

MONA OFFSHORE WIND PROJECT

Environmental Statement

Volume 7, Annex 4.2: Intertidal ornithology – wintering and migratory birds

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Image of an offshore wind farm

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Glossary

Term	Meaning
Autumn passage	The period when migratory species are returning to their wintering grounds.
British Trust for Ornithology	A non-statutory ornithological research organisation.
Expert Working Group (EWG)	Expert working groups set up with relevant stakeholders as part of the Evidence Plan process.
Foraging	The time when birds are actively looking for food.
Joint Nature Conservation Committee	A statutory body that advises the UK Government and devolved administrations on UK-wide and international nature conservation.
Non-breeding season	Taken as the wintering season plus the spring and autumn passage period.
Non-Estuarine Waterbird Survey	A British Trust for Ornithology led waterbird survey of non-estuarine stretches of coastline.
Potential Special Protection Areas	A site identified as potentially qualifying for Special Protection Area classification and for which a decision to classify has yet to be taken pending consultation.
Ramsar sites	Wetlands of international importance that have been designated under the criteria of the Ramsar Convention. In combination with Special Protection Areas and Special Areas of Conservation, these sites contribute to the national site network.
Roosting	The time when birds are resting.
Special Protection Area	A site designation specified in the Conservation of Habitats and Species Regulations 2017 (as amended), classified for rare and vulnerable birds, and for regularly occurring migratory species. Special Protection Areas contribute to the national site network.
Spring passage	The period when migratory species are returning to their breeding grounds.
Staging post	Places where migrant birds stop to rest, drink, and eat.
Wetland Bird Survey	A monitoring programme of waterbirds in the UK organised by the British Trust for Ornithology and run since 1965. The Wetland Bird Survey, or WeBS, is widely recognised as the most accurate national assessment of waterbird numbers.
Wintering season	The period when birds are present on their wintering grounds.
Tidal cycle	The waxing and waning of the tides from high to low and back to high again.

Acronyms

Acronym	Description
BTO	British Trust for Ornithology
GIS	Geographic Information System
JNCC	Joint Nature Conservation Committee
LNR	Local Nature Reserves
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs

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Acronym	Description
NEWS	Non-Estuarine Waterbird Survey
NNR	National Nature Reserves
NRW	Natural Resources Wales
PEIR	Preliminary Environmental Information Report
pSPA	potential SPA
RSPB	The Royal Society for the Protection of Birds
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
VORs	Valued Ornithological Receptors
WeBS	Wetland Bird Survey
WWT	Wildfowl and Wetlands Trust

Units

Unit	Description
ha	Hectare
km	Kilometres
m	Metres
%	Percentage
km ²	Square kilometres

1 INTERTIDAL ORNITHOLOGY TECHNICAL REPORT

1.1 Introduction

1.1.1.1 This intertidal ornithology wintering and migratory birds technical report provides a characterisation of the intertidal wintering and migratory bird assemblage for the Mona Offshore Wind Project.

1.2 Background

1.2.1.1 This technical report characterises the baseline waterbird utilisation of the intertidal zone and nearshore waters during the non-breeding (wintering and passage periods) and breeding seasons. This baseline information has been used to inform the assessment reported in Volume 3, Chapter 4: Onshore and intertidal ornithology of the Environmental Statement.

1.2.1.2 The report describes the methods used to characterise the baseline conditions (i.e. abundance and distribution of birds) and presents the results of the review of existing data sources and site-specific surveys carried out to date.

1.2.1.3 For this technical report, the intertidal zone is defined as the zone within which the shoreline location varies with the rising and falling astronomical tide as defined by Mean High Water Spring (MHWS) and Mean Low Water Spring (MLWS) tidal planes.

1.2.1.4 The landfall is located on the north coast of Conwy, North Wales. Colwyn Bay and the Orme lie to the west, and the town of Rhyl and the Dee Estuary to the east. It is adjacent to the boundary of the Liverpool Bay / Bae Lerpwl Special Protection Area (SPA) and is approximately 10.9 km west from the Dee Estuary SPA. These sites are of international importance for many waterbird species.

1.2.1.5 As defined by the Ramsar Convention on Wetlands (1971): waterbirds include geese, swans, ducks, rails, cranes, grebes, waders, divers, cormorants, spoonbills, herons, gulls, terns, and kingfishers (Ramsar, 1971). In addition to waterbirds, the value of the landfall has been characterized for other true seabirds that may use the nearshore waters. Together, these formed the key species for the baseline characterisation to inform the assessment.

1.3 Intertidal ornithology search and study areas

1.3.1.1 In this report there are two specific terms used to identify areas used for data collection. These are the intertidal ornithology search area and the intertidal ornithology study area.

- The intertidal ornithology search area is defined in section 1.3.2 of this technical report below and is the area used to identify designated sites with wintering and migratory bird features which may be affected by onshore elements of the Mona Offshore Wind Project (Figure 1.1)
- The intertidal ornithology study area is defined in section 1.3.3 of this technical report below and is the area covered by the review of desktop studies/data sources and the site-specific surveys (Figure 1.2).

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1.3.1 The intertidal ornithology search area

- 1.3.1.3 The intertidal ornithology search area is the extent of the area used to screen sites of special importance for birds which may be connected to the Mona Offshore Wind Project such as SPAs, SSSIs, etc.
- 1.3.1.4 The intertidal ornithology search area reflects standard industry good practice for identification of ornithological sites that could be affected by the Mona Offshore Wind Project and is the approach used for other offshore wind farm development consent order applications in England and Wales. It covers:
1. Internationally designated ornithological sites, specifically SPAs, potential SPAs (pSPAs) and Ramsar Sites, located within 20 km of the landfall, where the Mona Onshore Development Area overlaps with the intertidal and nearshore habitats
 2. Nationally designated sites, specifically Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs), located within 5 km of the landfall
 3. Locally designated sites, specifically Local Nature Reserves (LNRs), Local Wildlife Sites, etc, located within 2 km of the landfall.
- 1.3.1.5 The location and geographic extent of designated sites within the intertidal ornithology search area is presented in Figure 1.1 of this technical report below.

1.3.2 The intertidal ornithology study area

- 1.3.2.1 The intertidal ornithology study area (Figure 1.2) comprises all intertidal and nearshore habitats at the landfall, plus areas needed for beach access. A 500 m buffer extending alongshore from either extent has been added to consider disturbance effects upon the waterbird species present. This distance is based on the maximum potential disturbance distances of key non-breeding species expected to be found at the site (Goodship and Furness, 2022).
- 1.3.2.2 The intertidal ornithology study area extends offshore from the MHWS and consists of the intertidal zone (which features sandflats and shingles) and the nearshore marine waters.
- 1.3.2.3 The location and geographic extent of the intertidal ornithology study area is presented in Figure 1.2 of this technical report below.

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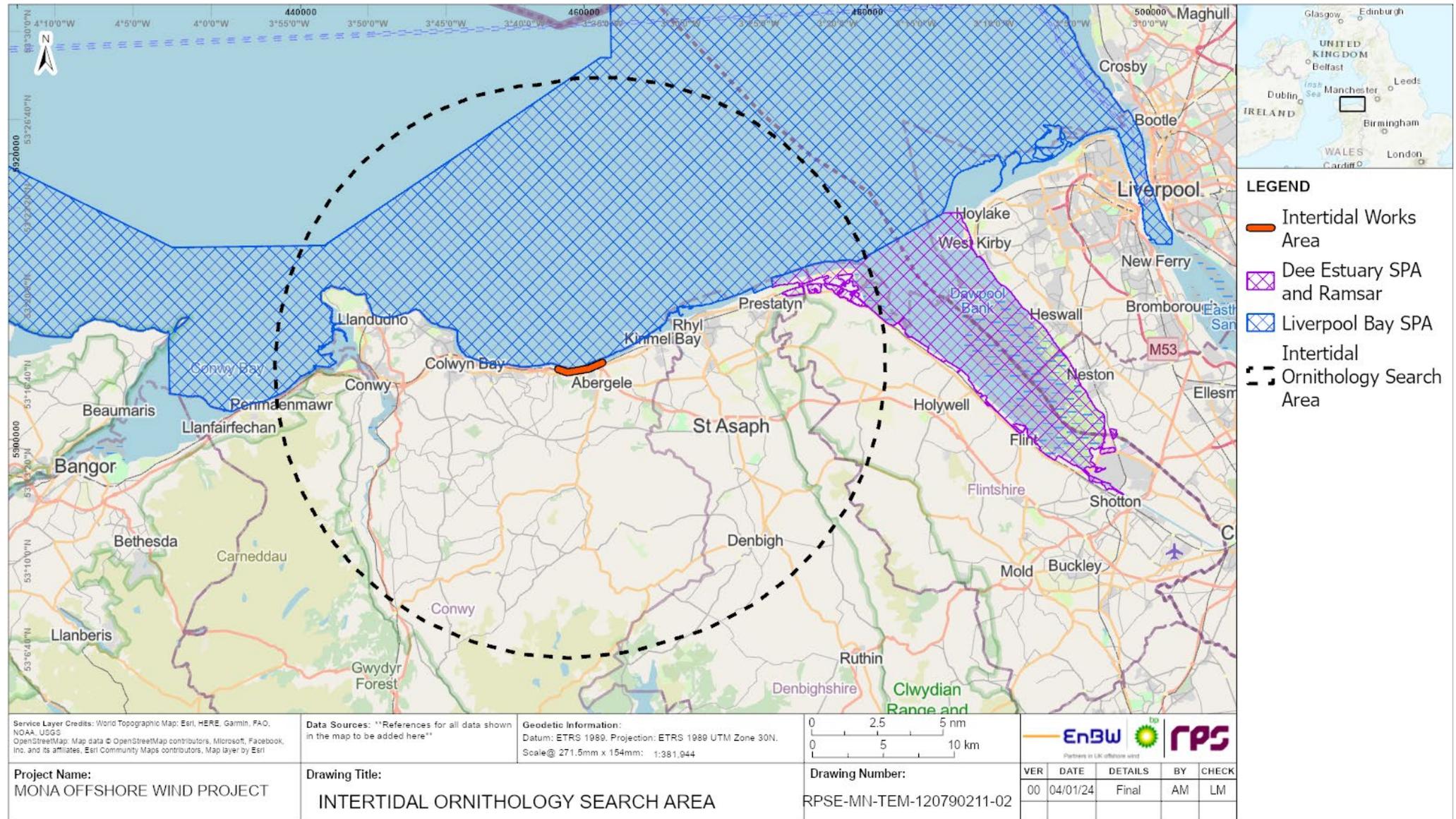


Figure 1.1: The intertidal ornithology search area.

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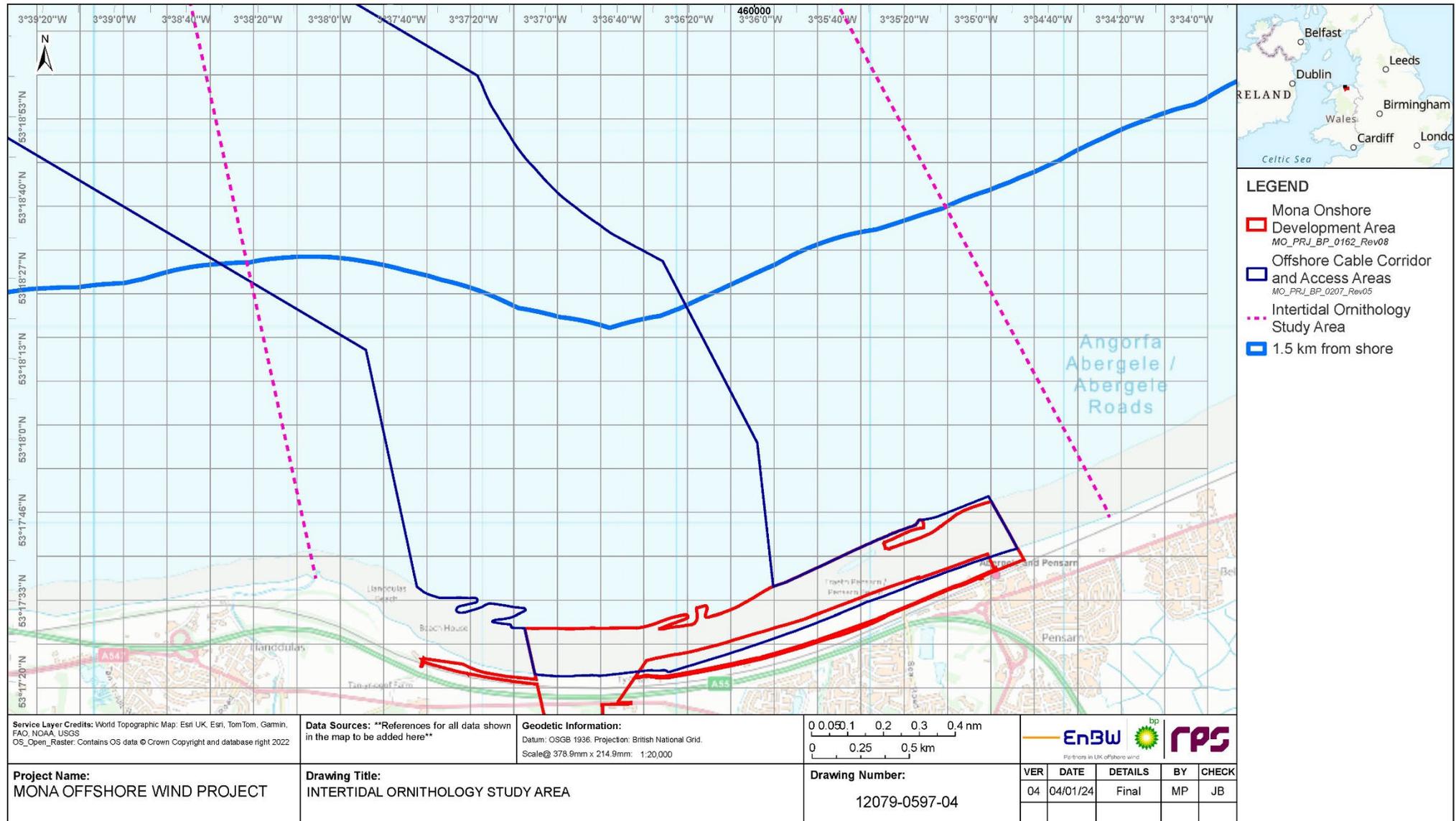


Figure 1.2: The intertidal ornithology study area.

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1.4 Consultation

1.4.1.1 A summary of the key issues raised during consultation activities undertaken to date specific to intertidal ornithology is presented in Table 1.1.

Table 1.1: Summary of key consultation topics raised during consultation activities undertaken for the Mona Offshore Wind Project relevant to intertidal ornithology.

Date	Consultee and type of response	Topic covered/consultee response
12 August 2021	Natural Resources Wales (NRW) (email)	<p>A technical note was prepared for NRW describing the proposed survey methodology for intertidal and nearshore coastal birds, including a map of the survey area, for review and comment.</p> <p>The proposed methodology included:</p> <ul style="list-style-type: none"> • Desk based assessment of online resources, including a review of available designated site citations and British Trust for Ornithology (BTO)/Wetland Bird Survey (WeBS) data • Scoping walkover of each landfall option during August/early September 2021 to identify habitats requiring survey • Monthly intertidal and nearshore coastal bird surveys of the landfall areas and a buffer of at least 500 m in either direction along the coast and up to 1.5 km from the MHWS mark. It must be noted that at this stage of the Mona Offshore Wind Project multiple landfall options were being considered
02 September 2021	NRW (email)	<p>NRW provided the following comments on the methodology:</p> <ul style="list-style-type: none"> • NRW advised that at least two contemporary years of core wintering bird surveys were required to account for inter-annual variation in use by bird features of designated sites • NRW welcomed the timing of the migratory passage and core wintering surveys being September 2021 to April 2022 inclusive, with the possibility of an extension into May, June, July • NRW welcomed the proposed 'Through-the-tidal-cycle' survey methodology which provides good coverage across the tidal cycle • NRW recommended contacting BTO for the latest WeBS and Non-Estuarine Waterbird Survey (NEWS) data as well as the most up-to-date high tide roost locations
06 September 2021	NRW (Teams meeting)	<p>NRW's comments were discussed in a meeting and the following actions were identified:</p> <ul style="list-style-type: none"> • Add nocturnal surveys and the strategy for coverage to the survey methodology. This followed from a similar meeting with Natural England in relation to the Morgan Offshore Windfarm project who requested nocturnal survey data. While NRW

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Date	Consultee and type of response	Topic covered/consultee response
		<p>highlighted that the daytime surveys should provide the level of data required, the survey methodology was aligned with both NRW and Natural England's approaches</p> <ul style="list-style-type: none"> • NRW to review lessons learnt from previous landfall areas and advise in terms of ornithological constraints • NRW to share the relevant NRW conservation packages for the protected sites in the vicinity of the landfall options • The Applicant to share initial results and progress with NRW
31 October 2021	NRW (email)	The updated survey methodology was issued to NRW, including requirements for nocturnal surveys.
16 June 2022	First EWG - NRW, Denbighshire County Council, Conwy County Borough Council, The Royal Society for the Protection of Birds (RSPB).	<ul style="list-style-type: none"> • Agreement on the Remit and Inputs to the EWG (as set out in the Evidence Plan Template) • Agreement on Ways of Working Documents, including timescales • Agreement on broad approach to future surveys • Agreement on broad approach to baseline characterisation
08 December 2022	Second EWG - NRW, Conwy County Borough Council, RSPB.	<ul style="list-style-type: none"> • RPS provided a recap on the intertidal survey methodology and coverage for the Year 1 survey, and presented peak survey counts for December 2021 to April 2022 and the distribution of waterbird species • Details of proposed further surveys were also shared with the EWG, including daytime and nocturnal survey details • No response from the EWG regarding intertidal ornithology was given
24 April 2023	Third EWG - NRW, Denbighshire County Council, Conwy County Borough Council, Welsh Government RSPB, Amphibian and Reptile Conservation Trust (ARC).	<p>The findings of the Preliminary Environmental Information Report (PEIR) were shared with the EWG, including:</p> <ul style="list-style-type: none"> • A summary of the field surveys undertaken • Valued ornithological receptors (VORs) identified • Potential impacts considered • Proposed mitigation • Likely significant effects on VORs • Assessment of cumulative effects • The next steps between the PEIR and Environmental Statement • No response from the EWG regarding intertidal ornithology was given
24 April 2023	NRW, Denbighshire County Council, Conwy County	<ul style="list-style-type: none"> • A detailed note of the bird survey methodologies was shared with the EWG

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Date	Consultee and type of response	Topic covered/consultee response
	Borough Council, Welsh Government RSPB, ARC.	<ul style="list-style-type: none"> No response from the EWG regarding intertidal ornithology was given
19 July 2023	Fourth EWG – NRW, Denbighshire County Council, Conwy County Borough Council, Welsh Government RSPB, ARC.	<ul style="list-style-type: none"> An update on survey progress was provided No response from the EWG regarding intertidal ornithology was given
5 October 2023	Fifth EWG – NRW, Denbighshire County Council Conwy County Borough Council, Welsh Government, ARC, Woodland Trust.	<ul style="list-style-type: none"> An update on survey progress was given No response from the EWG regarding intertidal ornithology was given
8 December 2023	Sixth EWG – NRW, Denbighshire County Council, ARC, RSPB.	<ul style="list-style-type: none"> An update on survey progress was provided No response from the EWG regarding intertidal ornithology was given

1.5 Methodology

1.5.1 Desk study

Approach to establishing the baseline

1.5.1.1 In order to establish a baseline of potential ornithological receptors, a combination of existing data sources (desktop study) and site-specific surveys have been undertaken between December 2021 and November 2023. The results of the review of existing data sources and site-specific surveys are described in section 1.5.3 and 1.6.2 respectively.

Desktop study data sources

1.5.1.2 Information on intertidal birds within the intertidal ornithology study area was collected through a detailed desktop review of existing studies and datasets. These are summarised within Table 1.2 below.

Table 1.2: Summary of key desktop sources.

Title	Source	Year	Author
Densities of qualifying species within Liverpool Bay / Bae Lerpwl SPA: 2015 to 2020	Natural England	2023	HiDef Aerial Surveying Limited.
An assessment of the numbers and distributions of core wintering waterbirds and seabirds in Liverpool Bay area of search.	Joint Nature Conservation Committee (JNCC)	2016	Lawson, J., Kober, K., Win, I., Allcock, Z., Black, J., Reid, J.B., Way, L. and O'Brien, S.H.

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Title	Source	Year	Author
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	2006	Webb, A., McSorley, C.A., Dean, B.J., Reid, J.B., Cranswick, P.A., Smith, L. and Hall, C.
Predicting the displacement of common scoter from benthic feeding areas due to offshore windfarms.	Centre for Applied Marine Sciences, School of Ocean Studies, University of Wales, Bangor	2002	Kaiser, M., Elliot, A., Galanidi, M., Rees, E.I.S., Caldow, R., Stillman, R., Sutherland, W. and Showler, D.
Results of the third Non-Estuarine Waterbird Survey, including Population Estimates for Key Waterbird Species.	BTO Research Report	2017	Austin, G., Frost, T., Mellan, H. and Balmer, D.
Waterbirds in the UK 2021/22: The Wetland Bird Survey and Goose and Swan Monitoring Programme.	BTO/RSPB/JNCC/Nature Scot.	2023	Austin, G.E., Calbrade, N.A., Birtles, G.A., Peck, K., Shaw, J.M. Wotton, S.R., Balmer, D.E. and Frost, T.M

1.5.2 Desk study: baseline characterisation

Designated sites

Internationally designated sites within 20 km

Special Protection Areas (SPAs)

- 1.5.2.1 There are two SPAs within the intertidal ornithology search area. They are the Dee Estuary SPA and the Liverpool Bay / Bae Lerpwl SPA.
- 1.5.2.2 The Dee Estuary SPA is designated for a total of 14 waterbird species as well as its bird assemblage during the non-breeding season. Two of the species are designated during the breeding season, two during passage, with the remaining species designated during the non-breeding season.
- 1.5.2.3 The Liverpool Bay / Bae Lerpwl SPA is designated for a total of five seabird species as well as its bird assemblage in the non-breeding season. Two of the species are designated during the breeding season and three during the non-breeding designations.
- 1.5.2.4 A summary of the designated features of the Dee Estuary SPA and Liverpool Bay / Bae Lerpwl SPA are listed in Table 1.3 of this technical report below.
- 1.5.2.5 The location and geographic extent of these designated sites can be seen in Figure 1.1.

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Table 1.3: Intertidal features of the SPAs within, or partly within, the intertidal ornithology search area.

Note: ¹ Abundance of the qualifying interest feature at the time of the SPA designation.

Site name	Distance from intertidal ornithology study area (km)	Interest feature	Designated season	SPA population ¹
The Dee Estuary	10.9	Bar-tailed godwit <i>Limosa lapponica</i>	Wintering	1,150
		Common tern <i>Sterna hirundo</i>	Breeding	392 (pairs)
		Little tern <i>Sternula albifrons</i>	Breeding	69 (pairs)
		Sandwich tern <i>Sterna sandviscencis</i>	Passage (autumn)	957
		Redshank <i>Tringa totanus</i>	Passage	8,795
		Shelduck <i>Tadorna tadorna</i>	Wintering	7,725
		Teal <i>Anas crecca</i>	Wintering	5,251
		Pintail <i>Anas acuta</i>	Wintering	5,407
		Oystercatcher <i>Haematopus ostralegus</i>	Wintering	22,677
		Grey plover <i>Pluvialis squatorola</i>	Wintering	1,643
		Knot <i>Calidris canuta</i>	Wintering	12,394
		Dunlin <i>Calidris alpina</i>	Wintering	27,769
		Black-tailed godwit <i>Limosa limosa</i>	Wintering	1,747
		Curlew <i>Numenius arquata</i>	Wintering	3,899
Redshank	Wintering	5,293		

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Site name	Distance from intertidal ornithology study area (km)	Interest feature	Designated season	SPA population ¹
		Non-breeding bird assemblage: great crested grebe <i>Podiceps cristatus</i> , cormorant <i>Phalacrocorax carbo</i> , shelduck, wigeon <i>Anas penelope</i> , teal, pintail, oystercatcher, grey plover, lapwing <i>Vanellus vanellus</i> , knot, sanderling <i>Calidris alba</i> , dunlin, black-tailed godwit, bar-tailed godwit, curlew and redshank.		120,726
Liverpool Bay / Bae Lerpwl	0	Red-throated diver <i>Gavia stellata</i>	Non-breeding	1,171
		Little gull <i>Hydrocoleus minutus</i>	Non-breeding	319
		Little tern	Breeding	130 (pairs)
		Common tern	Breeding	180 (pairs)
		Common scoter <i>Melanitta nigra</i>	Non-breeding	56,679
		Non-breeding bird assemblage: red-throated diver, little gull, common scoter, red-breasted merganser <i>Mergus serrator</i> and great cormorant		

Ramsar sites

1.5.2.6 The Dee Estuary Ramsar site is the only Ramsar site present within the intertidal ornithology search area (i.e. within 20 km of the landfall). A summary of the designated features of the Dee Estuary Ramsar site are provided in Table 1.4 of this technical report below. The location and geographic extent of the Dee Estuary Ramsar site can be seen in Figure 1.1.

Table 1.4: Intertidal features of the Ramsar sites within, or partly within the intertidal ornithology search area.

Note: ¹ Abundance of the interest feature at the time of the Ramsar designation.

Site name	Distance (km)	Interest feature	Designated season	Ramsar population ¹
The Dee Estuary	10.9	Redshank	Passage	8,795
		Teal	Wintering	5,251
		Shelduck	Wintering	7,725
		Oystercatcher	Wintering	22,677
		Curlew	Wintering	3,899
		Pintail	Wintering	5,407
		Grey plover	Wintering	1,643
		Knot	Wintering	12,394

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Site name	Distance (km)	Interest feature	Designated season	Ramsar population ¹
		Dunlin	Wintering	27,769
		Black-tailed godwit	Wintering	1,747
		Bar-tailed godwit	Wintering	1,150
		Redshank	Wintering	5,293
		Non-breeding season bird assemblage (not specified to species level on the Ramsar information sheet).		120,726

Nationally designated sites within 5 km

1.5.2.7 As shown in Figure 1.1, there are no NNRs or SSSIs with waterbird interests located within 5 km of the intertidal ornithology study area.

Locally designated sites within 2 km

1.5.2.8 As shown in Figure 1.1, there are no LNRs or LWSs with waterbird interests located within 2 km of the intertidal ornithology study area.

1.5.3 Results of desktop studies

Review of SPA bird utilisation and connectivity

1.5.3.1 The Liverpool Bay / Bae Lerpwl SPA is a marine SPA that extends to MLWS and therefore overlaps with the nearshore of the intertidal ornithology study area (Figure 1.2). Recent studies by Webb *et al.* (2006) and Lawson *et al.* (2016), to inform the creation and extension (respectively) of the Liverpool Bay/Bae Lerpwl SPA, found concentrations of both red-throated diver and common scoter along the North Wales coast. Webb *et al.* (2006) found three concentrations of red-throated diver: one in Conwy Bay, one off the Dee Estuary, and one between Colwyn and Rhyl. Lawson *et al.* (2016) corroborated these findings. The highest concentrations of common scoter in these studies were recorded on the nearshore waters between the Dee Estuary and Colwyn Bay where the intertidal ornithology study area is located. Updated data from HiDef Aerial Survey Limited (2023) showed peak densities of common scoter to be 56.51 birds per km² across the Liverpool Bay / Bae Lerpwl SPA. Records of red-throated diver in the Liverpool Bay / Bae Lerpwl SPA show that density varies between zero and 1.22 birds per km² during the winter months (HiDef Aerial Survey Limited, 2023), with consistent high densities occurring along the shoreline.

1.5.3.2 In addition to these, Kaiser *et al.* (2006) collected data on the distribution and behaviour of common scoter to help model the predicted effects that offshore wind farms might have on the species. They collected data on common scoter distribution using aerial surveys and found concentrations of common scoter in the nearshore waters off the coast of Abergele. For the collection of behavioural data, they chose a location at Llandulas (SH 906786) as at this point “it was possible to observe consistently between 200 and 2000 Common

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Scoter". This is at the east extent of the intertidal ornithology study area. Kaiser *et al.* (2006) found that all common scoters had left the Liverpool Bay area for their breeding grounds by May.

- 1.5.3.3 Kaiser *et al.* (2006) also used bathymetry to model the seafloor and collected data on prey distribution. They found that the North Wales seafloor falls away relatively steeply and that the highest prey densities along this coastline were located at a depth of 7.88 m. Common scoter were most frequently found in water between 7 to 15 m deep and it is widely accepted that they forage in water less than 20 m deep.
- 1.5.3.4 These studies highlighted above all indicated that both common scoter and red-throated diver congregate in high (relative) densities in the nearshore waters adjacent to the intertidal ornithology study area.
- 1.5.3.5 The Dee Estuary SPA is approximately 10.9 km to the east of the intertidal ornithology study area and is designated for waders and wildfowl features. Although there is potential for waders and wildfowl to travel between the SPA and the intertidal ornithology study area, no evidence was found in the literature review for wader species travelling that far for foraging or roosting purposes. It is widely accepted that many wader species are site faithful to their wintering grounds (Van de Kam *et al.*, 2017) and roost close to their foraging grounds (Burton and Armitage, 2005; Rehfishch *et al.*, 1996).

WeBS and NEWS data sources

- 1.5.3.6 The intertidal ornithology study area is covered by the WeBS site Colwyn Bay and the North Clwyd Coast (BTO, 2023). This site is approximately twice the length of the intertidal ornithology study area and extends much further to the east hence any comparisons must take the extent of the area covered into account.
- 1.5.3.7 The WeBS aims to collate data on birds using the intertidal zone at high tide (core counts), and low tide (low tide counts). Only core count data was available for the Colwyn Bay and the North Clwyd Coast WeBS site.
- 1.5.3.8 Table 1.5 summarises the findings for the last five years of WeBS surveys by averaging the annual peak maximum counts per species. A total of 43 species were found to be regularly occurring, including 11 species that are named as qualifying features of the nearby SPAs and Ramsar.
- 1.5.3.9 Species of note that were found in significant numbers within the WeBS were common scoter (5-year average of 5,278) and cormorant (5-year average of 285). Common scoter is a qualifying feature of the Liverpool Bay SPA and whilst cormorant is not a named feature, it is listed as non-breeding assemblage features of both the Liverpool Bay/Bae Lerpwl SPA and the Dee Estuary SPA.
- 1.5.3.10 Dunlin *Calidris alpina* were the most abundant wader, but large numbers of oystercatcher, curlew, redshank and turnstone *Arenaria interpres* were also found. Oystercatcher, curlew and redshank are all qualifying features of the Dee Estuary SPA and Ramsar.
- 1.5.3.11 Black-headed gull *Chroicocephalus ridibundus* and herring gull *Larus argentatus* were the most commonly recorded gull species with common gull

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Larus canus, lesser black-backed gull *Larus fuscus* and great black-backed gull *Larus marinus* also recorded in low numbers. Pelagic birds such as black-legged kittiwake *Rissa tridactyla* were also recorded in low numbers. The WeBS site has few records of terns with only 13 sandwich tern recorded.

Table 1.5: Summarising the WeBS results for the Colwyn Bay and North Clwyd Coast.

Note: ¹ Qualifying Dee Estuary SPA and Ramsar species of assemblage feature. ² Qualifying Liverpool Bay SPA species or assemblage feature.

