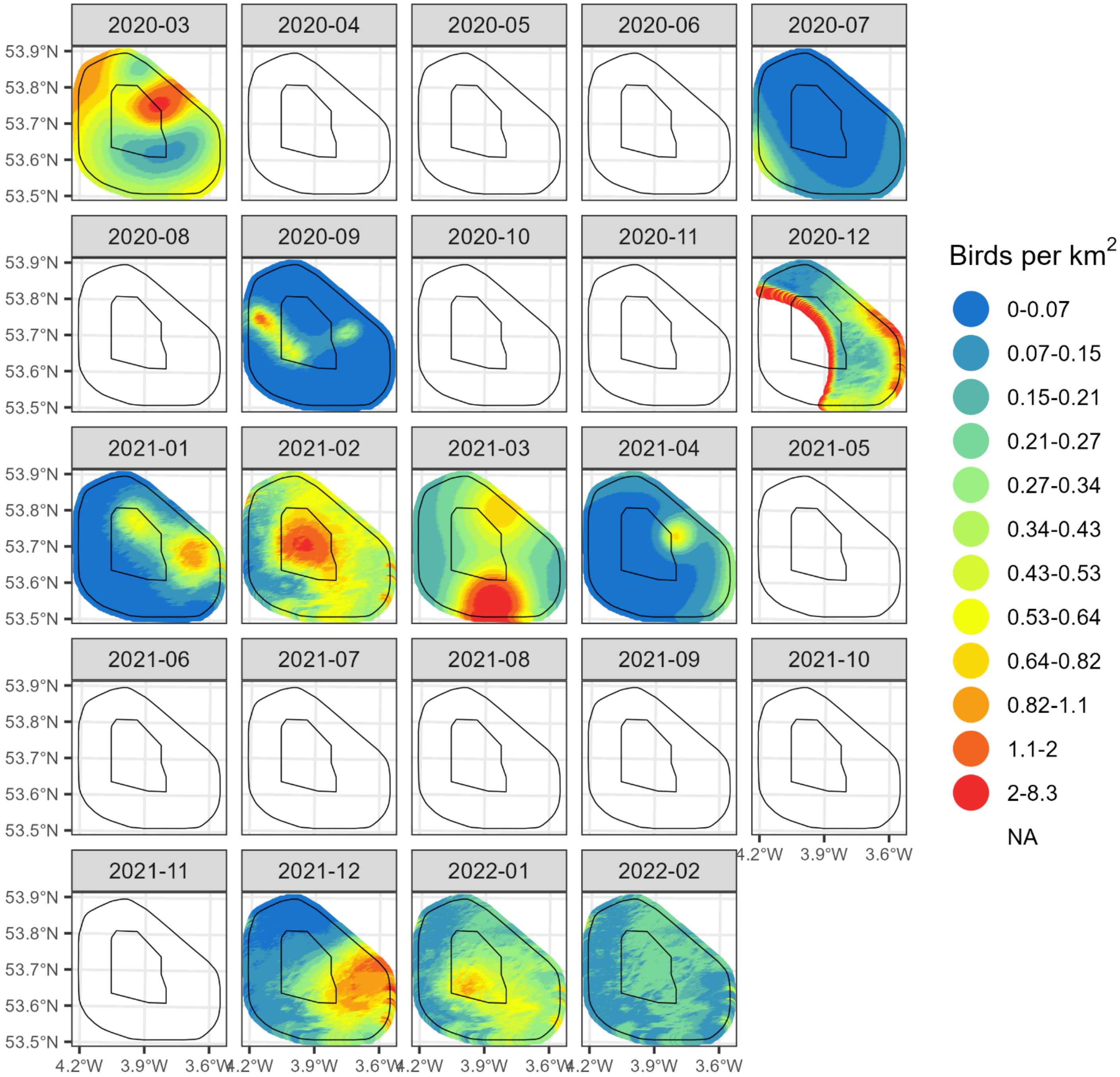

Figure F. 8: Razorbill upper CI MRSea maps.

