Ireland:
Important Bird and Biodiversity Area identification for seabirds

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Full details of specific datasets, their accessibility, and reference to custodianship of species data available from BirdWatch Ireland.

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Summary

In 2024, BirdWatch Ireland and BirdLife International, with funding from the Flotilla Foundation, undertook an assessment of existing data to identify Important Bird and Biodiversity Areas (IBAs) for seabirds in Irish waters. IBAs do not afford protection to a site in themselves; however, they are identified using a globally agreed, standardised set of criteria and thresholds, ensuring that sites must consistently meet the same thresholds worldwide.

A large number of datasets were collated including colony count data, tracking data and aerial survey data. These datasets were available in published form, or where still in progress, were kindly contributed by a range of stakeholders. Two wide-ranging consultation processes were undertaken to seek input on available data and processing methods.

Seabird colony data mainly from Seabirds Count (a national census effort published in 2023), extension areas to these colonies based on estimated foraging distances and high use areas at sea (from tracking data and aerial surveys) were analysed to produce the final boundaries.

From the data collated in this report, 73 sites across Ireland and in Irish waters where identified that support sufficient numbers of seabirds to meet IBA criteria.

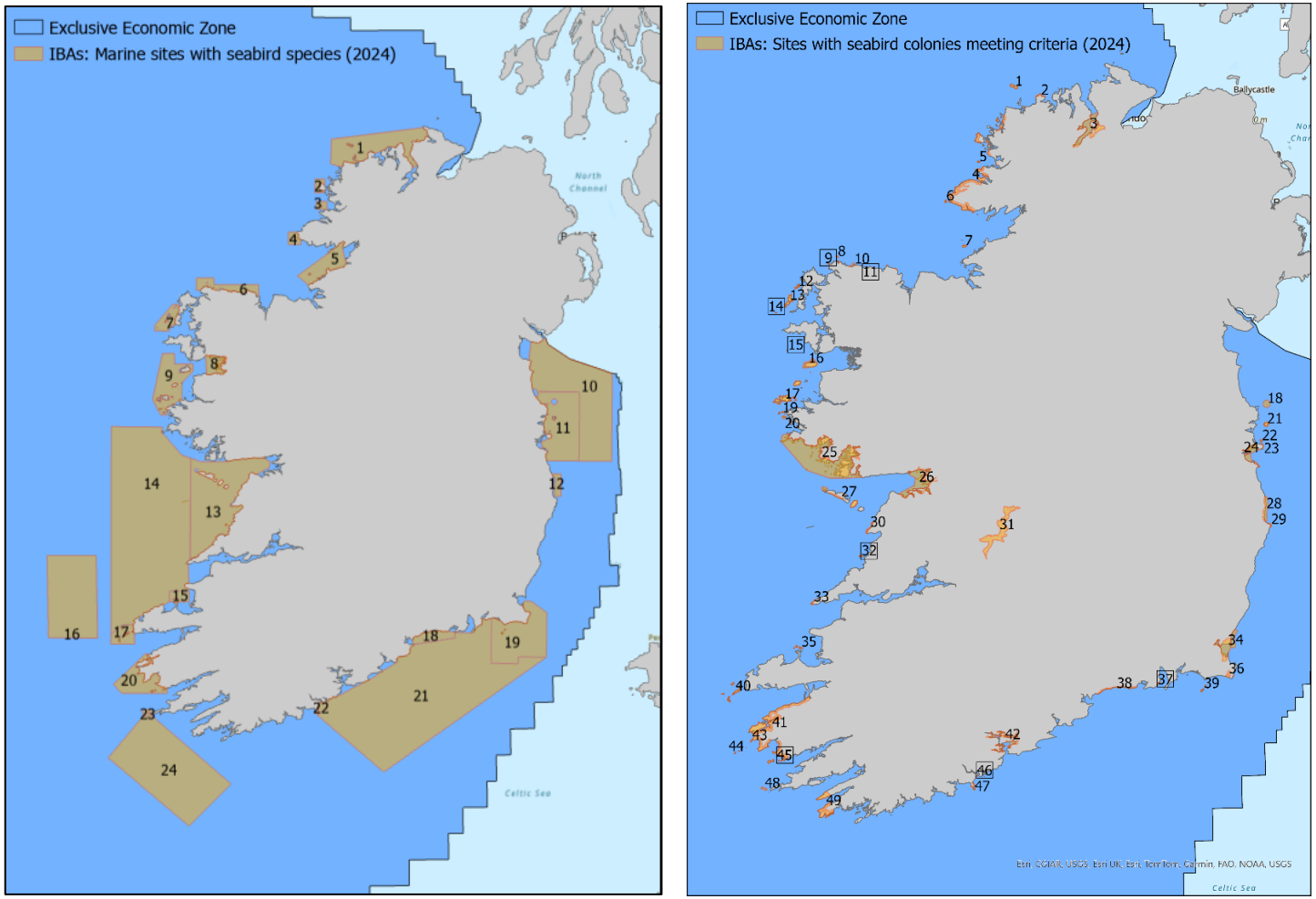
49 sites meet the IBA criteria and host important seabird colonies ("Terrestrial IBAs"); 41 of these sites have been recognised as IBAs in the past and contributed to previous SPA (Special Protection Areas) delineation. There are 8 new sites yet to contribute to SPA delineation.

24 sites meet the IBA criteria and represent important marine areas used by seabirds ("Marine IBAs").

The marine area from all IBAs documented in this report covers a total of 32,682Km^2, 7.6% of Ireland's Exclusive Economic Zone. Currently, just 7,402 km^2 , 1.6% of Ireland's EEZ, is designated as SPA. Given that seabirds are sentinels of the marine environment and the fact that many are declining with some now globally threatened, we call on the Irish government:

1. To designate all seabird IBAs as SPAs.
2. Where seabird IBAs overlap current SPAs, to review the relevant SPAs with the new information provided in this report, and revise boundaries and species data as appropriate.
3. To develop management plans in an open and transparent way in consultation with relevant stakeholders, with clearly defined and quantifiable science-based conservation objectives for all SPAs, and establish the protection measures necessary to achieve these objectives.
4. To develop, or support the development of, and utilise avian sensitivity maps to inform the strategic spatial planning of marine activities, in particular the development of offshore renewables, to ensure a comprehensive approach to the protection of Irish birds in the marine environment.

Maps showing identified and reassessed IBA sites for seabirds across Ireland



Left panel: New marine sites. Right panel: New (in black squares) and reassessed terrestrial sites.

Introduction

Ireland's marine waters represent 8% of the European Union's (EU) marine area. They host 24 species of seabirds, including significant proportions of EU species populations. Ireland's network of EU-recognised marine conservation sites (Special Protection Areas (SPAs) and Special Areas of Conservation (SACs)) is currently 10 percent of the Exclusive Economic Zone (EEZ). Of the entire network, only 1.6% is designated as SPAs (sites specific to bird conservation) under the EU Directive 2009/147 on the Conservation of Wild Birds (the Birds Directive). The Irish government has committed to designating additional SPAs and to properly manage and protect a future network of Marine Protected Ares (MPAs).