Species group	Species	2017/18 to 2021/22 (5 year average)
Ducks, geese and swans	Mute swan <i>Cygnus olor</i>	5
	Canada goose <i>Branta canadensis</i>	7
	Shelduck ¹	2
	Mallard <i>Anas platyrhynchos</i>	25
	Mandarin duck <i>Aix galericulata</i>	1
	Wigeon ¹	60
	Teal ¹	14
	Shoveler <i>Anas clypeata</i>	1
	Common scoter ²	5,278
	Velvet scoter <i>Melanitta fusca</i>	1
	Scaup <i>Anthya marila</i>	3
	Red-breasted merganser ²	8
Goosander <i>Mergus merganser</i>	3	
Cormorants	Cormorant ^{1 2}	285
	Shag <i>Phalacrocorax aristotelis</i>	18
Loons	Red-throated Diver ²	14
	Black-throated diver <i>Gavia arctica</i>	1
	Great northern diver <i>Gavia immer</i>	2
Grebes	Black-necked grebe <i>Podiceps nigricollis</i>	1
	Great crested grebe ¹	31
Gulls and terns	Black-headed gull	119
	Black-legged kittiwake	13
	Common gull	8
	Herring gull	144
	Lesser black-backed gull	1
	Great black-backed gull	4
	Sandwich tern ¹	13

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Species group	Species	2017/18 to 2021/22 (5 year average)
Waders	Oystercatcher ¹	228
	Grey plover ¹	3
	Ringed plover <i>Charadrius hiaticula</i>	48
	Knot ¹	32
	Dunlin ¹	233
	Sanderling ¹	23
	Purple sandpiper <i>Calidris maritima</i>	4
	Turnstone <i>Arenaria interpres</i>	129
	Redshank ¹	113
	Snipe <i>Gallinago gallinago</i>	9
	Curlew ¹	186
Hérons	Grey heron <i>Ardea cinerea</i>	2
	Little egret <i>Egretta garzetta</i>	2
Rails	Water rail <i>Rallus aquaticus</i>	1
	Moorhen <i>Gallinula cholropus</i>	15
	Coot <i>Fulica atra</i>	20
Grand total		7,110

- 1.5.3.12 The NEWS count sectors Z360103B and Z360104 cover approximately the same area as the WeBS site. However, the last survey NEWS was in 2015/16 so results are not directly comparable.
- 1.5.3.13 Table 1.6 summarises those species for which peak counts were higher in the NEWS. The only difference of note is that of herring gull which had a NEWS peak of 630 in comparison to 144 for the WeBS.

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Table 1.6: Summarising the peak data for the core wintering period of 2015/16, as recorded by NEWS for sectors Z360103B and Z360104.

Species group	Species	2015/16
Gulls and terns	Common gull	27
	Herring gull	630
	Lesser-black-backed gull	5
	Great black-backed gull	10
Waders	Oystercatcher	238

1.6 Site-specific surveys

1.6.1 Through the tidal cycle methodology

1.6.1.1 The main objectives of the intertidal and nearshore ‘through-the-tidal-cycle’ waterbird surveys are to identify any areas that:

- Support significant numbers of qualifying species of Dee Estuary SPA and Liverpool Bay/Bae Lerpwl SPA
- Are regularly used by assemblages of waterbirds
- Have seasonal periods of sensitivity for waterbirds (e.g. staging posts for migratory birds or traditional feeding and roosting grounds).

1.6.1.2 A summary of the surveys undertaken to inform this technical report are outlined in Table 1.7 below.

Table 1.7: Summary of surveys undertaken to inform intertidal ornithology.

Title	Extent of survey	Overview of survey	Survey contractor	Date
Nocturnal survey	500 m of the intertidal zone.	Using thermal monocular, image-intensifying camera and an infra-red spotlight to identify waterbird species within 300 to 400 m from surveyors.	Enfys	Year 1 – from February 2022 to March 2022. Year 2 – from December 2022 to March 2023.
Diurnal surveys	From shoreline (MHWS mark) extending to 1.5 km out to the sea.	Counts made from identified vantage points. Counts are segregated into three distance bands from the shoreline.	Enfys	From December 2021 to November 2023.

Through the tidal cycle diurnal field methodology

- 1.6.1.3 The daytime survey programme comprised a series of monthly intertidal and nearshore waterbird surveys beginning in December 2021 and continuing through to November 2023. Data collected across these surveys account for inter-annual variation and capture seasonal fluctuations (i.e. spring and autumn passage periods and wintering periods).
- 1.6.1.4 The survey methods followed were adapted from the Core Count (high tide) and Low Tide Count methodology of the BTO, JNCC, RSPB and Wildfowl and Wetlands Trust (WWT) WeBS scheme as outlined by Gilbert *et al.* (1998).
- 1.6.1.5 The intertidal ornithology study area was segmented into discrete count sectors. These count sectors were identified based on local features such that the sectors can be repeatedly identified.
- 1.6.1.6 Each survey sector extends out to nearshore waters. To identify the distribution of birds, the count sectors are further segregated into three distance bands from the shoreline:
- 1.6.1.7 During each survey visit, waterbird species in each sector along the foreshore and nearshore waters were counted and ascribed to one of the three distance bands. Observations of waterbird species were plotted on to a field map using standard BTO species and behaviour codes.
- 1.6.1.8 Surveys were scheduled to cover a range of times of day and all tidal states. Counts were made once per hour of the tidal cycle period of 12 hours (-6 to +5 hours relative to low tide), with a minimum number of counts across the four periods of high tide, ebb tide, low tide and flood tide, where weather and safety conditions allowed.
- 1.6.1.9 Counts were made from vantage points along the coast using binoculars and a telescope.

Through the tidal cycle nocturnal field methodology

- 1.6.1.10 The nocturnal survey programme comprised a series of monthly intertidal and nearshore waterbird surveys carried out over two core wintering periods, February 2022 to March 2022 and November 2022 to March 2023 respectively.
- 1.6.1.11 Monthly surveys covered half a tidal cycle. Therefore, for each monthly survey birds were counted in approximately a 6-hour period. Surveys were staggered with the aim of completing a full tidal cycle every two months.
- 1.6.1.12 Surveyors used a thermal monocular (HIK Micro Owl), plus an image-intensifying camera with an infra-red spotlight to allow for the detection and identification of waterbird species within 300 to 400 m of the surveyor's position, with the aim of minimising disturbance. Due to the limited range of nocturnal equipment, only the first 500 m of the intertidal zone (from the MHS mark) was fully surveyed.
- 1.6.1.13 The position of birds was recorded and mapped, and behaviour noted. The surveys were undertaken by a pair of surveyors due to health and safety reasons.

Disturbance

- 1.6.1.14 For both diurnal and nocturnal surveys any source of disturbance to birds in each section at the time of the count was recorded under the following categories: walkers, dogs, anglers, bait diggers, shell fishers, vehicles, unpowered boats, powered boats, aircraft and 'other'. The perceived effect of disturbance on abundance and behaviour of birds in the count section is scaled according to the categories outlined in Table 1.8.

Table 1.8: Perceived effect of disturbance on birds during diurnal and nocturnal surveys.

	Notation	Definition
Effect	W	Weak (e.g. change in behaviour but birds not excluded).
	M	Moderate (e.g. birds excluded from parts of the recording sector).
	S	Strong (e.g. avoidance of the recording sector).

Mapping count data

- 1.6.1.15 Average bird density maps were produced for regularly occurring waterbirds and/or waterbird species named in the designated sites identified in section 1.5.2. These maps were produced seasonally for each bird species group, the seasons are defined in Table 1.9.
- 1.6.1.16 All point data was collected during the diurnal surveys were entered into an ArcGIS (Geographic Information System) database. A 5 hectare (ha) grid was overlain on the intertidal ornithology study area and all counts of birds recorded within each 5 ha square over the total survey period were averaged per season (i.e. breeding and non-breeding). The mean number of birds present in any 5 ha square over the intertidal ornithology study area was derived. Grid squares where no birds were recorded were left transparent. Maps showing the seasonal distribution are presented in Figure 1.23 to Figure 1.59.

Limitations

- 1.6.1.17 Although weather conditions meant that some surveys had to be re-arranged, the diurnal surveys captured data monthly spread over a period of 24 months and covering the full range of tidal states. Therefore, there are considered to be no limitations to the diurnal surveys and the dataset reported within this technical report is considered to be robust enough to fully characterise bird abundance and distribution of the intertidal zone and nearshore waters at the landfall.
- 1.6.1.18 The nocturnal surveys ran over a limited period of time (the core wintering period as agreed with NRW). Although every effort was taken to cover most of intertidal ornithology study area using high-quality professional optical equipment, limitations in nocturnal optical equipment mean that the results are not directly comparable with diurnal survey results.
- 1.6.1.19 The HIK MicroOwl used could pick out 'blobs' at a great distance. However, these 'blobs' could not be identified as birds until approached at a closer range. To identify birds to species level an infrared rifle torch was used in combination

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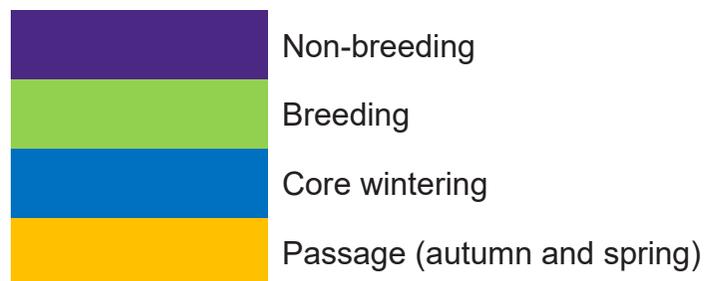
with a camcorder with a night vision setting. Using this, birds could be identified to species level at approx. 300 – 400 m in good weather.

- 1.6.1.20 Strong winds and precipitation prevented nocturnal surveys from taking place. This was due to interference with the nocturnal equipment caused by any moisture in the air. Although missed surveys were carried out at the next available opportunity this often meant that surveys had to take place during the next calendar month.
- 1.6.1.21 As the diurnal surveys stipulated that no surveys were to take place if visibility was 500 m or less, the nocturnal results are not directly comparable to the diurnal results and were not included with the data used for density mapping. Whilst there have been some high peaks of certain species recorded at night, it is thought that birds may have been missed. There is much documented evidence that birds continue to use the intertidal zone throughout the night however the peaks reported for the diurnal surveys are more likely to represent the actual numbers of birds present.

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Table 1.9: Showing the season of the taxonomic groups recorded within intertidal ornithology study area.

Taxonomic group	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Waders	Passage	Passage	Passage	Core wintering	Passage	Passage	Passage	Passage				
Gulls and terns	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Breeding	Breeding	Breeding	Breeding
Auks	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Breeding	Breeding	Breeding	Breeding
Divers	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Breeding	Breeding	Breeding	Breeding
Cormorants and shags	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Breeding	Breeding	Breeding	Breeding
Geese duck and swans	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Breeding	Breeding	Breeding	Breeding
Herron stork and ibises	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Non-breeding	Breeding	Breeding	Breeding	Breeding



1.6.2 Results

Diurnal surveys bird assemblage

- 1.6.2.1 A total of 36 species were recorded during the diurnal surveys. The species peak maximum counts are presented in Table 1.10, with the breakdown of monthly peaks shown in Appendix A of this technical report.
- 1.6.2.2 In total 5,283 birds were recorded within the intertidal ornithology study area during the period between December 2021 and November 2023.
- 1.6.2.3 Species that were recorded in the highest numbers were common scoter with 2,225 individuals, black-headed gull with 632, common gull with 713, and herring gull with 915 birds.
- 1.6.2.4 The most abundant wader species were oystercatcher with a peak of 188. This was followed by curlew with 71 and turnstone with 54.

Table 1.10: Summarising the diurnal survey peak counts between December 2021 and November 2023.

Note: ¹ Qualifying Dee Estuary SPA species or assemblage feature. ² Qualifying Liverpool Bay SPA species or assemblage feature.

Species group	Species	Peak count
Ducks, geese and swans	Mute swan	1
	Tufted duck <i>Anthya fuligula</i>	2
	Common scoter ²	2,225
	Eider <i>Somateria mollissima</i>	1
	Goosander	2
	Red-breasted merganser ²	15
Cormorants	Cormorant ^{1 2}	42
	Shag	11
Loons	Red-throated diver ²	95
Grebes	Great Crested grebe ¹	98
Auks	Guillemot <i>Uria aalge</i>	1
	Razorbill <i>Alca torda</i>	6
Seabirds	Gannet <i>Morus bassanus</i>	2
Gulls and terns	Black-headed gull	632
	Common gull	713
	Mediterranean gull <i>Larus melanocephalus</i>	1
	Herring gull	915
	Yellow-legged gull <i>Larus michahellis</i>	1
	Lesser black-backed gull	11
	Great black-backed gull	24

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Species group	Species	Peak count
	Sandwich tern ¹	33
Waders	Oystercatcher ¹	188
	Ringed plover	22
	Golden plover <i>Pluvialis apricaria</i>	1
	Dunlin ¹	44
	Sanderling ¹	5
	Turnstone	54
	Common sandpiper <i>Actitis hypoleucos</i>	1
	Redshank ¹	41
	Bar-tailed godwit ¹	1
	Curlew ¹	71
	Whimbrel <i>Numenius phaeopus</i>	8
	Unidentified wader	5
Herons	Grey heron	2
	Little egret	8
Kingfishers	Kingfisher <i>Alcedo atthis</i>	1
Total		5,283

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Nocturnal survey bird assemblage

- 1.6.2.5 Table 1.11 shows the monthly peak maximum counts recorded within the intertidal ornithology study area during the nocturnal surveys.
- 1.6.2.6 Common gull and herring were the most abundant species recorded, with 600 and 400 bird respectively.
- 1.6.2.7 Oystercatcher was the most abundant wader species, with 225 individuals recorded in December 2022. Redshank numbers remained very low, with 26 individuals recorded in January 2023, and both sanderling and ringed plover showed low abundance of birds over the two wintering seasons, with maximum peak count of 10 and 7 individuals respectively.
- 1.6.2.8 The limitations of the nocturnal surveys may explain observed fluctuations between counts and the low peak maximum counts observed.

Table 1.11: Monthly peak maximum counts recorded during the nocturnal surveys in February and March 2022 and winter 2022/23.

¹ Qualifying Dee Estuary SPA and Ramsar species of assemblage feature.

² Qualifying Liverpool Bay SPA species or assemblage feature.

Species	Winter 2021 / 22		Winter 2022 / 23				Max count
	February	March	December	January	February	March	
Common scoter ²	250	-	-	-	-	-	250
Oystercatcher ¹	2	-	225	7	8	3	225
Ringed plover	4	2	4	5	7	1	7
Dunlin ¹	-	-	-	1	-	-	1
Sanderling ¹	-	-	2	-	10	7	10
Turnstone	-	-	1	-	-	-	1
Redshank ¹	5	-	10	26	6	-	26
Curlew ¹	-	-	13	-	-	6	13
Unidentified wader	3	-	-	-	-	70	70
Grey heron	-	1	-	-	-	-	1
Little egret	-	-	-	-	1	-	1
Common gull	600	-	-	-	-	-	600
Herring gull	-	400	-	-	-	-	400
Unidentified gull	70	150	270	1	-	-	270
Barn owl <i>Tyto alba</i>	-	1	-	-	-	-	1
Total	934	554	525	40	32	87	1,876

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Diurnal survey species accounts

Common scoter

- 1.6.2.9 Common scoter are predominantly observed in the UK during the non-breeding season. They undertake a migratory journey from their breeding areas in north Europe and Siberia to seek the milder coastal waters of the UK. This seasonal movement typically commences in late autumn and extends through the winter season.
- 1.6.2.10 This pattern is illustrated in Figure 1.3, highlighting their peak abundance between October and March. The highest count recorded during the survey period was in January 2023 with 2,225 birds.
- 1.6.2.11 During both the breeding and non-breeding seasons (Figure 1.23 and Figure 1.24) common scoter were widely distributed within the nearshore waters, however in lower densities during the breeding season which consisted of low numbers of passage birds in April.
- 1.6.2.12 Despite being widely distributed higher densities of birds were found as distance from the shore increased.

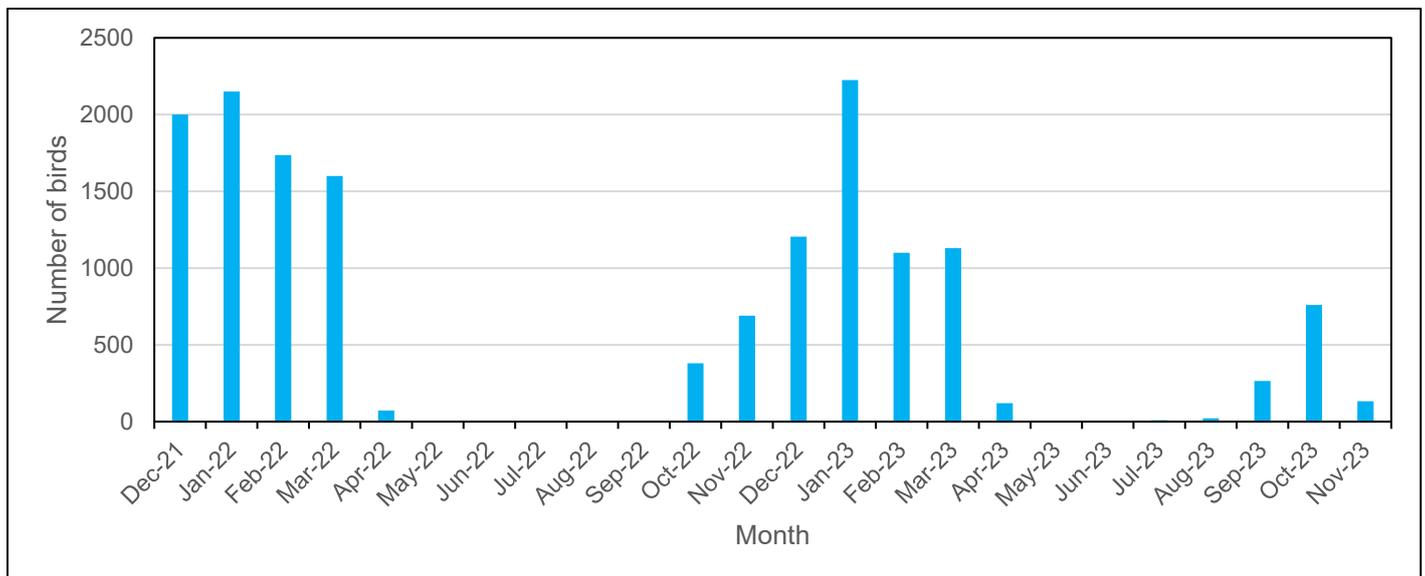


Figure 1.3: Monthly peak maximum count of common scoter.

Red-breasted merganser

- 1.6.2.13 Red-breasted merganser begin arriving in the autumn after migrating from their breeding grounds in north Europe and subsequently depart around March.
- 1.6.2.14 The diurnal survey results showed that January 2022 recorded the highest count, with 15 individuals (Figure 1.4).
- 1.6.2.15 This highest abundance during the winter months is a notable feature of their presence in the UK, as they are most commonly observed during this period (Figure 1.25). The intertidal ornithology study area is not of importance for this species during the breeding season (Figure 1.26).

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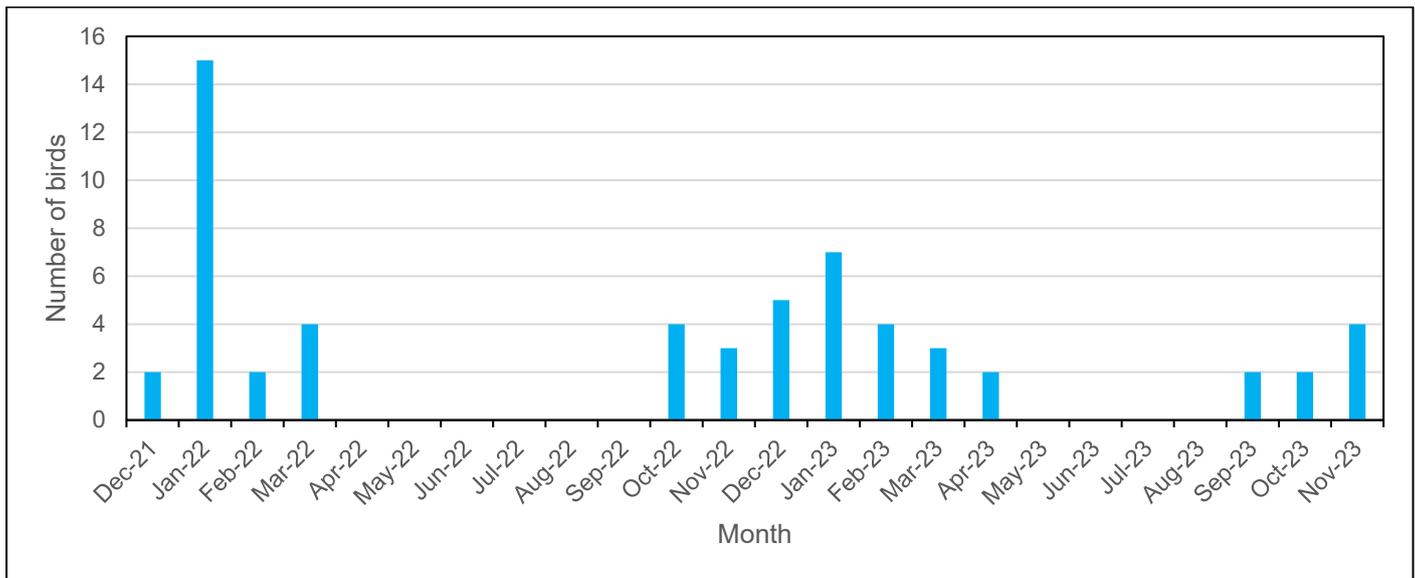


Figure 1.4: Monthly peak maximum count of red-breasted merganser.

Great cormorant

- 1.6.2.16 Great cormorant are present all year around with the species breeding around the UK coastline and in inland waterbodies. During the non-breeding season, the birds have a similar distribution, but the numbers are inflated by continental birds.
- 1.6.2.17 Notably, the highest count of great cormorant was recorded in November 2022, with maximum peak counts exceeding 40 individuals (Figure 1.5).
- 1.6.2.18 It is likely that birds present outside the non-breeding season are associated with the breeding colony at the Little Orme.
- 1.6.2.19 Cormorant were widespread at low densities (<0.01 bird per ha) in the nearshore waters during both the non-breeding and breeding seasons (Figure 1.27 and Figure 1.28).
- 1.6.2.20 There were also aggregations of foraging great cormorant beyond 1.5 km from the shoreline during the non-breeding season (Figure 1.28)).

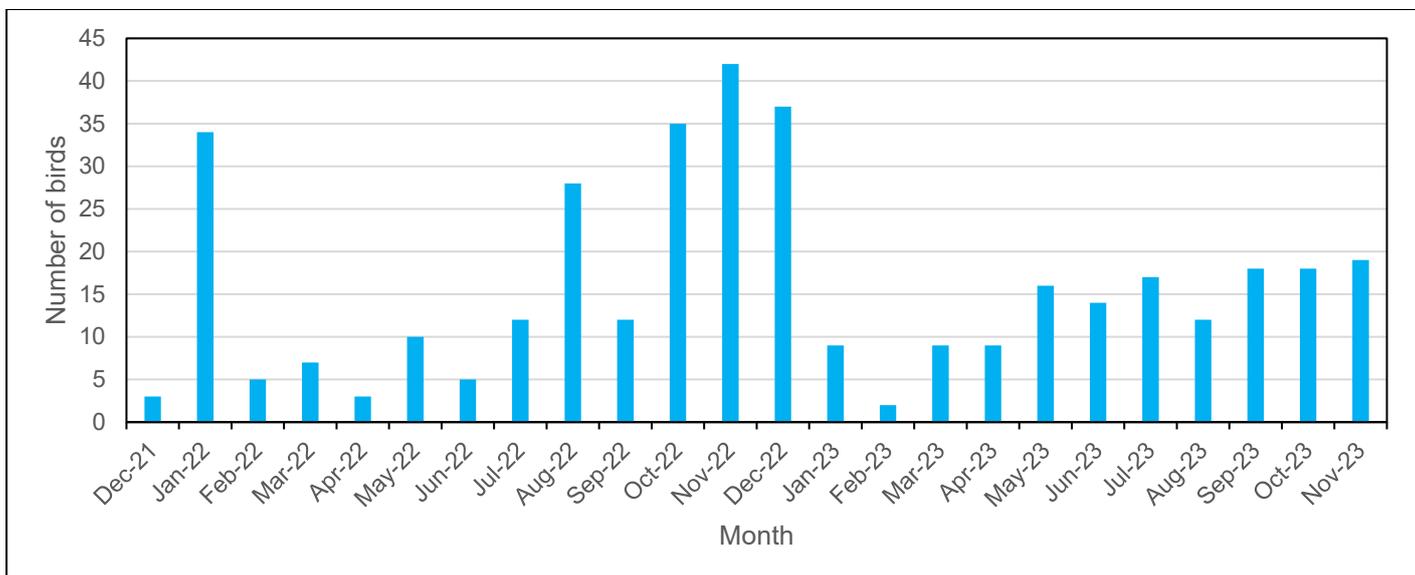


Figure 1.5: Monthly peak maximum count of great cormorant.

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Red-throated diver

- 1.6.2.21 Red-throated diver, like common scoter, display a seasonal pattern in the UK, they migrate from their breeding grounds, often in the Arctic regions but as far south as Scotland, to spend the winter in UK coastal waters.
- 1.6.2.22 There was a notable peak in October 2023 with 95 birds. A second peak was recorded in January 2022 with 65 individuals (Figure 1.6).
- 1.6.2.23 Red-throated diver were primarily present during the non-breeding season. The four individuals recorded in April 2023 were presumably passage birds.
- 1.6.2.24 Although widely distributed in the nearshore waters during both seasons (Figure 1.29 and Figure 1.30) the highest concentrations of birds were found approximately 1.5 km from the shoreline.

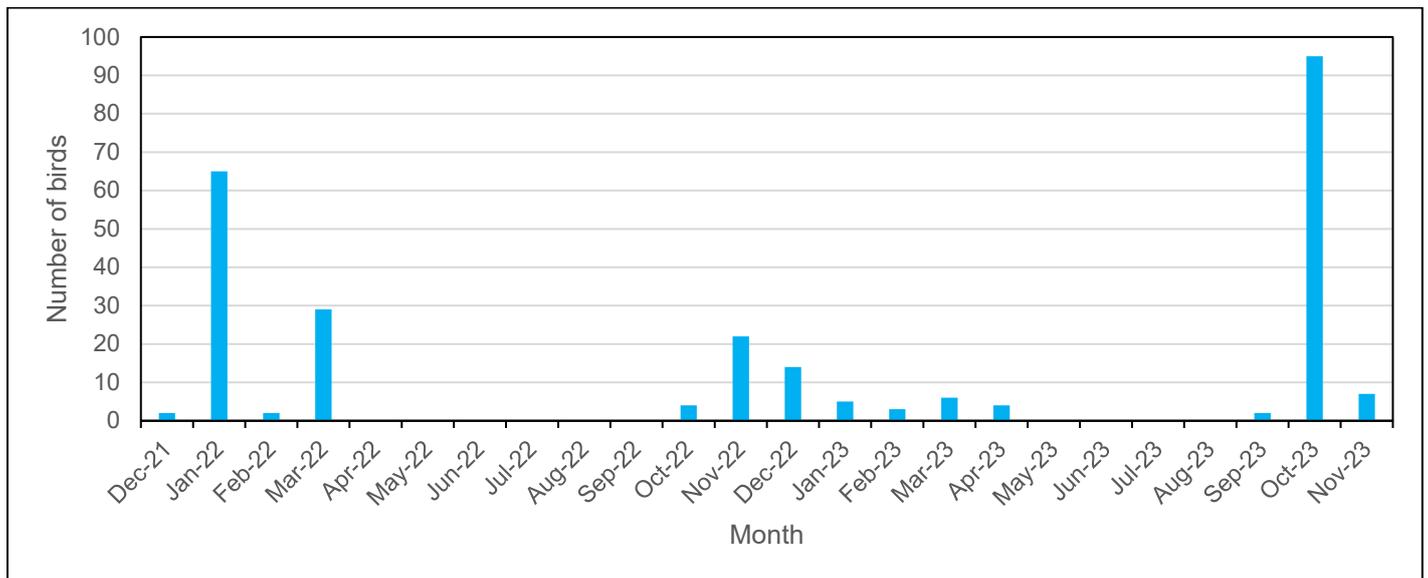


Figure 1.6: Monthly peak maximum count of red-throated diver.

Great crested grebe

- 1.6.2.25 Great crested grebe are mostly sedentary; however, they often congregate in higher numbers during the non-breeding season and subsequently disperse during other times of the year for breeding.
- 1.6.2.26 The site-specific survey shows this pattern of usage with the highest counts recorded in January 2022, with almost 100 individuals. Low numbers were recorded in the following winter, with the peak count just over 20 individuals (Figure 1.7). The Dee Estuary is a well-known moulting spot for this species during the autumn months.
- 1.6.2.27 Whilst great crested grebe were present during both the non-breeding and breeding seasons, they were present in higher numbers during the non-breeding season when they were widely distributed (Figure 1.31). Although the highest densities tended to be found at some distance to the shoreline there were also high densities found close to the shoreline. During the breeding season (Figure 1.32) they were generally found closer inshore.

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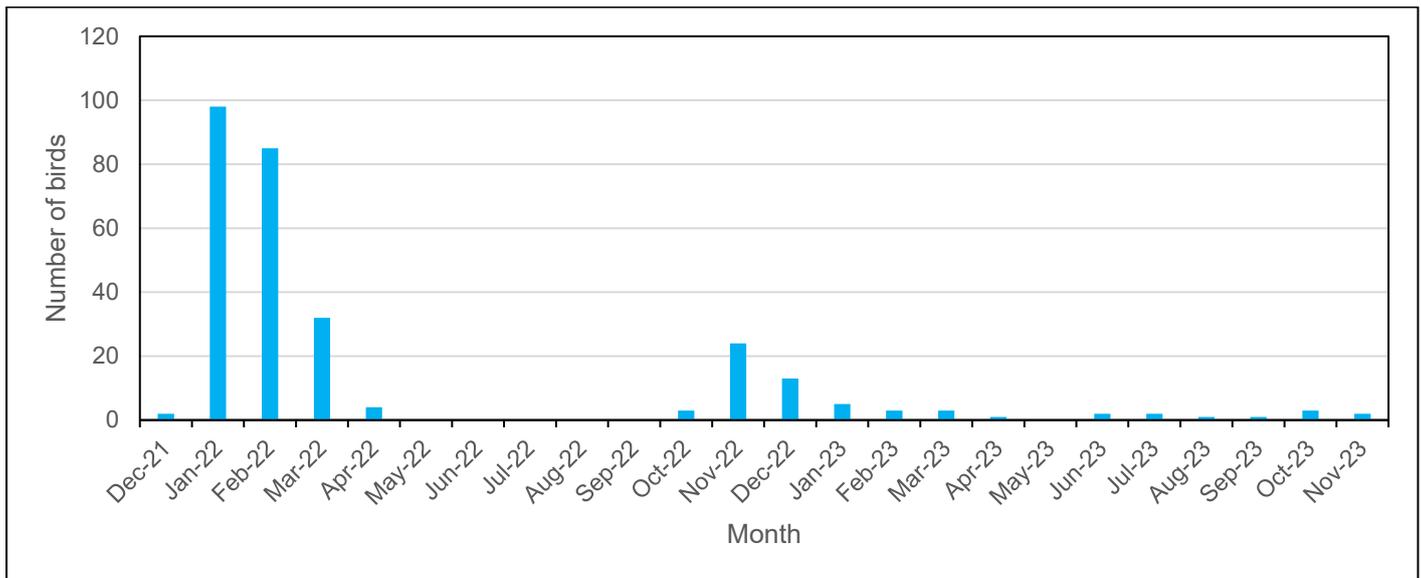


Figure 1.7: Monthly peak maximum count of great crested grebe.

Black-headed gull

1.6.2.28 Black-headed gull were mostly present during the non-breeding season with a peak of 632 in September 2023 (Figure 1.8). However, black-headed gull were mostly found in lower numbers.

1.6.2.29 During the breeding season black-headed gull were mostly distributed on the intertidal zone (Figure 1.34) whereas during the non-breeding season (Figure 1.33) they were more widely distributed along the intertidal zone and in waters close to the shoreline.