F.4. Manx shearwater

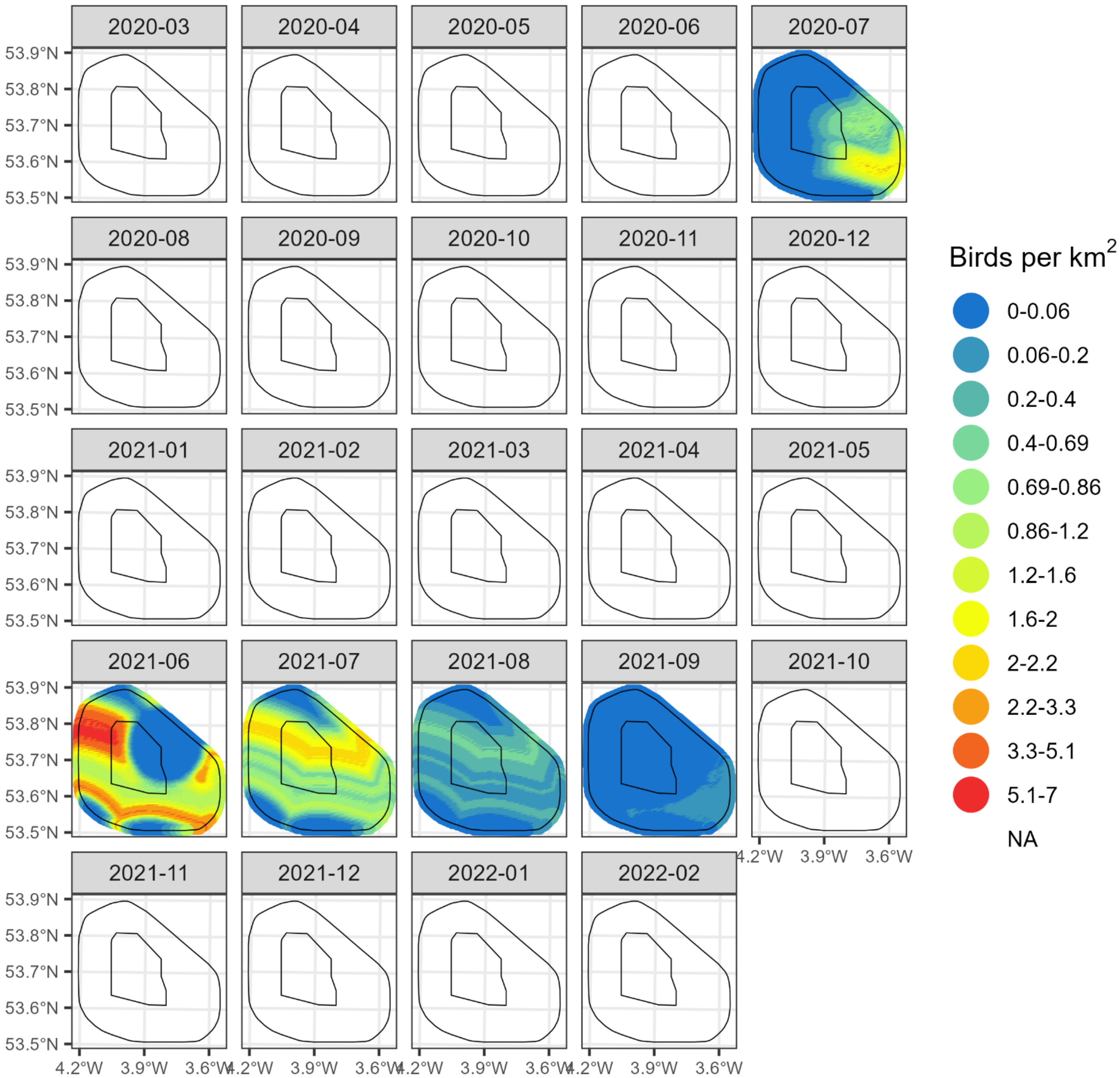

Figure F. 9: Manx shearwater lower CI MRSea maps.