It is vital that the selection of SPAs is based on robust science-based criteria and processes. Areas fulfilling BirdLife International's[1] criteria for Important Bird and Biodiversity Areas (IBAs) are recognised by the European Court of Justice (ECJ) and the European Commission (EC) as sites that should be designated by Member States as SPAs. A comprehensive assessment of IBAs in Irish marine waters has not been conducted given limited data availability and funding in the past. Hence, to date, there has been a lack of a clear basis to demonstrate where the marine SPA network in Ireland could be improved upon.

Identifying IBAs is now feasible given the large amount of seabird tracking and at-sea survey data available for Ireland's marine waters, providing a huge opportunity for comprehensive IBA identification. IBAs do not afford protection to a site in themselves; however, they are identified using a globally agreed, standardised set of data-driven criteria and thresholds (see Box 1), ensuring that sites must consistently meet the same thresholds worldwide. The IBA identification process is consultative and involves the inputs from local stakeholders.

Marine IBAs are sites located at-sea that are of global importance for the persistence of species (Donald *et al.*, 2018; Lascelles *et al.*, 2016). For seabirds, examples are foraging areas around breeding colonies, high use areas for non-foraging behaviours, non-breeding concentrations, migratory bottlenecks and feeding areas for pelagic species (BirdLife International, 2010).

BirdLife International and BirdWatch Ireland worked together to collate this data and by applying the criteria set out in Box 1 have identified a network of Marine IBAs within Ireland's EEZ. The results of this work are set out in this report and the sites identified provide a robust framework for the designation of new marine SPAs for Ireland.

[1] BirdLife International is a global partnership of environmental NGOs and national conservation organizations that work together to conserve biodiversity. The partnership is made up of 123 autonomous non-governmental organizations (NGOs), each representing a country or territory, and is supported by a large grassroots membership. BirdWatch Ireland is the BirdLife partner in Ireland. The NGOs share a common vision to protect the world's birds, their habitats, and global biodiversity through a holistic approach to conservation.

Box 1: Overview of Important Bird and Biodiversity Area selection criteria (Detailed guidelines are available online: http://datazone.birdlife.org/site/ibacriteria and discussed in Donald *et al*. (2019)).

GLOBAL CRITERIA

[1] A1: Globally Threatened Species (CR, EN, VU)
[1] A2: Restricted Range Species
[1] A3: Bioregion-Restricted Assemblages
[1] A4: Congregations

REGIONAL CRITERIA

B1: Species of Conservation Concern
[1] a: Globally near threatened species (NT)
[2] b: Species with an unfavourable conservation status in the region
B2: Species with most of their range restricted to a region
[2] a: Species with a favourable conservation status but concentrated in the region
B3: Regionally important congregations
[1] a: Regionally important congregations – biographical populations
[3] b: Regionally important congregations – multi-species aggregations (seabirds)
[3] c: Regionally important congregations – bottleneck sites

EUROPEAN UNION CRITERIA

[1] C1: Species of global conservation concern
[1] C2: Concentrations of species threatened at the European Union level
[1] C3: Concentrations of migratory non-threatened species
[3] C4: Large congregations – multi-species aggregations (seabirds)
[3] C5: Large congregations – "bottleneck" sites
[2] C6: Species threatened at the European Union level

CRITERIA SUMMARY

[1]: Criteria met when certain proportion of global or regional population present at site. Thresholds vary depending on the global or regional Red List status of the species.

[2]: Criteria support identification of the top 'n' sites in a country. 'n' is typically 5.

[3]: Criteria support identification of sites with greater than a threshold number of individuals present at the site. For seabirds, this threshold is >13,400 mature individuals (single or multispecies sites)

Methods

Full details of the methods and protocols used to identify Ireland's Marine IBAs are set out in Appendix 1 – Detailed Methods and Protocols; these are briefly summarised below.

24 regularly occurring seabird species breeding in Ireland were included in the assessment (see Appendix 1, Table 6). To identify the most important breeding and foraging areas for these species, their spatial distribution and occurrence was mapped as (i) colony breeding sites (ii) seaward extensions from the colonies and (iii) other high use areas at sea. Where mapped distributions met the IBA criteria (Box 1), marine IBAs were identified as either Terrestrial sites (mainly colony breeding sites) or Marine sites (extensions to breeding sites and high use areas at sea).

Relevant spatial datasets were collated from a wide range of sources, see Appendix 1 for full details.

Many of the datasets were obtained from central repositories including:

- the Seabird Monitoring Programme (SMP) (https://app.bto.org/seabirds/public/) maintained by the British Trust for Ornithology (BTO) on behalf of the project partners, including the Joint Nature Conservation Committee (JNCC), the National Parks and Wildlife Service (NPWS), RSPB, BirdWatch Ireland and others;

-the Seabird Tracking Database, maintained by BirdLife International (https://www.seabirdtracking.org/);

-the Observe II programme (https://www.marei.ie/project/observe-ii/), a project managed by the Research Ireland Centre for Energy, Climate and Marine (MaREI) at University College Cork (UCC) and funded by the Department of Housing, Local Government and Heritage, Department of Environment, Climate, and Communications (DECC) and the Sustainable Energy Authority of Ireland (SEAI).

Below is a summary of how all the datasets obtained were utilized to map important areas.

Terrestrial sites

The assessment of sites encompassing seabird breeding colonies utilized existing colony data from the SMP, with the latest breeding colony data and population estimates from Burnell *et al.* (2023). Figure 1 shows the locations of the five largest colonies per species.

In addition, colony counts from the Connemara Islands IBA were updated using the 2023 NPWS Report to Science Advisory & Research Directorate (Colhoun *et al.* 2023).

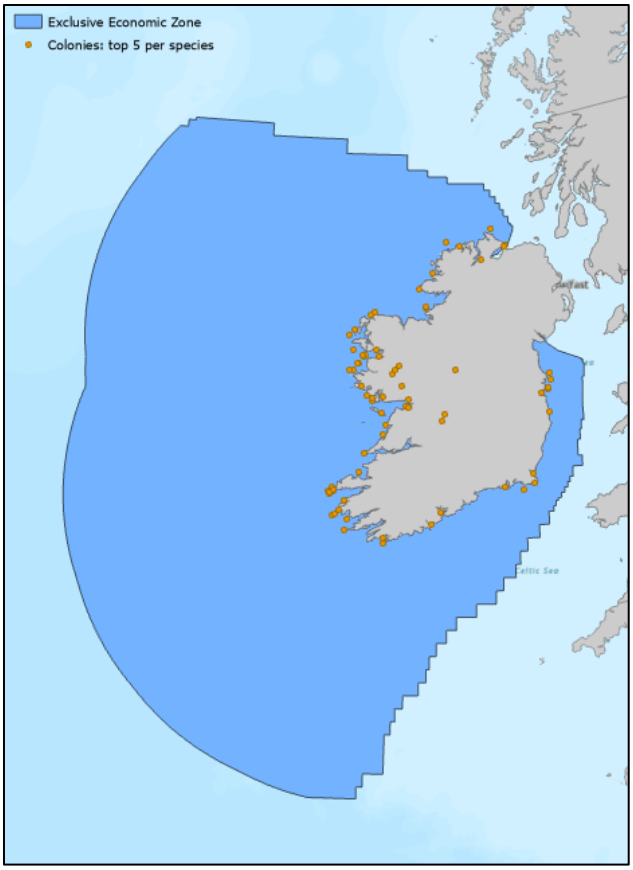


Figure 1: Colony locations for species assessed in the IBA assessment. For simplicity, only the colony locations for the five largest colonies per species are shown.