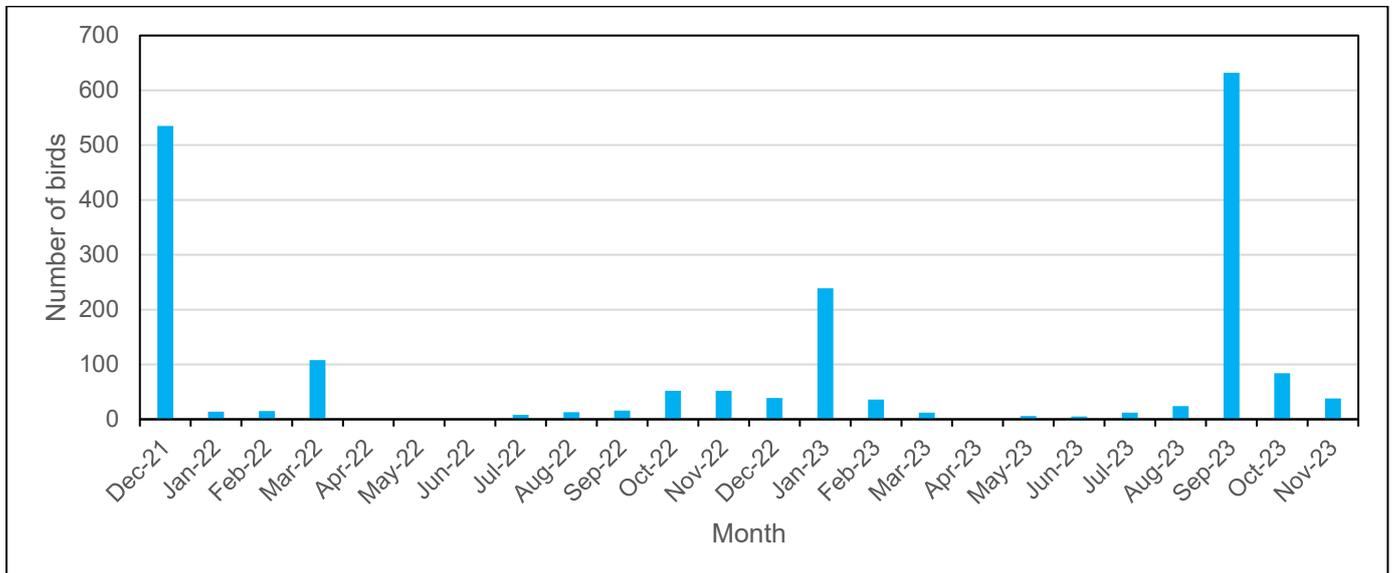


Figure 1.8: Monthly peak maximum count of black-headed gull.

Common gull

1.6.2.30 Most common gull are migratory birds that breed further to the north. They migrate southward during the winter to take advantage of milder conditions and more accessible food sources. On UK coasts, they can be commonly observed during the winter months, particularly along coastal areas, where they feed on a variety of aquatic organisms and scavenged food.

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- 1.6.2.31 During the winter months of 2021 and 2022, again in 2022/23, common gull counts ranged between 300 and over 700 individuals, with the highest count in March 2022 (Figure 1.9).
- 1.6.2.32 Whilst common gull were present in low numbers on the intertidal zone during the breeding season (Figure 1.36). During the non-breeding season (Figure 1.35), they were present in high densities throughout the intertidal zone and nearshore waters (although primarily close to the shoreline). The highest densities during the non-breeding season were found at the western end of the intertidal ornithology study area.

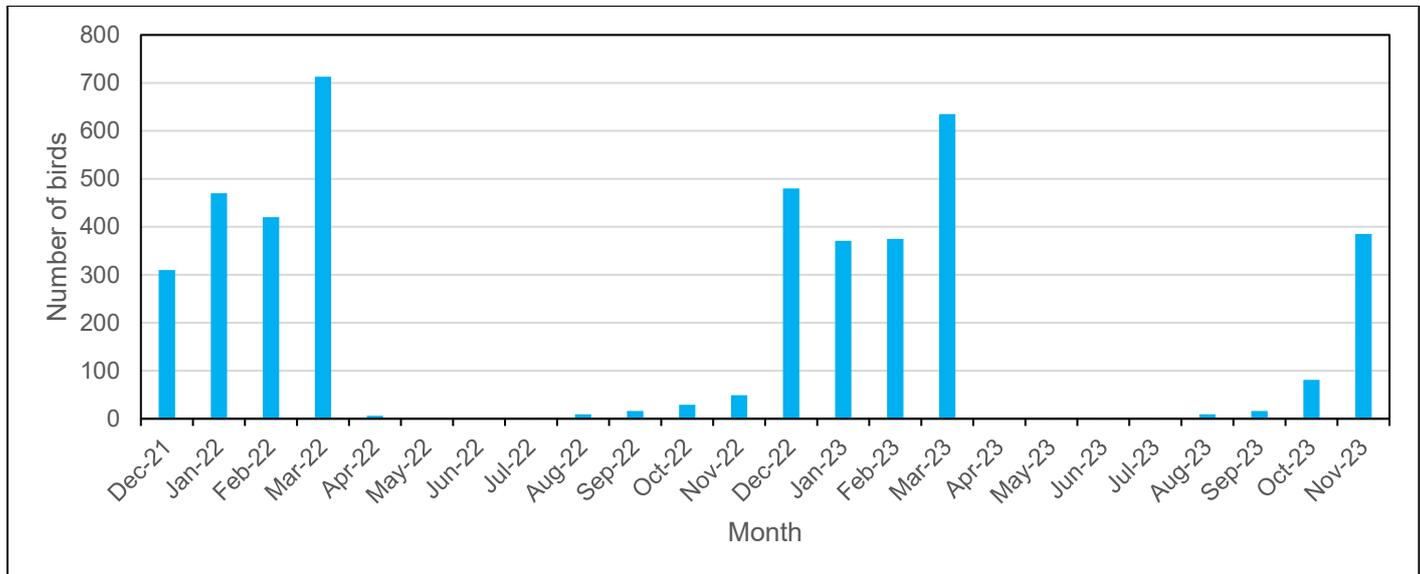


Figure 1.9: Monthly peak maximum count of common gull.

Herring gull

- 1.6.2.33 Herring gull were present throughout the year albeit in greater numbers during the non-breeding season. Peak maximum of 915 and 835 in December 2021 and March 2022 were exceptions with typical numbers during the non-breeding season varying between 100 and 300 individuals (Figure 1.10). The peak maximum in December 2021 and March 2022 may have coincided with cold weather which forced gulls foraging in terrestrial habitats to move onto the intertidal zone which remained unfrozen.
- 1.6.2.34 Figure 1.37 and Figure 1.38 show the species to be widely distributed throughout the intertidal ornithology study area during both the non-breeding and breeding season. Although higher numbers of birds are found close to shoreline and on the intertidal zone, herring gull were recorded beyond 2 km from the shoreline.

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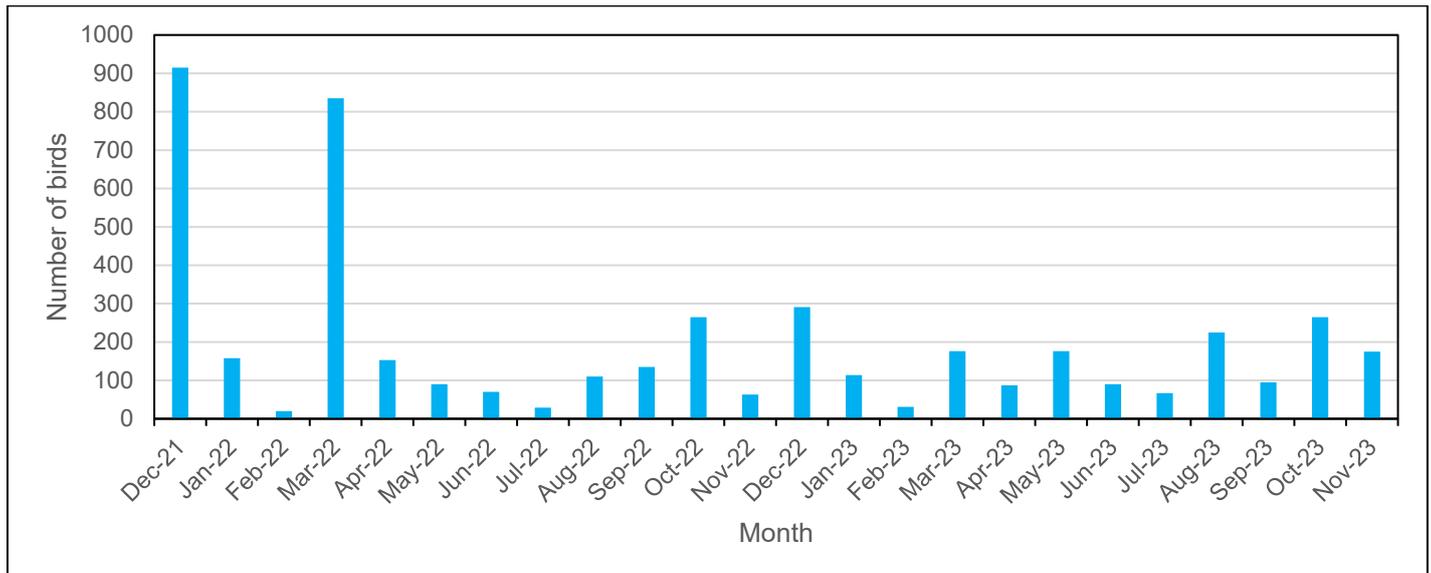


Figure 1.10: Monthly peak maximum count of herring gull.

Great black-backed gull

- 1.6.2.35 Great black-backed gull displayed a similar pattern to herring gull, although on a smaller scale with non-breeding peak maximum peaking at 24 individuals (Figure 1.11). During the breeding season they are more likely to be found on rocky stretches of coast where they prefer to breed.
- 1.6.2.36 During both the breeding and non-breeding season great black-backed gull were widely distributed. They are mostly present on the intertidal zone and within the nearshore waters close to shore, however birds were also recorded as far out as 1.5 km from shoreline (Figure 1.39 and Figure 1.40).

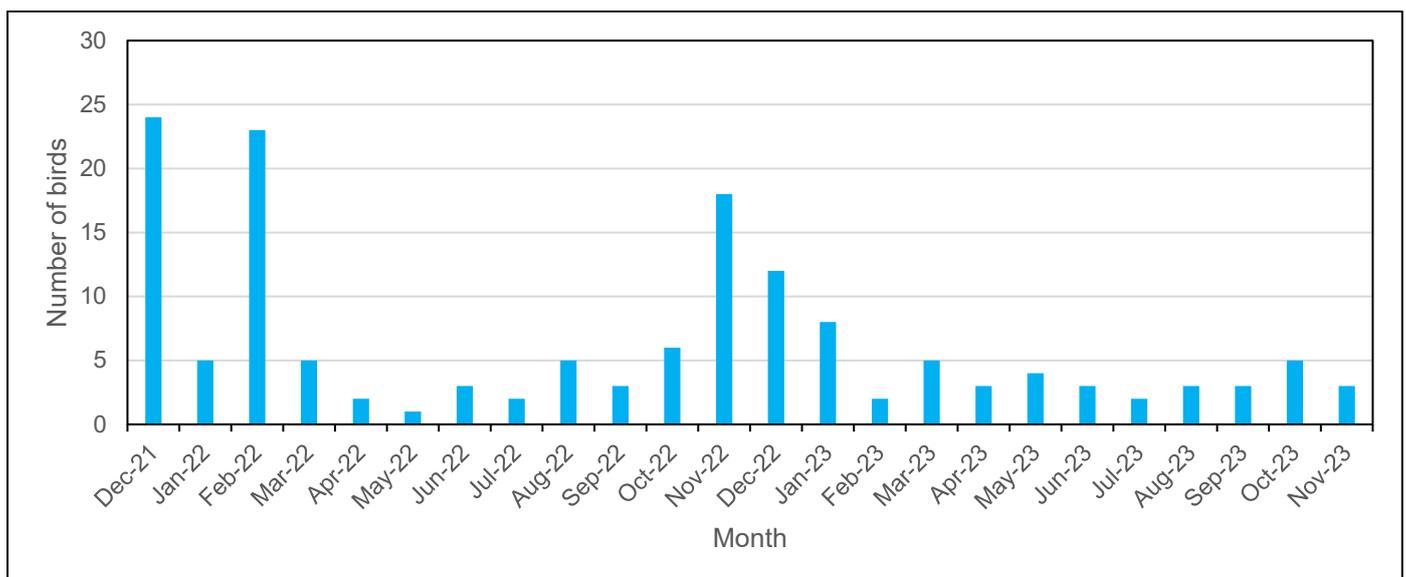


Figure 1.11: Monthly peak maximum count of great black-backed gull.

Sandwich tern

- 1.6.2.37 Sandwich tern of the nearby Dee Estuary SPA and Ramsar experience a typical autumn passage with numbers exceeding 1,000 individuals. There are also breeding

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colonies situated on Anglesey to the west of the intertidal ornithology study area. Despite the breeding colonies in Anglesey, the numbers of sandwich tern recorded during both the breeding and not breeding season were sporadic and low with most records probably representing passage birds (Figure 1.12).

1.6.2.38 The distribution of sandwich tern during the non-breeding and breeding seasons are shown in Figure 1.41 and Figure 1.42. Sandwich tern were widely distributed in the nearshore waters although some birds were recorded on the intertidal zone.

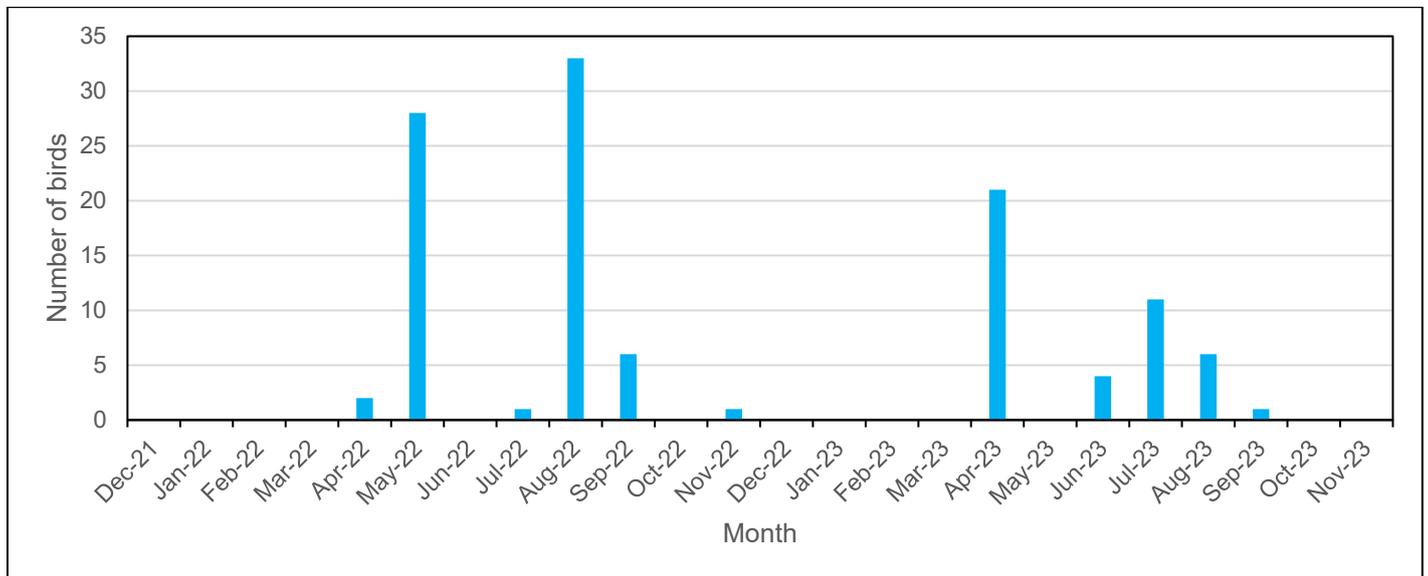


Figure 1.12: Monthly peak maximum count of sandwich tern.

Oystercatcher

1.6.2.39 Oystercatcher were present in relatively low numbers during every survey month (Figure 1.13). The highest peak counts were recorded in December 2021 and January 2022 (Figure 1.13). The 2021/22 winter saw much higher numbers of oystercatcher than the 2022/23 winter. This may represent a period of cold weather when extra birds congregate on the intertidal zone.

1.6.2.40 Monthly peak maximum were low compared to the Dee Estuary population of 28,033 (Austin *et al.*, 2023). The Colwyn Bay and North Clwyd Coast WeBS also recorded higher numbers than the site-specific surveys (Table 1.5). The WeBS site extends beyond the east boundary of the intertidal ornithology study area so this may indicate better feeding or roosting opportunities to the east.

1.6.2.41 Figure 1.43 shows the distribution of oystercatcher during the winter. Birds were present along the shoreline of the intertidal ornithology study area. During the passage season, the distribution of birds was very similar to that of the winter season (Figure 1.44).

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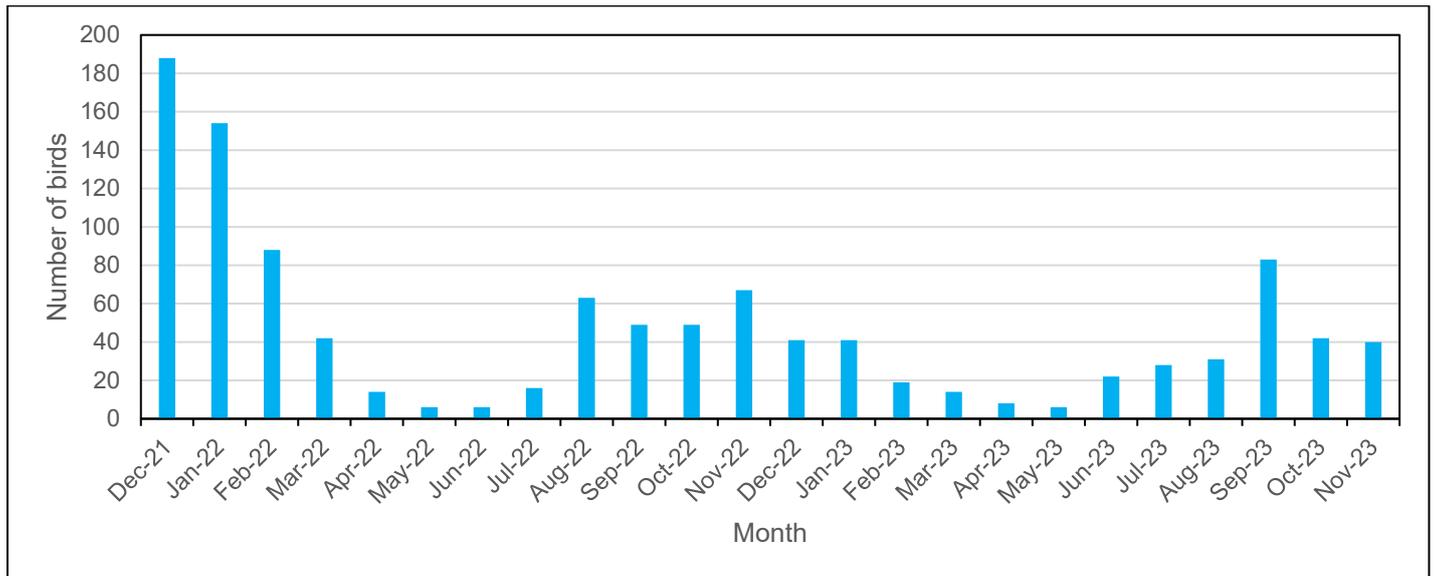


Figure 1.13: Monthly peak maximum count of oystercatcher.

Ringed plover

1.6.2.42 Ringed plover were infrequently recorded during the first winter (Figure 1.14), although they were more frequent and abundant during the nocturnal surveys. However, they were recorded regularly in winter 2022/23 and there was at least one pair recorded as breeding during the summer of 2023 on the upper beach towards the east of the intertidal ornithology study area. The peak count of 22 birds was recorded during September 2023.

1.6.2.43 Similar to oystercatcher, the distribution of ringed plover during the winter was restricted to the shoreline of the intertidal ornithology study area (Figure 1.45). During the passage season, birds were also found mainly along the shoreline (Figure 1.46).

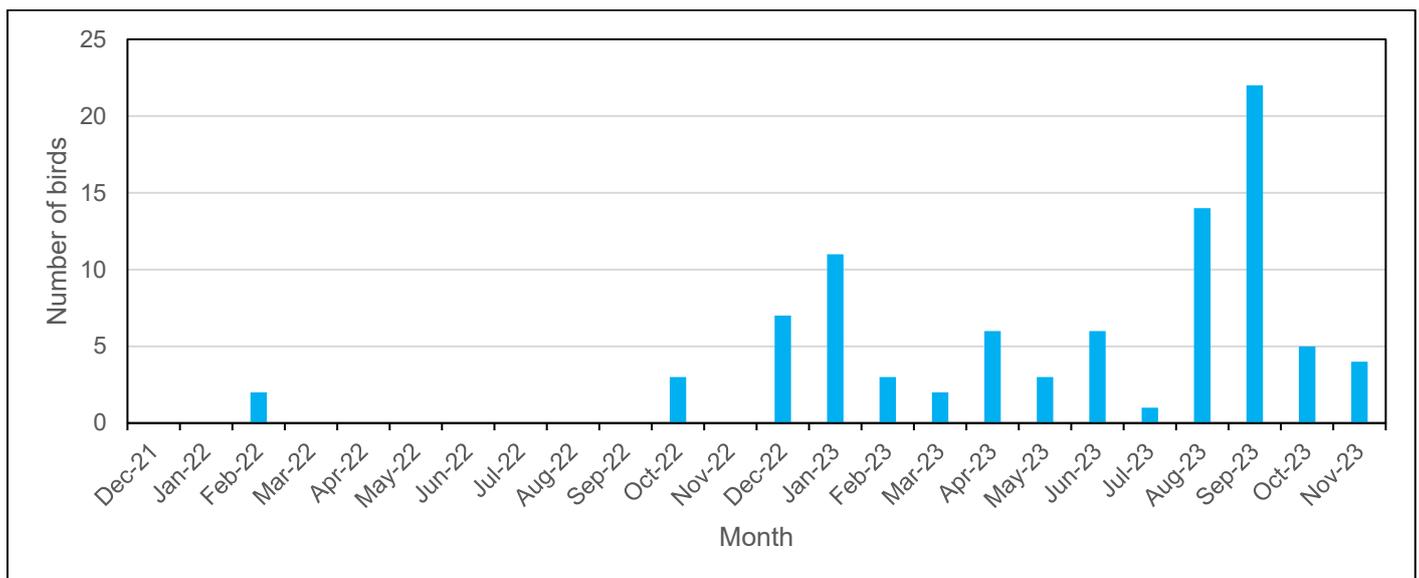


Figure 1.14: Monthly peak maximum count of ringed plover.

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Golden plover

1.6.2.44 Only one golden plover was recorded, observed in December 2022 (Figure 1.15) in the western area of the intertidal ornithology study area. The area is therefore unlikely to be of importance to this species.

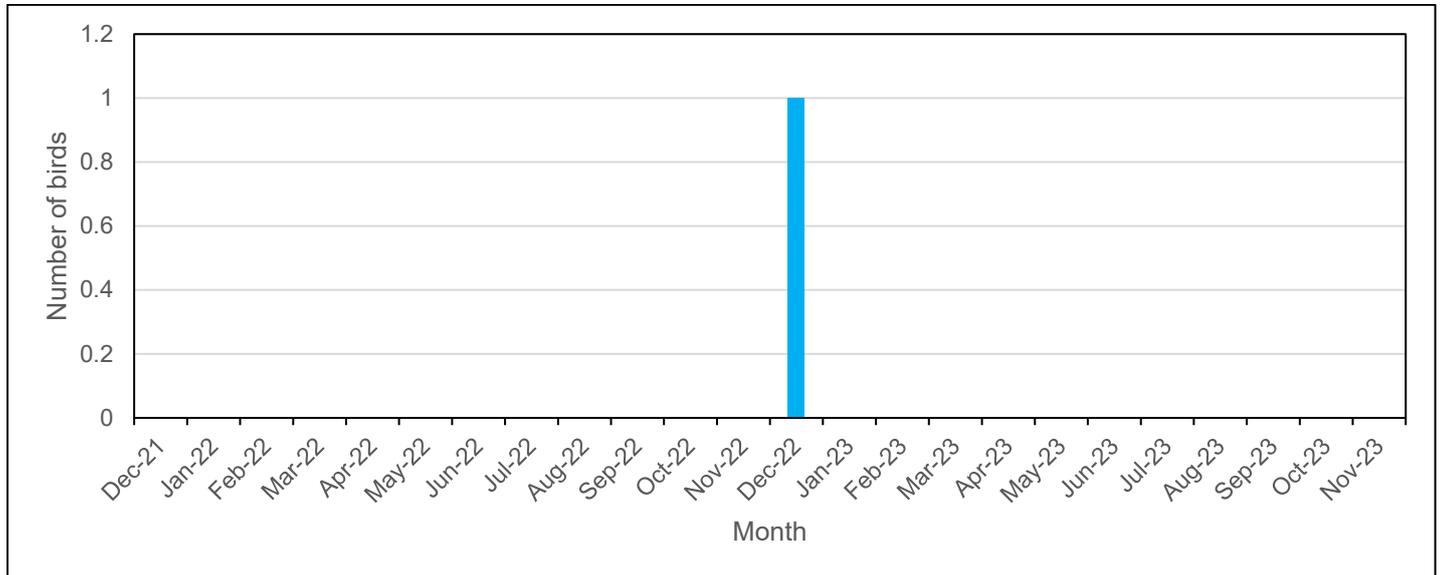


Figure 1.15: Monthly peak maximum count of golden plover.

Sanderling

1.6.2.45 Sanderling were recorder in only two occasions, October 2022 with a total of five individuals and in December 2022, with just one bird (Figure 1.16). All individuals were located at the shoreline both during the passage and winter season (Figure 1.48 and Figure 1.49). The intertidal ornithology study area is therefore unlikely to be of importance to this species.

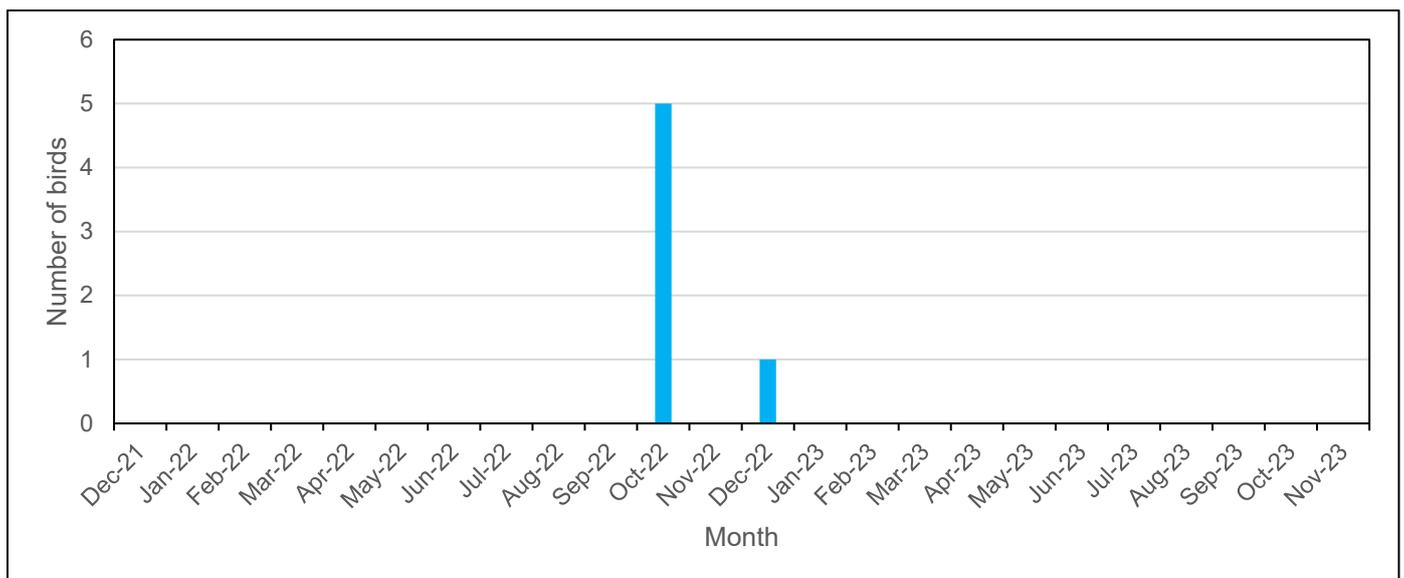


Figure 1.16: Monthly peak maximum count of sanderling.

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Dunlin

1.6.2.46 Dunlin were recorded infrequently and in low numbers despite a peak of 44 individuals in December 2022 (Figure 1.17). The intertidal ornithology study area is therefore unlikely to be of importance to this species.

1.6.2.47 Figure 1.50 shows that dunlin were mainly distributed in the western part of the intertidal ornithology study area during the winter season.

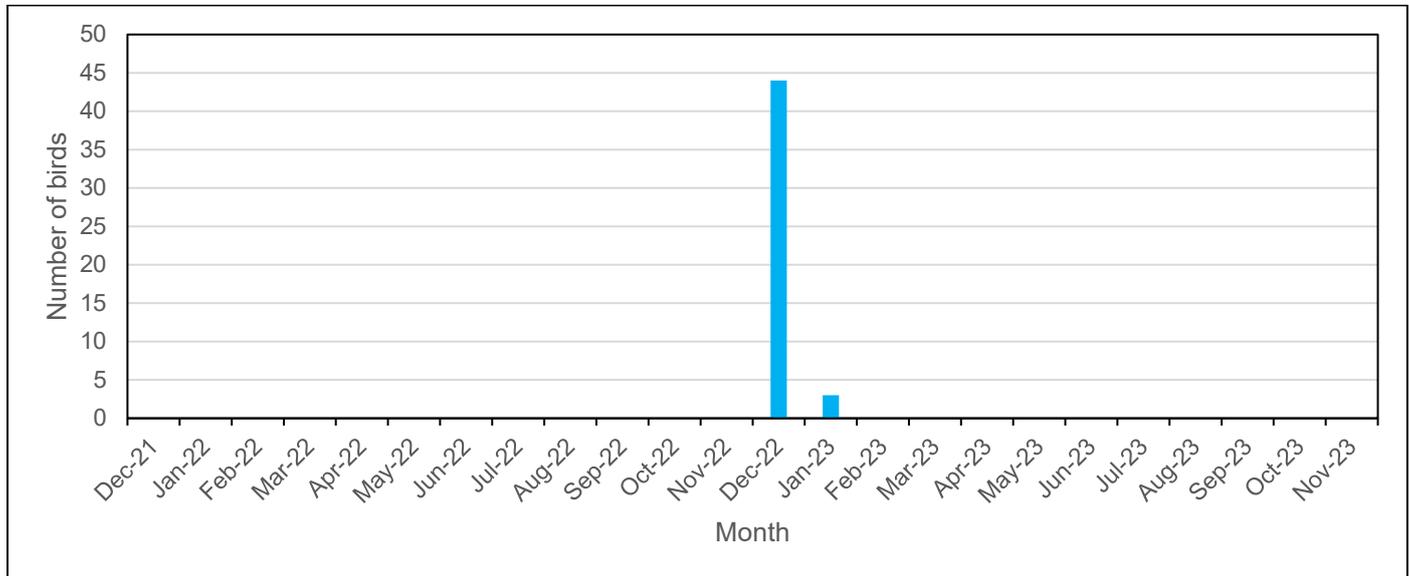


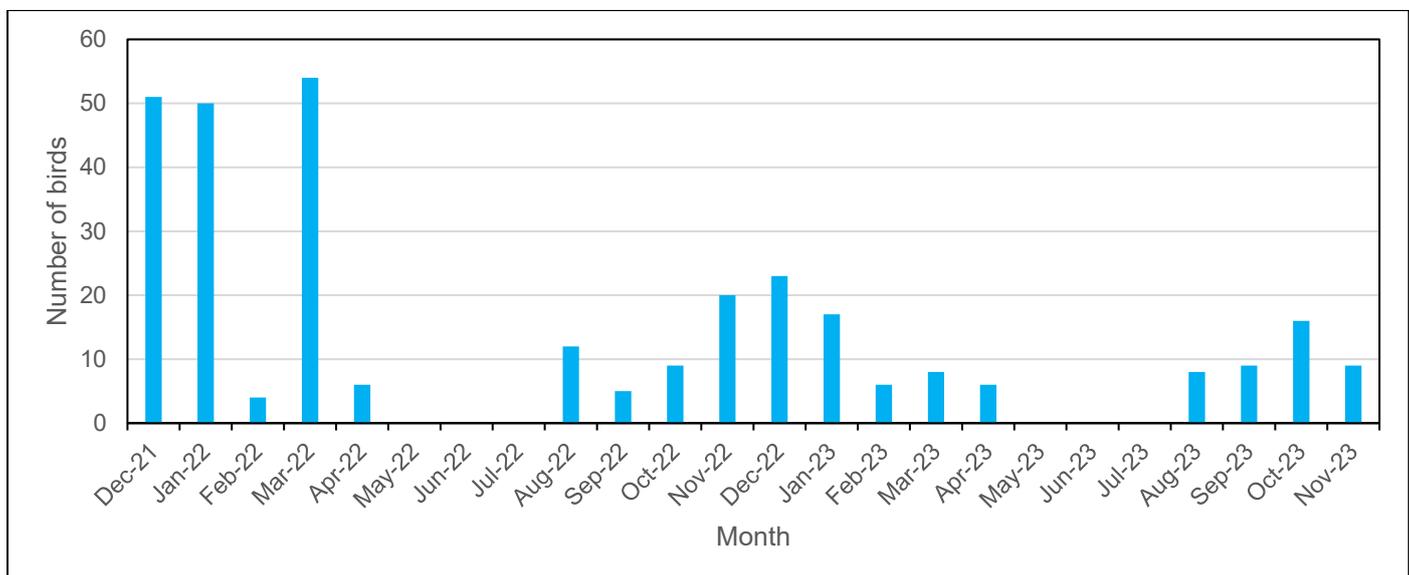
Figure 1.17: Monthly peak maximum count of dunlin.