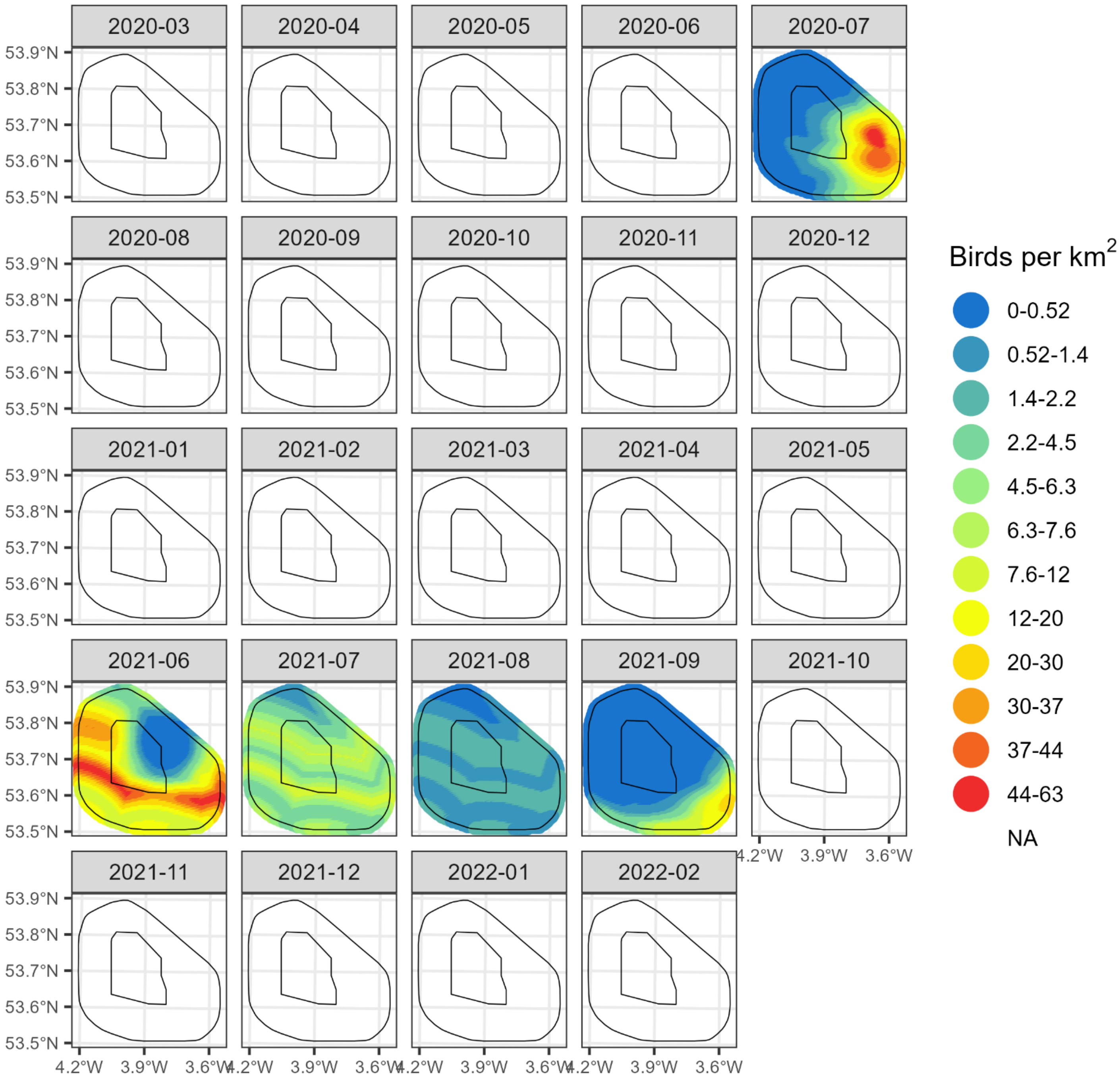

Figure F. 10: Manx shearwater upper CI MRSea maps.