Seaward extensions

For all 24 species, we estimated high at-sea use areas around colonies by delineating seaward extension buffers around colonies. This is a pragmatic approach for assessing distributions; particularly in data sparse situations (Critchley *et al.* 2018, 2019; Handley *et al.* 2021) where studies involving the direct tracking of species or at-sea surveys have been limited. We mapped the distribution and estimated the abundance of birds at sea from individual colonies on a 1 km x 1 km grid.

High use areas at sea

High use areas at sea were identified from tracking data and aerial surveys as follows:

-Tracking data

We considered tracking data, hosted on the Seabird Tracking database and / or requested from individual researchers, for 14 seabird species to identify high use areas at sea, following a published protocol (Beal *et al.* 2021). These tracking data (Figure 2), coupled with conservative estimates of distribution via seaward extensions (Figure 3), allowed us to develop unique species-at sea data that could be assessed against IBA criteria.

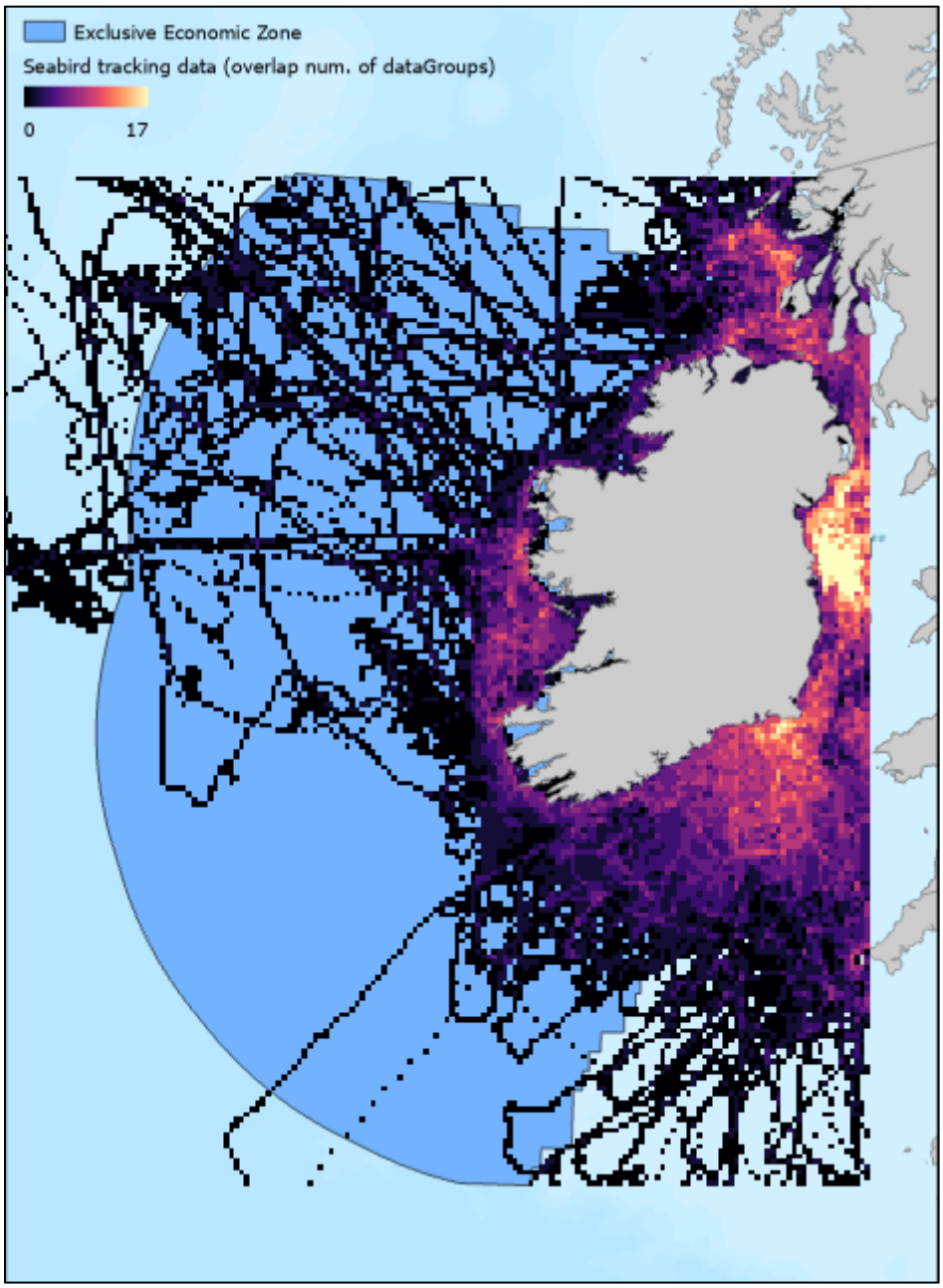


Figure 2: Overlap of seabird tracking data included in the analysis mapped at 5km2 grids. Each input layer represents a unique dataGroup (i.e. tracking data from a unique species, at a unique colony, during a unique life-history stage (e.g. chick-guard period))