Turnstone

1.6.2.48 Turnstone were present regularly throughout both winter periods with a peak of 54 during March 2022/23 and during December 2022. It is of note that monthly peak counts were higher during the first winter.

1.6.2.49 The Colwyn Bay and North Clwyd Coast WeBS records relatively high numbers with a 5-year average of 129 (Table 1.5).

1.6.2.50 The presence of turnstone during the winter and passage were restricted to the intertidal area of the intertidal ornithology study area (Figure 1.51 and Figure 1.52).



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Figure 1.18: Monthly peak maximum count of turnstone.

Redshank

- 1.6.2.51 Redshank were present throughout both winter periods, and at lower numbers during the passage periods in spring and autumn. The distribution of redshank in both seasons was alike, with individuals mainly restricted to the shoreline and intertidal ornithology study area (Figure 1.53 and Figure 1.54).
- 1.6.2.52 The pattern and number of birds was broadly similar between the first year and second year of surveys with numbers decreasing throughout the late winter/spring period. A peak maximum count of 41 individuals was recorded in November 2023(Figure 1.19).

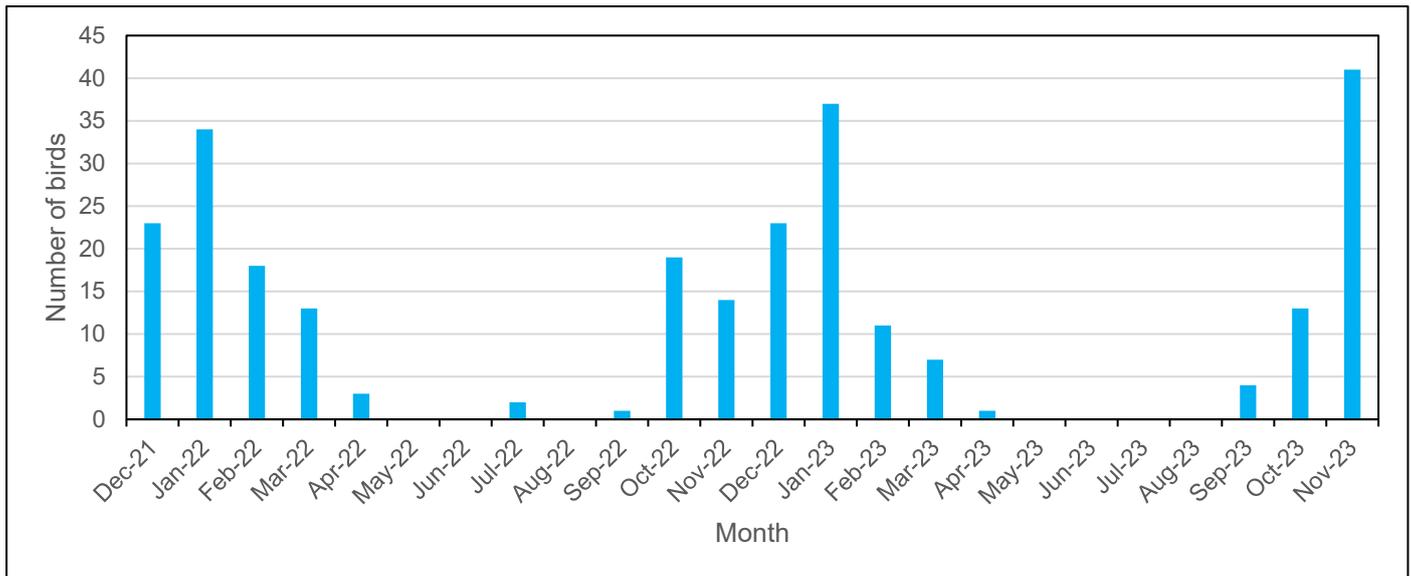


Figure 1.19: Monthly peak maximum count of redshank.

Bar-tailed godwit

- 1.6.2.53 Only one bar-tailed godwit was recorded in November 2022 (Figure 1.20) during the winter season (Figure 1.55). The intertidal ornithology study area is therefore unlikely to be of low importance for this species.

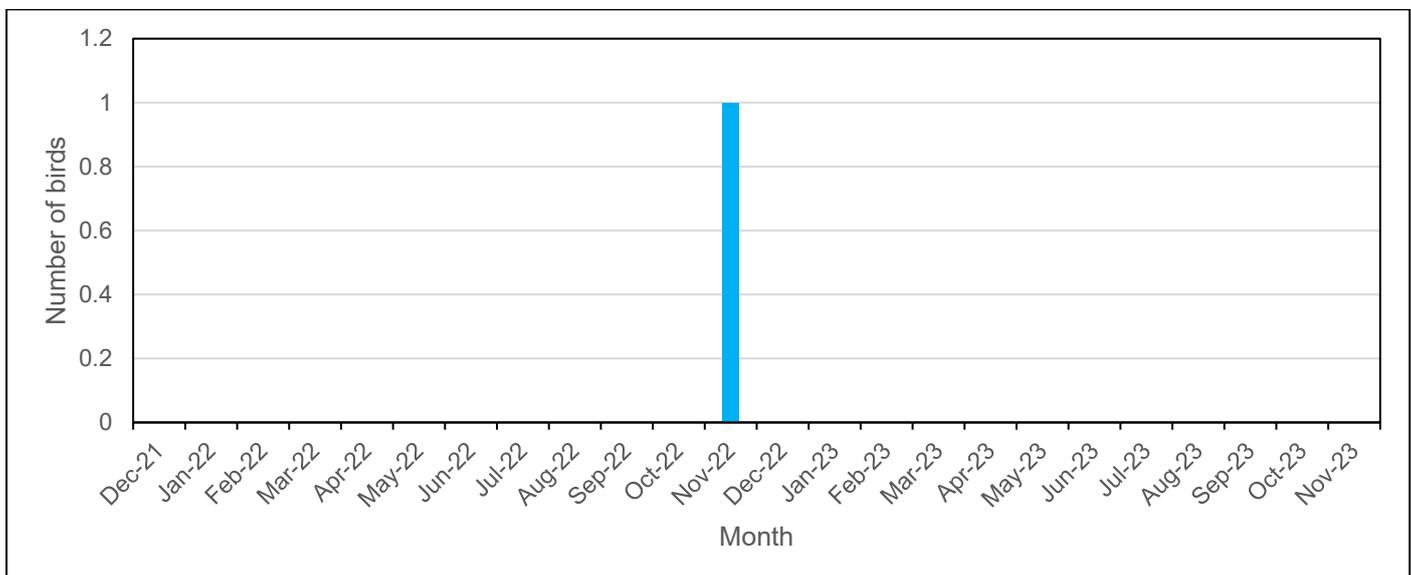


Figure 1.20: Monthly peak maximum count of bar-tailed godwit.

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Curlew

1.6.2.54 Curlew were present throughout the winter and passage periods although there were large fluctuations between months, winters and years (Figure 1.21). Curlew often feed on flooded farmland during the winter, so the December 2021 to January 2022 peak maximum counts may represent a period of cold weather when extra birds congregate on the intertidal zone.

1.6.2.55 The distribution of curlew during both winter and passage seasons was similar with individuals distributed towards the western part and along the coastline of the intertidal ornithology study area (Figure 1.56 and Figure 1.57).

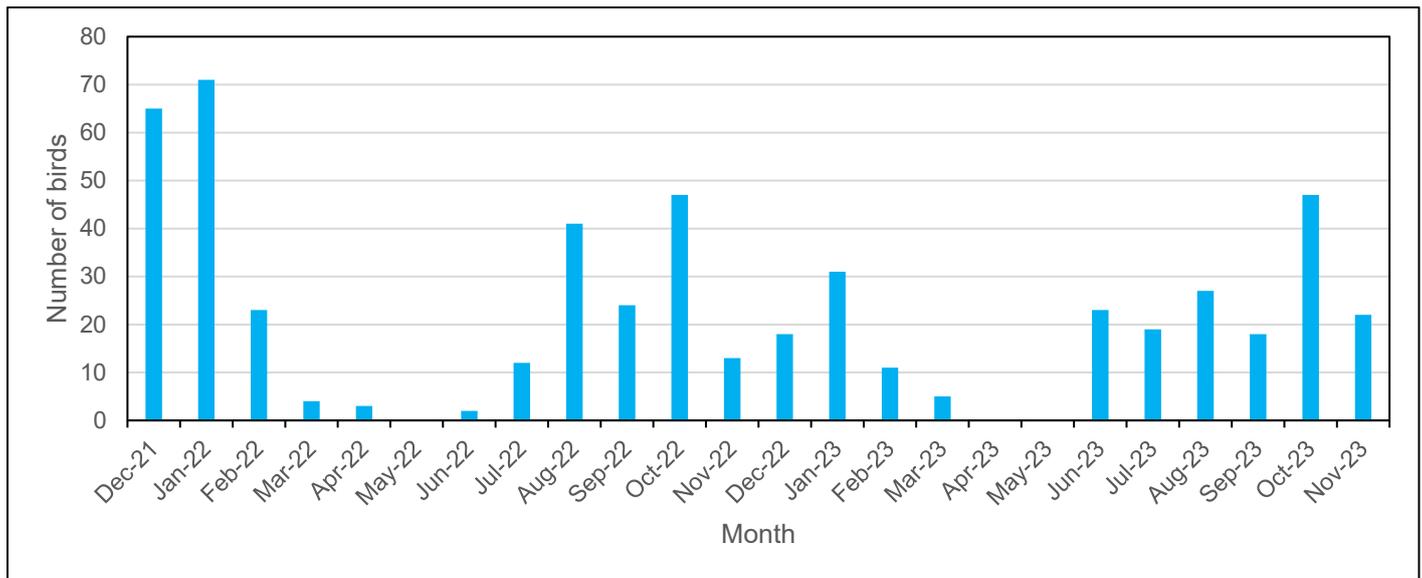


Figure 1.21: Monthly peak maximum count of curlew.

Little egret

1.6.2.56 Little egret were present in low numbers throughout the winter and passage periods (Figure 1.22). The peak maximum count was recorded in September 2022, with eight birds.

1.6.2.57 Little egret during the non-breeding were found well distributed along the intertidal zone of the intertidal ornithology study area (Figure 1.58). The distribution during the breeding season was more restricted (Figure 1.59).

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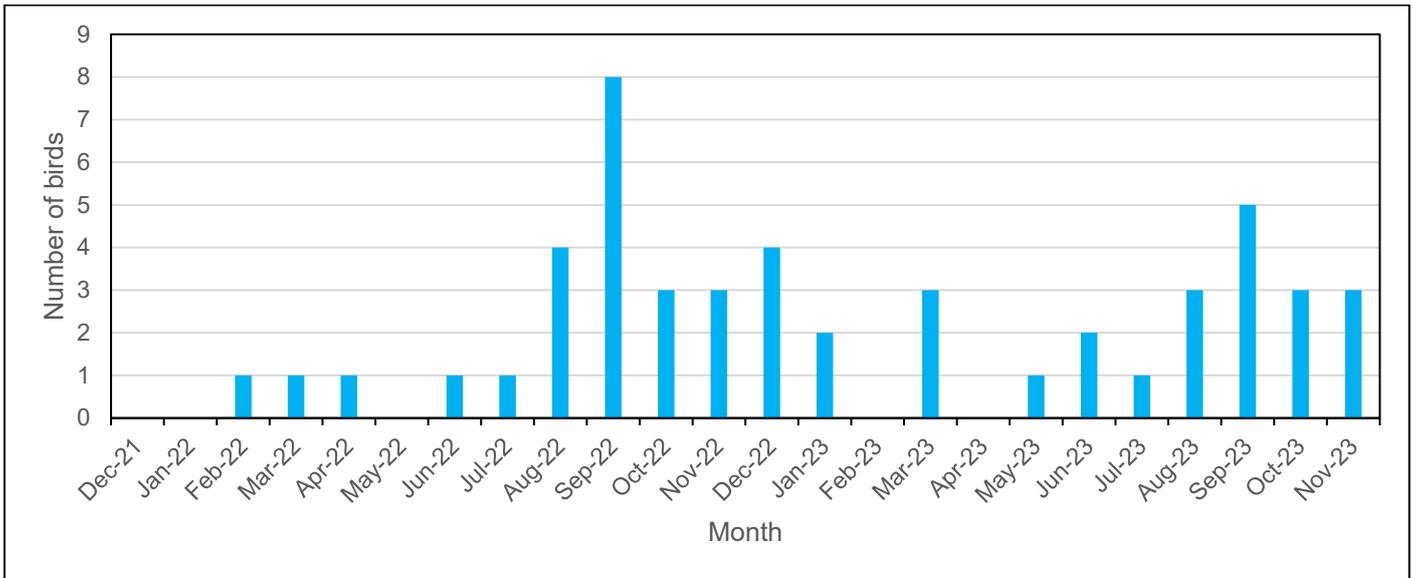


Figure 1.22: Monthly peak maximum count of little egret.

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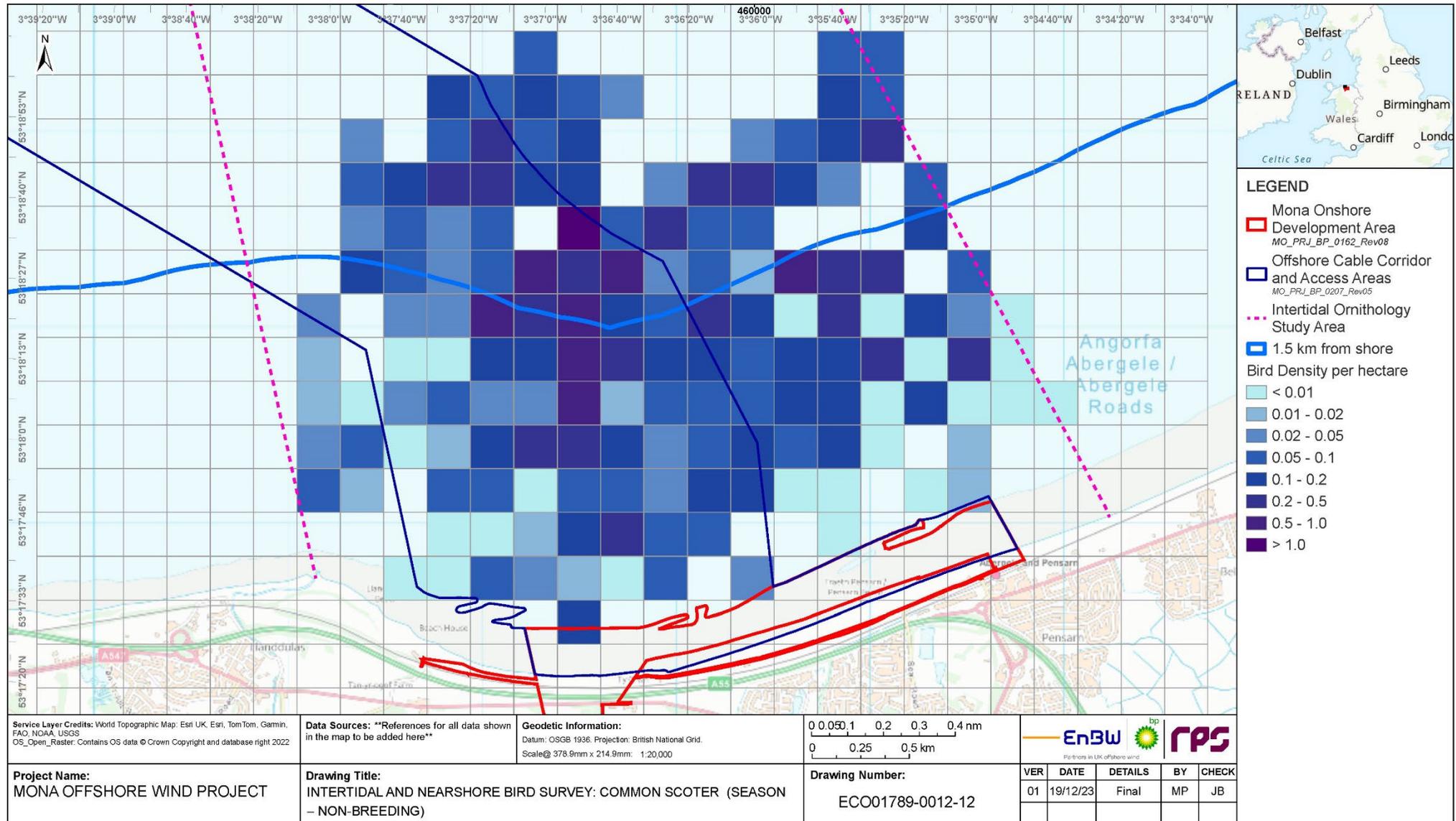


Figure 1.23: Distribution of common scoter during the non-breeding season.

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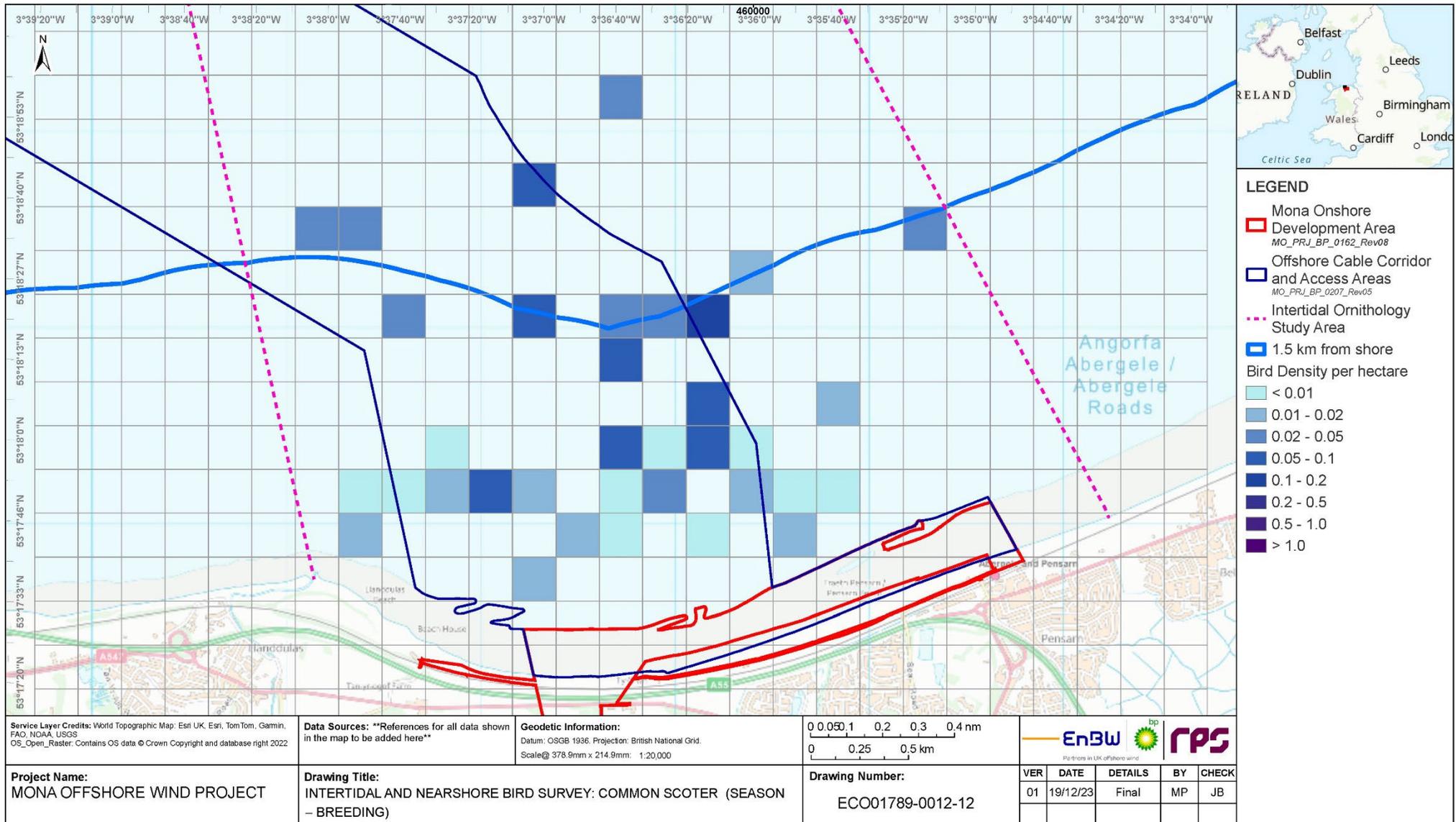


Figure 1.24: Distribution of common scoter during the breeding season.

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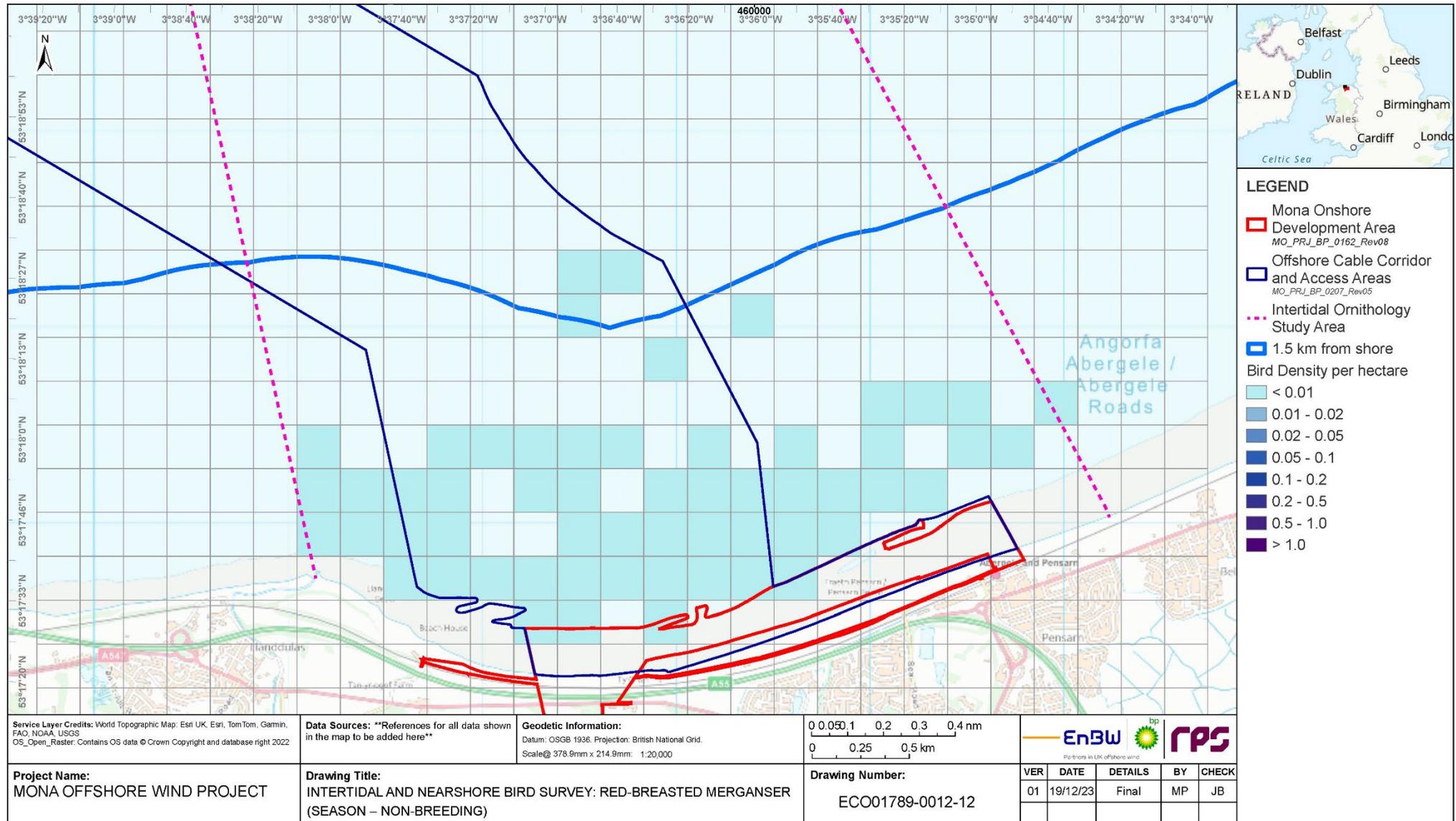


Figure 1.25: Distribution of red-breasted merganser during the non-breeding season.

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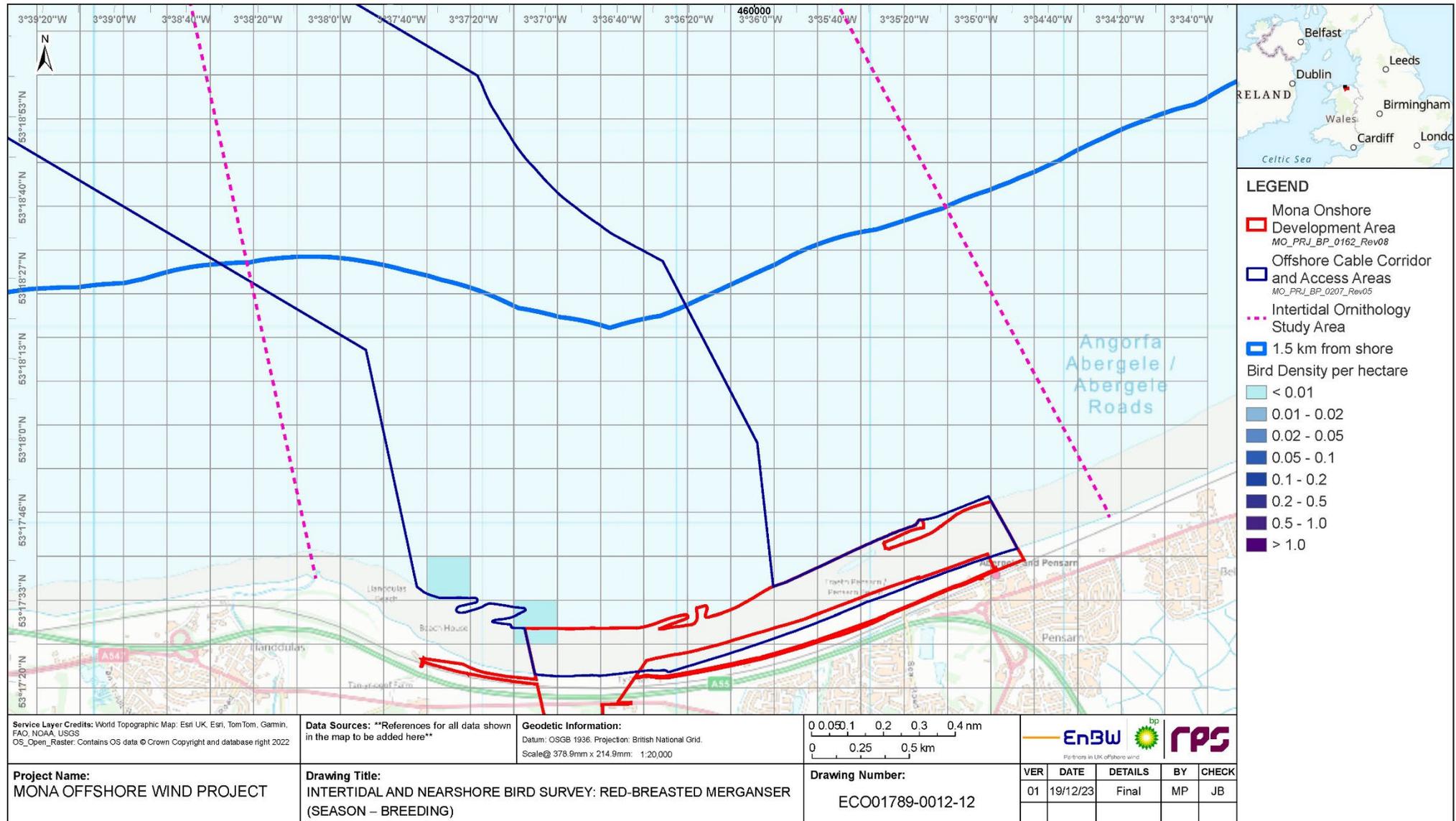


Figure 1.26: Distribution of red-breasted merganser during the breeding season.

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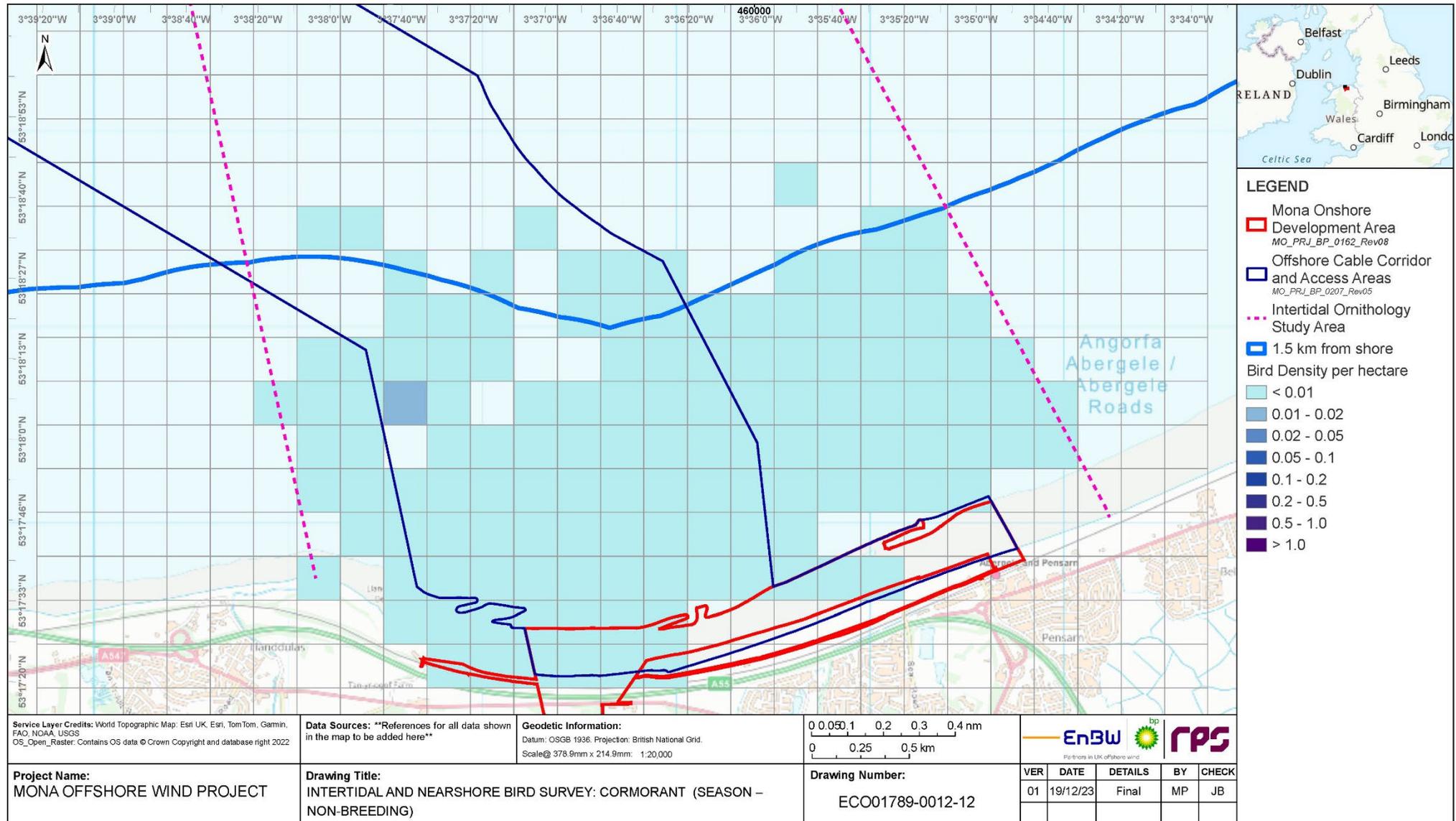


Figure 1.27: Distribution of great cormorant during the non-breeding season.