F.5. Northern gannet

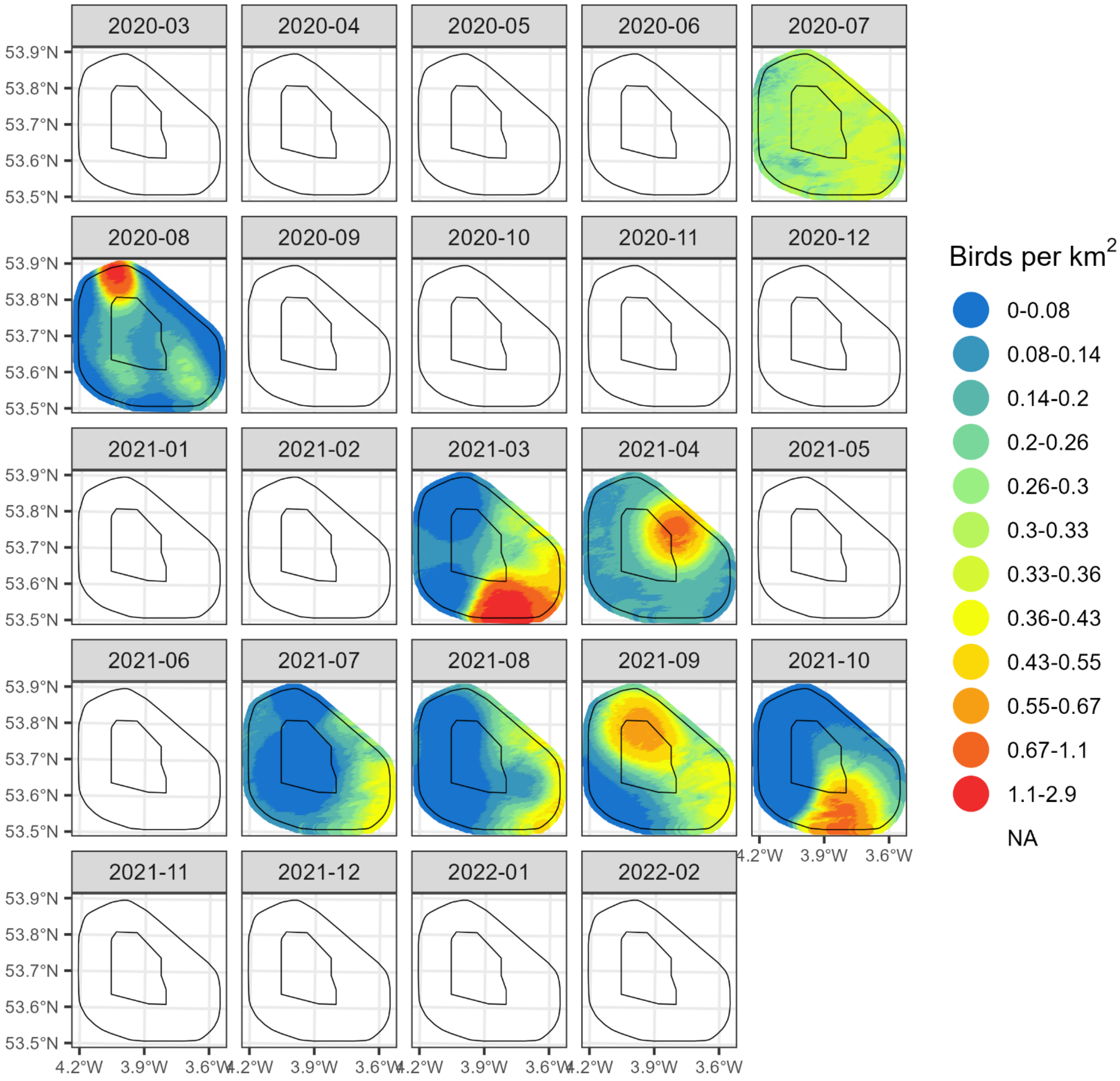

Figure F. 11: Northern gannet lower CI MRSea maps.