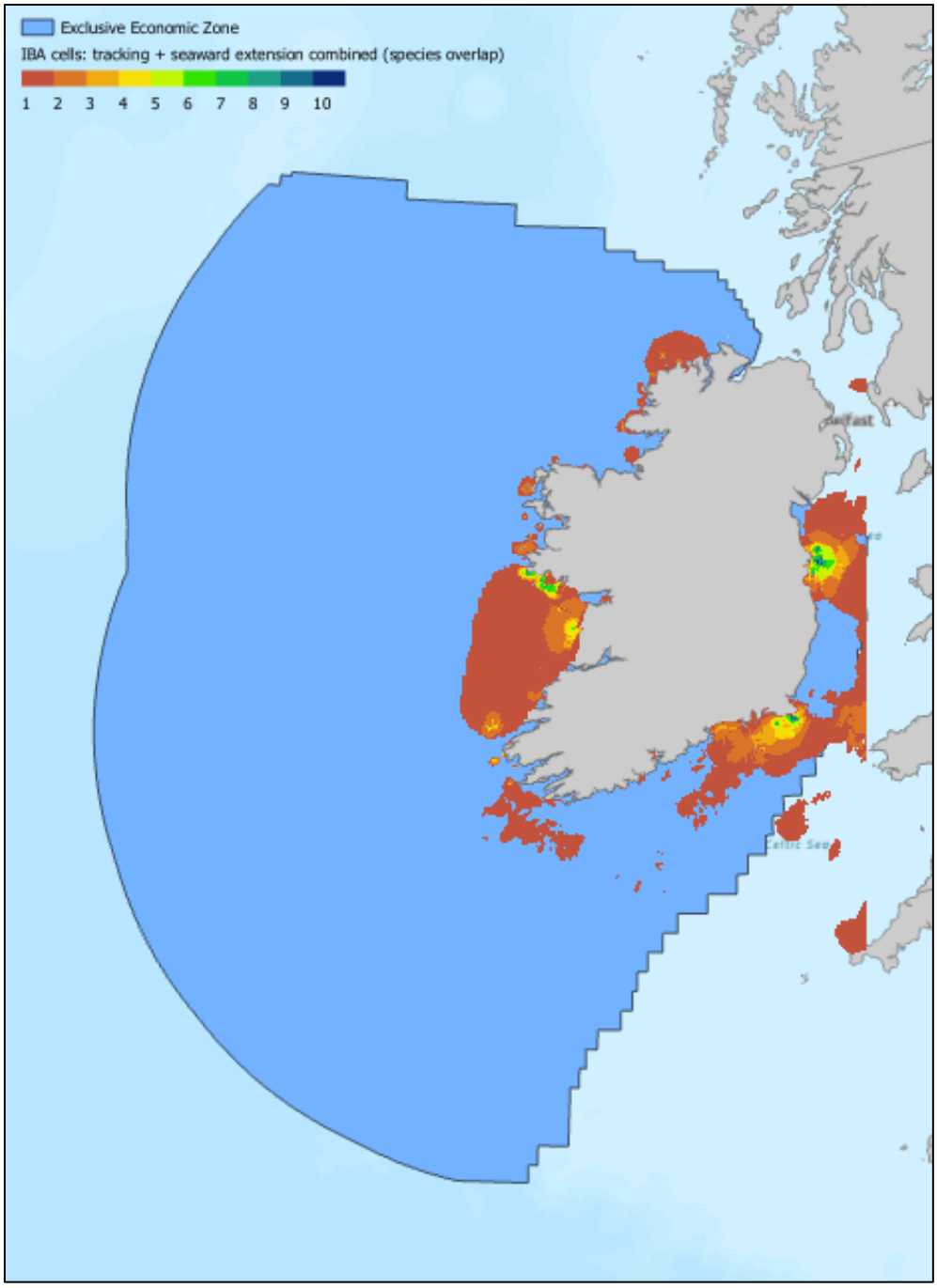


Figure 3: Combined tracking and seaward extension cells per species that met IBA criteria.

Aerial surveys

The ObSERVE II programme conducted aerial surveys of Ireland's marine waters, to investigate the occurrence, distribution and abundance of seabirds and other marine fauna (Rogan *et al*. 2018, Paradell *et al*. 2024). Seabird abundance data was kindly contributed from the programme, see Figure 4.

Recognition of these high use areas supplemented the results from the tracking data and seaward extension analysis.

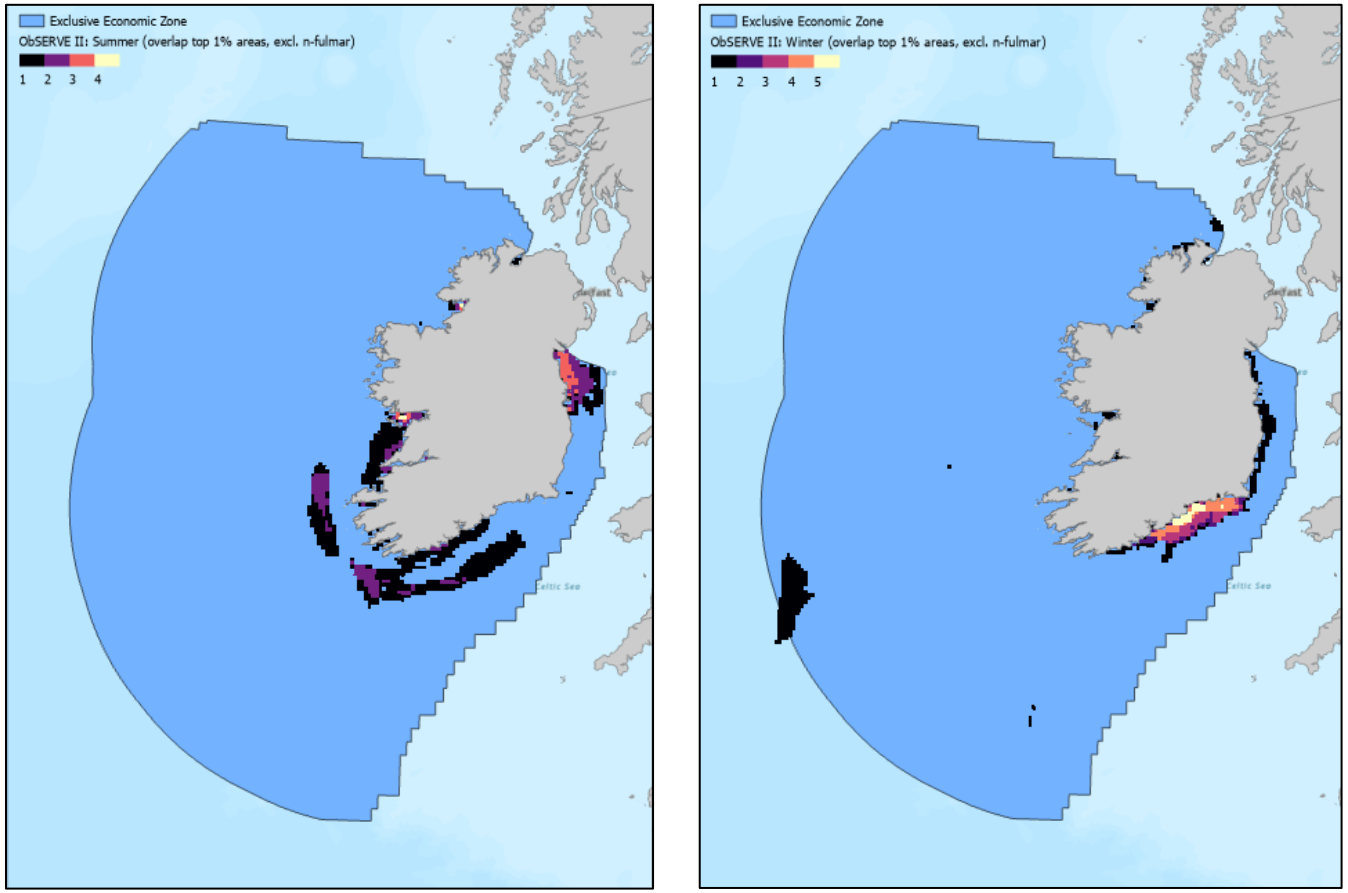


Figure 4: Overlap in the top 1% of areas used by species / taxonomic groups in summer (left panel) and winter (right panel) as evidenced from the modelled outputs from the ObSERVE II programme at-sea survey data.[1]

[1]*The Northern Fulmar layers from ObSERVE II were excluded given this species is not on a list to be considered under IBA criteria B1b, B2a, or C6 (criteria relating to top 5 sites per country), and because abundance estimates were too low to meet other IBA criteria.*

Consultation on data and analysis

In order to ensure that the most appropriate available data contributed to the analysis and also to raise awareness of the project, detailed consultation was undertaken with relevant Irish stakeholders and Irish and UK seabird and marine experts.