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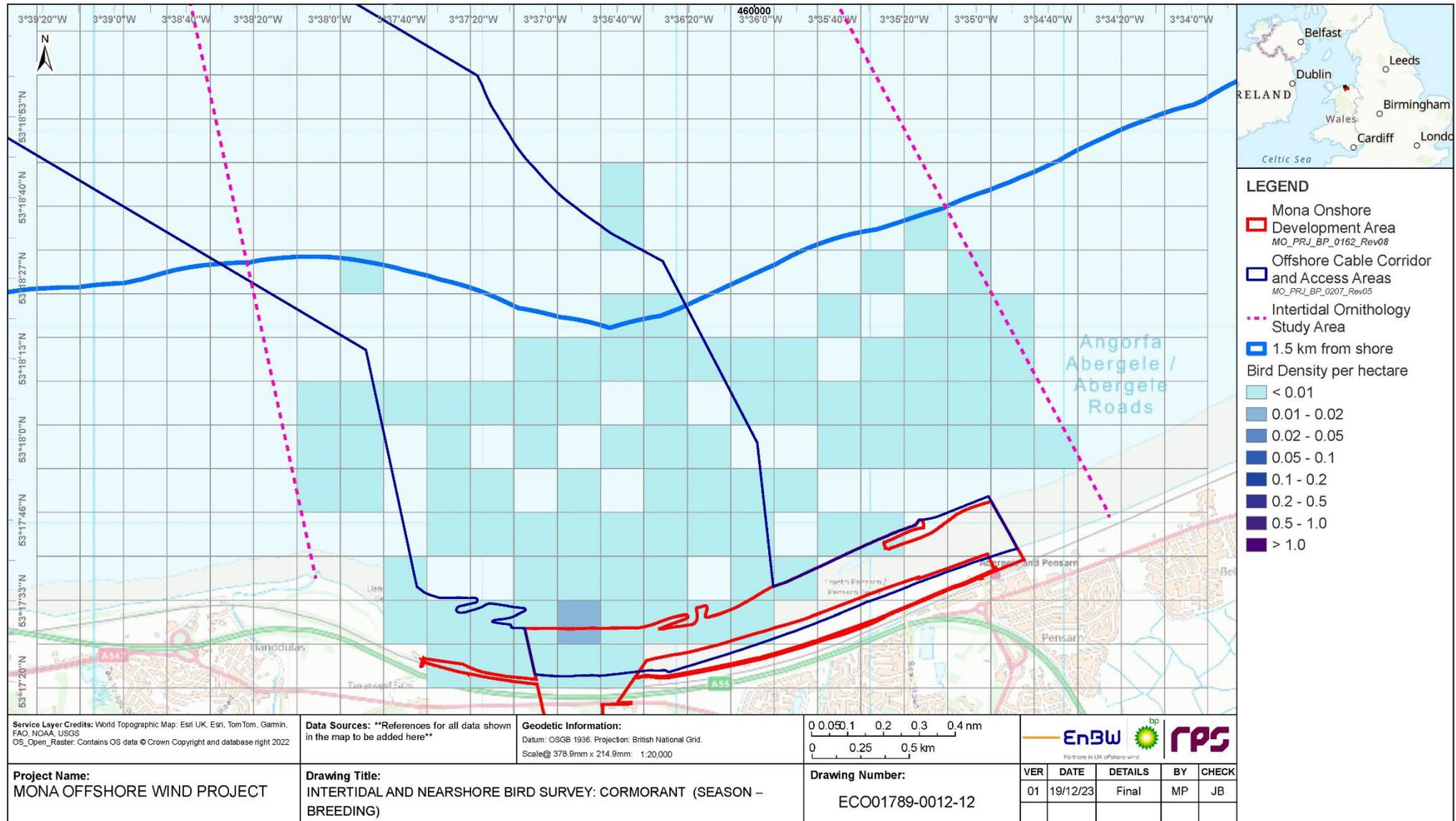


Figure 1.28: Distribution of great cormorant during the breeding season.

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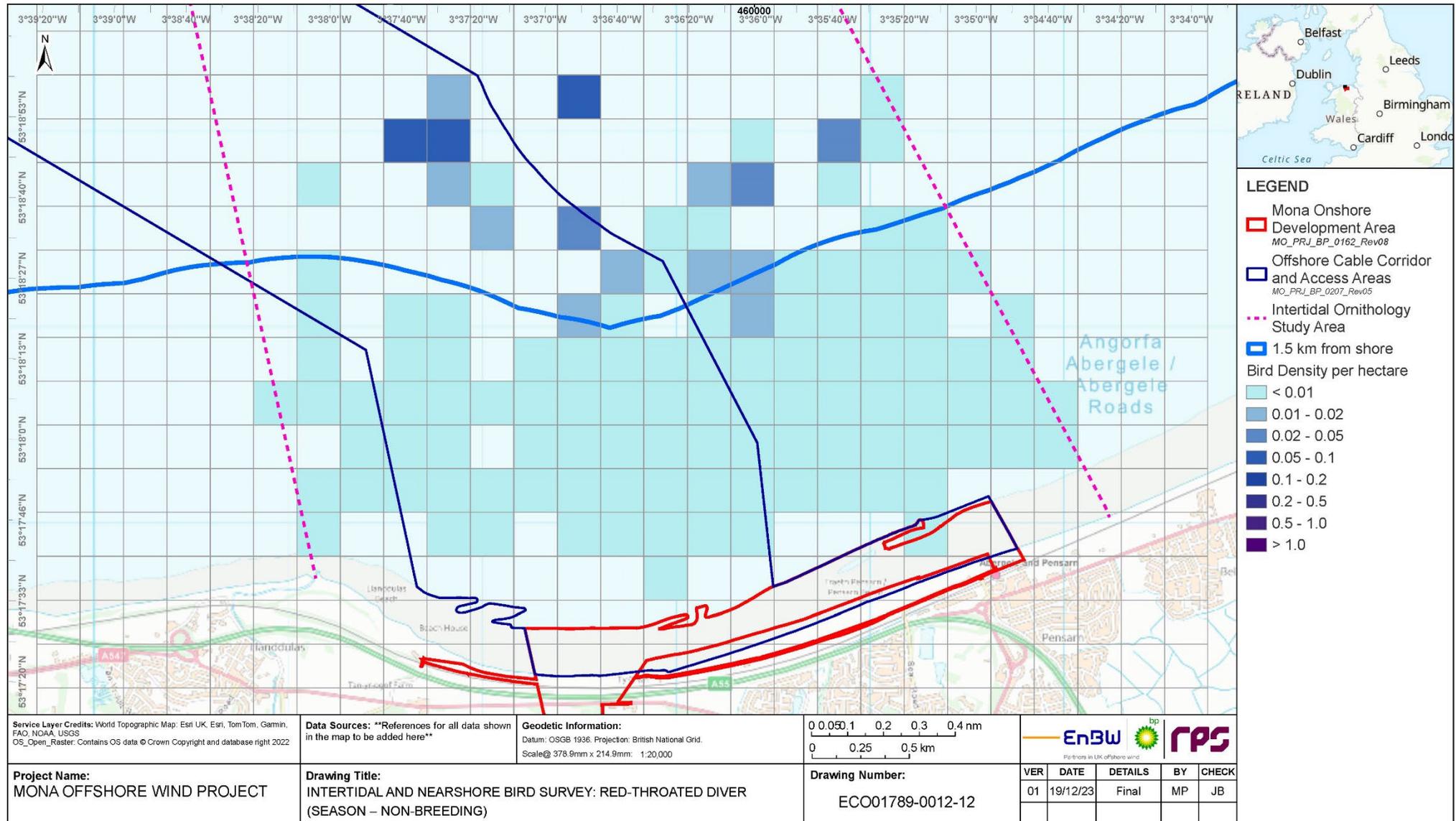


Figure 1.29: Distribution of red-throated diver during the non-breeding season.

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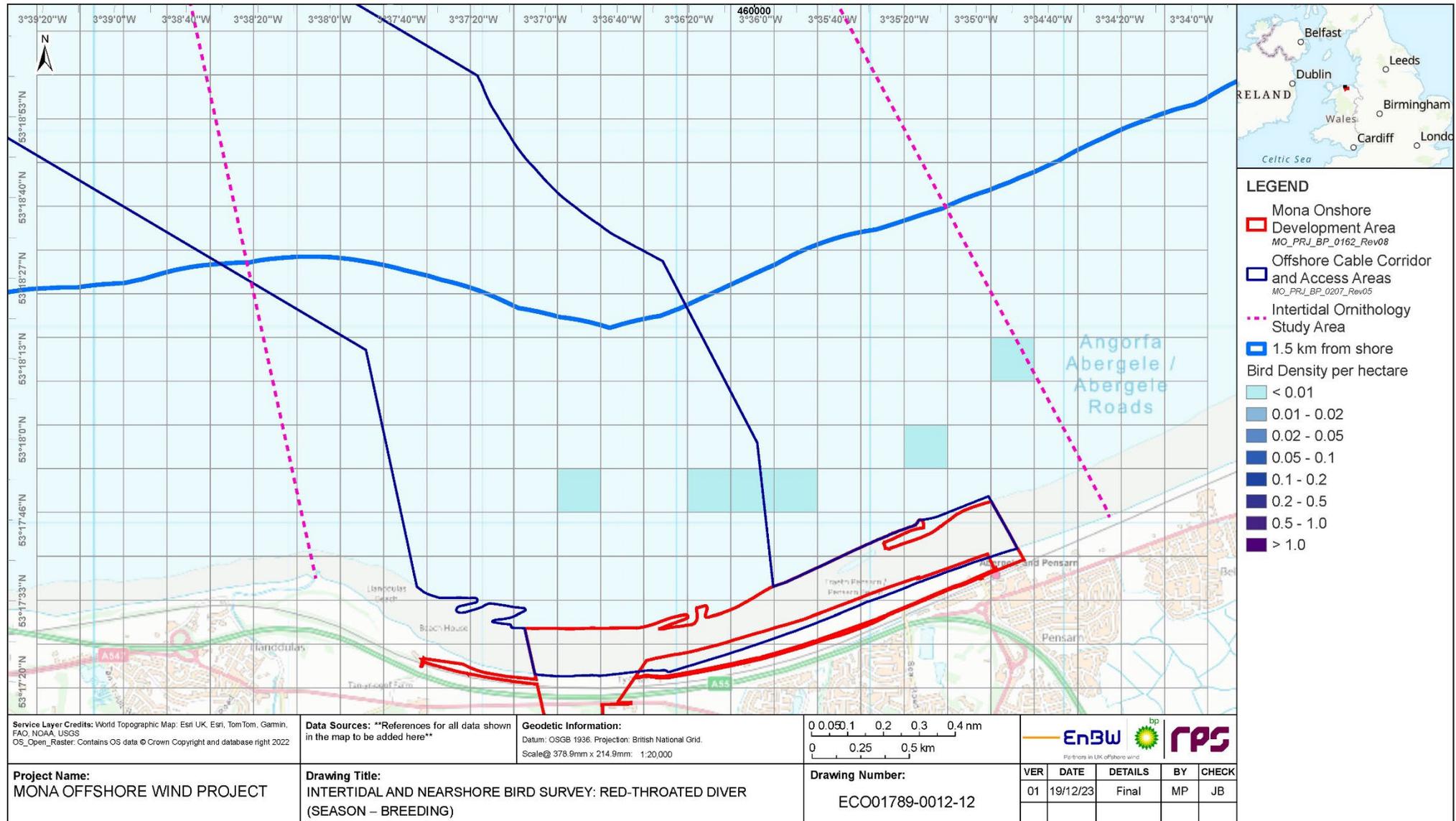


Figure 1.30: Distribution of red-throated diver during the breeding season.

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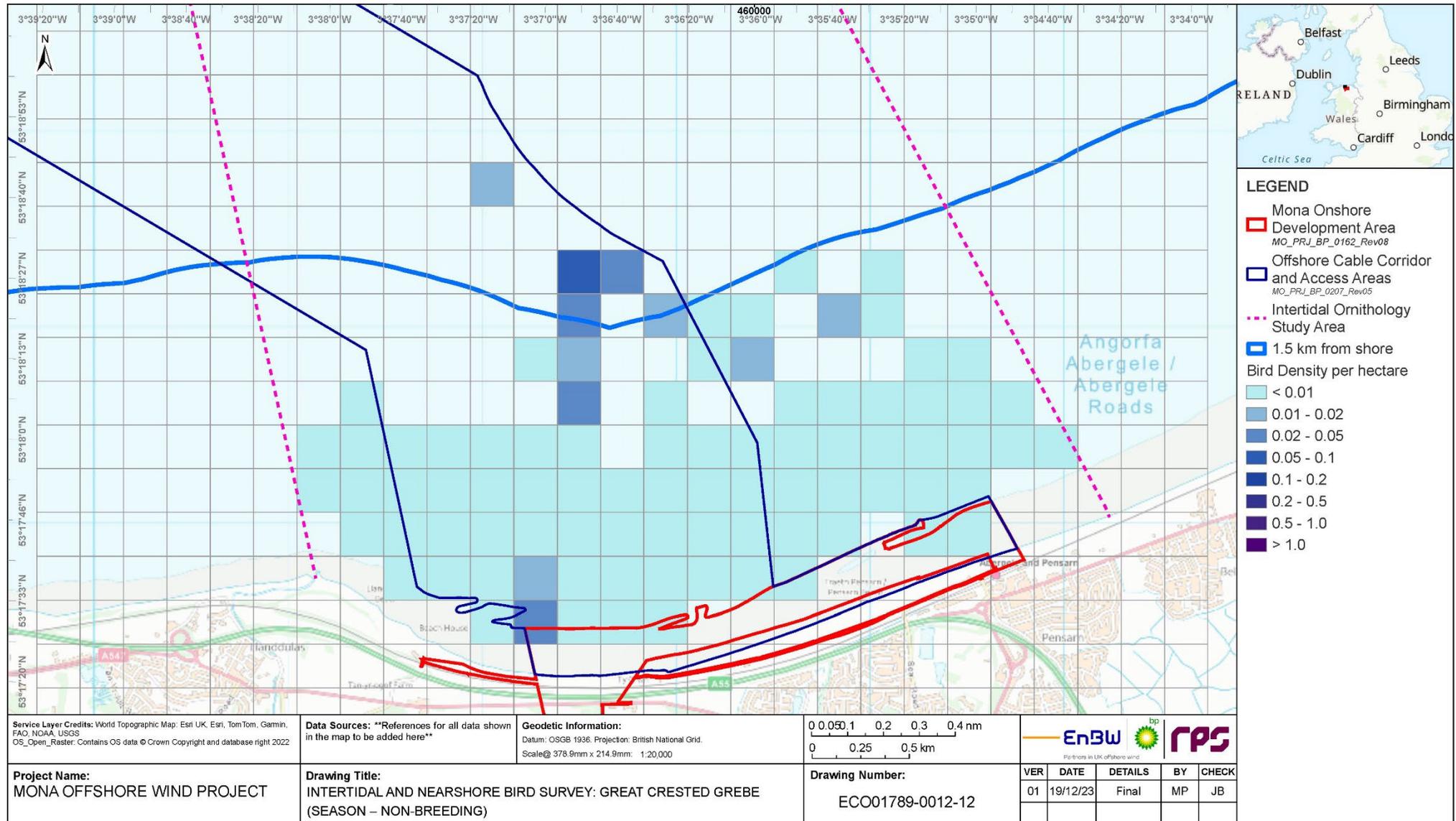


Figure 1.31: Distribution of great crested grebe during the non-breeding season.

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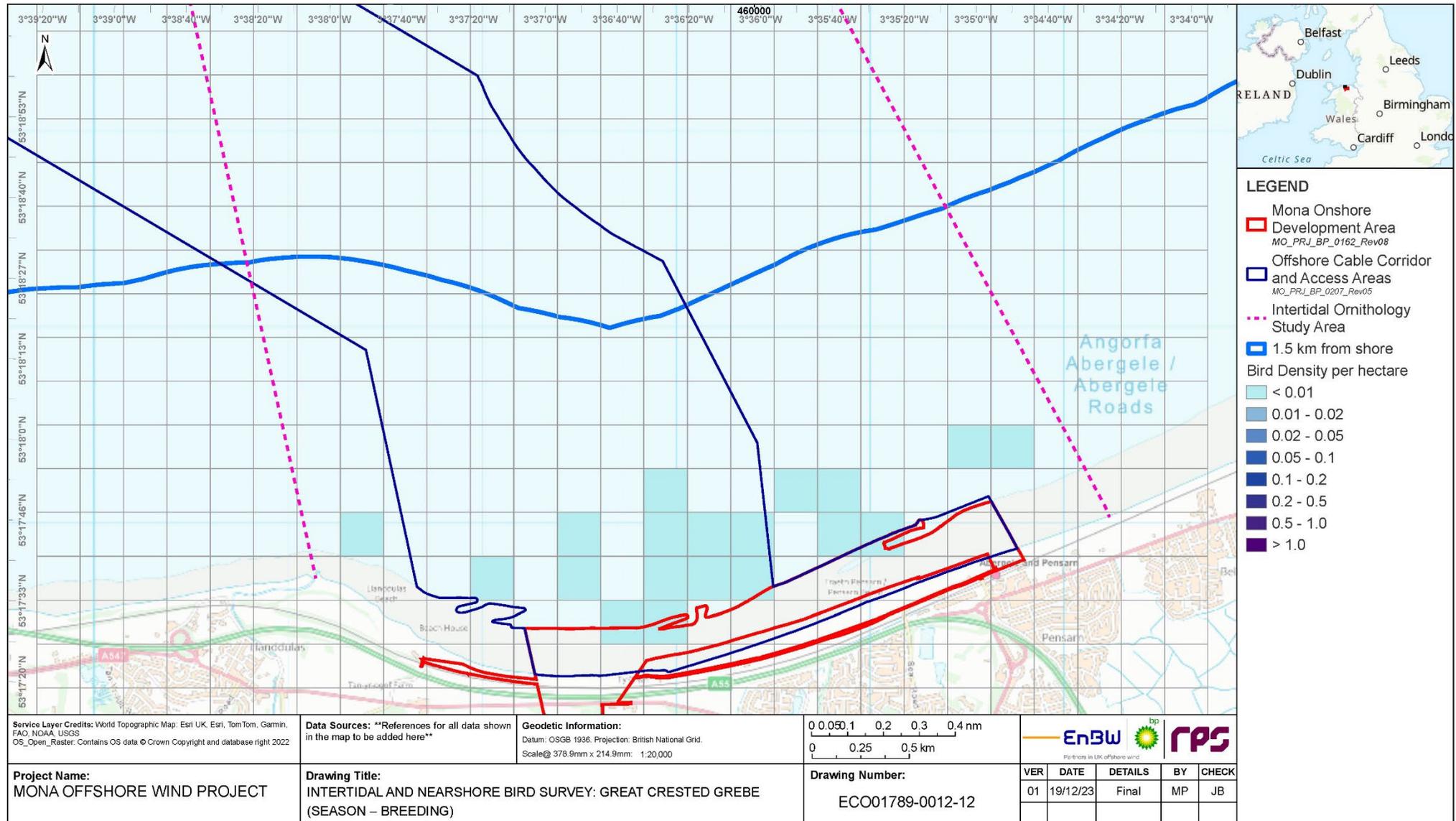


Figure 1.32: Distribution of great crested grebe during the breeding season.

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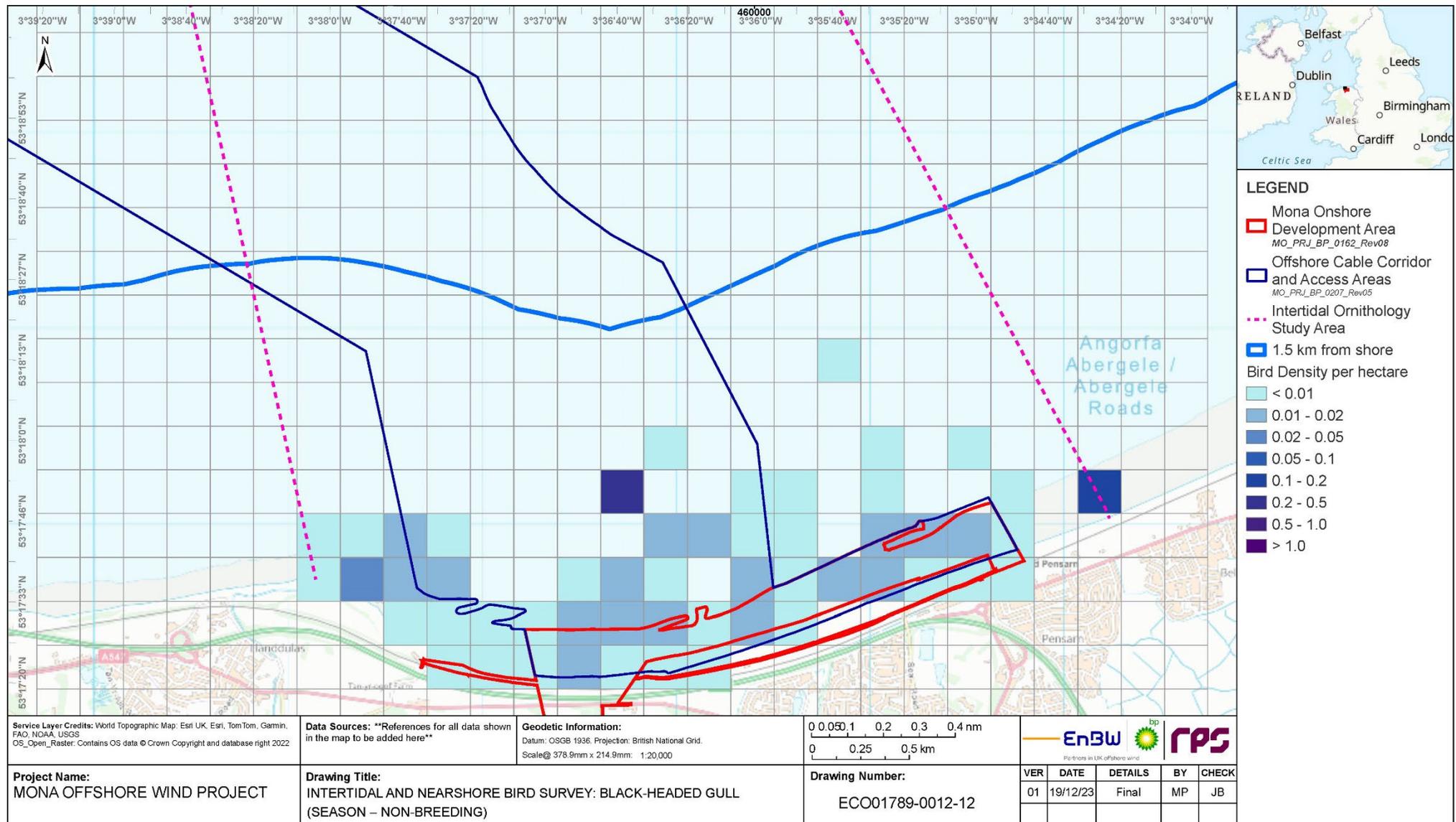


Figure 1.33: Distribution of black-headed gull during the non-breeding season.

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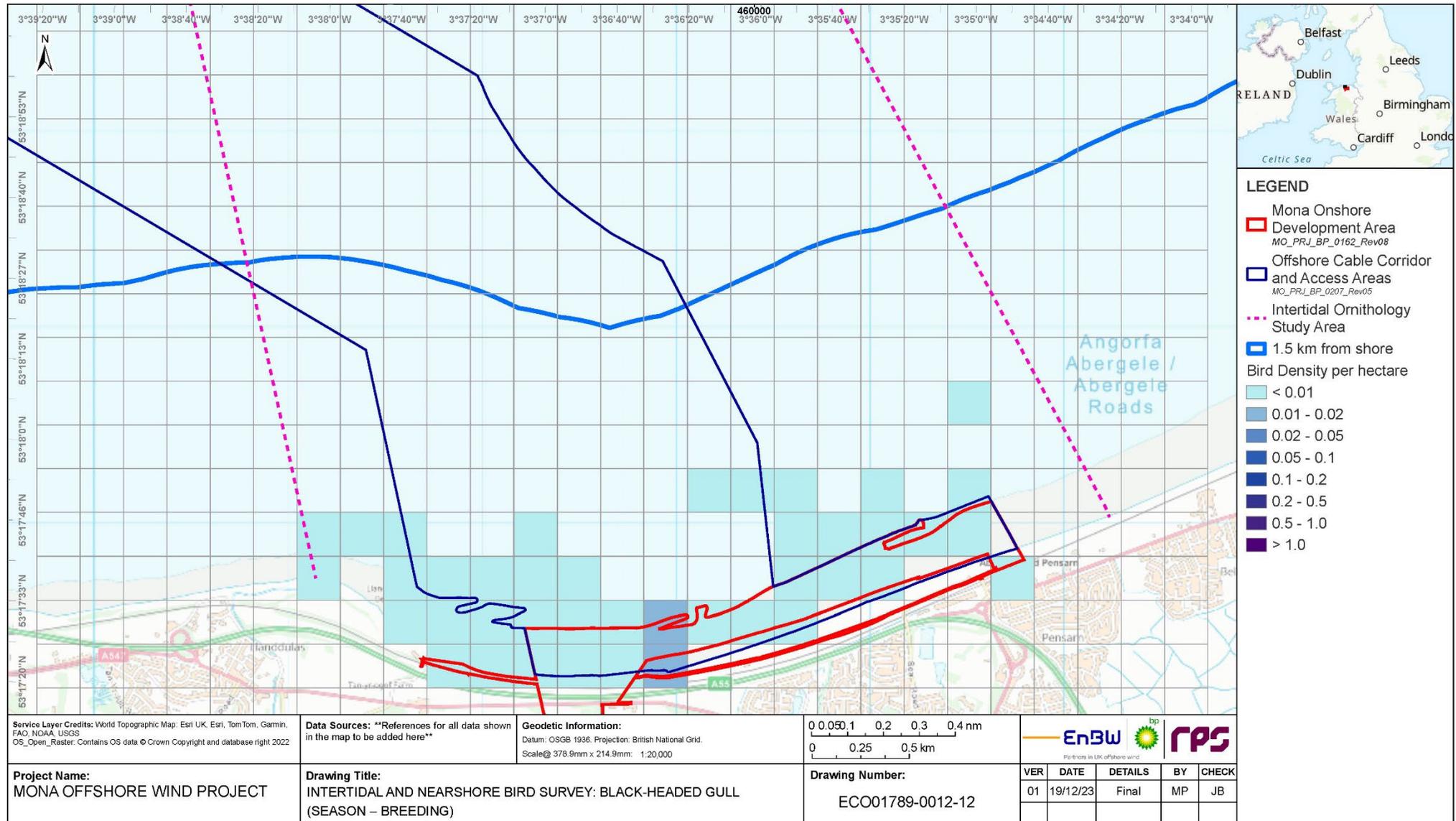


Figure 1.34: Distribution of black-headed gull during the breeding season.

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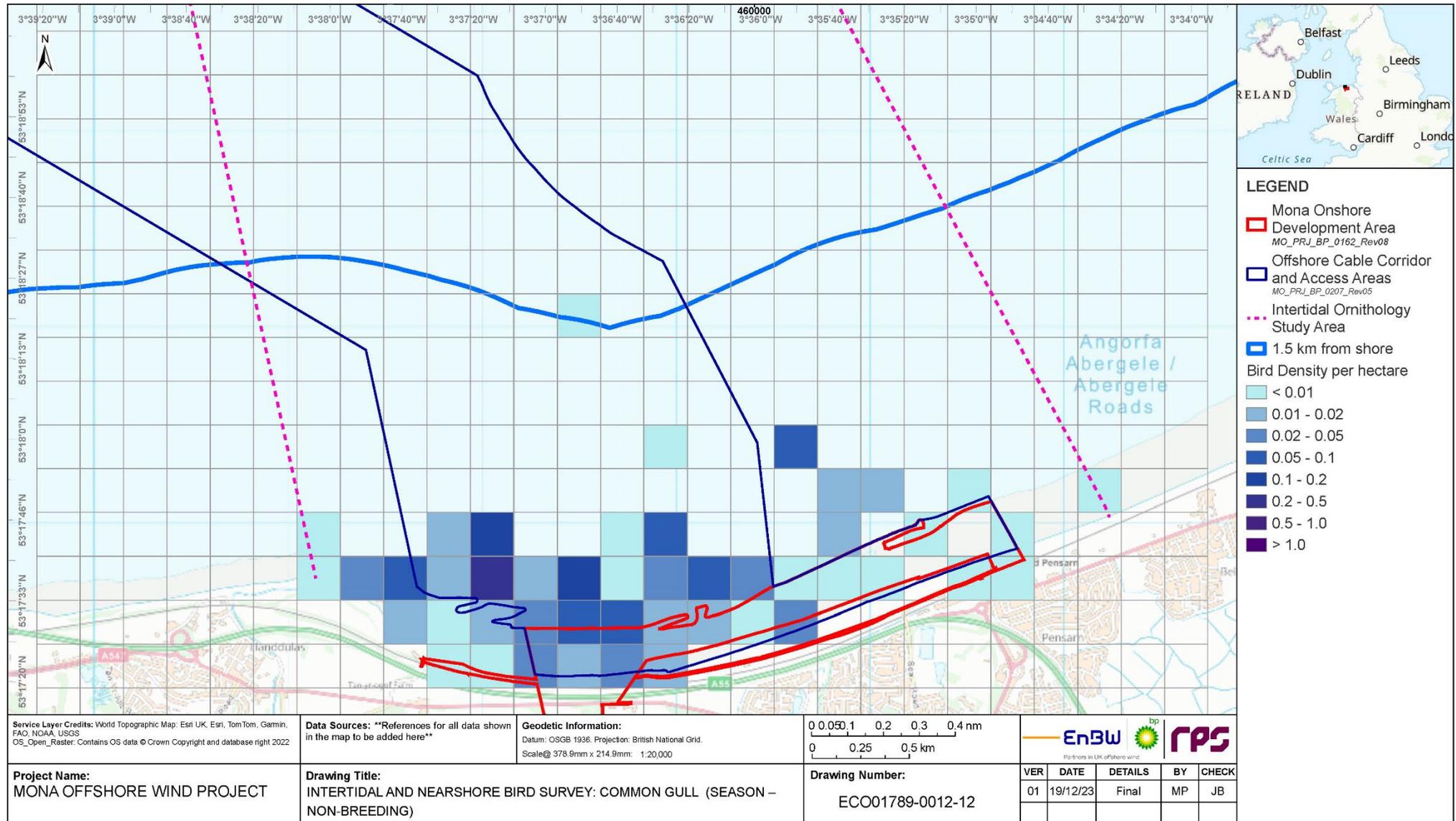


Figure 1.35: Distribution of common gull during the non-breeding season.