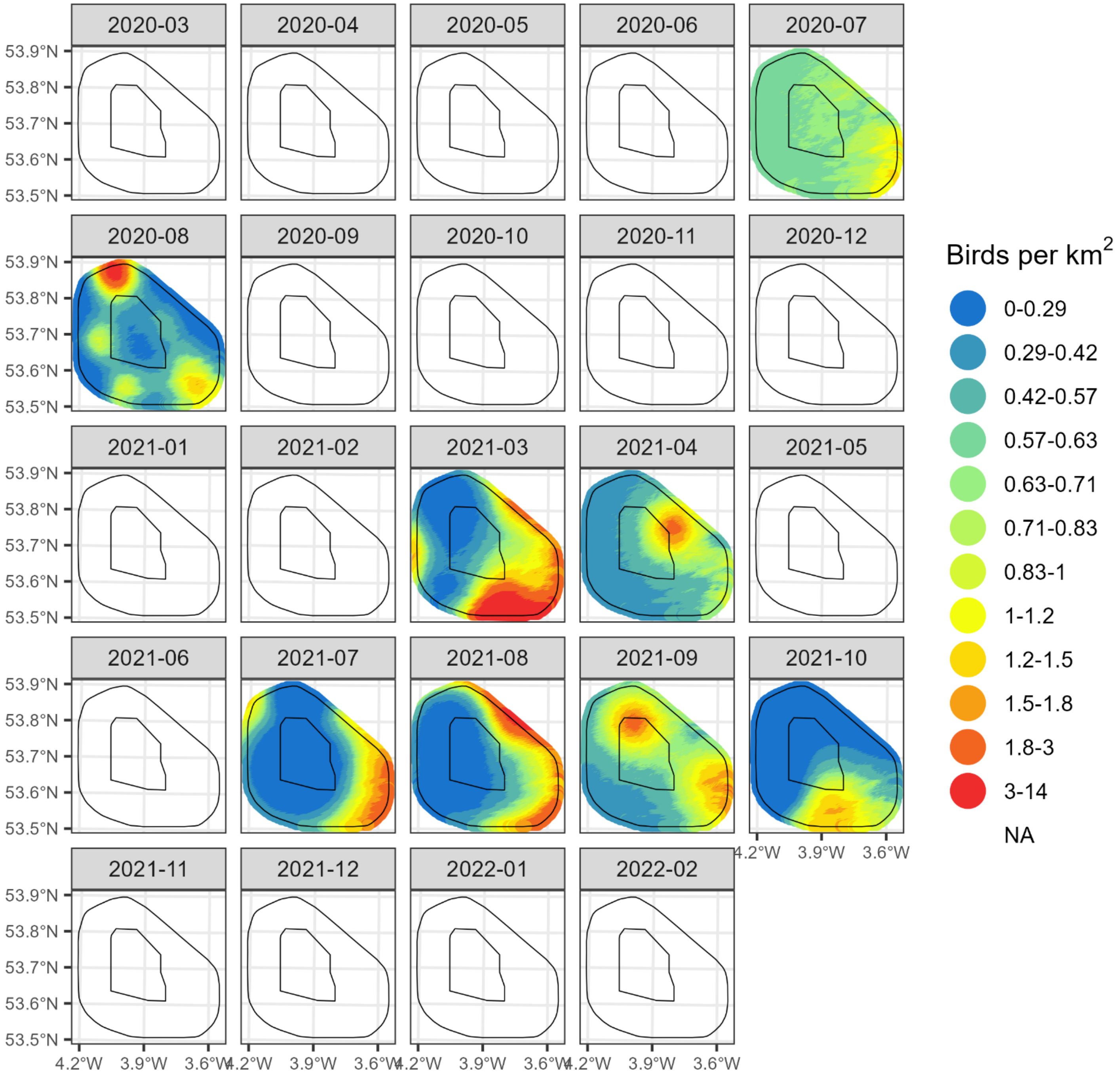

Figure F. 12: Northern gannet upper CI MRSea maps.