A first expert consultation workshop was hosted online early in the process; a comprehensive consultation document was circulated in advance, setting out those datasets that had been collated and seeking information on other relevant data. A questionnaire seeking specific feedback on the approach to be taken was also circulated. This first meeting was attended by representatives of NPWS, various windfarm and ecological consultancies, data contributors from relevant research institutions (Ireland and UK), relevant conservation organisations, individuals from other stakeholder groups, as well as the other members of the project team.

Consultation follow-up in the form of one-to-one meetings was organised with researchers and government officials. These meetings were organised to discuss any gaps in data collation with relevant data contributors, specifically to seek permission to include unpublished datasets that would be valuable for the analysis.

A second expert consultation workshop was hosted online to present preliminary outputs from this analysis. Attendees included representatives from many of the same groups as the first consultation, with the addition of policy representatives and individuals from the Marine Institute.

Following feedback from data contributors, further tracking data was identified and sourced. Sources for aerial data were identified and access was given to unpublished aerial at-sea survey data.

The consultation was very helpful in many ways not only for the provision of datasets but also to build relationships with key stakeholders and raise awareness about the IBA criteria, process and outputs.

Review of risk factors to seabirds

In addition to collating and analyzing the data to identify marine IBAs, a literature review of risk factors to seabirds was also undertaken. The results of this can be found in Appendix 3 of this report.

Results

Terrestrial sites

Terrestrial sites are those sites with seabird colonies meeting the criteria for IBA identification; these are shown in Figure 5. Table 1 shows the species which meet the criteria and Table 2 shows the information on each of the sites.

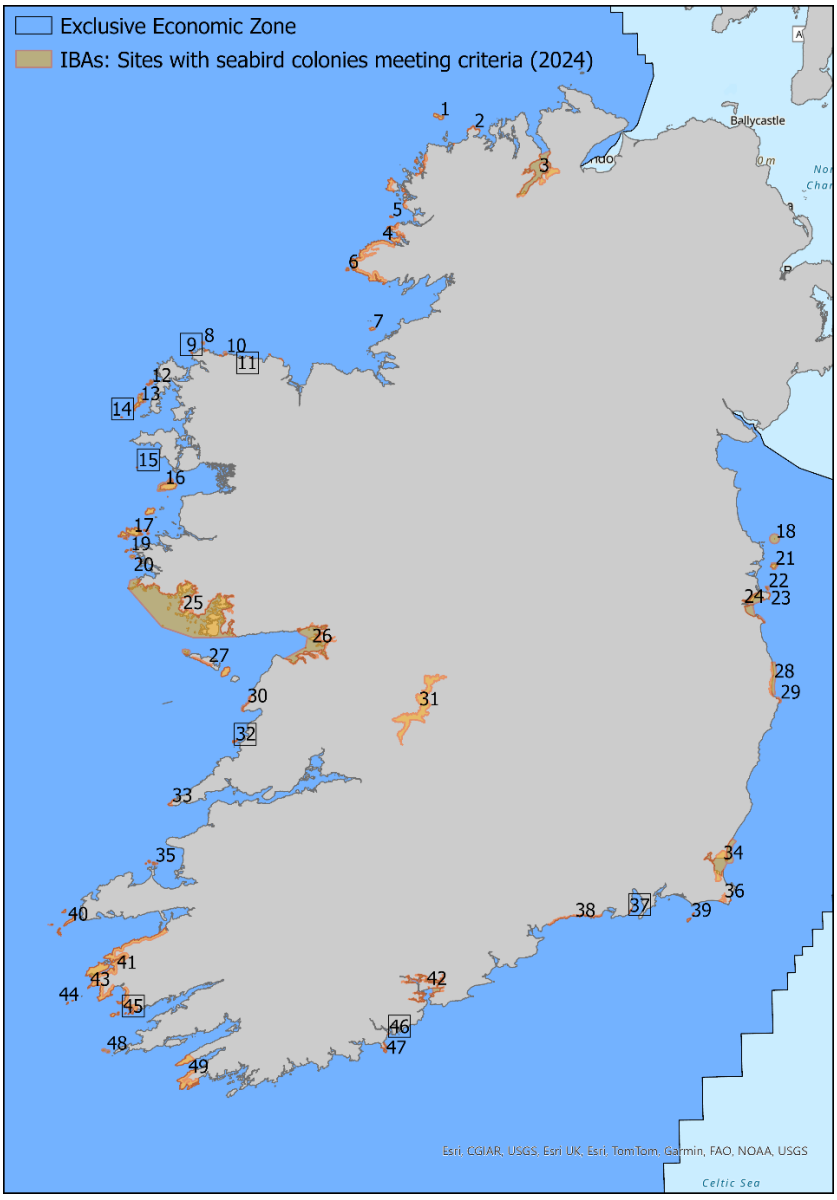


Figure 5: Colonies: Sites with seabird colonies meeting criteria (8 new sites shown with black outline)

Table 1: Species (and sites at which they trigger IBA criteria), for the colony / terrestrial sites.

Common name	Sites	Criteria Met
Arctic Tern	5, 13, 17, 25, 36	C6
Atlantic Puffin	1, 8, 10, 15, 16, 21, 22, 30, 39, 43, 44	A1, C1, B3b, C4
Black Guillemot	4, 16, 18, 25, 35	B2a
Black-legged Kittiwake	1, 2, 4, 8, 9, 11, 14, 15, 16, 17, 18, 21, 22, 23, 27, 29, 30, 33, 37, 39, 40, 41, 43, 44, 47, 48, 49	A1, C1, B1b
Common Guillemot	21, 30, 39	B3b, C4
Common Tern	18, 24, 25, 36, 42	C6
European Herring Gull	21, 22, 25, 38, 46	B1b
European Shag	7, 13, 17, 21, 40	B2a
European Storm-petrel	5, 10, 12, 17, 19, 40, 43, 44, 45, 48	A4, B2a, C2, C6, B3b, C4
Great Black-backed Gull	6, 21, 22, 25, 32	B2a
Great Cormorant	21, 22, 26, 31, 39	B2a
Leach's Storm-petrel	8, 14, 15	A1, C1, C2, C6
Little Tern	25, 27, 28, 34	C6
Manx Shearwater	20, 39, 40, 43, 45	B2a, A4, B3b, C4
Mediterranean Gull	36	C6
Northern Gannet	16, 21, 39, 44, 48	B2a, A4, B3b, C4
Razorbill	2, 21, 22, 30, 39	B2a
Roseate Tern	18, 36	A4, B1b, C2, C6
Sandwich Tern	3, 25, 26, 36	B2a, C6, C2

Five of 24 species assessed did not have sufficient numbers of birds at sites to meet IBA criteria. However, these species are still found throughout a number of the identified sites.