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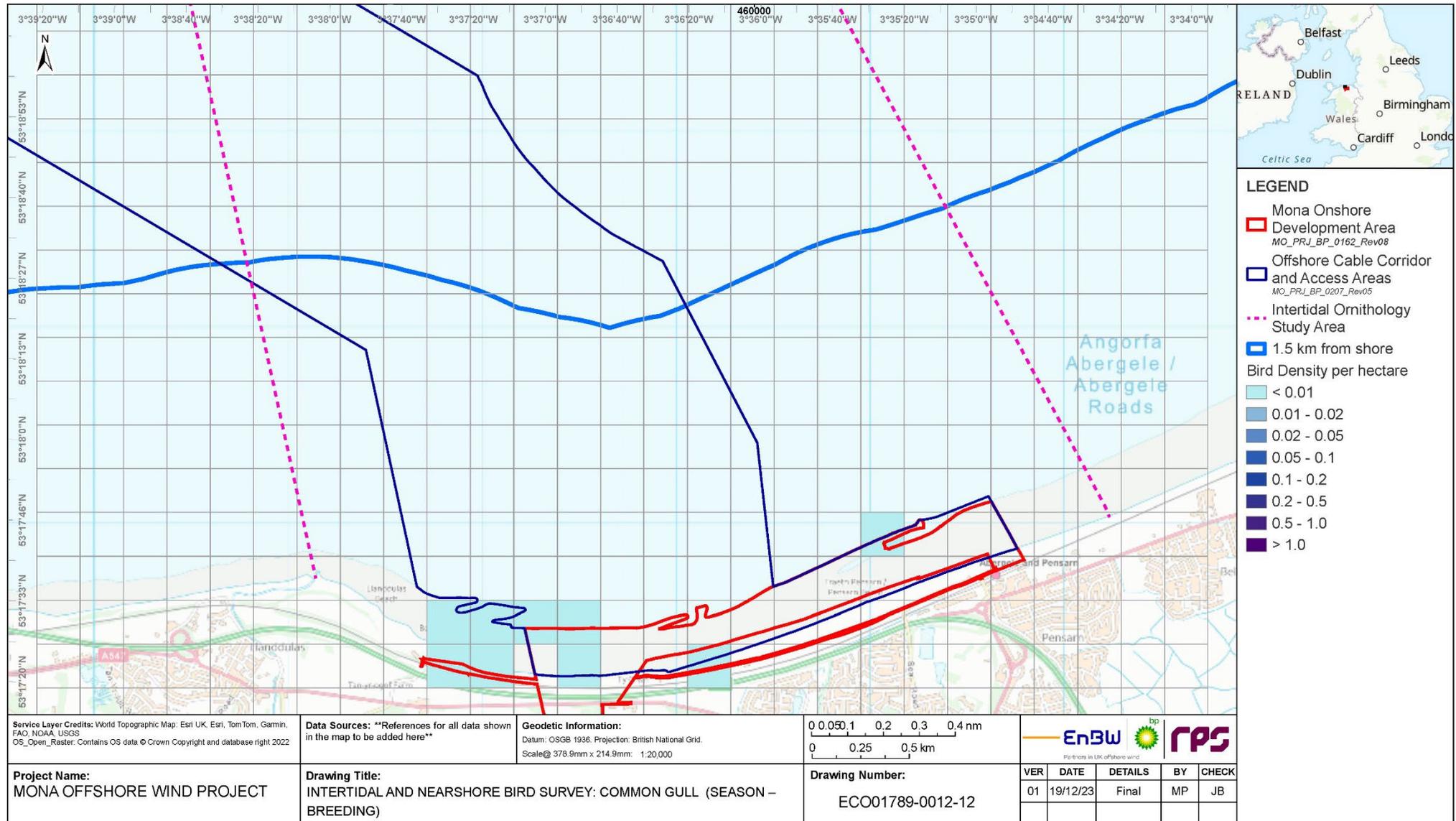


Figure 1.36: Distribution of common gull during the breeding season.

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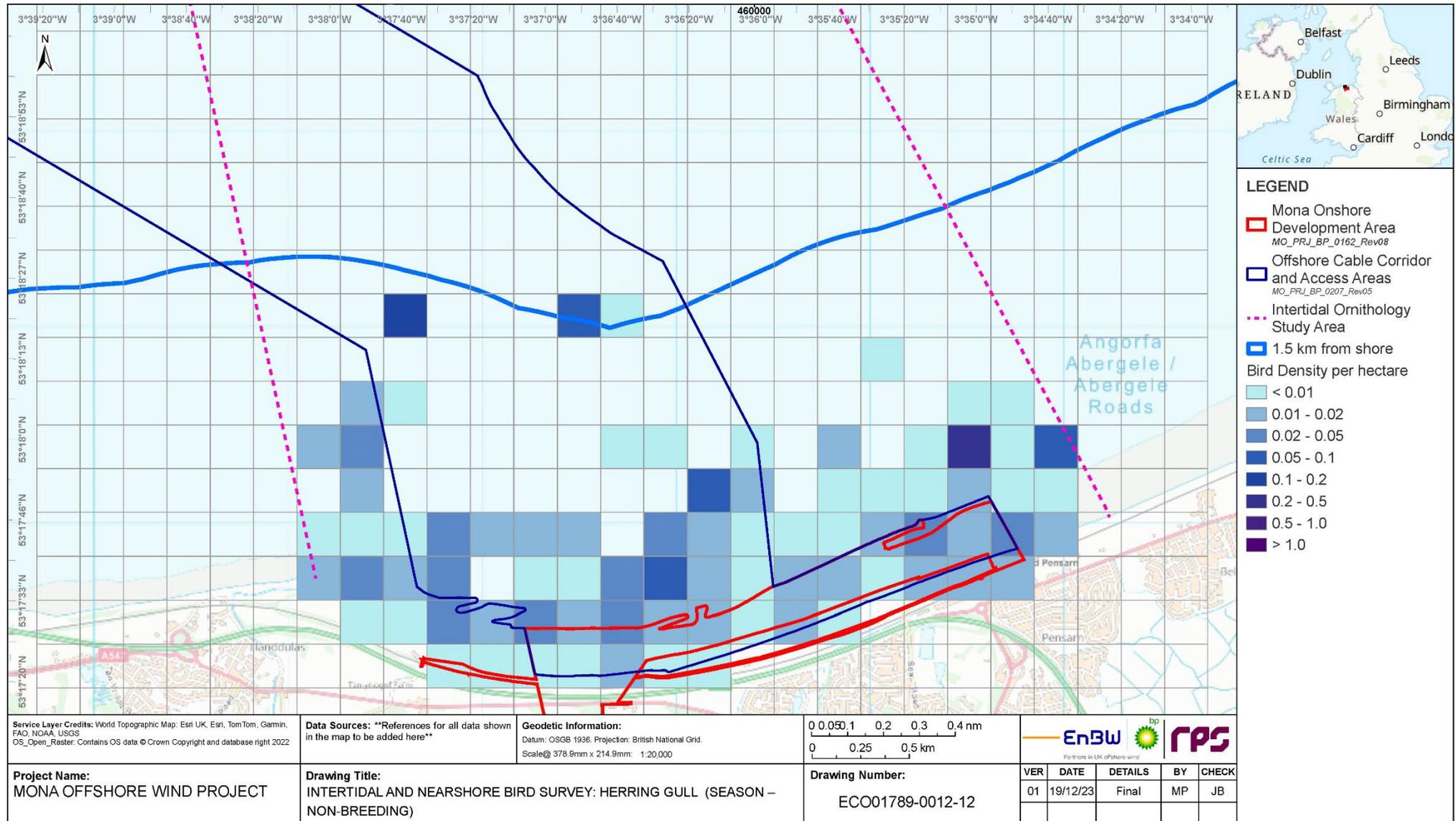


Figure 1.37: Distribution of herring gull during the non-breeding season.

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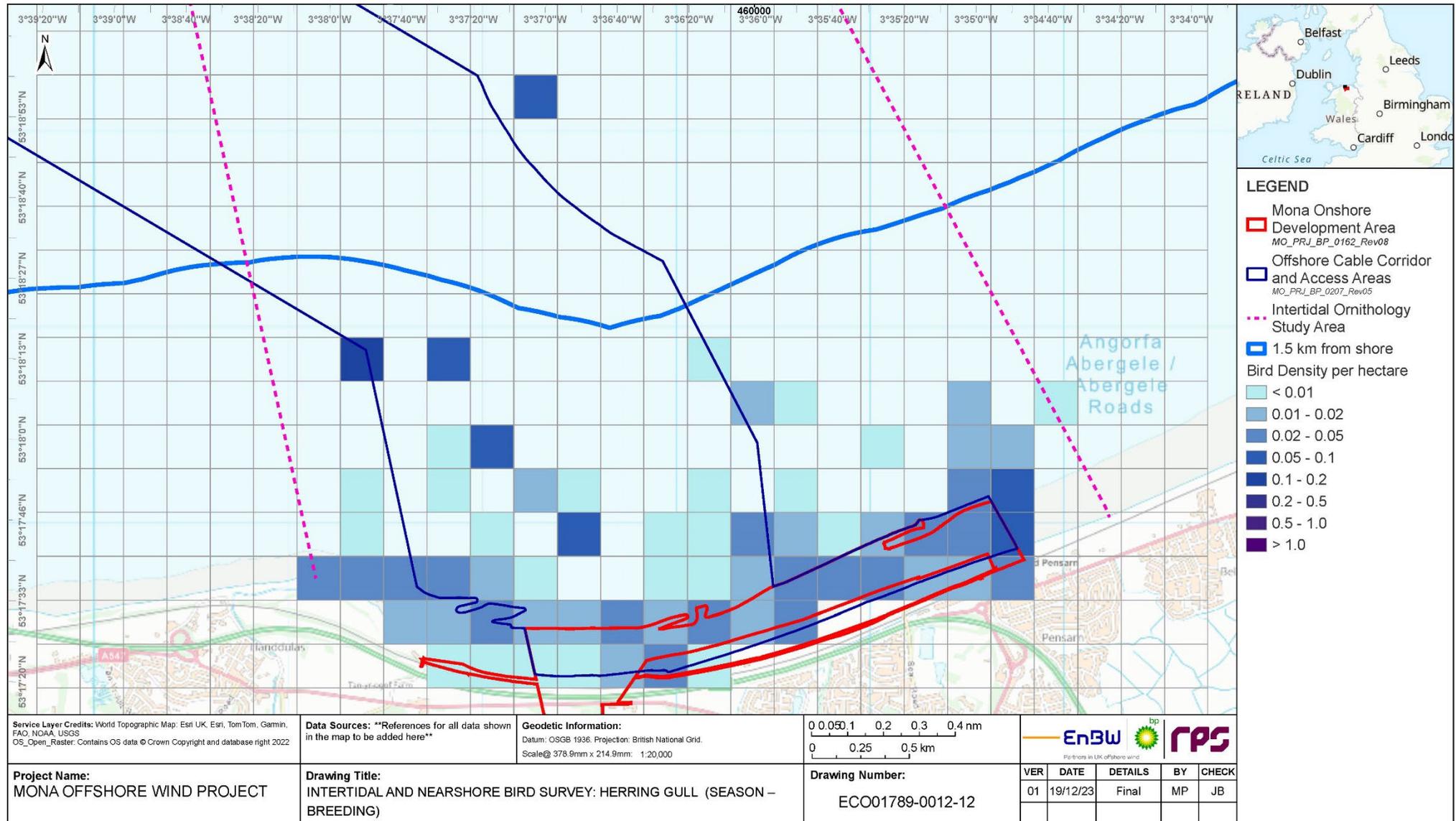


Figure 1.38: Distribution of herring gull during the breeding season.

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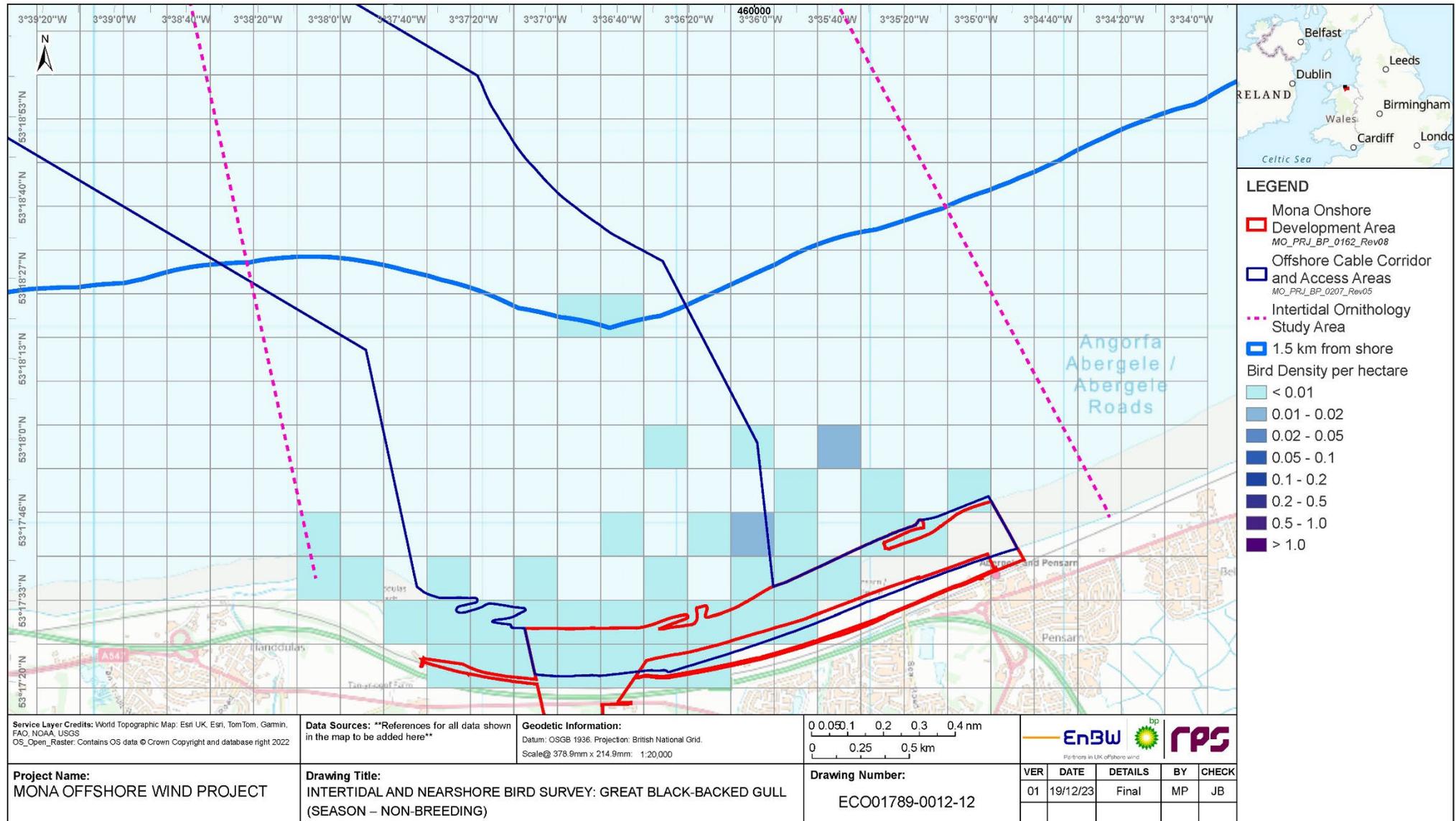


Figure 1.39: Distribution of great black-backed gull during the non-breeding season.

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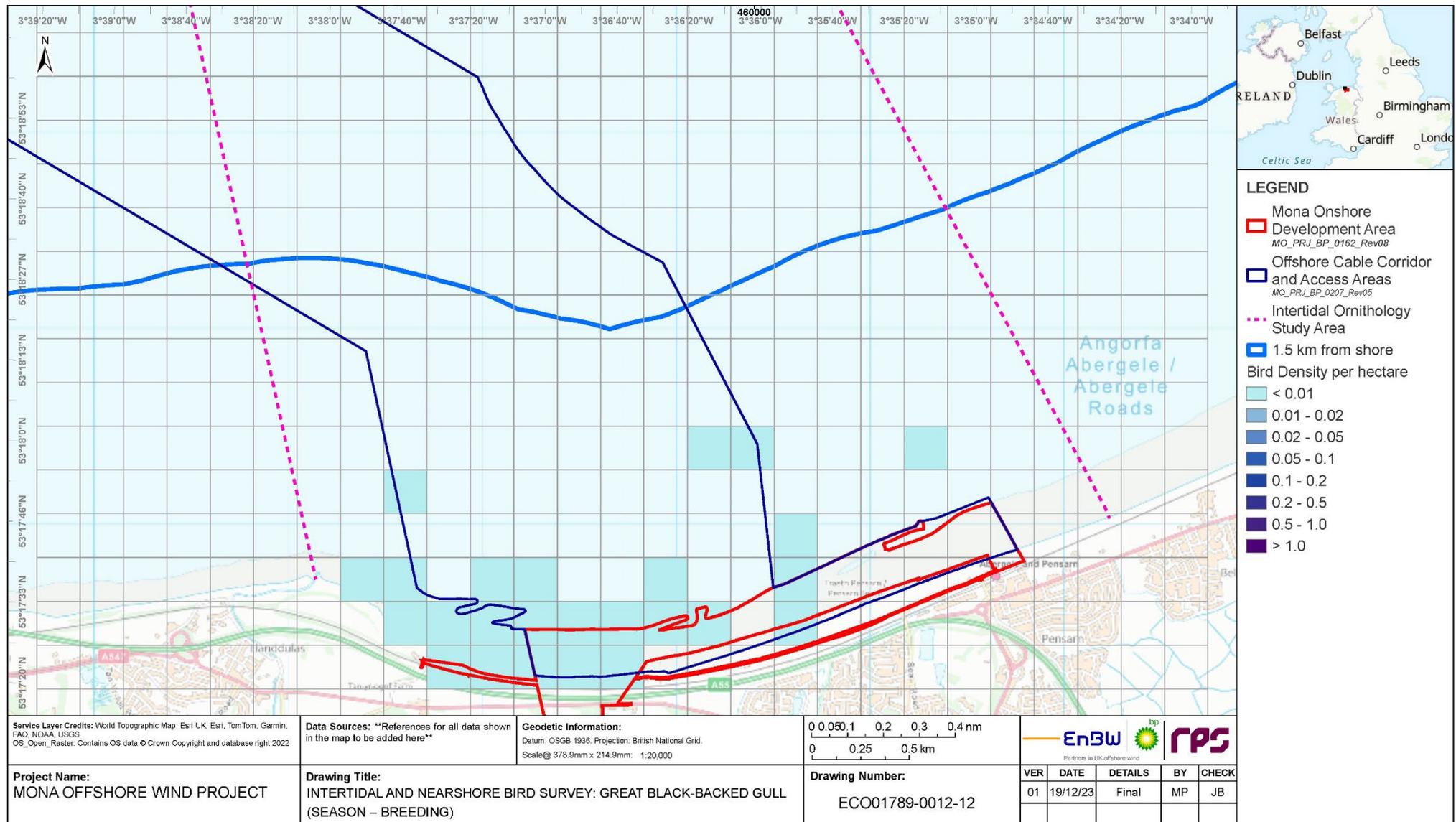


Figure 1.40: Distribution of great black-backed gull during the breeding season.

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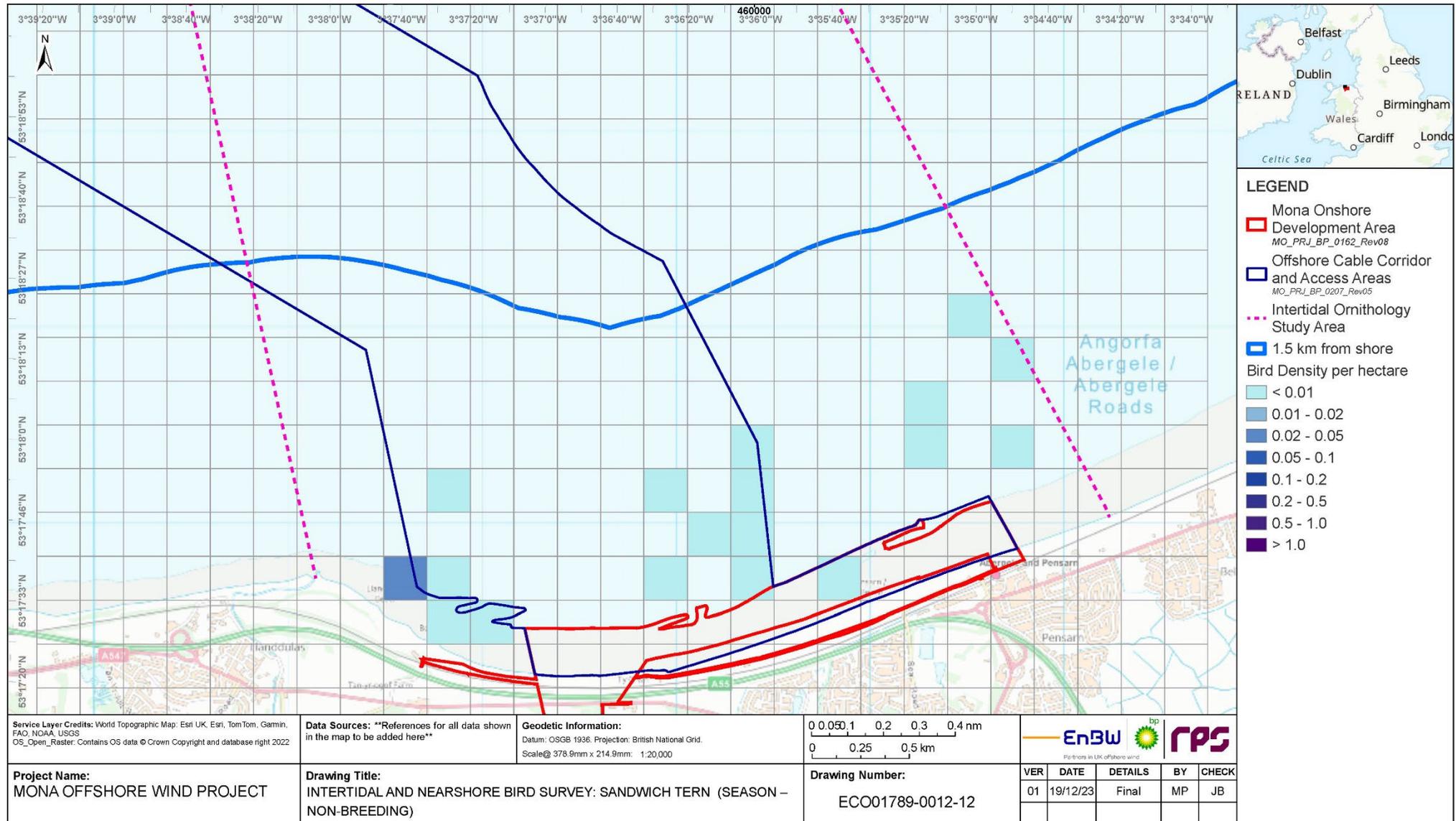


Figure 1.41: Distribution of sandwich tern during the non-breeding season.

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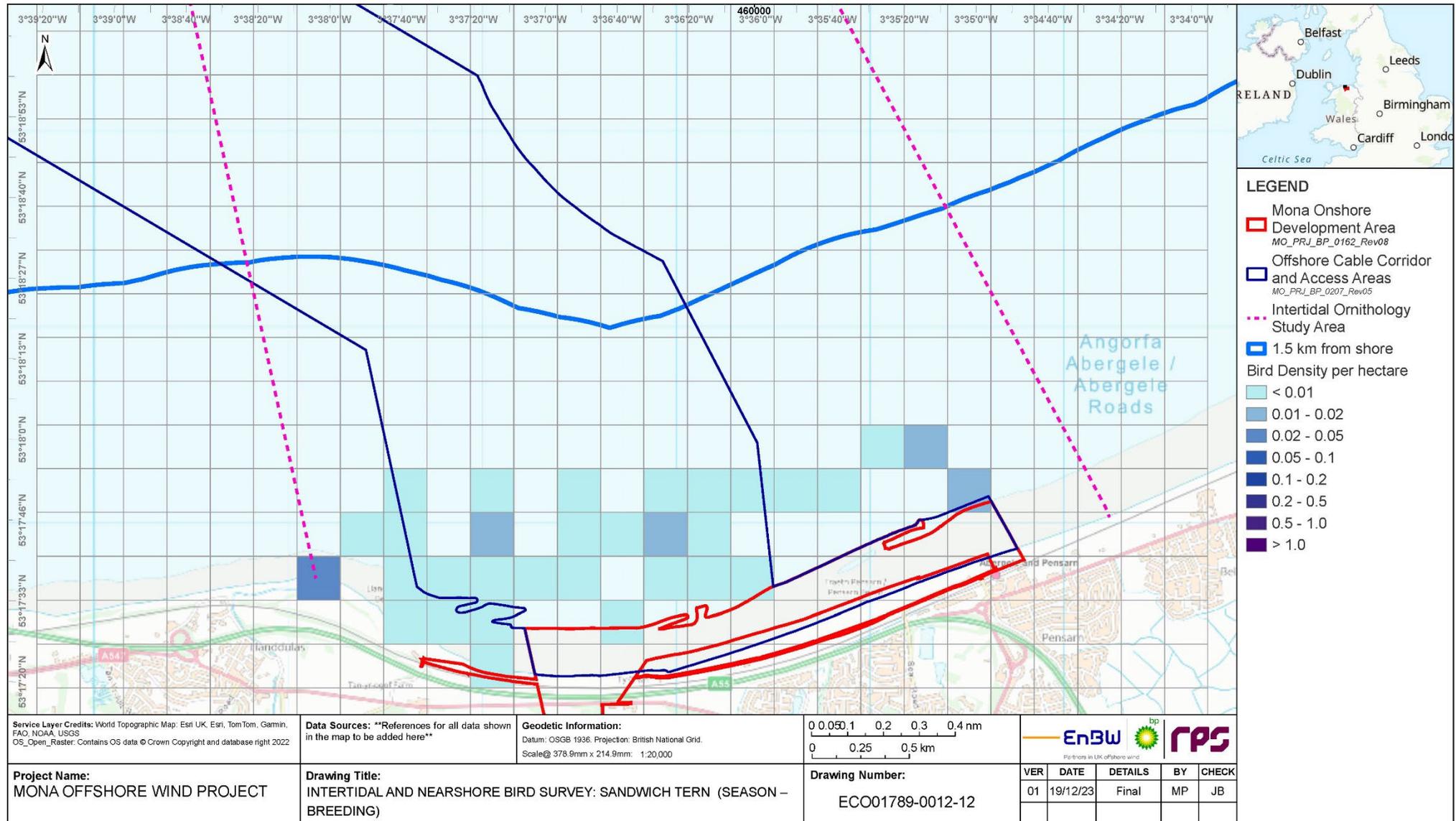


Figure 1.42: Distribution of sandwich tern during the breeding season.

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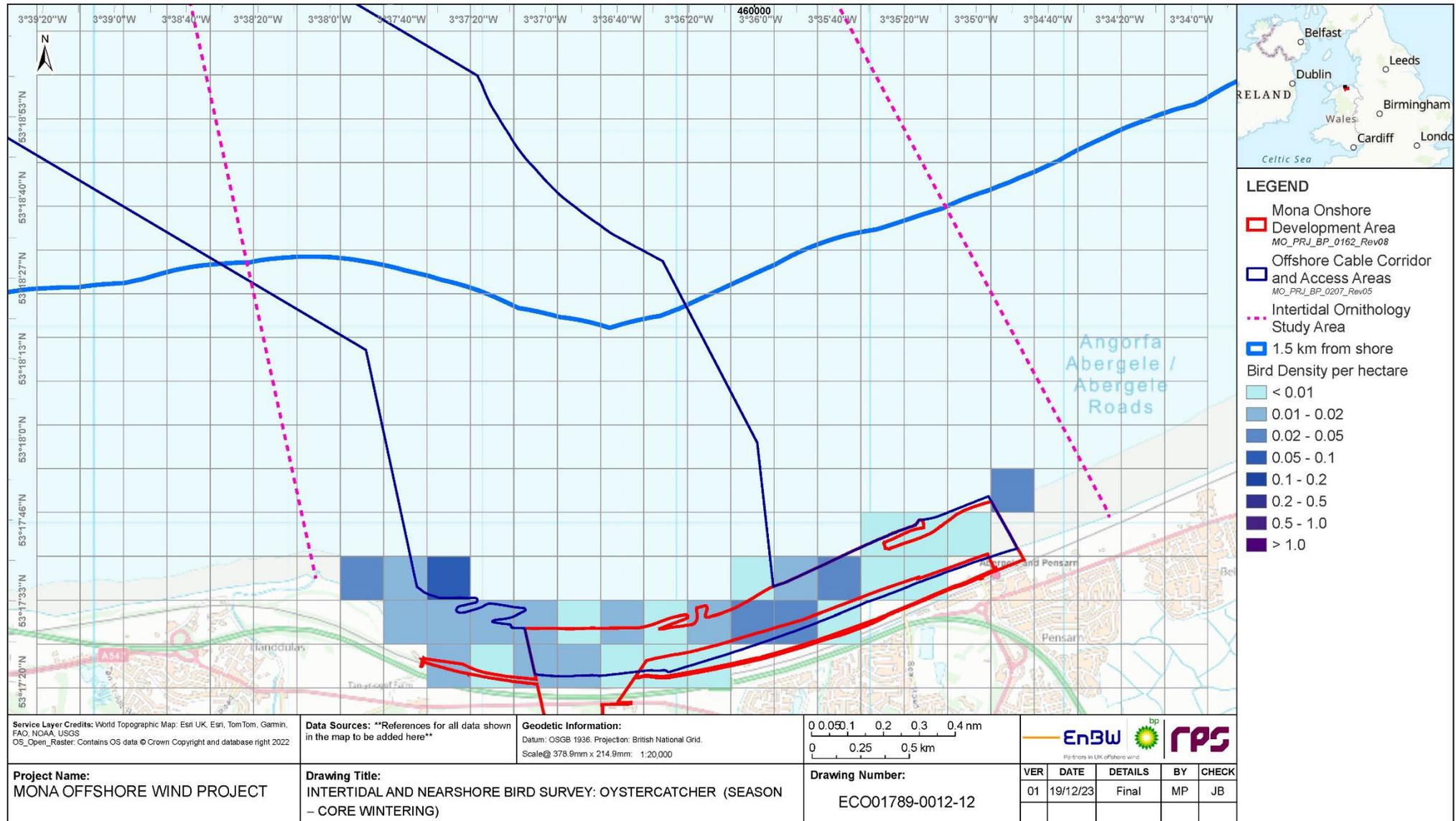


Figure 1.43: Distribution of oystercatcher during the winter period.

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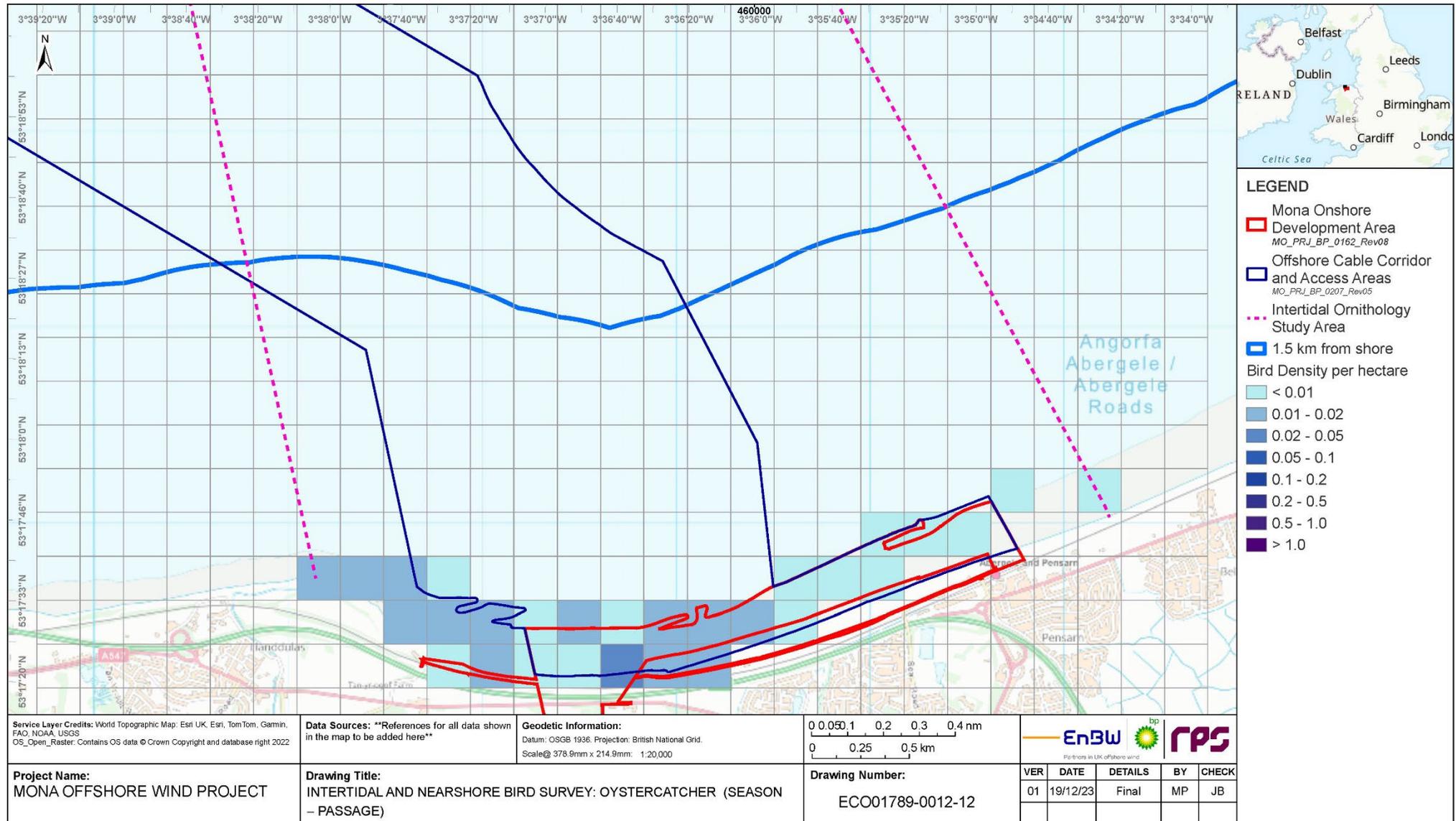


Figure 1.44: Distribution of oystercatcher during the passage period.

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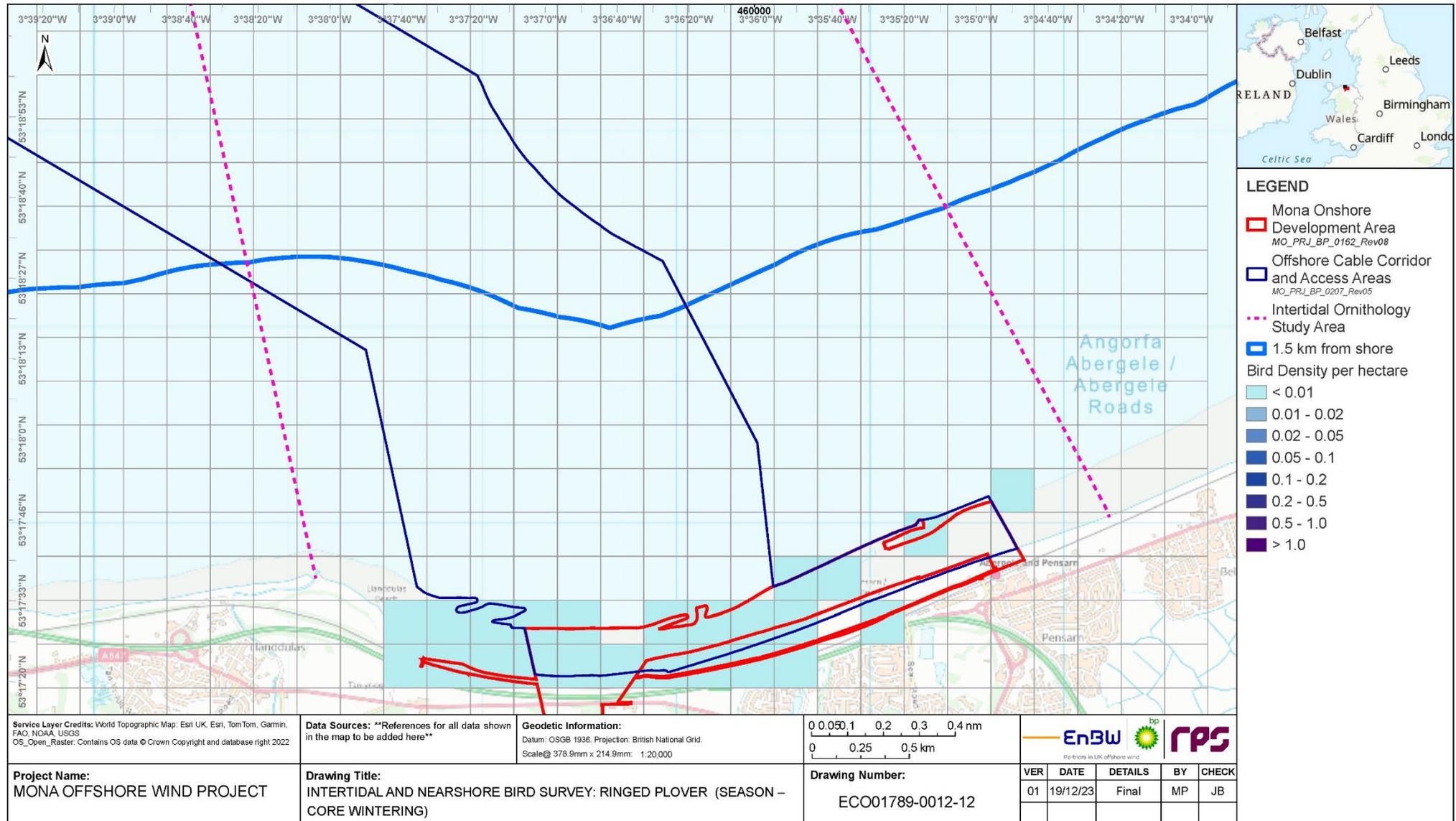


Figure 1.45: Distribution of ringed plover during the winter period.

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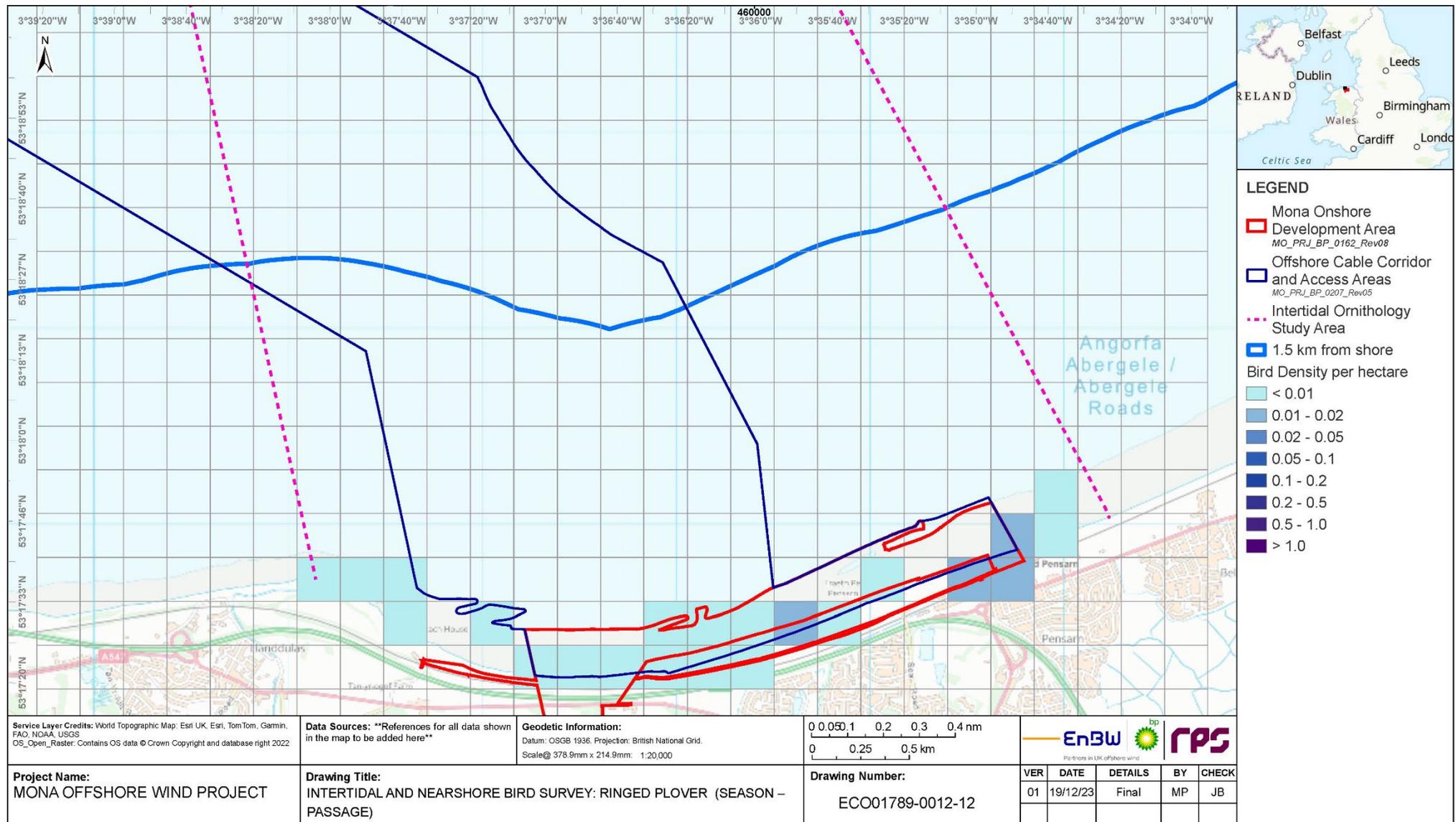


Figure 1.46: Distribution of ringed plover during the passage period.

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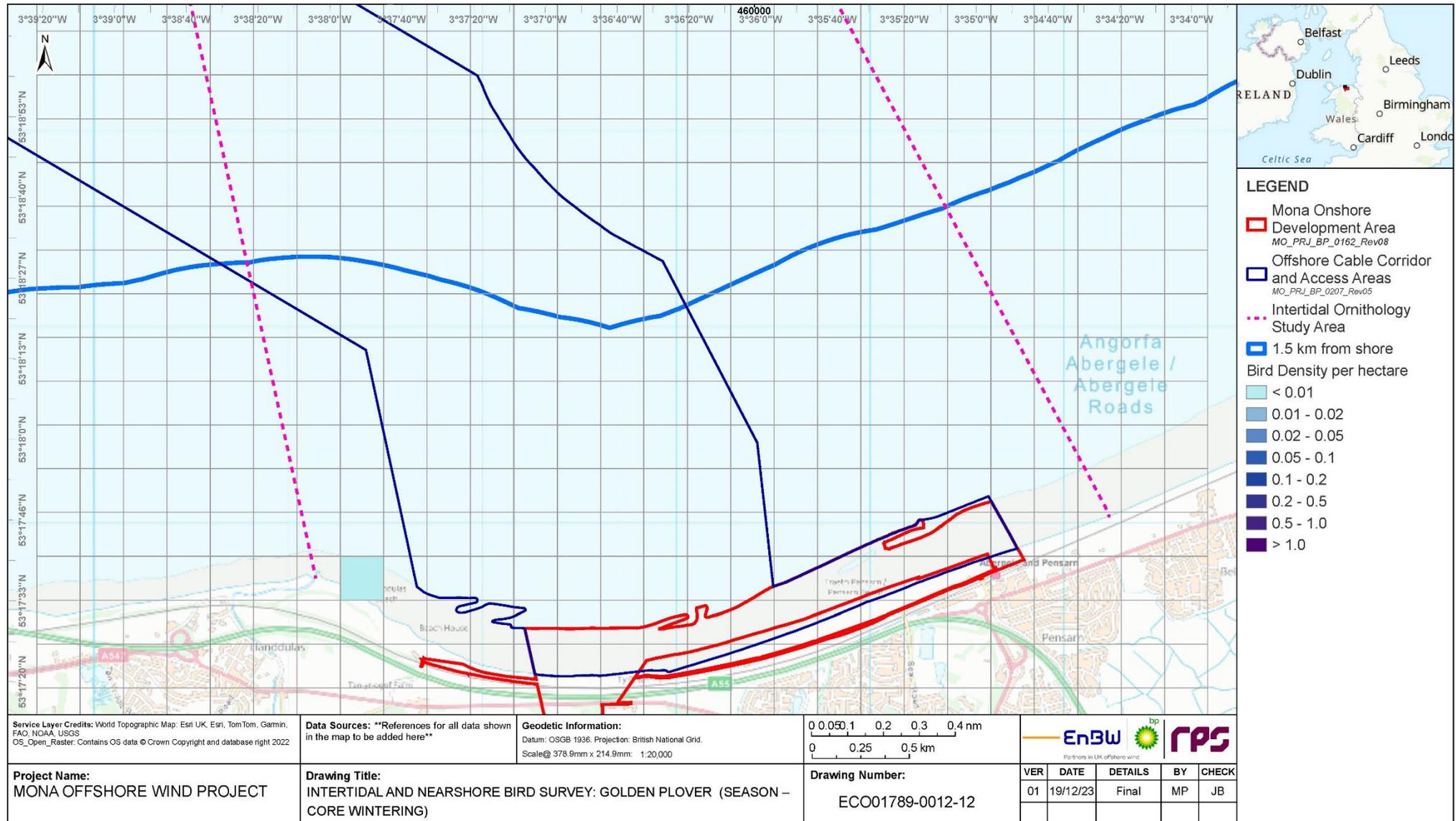


Figure 1.47: Distribution of golden plover during the winter period.

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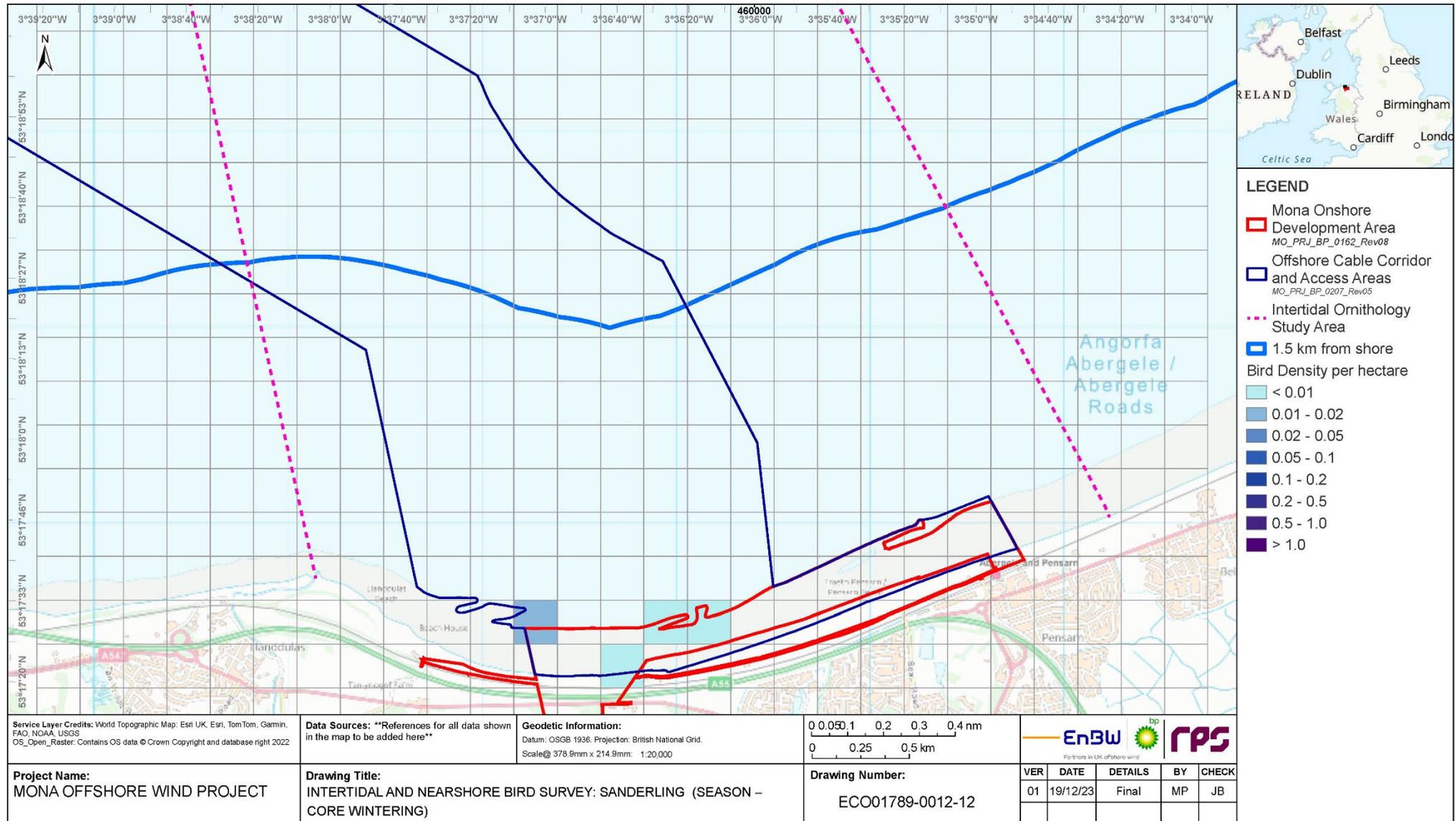


Figure 1.48: Distribution of sanderling during the winter period.

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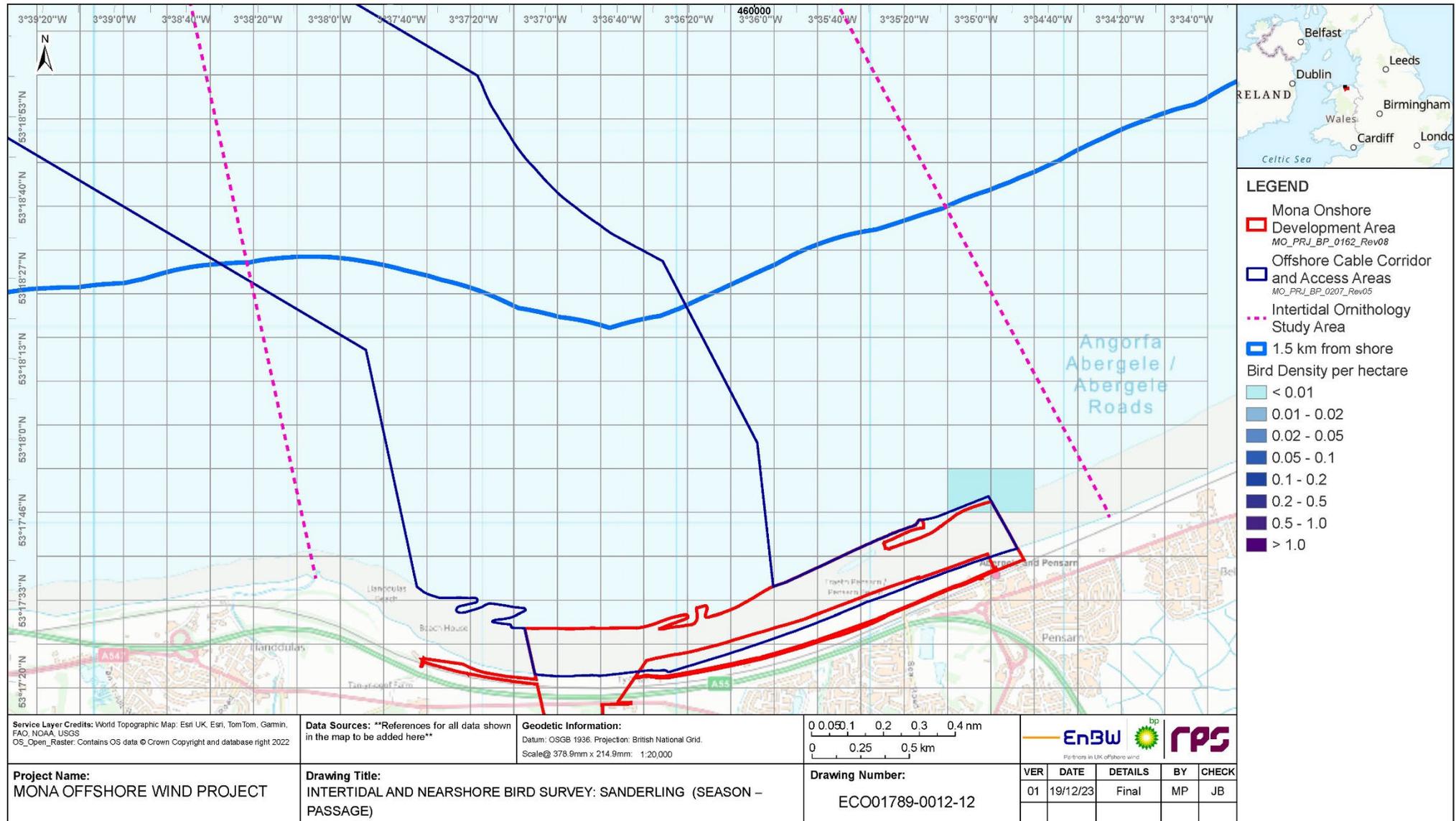


Figure 1.49: Distribution of sanderling during the passage period.

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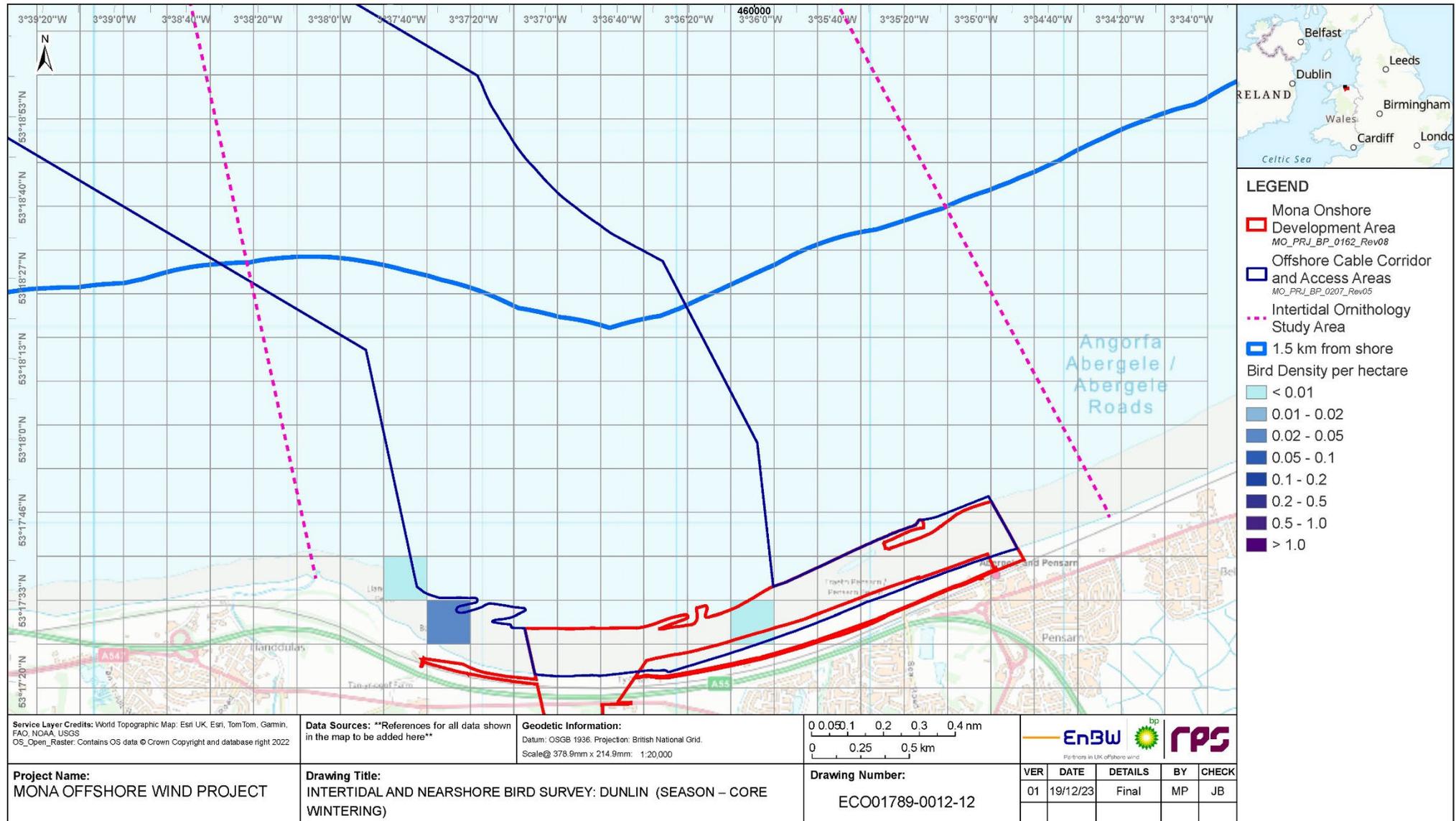


Figure 1.50: Distribution of dunlin during the winter period.

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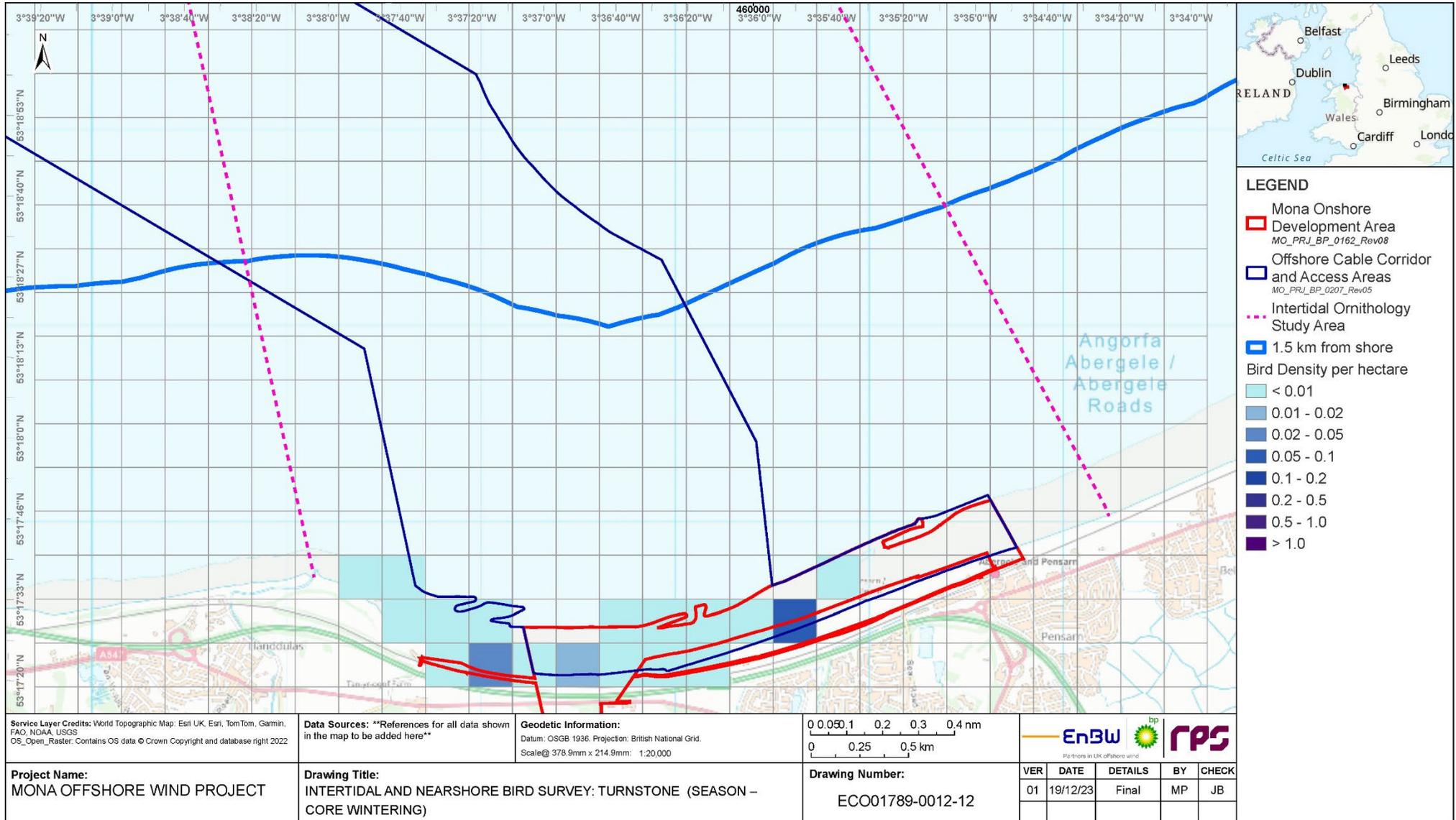


Figure 1.51: Distribution of turnstone during the winter period.

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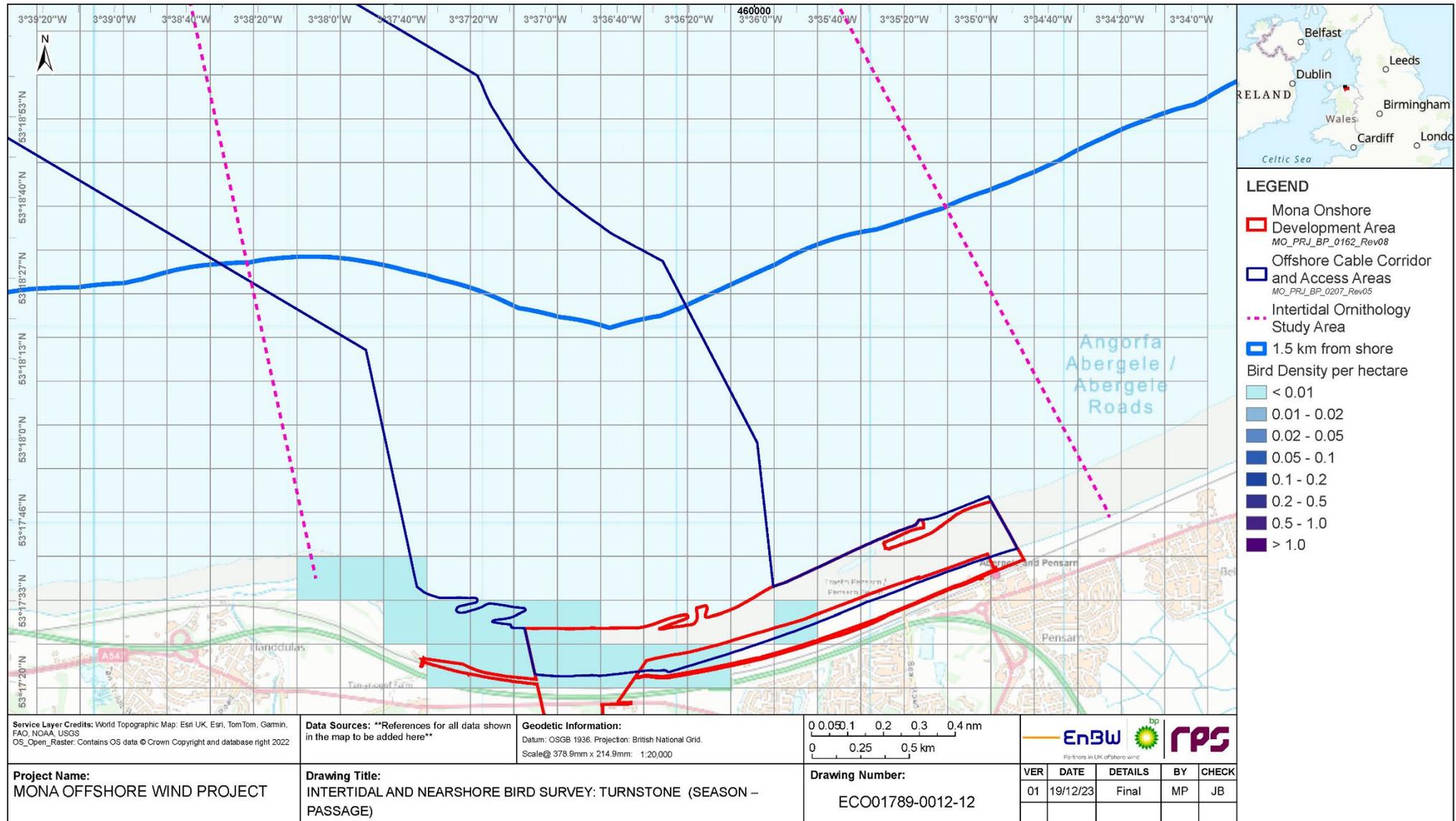


Figure 1.52: Distribution of turnstone during the passage period.