Common name	Sites species present at (albeit with population sizes below IBA thresholds)
Black-headed Gull	1, 3, 4, 25, 26, 31, 36
Common Gull	1, 5, 6, 7, 12, 13, 16, 17, 21, 25, 26, 32, 33, 35, 45
Great Skua	4, 6, 7, 8, 9, 10, 13, 15, 16, 17, 40
Lesser Black-backed Gull	1, 5, 6, 7, 10, 12, 13, 16, 17, 19, 21, 22, 24, 25, 26, 27, 32, 33, 35, 36, 38, 39, 40, 41, 43, 44, 45, 46, 47, 49
Northern Fulmar	1, 2, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 25, 27, 29, 30, 35, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 49

Table 2: Terrestrial sites with breeding seabird colonies which meet IBA criteria: site and species summary.

Map label	Site name	Species	Criteria Met	Count (mat. inds.)	Count (total mat. Inds.)	Delineation notes
1	Tory Island	Atlantic Puffin, Black-legged Kittiwake	A1, C1	734	4130	Existing IBA boundary used. Only seabird information updated for the existing site.
1	Tory Island	Arctic Tern, Black Guillemot, Black-headed Gull, Common Guillemot, Common Gull, Common Tern, European Herring Gull, European Shag, European Storm-petrel, Great Black-backed Gull, Lesser Black-backed Gull, Little Tern, Northern Fulmar, Razorbill	none	3396		
2	Horn Head Cliffs	Black-legged Kittiwake, Razorbill	A1, B1b, C1, B2a	8181	13166	Existing IBA boundary used. Only seabird information updated for the existing site.
2	Horn Head Cliffs	Black Guillemot, Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Northern Fulmar	none	4985		
3	Lough Swilly including Blanket Nook and Inch Lake	Sandwich Tern	B2a, C6	800	3815	Existing IBA boundary used. Only seabird information updated for the existing site.
3	Lough Swilly including Blanket Nook and Inch Lake	Black Guillemot, Black-headed Gull, Common Tern	none	3015		
4	West Donegal coast	Black Guillemot, Black-legged Kittiwake	B2a, A1, C1	1238	4859	Existing IBA boundary used. Only seabird information updated for the existing site. **NOTE:** Site enlarged with the addition of site 4 Árainn Mhór (north cliffs), initially proposed as a separate site). The site now reflects entirely under "West Donegal Coast" in the BirdLife database.
4	West Donegal coast	Black-headed Gull, Black Guillemot, Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Great Skua, Northern Fulmar, Razorbill	none	3621		
5	Roaninish	Arctic Tern, European Storm-petrel	C6, A4	5998	6393	

5	Roaninish	Black Guillemot, Common Gull, European Herring Gull, European Shag, Great Black-backed Gull, Great Cormorant, Lesser Black-backed Gull	none	395		Existing IBA boundary used. Only seabird information updated for the existing site. **NOTE:** The site is considered a new site per the project, but the boundary reflects a site with a 1km seaward extension originally proposed for the species in year 2000.
6	Rathlin O'Birne	Great Black-backed Gull	B2a	290	5243	Existing IBA boundary used. Only seabird information updated for the existing site.
6	Rathlin O'Birne	Black Guillemot, Common Gull, European Herring Gull, European Shag, European Storm-petrel, Great Cormorant, Great Skua, Lesser Black-backed Gull, Northern Fulmar	none	4953		
7	Inishmurray	European Shag	B2a	778	3317	Existing IBA boundary used. Only seabird information updated for the existing site.
7	Inishmurray	Black Guillemot, Common Gull, European Herring Gull, European Storm-petrel, Great Black-backed Gull, Great Skua, Lesser Black-backed Gull, Northern Fulmar	none	2539		
8	Stags of Broadhaven	Atlantic Puffin, Black-legged Kittiwake, Leach's Storm-petrel	A1, C1, C2, C6	3482	4980	Existing IBA boundary used. Only seabird information updated for the existing site.
8	Stags of Broadhaven	Common Guillemot, European Storm-petrel, Great Skua, Manx Shearwater, Northern Fulmar, Razorbill	none	1498		
9	Kid Island (Mayo)	Black-legged Kittiwake	A1, C1	302	531	New boundary digitised based on basemaps used in existing Irish marine spatial planning initiatives (Fair Seas Ireland, Provinces of Ireland coastline layer). Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records from Burnell *et al.* (2023). Initial boundary delineation ideas were also presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
9	Kid Island (Mayo)	Common Guillemot, European Shag, Great Black-backed Gull, Great Skua, Manx Shearwater, Razorbill	none	229		

10	Illaunmaistir (Oileán Máistir)	Atlantic Puffin, European Storm-petrel	A1, C1, A4	5300	5590	Existing IBA boundary used. Only seabird information updated for the existing site.
10	Illaunmaistir (Oileán Máistir)	Black Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Great Skua, Lesser Black-backed Gull, Northern Fulmar	none	290		
11	North Mayo coastline	Black-legged Kittiwake	A1, B1b, C1	2586	5549	**New boundary** digitised based on NPWS seabird subsites GIS layer. Only sections of the subsite layer containing a site that met criteria were included in the boundary. Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records from Burnell *et al.* (2023). Initial boundary delineation ideas were also presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
11	North Mayo coastline	Black Guillemot, Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Northern Fulmar, Razorbill	none	2963		
12	Inishglora and Inishkeeragh	European Storm-petrel	A4	7354	7822	Existing IBA boundary used. Only seabird information updated for the existing site.
12	Inishglora and Inishkeeragh	Arctic Tern, Common Gull, European Herring Gull, Great Black-backed Gull, Lesser Black-backed Gull, Northern Fulmar	none	468		
13	Inishkea Islands	Arctic Tern, European Shag	C6, B2a	656	3648	Existing IBA boundary used. Only seabird information updated for the existing site.
13	Inishkea Islands	Black Guillemot, Common Gull, European Herring Gull, European Storm-petrel, Great Black-backed Gull, Great Skua, Lesser Black-backed Gull, Little Tern, Northern Fulmar	none	2992		
14	Black Rock (Mayo)	Black-legged Kittiwake, Leach's Storm-petrel	A1, C1, C6	38	602	**New boundary** digitised based on basemaps used in existing Irish marine spatial planning initiatives (Fair Seas Ireland, Provinces of Ireland coastline layer). Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records available
14	Black Rock (Mayo)	European Shag, European Storm-petrel, Great Black-backed Gull, Northern Fulmar	none	564		