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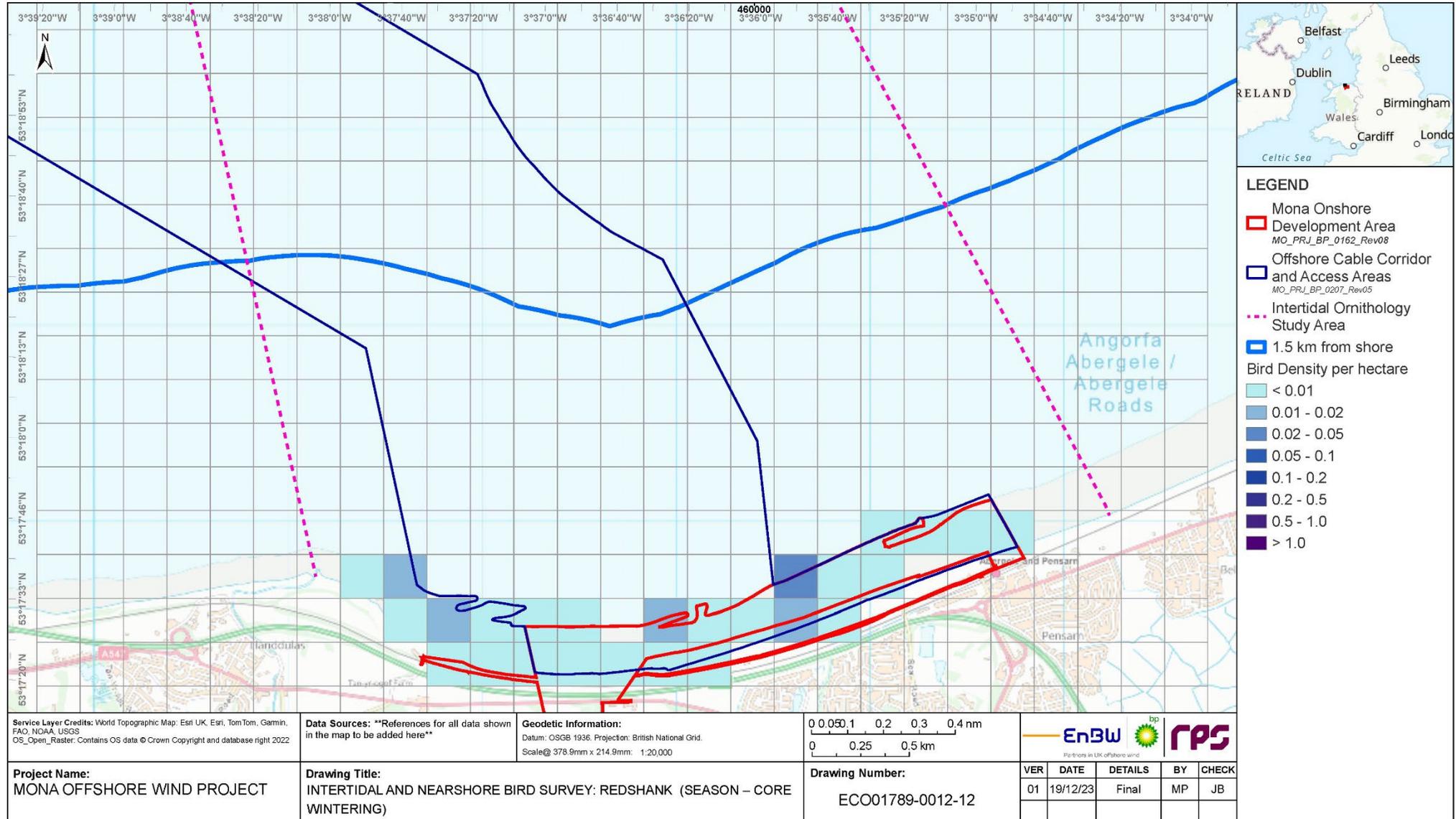


Figure 1.53: Distribution of redshank during the winter period.

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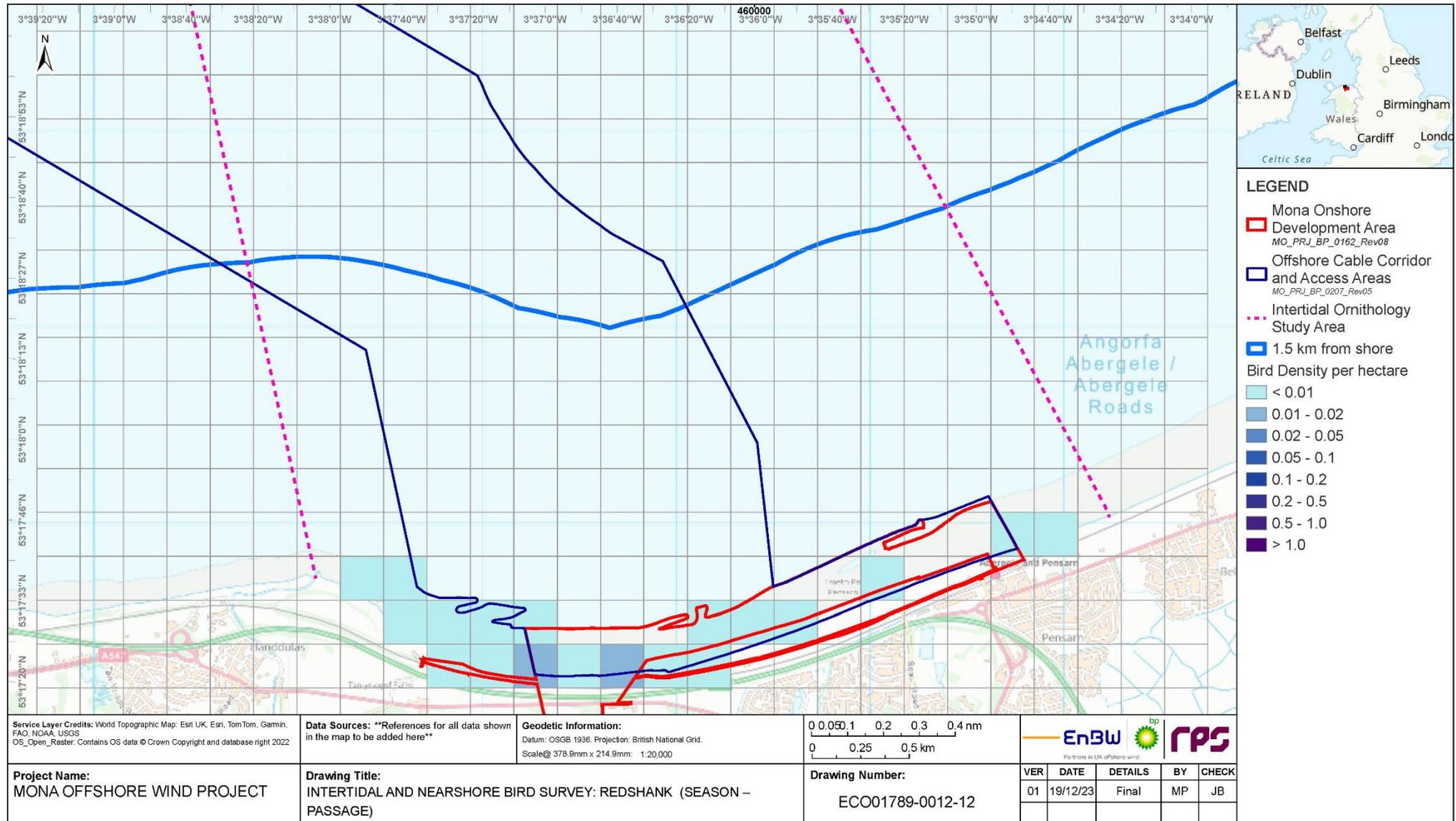


Figure 1.54: Distribution of redshank during the passage period.

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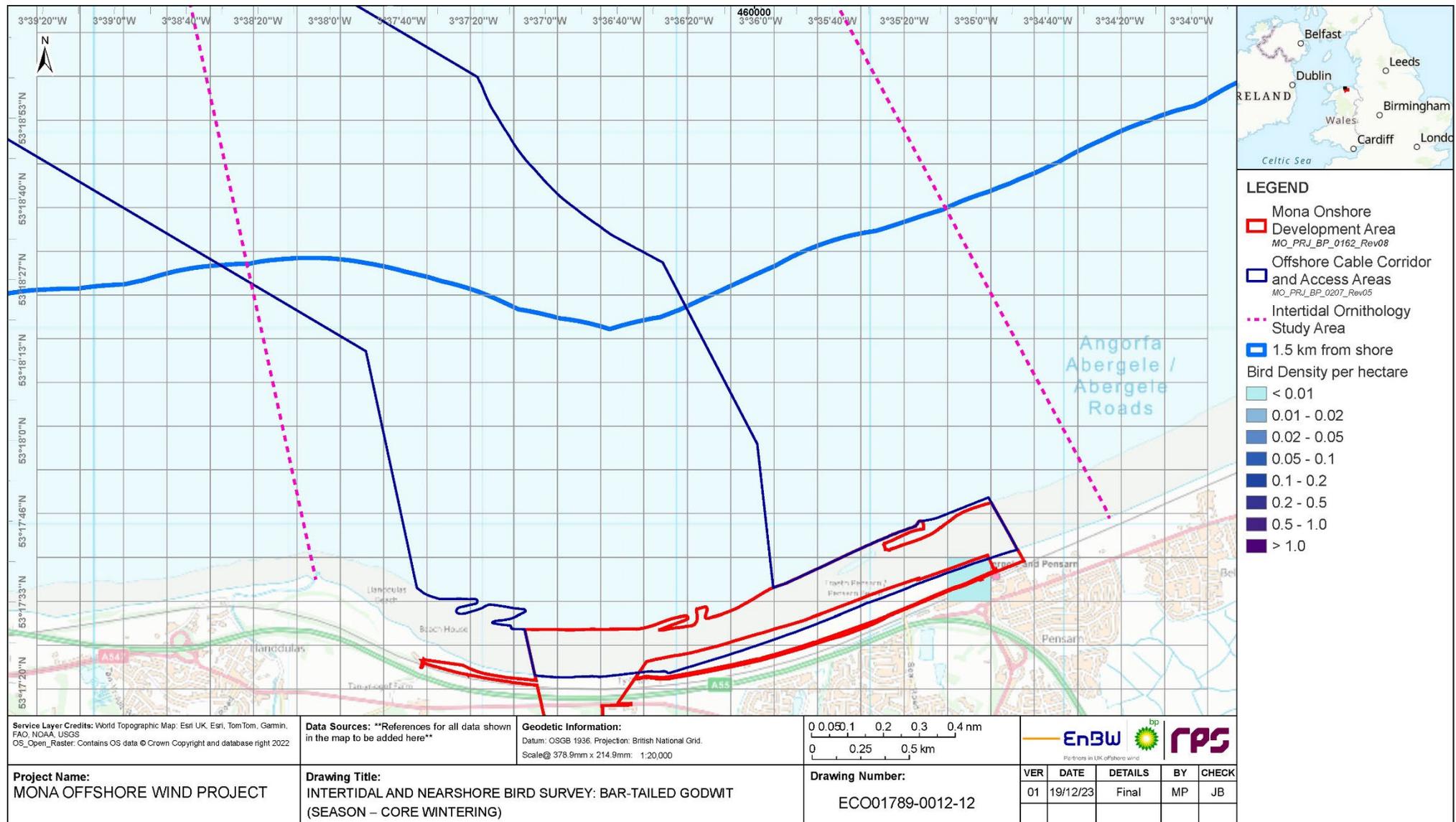


Figure 1.55: Distribution of bar-tailed godwit during the winter period.

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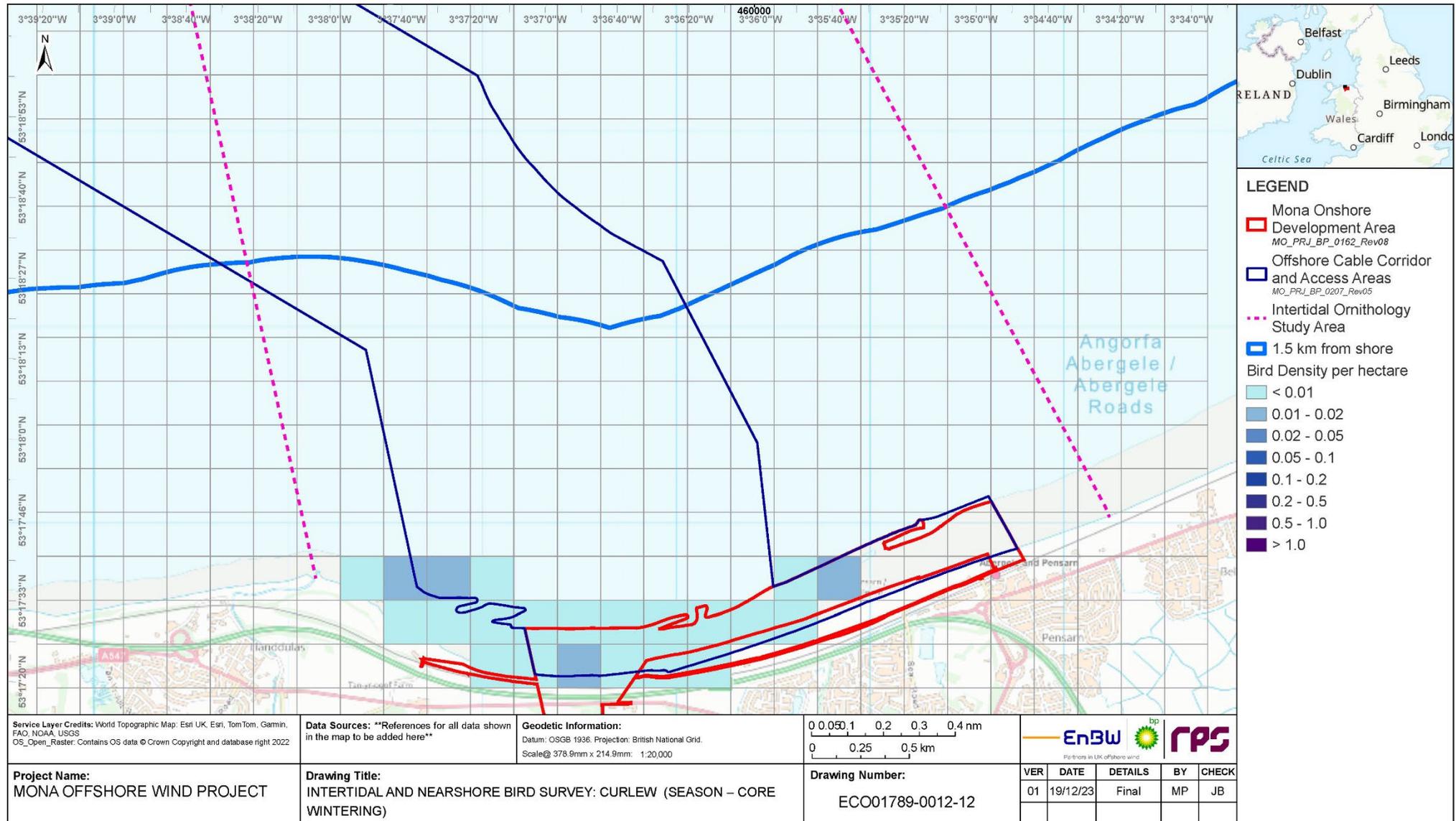


Figure 1.56: Distribution of curlew during the winter period.

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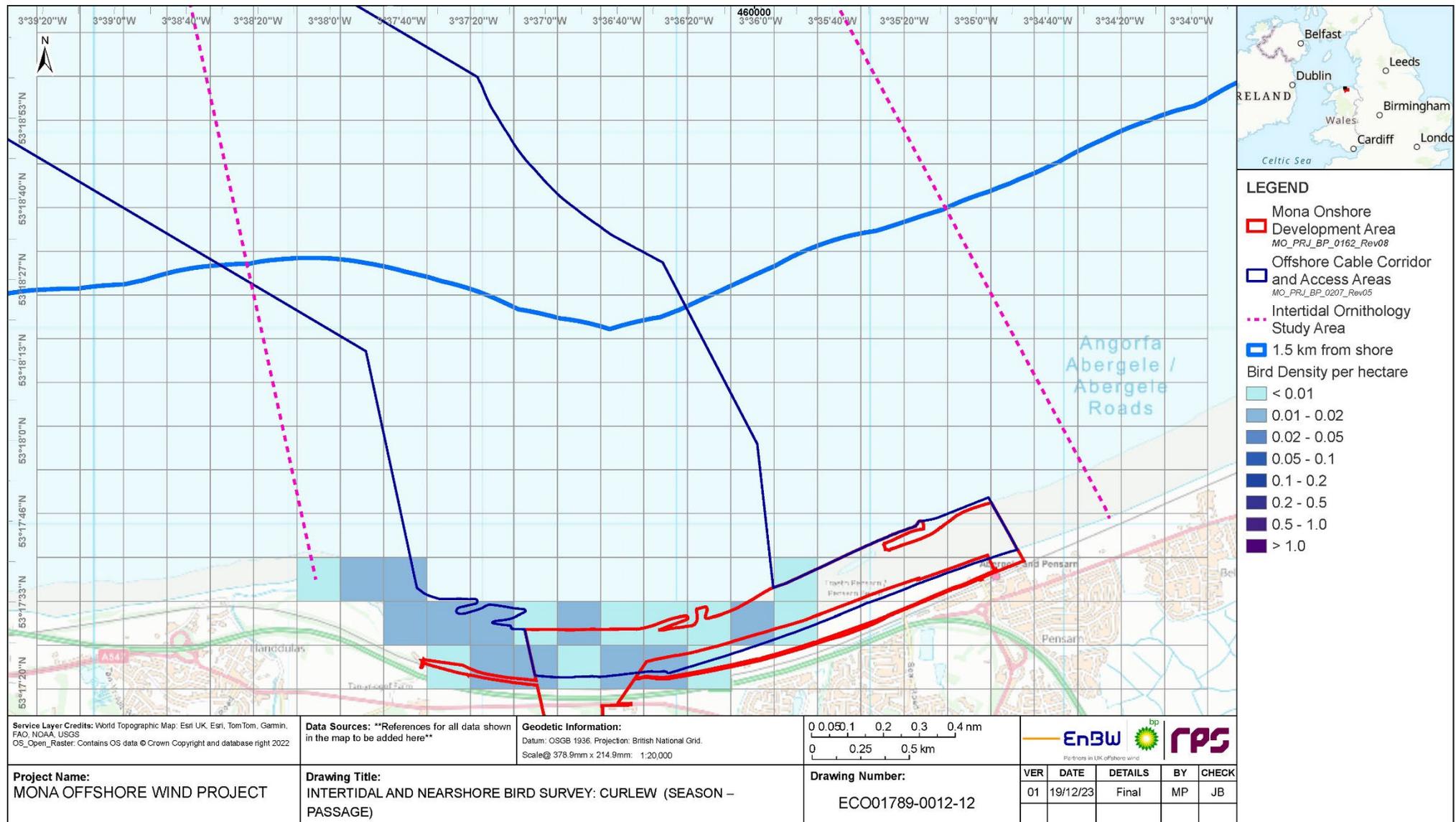


Figure 1.57: Distribution of curlew during the passage period.

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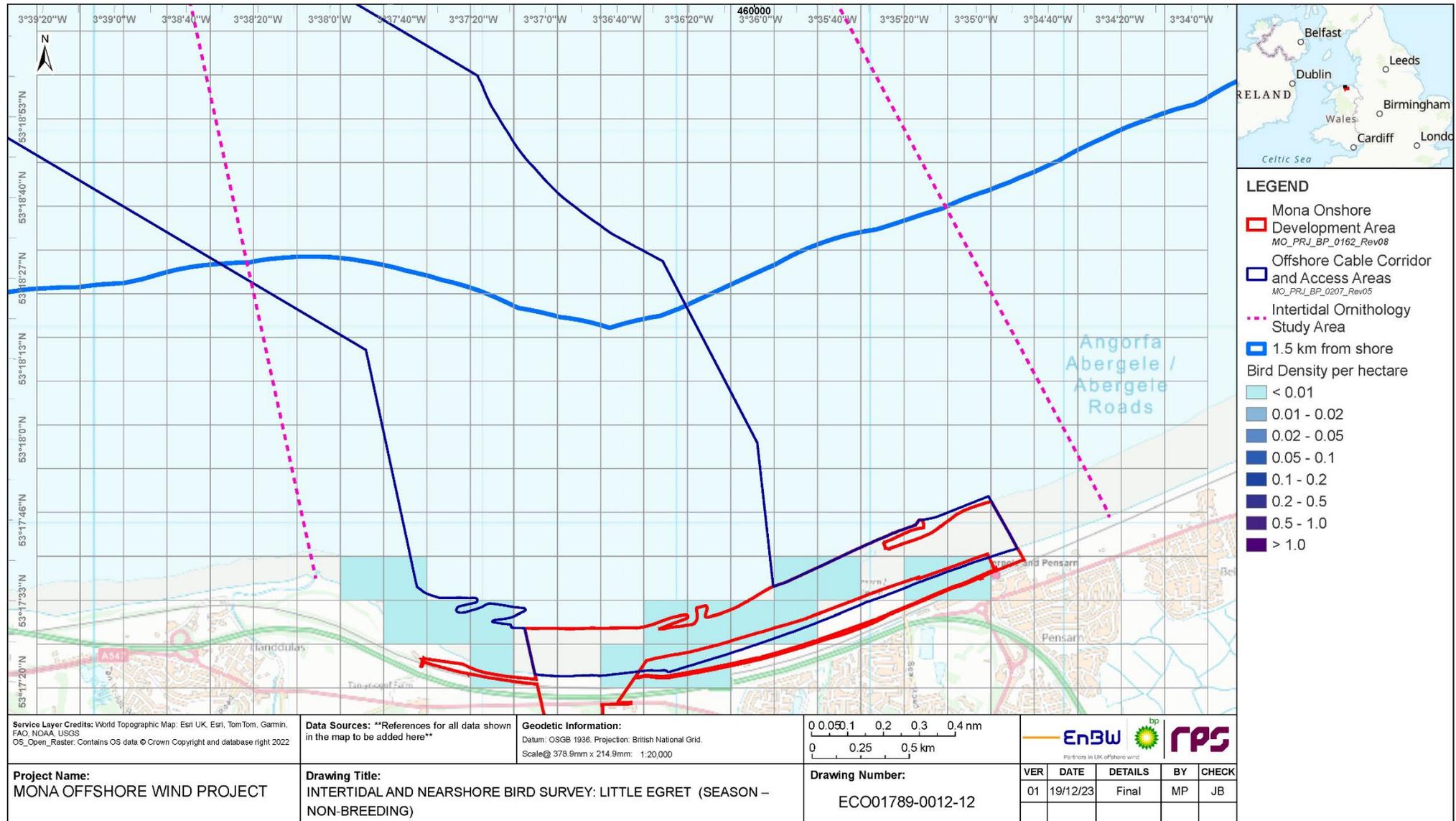


Figure 1.58: Distribution of little egret during the non-breeding season.

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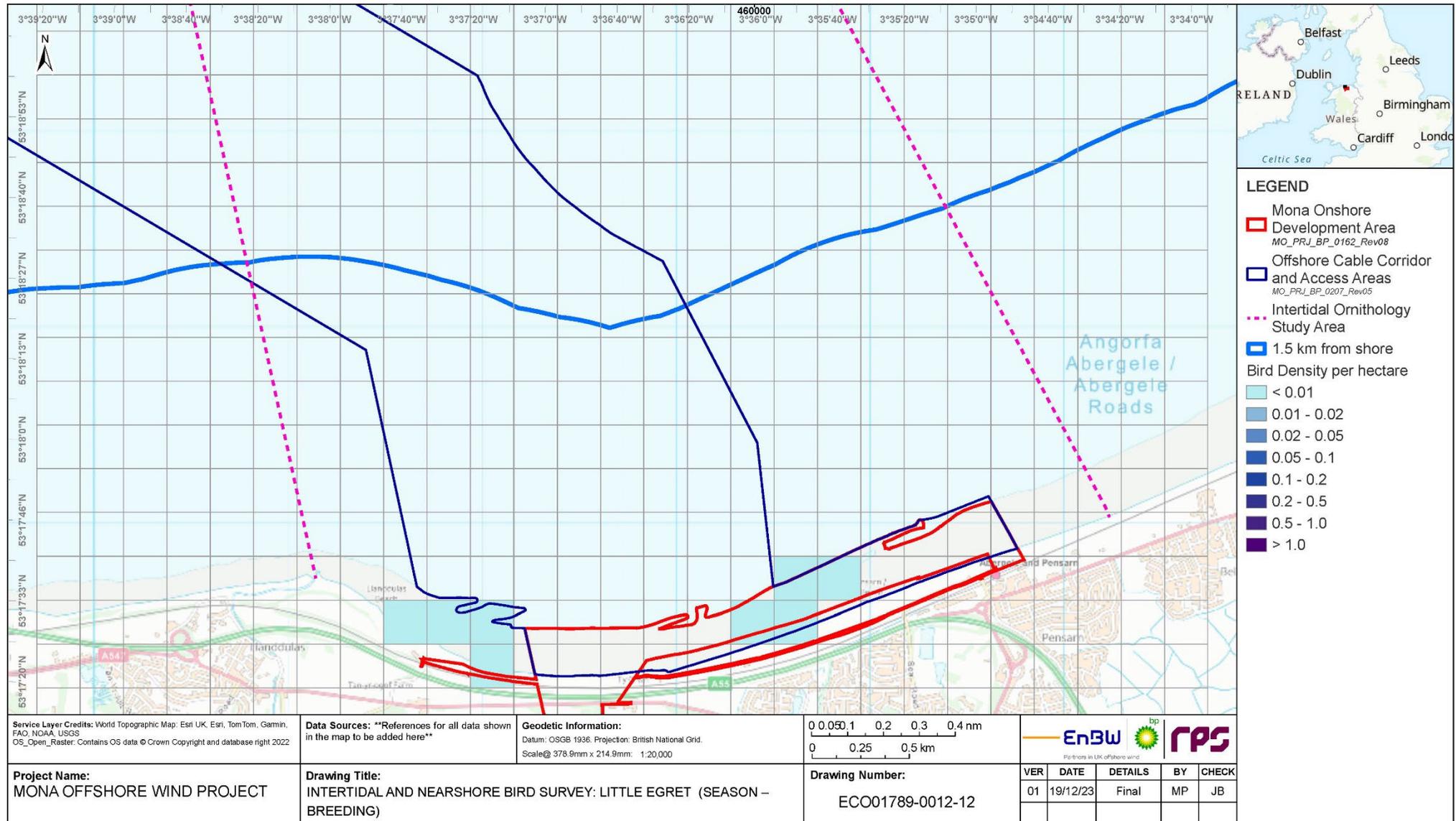


Figure 1.59: Distribution of little egret during the breeding season.

1.7 Summary

- 1.7.1.1 A two-year programme of intertidal surveys has been undertaken within the intertidal ornithology study area. The results presented within this technical report cover a two-year period between December 2021 and November 2023.
- 1.7.1.2 The landfall is situated adjacent to the Liverpool Bay/Bae Lerpwl SPA which is designated in part for its non-breeding common scoter and red-throated diver populations. The landfall is also located approximately 10.9 km from the Dee Estuary SPA and Ramsar site which is designated in part for its wintering and passage wildfowl and wader species. Both sites are also designated for their breeding and passage terns.
- 1.7.1.3 A total of 36 species were seen within the intertidal ornithology study area during the site-specific surveys.
- 1.7.1.4 A similar species richness was found between the data sources from WeBS site and the site-specific surveys. However, the WeBS had higher counts for many wader species, as the WeBS sector includes foraging and/or roosting areas beyond the east extent of the intertidal ornithology study area.
- 1.7.1.5 Gulls were generally recorded in higher numbers during the site-specific surveys. As the WeBS does not systematically record gulls or terns, they may be under-represented in the WeBS results.
- 1.7.1.6 Common scoter were present throughout the non-breeding season in large numbers with a peak maximum count of 2,225 individuals. These findings are backed by the desktop review of existing studies (Webb *et al.*, 2006; Kaiser *et al.*, 2006; Lawson *et al.*, 2016; HiDef Aerial Survey Limited, 2023; Austin *et al.*, 2023).
- 1.7.1.7 Red-throated diver were also present infrequently in relatively high numbers (peak maximum count of 95 birds), although there was some degree of inter-annual variation between counts).
- 1.7.1.8 Waders were found in relatively low numbers. The only tern species recorded was sandwich tern with very low numbers.
- 1.7.1.9 Generally low numbers of birds were recorded within the intertidal ornithology study area during the summer months (April to September inclusive). This is likely to be in part due to the absence of common scoter and common gull during this period as these species were recorded regularly in high numbers during the non-breeding season.

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Appendix A: Monthly peak counts

A.1.1 Monthly maximum counts recorded during the diurnal site-specific surveys.

Apx Table 1: Monthly maximum counts recorded during the diurnal site-specific surveys.

Species group	Species	2021	2022											2023											Peak	
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct		Nov
Ducks, geese and swans	Mute swan	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	1
	Tufted duck	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	Common scoter	2000	2150	1736	1600	72	-	-	-	-	-	380	690	1205	2225	1100	1130	120	-	-	9	21	265	760	133	2225
	Eider	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
	Goosander	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	1	-	2
	Red-breasted merganser	2	15	2	4	-	-	-	-	-	-	4	3	5	7	4	3	2	-	-	-	-	2	2	4	15
Cormorants	Great cormorant	3	34	5	7	3	10	5	12	28	12	35	42	37	9	2	9	9	16	14	17	12	18	18	19	42
	Shag	3	-	-	-	-	-	-	-	1	-	-	1	-	1	-	-	2	11	-	1	-	-	-	1	11
Loons	Red-throated diver	2	65	2	29	-	-	-	-	-	-	4	22	14	5	3	6	4	-	-	-	-	2	95	7	95
Grebes	Great crested grebe	2	98	85	32	4	-	-	-	-	-	3	24	13	5	3	3	1	-	2	2	1	1	3	2	98
Auks	Guillemot	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	1
	Razorbill	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	3	-	-	-	-	-	-	-	6

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Species group	Species	2021	2022												2023											Peak
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
Seabirds	Gannet	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	1	1	1	-	-	1	-	2
Gulls and terns	Black-headed gull	535	14	15	108	-	-	-	8	13	16	52	52	39	239	36	12	-	6	5	12	24	632	84	38	632
	Common gull	310	470	420	713	6	-	-	1	9	16	29	49	480	371	375	635	-	1	1	1	9	16	81	385	713
	Mediterranean gull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
	Herring gull	915	158	20	835	153	90	70	29	110	135	265	63	291	114	31	176	87	176	90	67	225	95	265	175	915
	Yellow-legged gull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
	Lesser black-backed gull	-	-	1	-	-	-	1	1	-	-	-	-	-	-	1	-	2	2	2	3	-	1	11	-	11
	Great black-backed gull	24	5	23	5	2	1	3	2	5	3	6	18	12	8	2	5	3	4	3	2	3	3	5	3	24
	Sandwich tern	-	-	-	-	2	28	-	1	33	6	-	1	-	-	-	-	21	-	4	11	6	1	-	-	33
Waders	Oystercatcher	188	154	88	42	14	6	6	16	63	49	49	67	41	41	19	14	8	6	22	28	31	83	42	40	188
	Ringed plover	-	-	2	-	-	-	-	-	-	-	3	-	7	11	3	2	6	3	6	1	14	22	5	4	22
	Golden plover	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1
	Dunlin	-	-	-	-	-	-	-	-	-	-	-	-	44	3	-	-	-	-	-	-	-	-	-	-	44
	Sanderling	-	-	-	-	-	-	-	-	-	-	5	-	1	-	-	-	-	-	-	-	-	-	-	-	5
	Turnstone	51	50	4	54	6	-	-	-	12	5	9	20	23	17	6	8	6	-	-	-	8	9	16	9	54
	Common Sandpiper	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1

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Species group	Species	2021	2022												2023											Peak
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
	Redshank	23	34	18	13	3	-	-	2	-	1	19	14	23	37	11	7	1	-	-	-	-	4	13	41	41
	Bar-tailed godwit	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
	Curlew	65	71	23	4	3	-	2	12	41	24	47	13	18	31	11	5	-	-	23	19	27	18	47	22	71
	Whimbrel	-	-	-	-	8	-	-	5	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	8
	Unidentified wader	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Herons	Grey heron	1	2	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-	-	-	1	1	1	-	-	2
	Little egret	-	-	1	1	1	-	1	1	4	8	3	3	4	2	-	3	-	1	2	1	3	5	3	3	8
Kingfishers	Kingfisher	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	1
Total		4125	3321	2446	3449	282	136	89	91	320	276	914	1093	2260	3126	1608	2020	278	227	176	178	386	1178	1452	887	5283