						from Burnell *et al.* (2023). Initial boundary delineation ideas were also presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
15	Bills Rocks (Mayo)	Atlantic Puffin, Black-legged Kittiwake, Leach's Storm-petrel	A1, C1, C6	464	757	**New boundary** digitised based on basemaps used in existing Irish marine spatial planning initiatives (Fair Seas Ireland, Provinces of Ireland coastline layer). Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records available from Burnell *et al.* (2023). Initial boundary delineation ideas were also presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
15	Bills Rocks (Mayo)	European Herring Gull, European Storm-petrel, Great Black-backed Gull, Great Skua, Northern Fulmar, Razorbill	none	293		
16	Clare Island Cliffs, Inishturk and Mweelaun	Atlantic Puffin, Black Guillemot, Black-legged Kittiwake, Northern Gannet	A1, C1, B2a	3543	19147	Revised boundary digitised based on basemaps used in existing Irish marine spatial planning initiatives (Fair Seas Ireland, Provinces of Ireland coastline layer). Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records available from Burnell *et al.* (2023). This site hosts an updated complex of species from the existing "Clare Island cliffs" existing IBA. Initial boundary delineation ideas were also presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 – 2025). **NOTE:** The boundary here is an updated boundary from "Clare Island Cliffs" IBA formerly recognised. A single new site, "Clare Island Cliffs, Inishturk and Mweelaun" reflects on BirdLife's database.
16	Clare Island Cliffs, Inishturk and Mweelaun	Common Guillemot, Common Gull, European Herring Gull, European Shag, Great Black-backed Gull, Great Coromorant, Great Skua, Lesser Black-backed Gull, Manx Shearwater, Northern Fulmar, Razorbill	none	15604		

17	Inishbofin and Inishshark (including Davillaun)	Arctic Tern, Black-legged Kittiwake, European Shag, European Storm-petrel	C6, A1, C1, B2a, A4, C2	11740	15877	Existing IBA boundary used. Only seabird information updated for the existing site.
17	Inishbofin and Inishshark (including Davillaun)	Black Guillemot, Common Guillemot, Common Gull, Common Tern, European Herring Gull, Great Black-backed Gull, Great Skua, Lesser Black-backed Gull, Manx Shearwater, Northern Fulmar, Razorbill	none	4137		
18	Rockabill	Black Guillemot, Black-legged Kittiwake, Common Tern, Roseate Tern	B2a, A1, C1, C6, A4, B1b, C2	7791	7911	Existing IBA boundary used. Only seabird information updated for the existing site.
18	Rockabill	Arctic Tern	none	120		
19	High Island	European Storm-petrel	A4	7642	10186	Existing IBA boundary used. Only seabird information updated for the existing site. **NOTE:** The site is considered a new site, but the boundary reflects a site with a 1km seaward extension originally proposed for the species in (the year) 2000.
19	High Island	European Herring Gull, European Shag, Great Black-backed Gull, Lesser Black-backed Gull, Manx Shearwater, Northern Fulmar	none	2544		
20	Cruagh Island	Manx Shearwater	B2a	6570	6570	Existing IBA boundary used. Only seabird information updated for the existing site.
21	Lambay Island	Atlantic Puffin, Black-legged Kittiwake, Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Great Cormorant, Northern Gannet, Razorbill	A1, C1, B1b, B3b, C4, B2a	57345	58893	Existing IBA boundary used. Only seabird information updated for the existing site.
21	Lambay Island	Black Guillemot, Common Gull, Lesser Black-backed Gull, Manx Shearwater, Northern Fulmar	none	1549		
22	Ireland's Eye	Atlantic Puffin, Black-legged Kittiwake, European Herring Gull, Great Black-backed Gull, Great Cormorant, Razorbill	A1, C1, B1b, B2a	4023	7959	Existing IBA boundary used. Only seabird information updated for the existing site.

22	Ireland's Eye	Common Guillemot, European Shag, Lesser Black-backed Gull, Northern Fulmar, Northern Gannet	none	3936		
23	Howth Head	Black-legged Kittiwake	A1, B1b, C1	3546	4456	Revised boundary digitised based on NPWS seabird subsites GIS layer. Only sections of the subsite layer containing a site that met criteria were included in the boundary. Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records available via the Seabirds Count colony census records published in November 2023. Initial boundary delineation ideas were also presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
23	Howth Head	Black Guillemot, Common Guillemot, European Herring Gull, European Shag, Northern Fulmar, Razorbill	none	910		
24	Dublin Bay	Common Tern	C6	1034	1525	The existing IBA boundary adjusted to include the tern mooring in Dublin port since this site triggered criteria C6. The structure was delineated using part of an existing SPA file (4024).
24	Dublin Bay	Arctic Tern, Black Guillemot, European Herring Gull, Great Black-backed Gull, Lesser Black-backed Gull	none	491		
25	Connemara Islands	Arctic Tern, Black Guillemot, Common Tern, European Herring Gull, Great Black-backed Gull, Little Tern, Sandwich Tern	C6, B2a, B1b	2566	3402	This is an existing IBA, where the boundary has been updated slightly to include the bay to the east, which hosts the Lobinish site, and one of the five largest sites for Sandwich Terns. Overall, the site encompasses many small islands and islets stretching from Slyne Head (Illaunamid Island) south-eastwards via Ballyconneely, Bertraghboy and Kilkieran Bay. Several IBAs were treated separately in earlier pan-European inventory (Grimmett and Jones 1989). The large site reflects a merge of these smaller sites which were: Eeshal Island (formerly IE041), Horse Island (formerly IE042), Hen Island (formerly IE043), Oileán Geabhróg (formerly IE045), Oileán na nGeabhróg (formerly IE046), Duck Island (formerly IE047) and Geabhróg Island (formerly
25	Connemara Islands	Black-headed Gull, Common Gull, European Shag, European Storm-petrel, Great Cormorant, Lesser Black-backed Gull, Northern Fulmar	none	836		

						IE048). The site also includes surrounding waters, covering a sea area which supports foraging grounds for species.
26	Inner Galway Bay	Great Cormorant, Sandwich Tern	B2a, C6	504	1394	Existing IBA boundary used. Only seabird information updated for the existing site.
26	Inner Galway Bay	Black-headed Gull, Common Gull, Common Tern, European Herring Gull, Great Black-backed Gull, Lesser Black-backed Gull	none	890		
27	Aran Islands (parts)	Black-legged Kittiwake, Little Tern	A1, C1, C6	276	1333	Existing IBA boundary used. Only seabird information updated for the existing site.
27	Aran Islands (parts)	Black Guillemot, Common Tern, European Herring Gull, European Shag, Great Cormorant, Lesser Black-backed Gull, Northern Fulmar, Razorbill, Sandwich Tern	none	1057		
28	North Wicklow coastal marshes	Little Tern	C6	286	286	Existing IBA boundary used. Only seabird information updated for the existing site.
29	Wicklow Head	Black-legged Kittiwake	A1, C1	1446	2236	The boundary has been aligned with the SPA layer (Site code 004127) because the SPA layer has the same single qualifying interest species.
29	Wicklow Head	Black Guillemot, Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Northern Fulmar, Razorbill	none	790		
30	Cliffs of Moher	Atlantic Puffin, Black-legged Kittiwake, Common Guillemot, Razorbill	A1, C1, B1b, B3b, C4, B2a	34267	44073	Existing IBA boundary used. Only seabird information updated for the existing site.
30	Cliffs of Moher	European Herring Gull, European Shag, Great Black-backed Gull, Northern Fulmar	none	9806		
31	Lough Derg (River Shannon)	Great Cormorant	B2a	544	1378	Existing IBA boundary used. Only seabird information updated for the existing site.
31	Lough Derg (River Shannon)	Black-headed Gull, Common Tern	none	834		
32	Mutton Island	Great Black-backed Gull	B2a	374	934	

32	Mutton Island	Common Gull, European Herring Gull, Lesser Black-backed Gull	none	560		**New boundary** digitised based on basemaps used in existing Irish marine spatial planning initiatives (Fair Seas Ireland, Provinces of Ireland coastline layer). Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records available via the Seabirds Count colony census records published in November 2023. Initial boundary delineation ideas were also presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
33	Loop Head	Black-legged Kittiwake	A1, C1	2442	7885	Revised boundary digitised based on basemaps used in existing Irish marine spatial planning initiatives (Fair Seas Ireland, Provinces of Ireland coastline layer), and also GIS layers indicating the sea cliffs of Ireland. Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records available via the Seabirds Count colony census records published in November 2023. Initial boundary delineation ideas were also presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
33	Loop Head	Common Guillemot, Common Gull, European Herring Gull, European Shag, Great Black-backed Gull, Great Cormorant, Lesser Black-backed Gull, Razorbill	none	5443		
34	Wexford Harbour and Slobs	Little Tern	C6	102	128	Existing IBA boundary used. Only seabird information updated for the existing site.
34	Wexford Harbour and Slobs	Great Black-backed Gull	none	26		
35	Magharee Islands, Mucklaghmore	Black Guillemot	B2a	111	3701	Existing IBA boundary used. Only seabird information updated for the existing site.

	and Illaunbarnagh					
35	Magharee Islands, Mucklaghmore and Illaunbarnagh	Arctic Tern, Common Gull, Common Tern, European Herring Gull, European Shag, European Storm-petrel, Great Black-backed Gull, Great Cormorant, Lesser Black-backed Gull, Little Tern, Northern Fulmar, Sandwich Tern	none	3590		
36	Lady's Island Lake	Arctic Tern, Common Tern, Mediterranean Gull, Roseate Tern, Sandwich Tern	C6, B1b, C2, B2a	7794	12654	This is an existing IBA, where the boundary has been updated slightly to align with the SPA layer (Site code 004009) because the SPA layer is adjacent to the coastline where a new marine IBA has also been identified as part of the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
36	Lady's Island Lake	Black-headed Gull, Lesser Black-backed Gull	none	4860		
37	Dunmore East	Black-legged Kittiwake	A1, C1	1054	1191	**New boundary** digitised based on NPWS seabird subsites GIS layer. Only sections of the subsite layer containing a site that met criteria were included in boundary. Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records available via the Seabirds Count colony census records published in November 2023. Initial boundary delineation ideas were also presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
37	Dunmore East	European Herring Gull, European Shag, Northern Fulmar, Razorbill	none	137		
38	Mid Waterford Coast	European Herring Gull	B1b	1184	2228	Existing IBA boundary used. Only seabird information updated for the existing site.
38	Mid Waterford Coast	Black Guillemot, Common Guillemot, European Shag, Great Black-backed Gull, Great Cormorant, Lesser Black-backed Gull, Northern Fulmar, Razorbill	none	1044		
39	Saltee Islands	Atlantic Puffin, Black-legged Kittiwake, Common Guillemot, Great Cormorant,	A1, C1, B3b, C4, B2a	37396	39198	Existing IBA boundary used. Only seabird information updated for the existing site.

		Manx Shearwater, Northern Gannet, Razorbill				
39	Saltee Islands	European Herring Gull, European Shag, Great Black-backed Gull, Lesser Black-backed Gull, Northern Fulmar	none	1802		
40	Blasket Islands	Black-legged Kittiwake, European Shag, European Storm-petrel, Manx Shearwater	A1, C1, B2a, A4, B3b, C2, C4, C6	332734	339502	Existing IBA boundary used. Only seabird information updated for the existing site.
40	Blasket Islands	Black Guillemot, Common Guillemot, Great Skua, Lesser Black-backed Gull, Northern Fulmar, Razorbill	none	6768		
41	Iveragh peninsula	Black-legged Kittiwake	A1, C1	1988	9328	Existing IBA boundary used. Only seabird information updated for the existing site.
41	Iveragh peninsula	Black Guillemot, Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Lesser Black-backed Gull, Northern Fulmar, Razorbill	none	7340		
42	Cork Harbour	Common Tern	C6	440	442	Existing IBA boundary used. Only seabird information updated for the existing site.
42	Cork Harbour	Great Black-backed Gull	none	2		
43	Puffin Island	Atlantic Puffin, Black-legged Kittiwake, European Storm-petrel, Manx Shearwater	A1, C1, A4, B2a, C2, C6	21804	24219	Existing IBA boundary used. Only seabird information updated for the existing site.
43	Puffin Island	Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Lesser Black-backed Gull, Northern Fulmar, Razorbill	none	2415		
44	The Skelligs: Great Skellig and Little Skellig	Atlantic Puffin, Black-legged Kittiwake, European Storm-petrel, Northern Gannet	A1, B3b, C1, C4, A4, B2a, C2, C6	101450	107819	Existing IBA boundary used. Only seabird information updated for the existing site.
44	The Skelligs: Great Skellig and Little Skellig	Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Lesser Black-backed Gull, Manx Shearwater, Northern Fulmar, Razorbill	none	6369		
45	Scarriff, Deenish and nearby islands	European Storm-petrel, Manx Shearwater	A4, B2a, B3b, C2, C4, C6	53114	54940	**New boundary** digitised based on NPWS seabird subsites GIS layer. Only sections of the subsite layer containing a site that met criteria were included in

45	Scarriff, Deenish and nearby islands	Arctic Tern, Black Guillemot, Common Gull, European Herring Gull, European Shag, Great Black-backed Gull, Great Cormorant, Lesser Black-backed Gull, Northern Fulmar	none	1826		boundary. NPWS subsites layer used to delineate islands, Deenish, Moylaun & Oileán Dá Cheann were included with Scarriff. Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records available via the Seabirds Count colony census records published in November 2023. Initial boundary delineation ideas were also presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
46	Sandycove Island (Cork)	European Herring Gull	B1b	610	1336	**New boundary** digitised based on basemaps used in existing Irish marine spatial planning initiatives (Fair Seas Ireland, Provinces of Ireland coastline layer). Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records available via the Seabirds Count colony census records published in November 2023. Initial boundary delineation ideas were also presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
46	Sandycove Island (Cork)	European Shag, Great Black-backed Gull, Lesser Black-backed Gull, Northern Fulmar	none	726		
47	Old Head of Kinsale	Black-legged Kittiwake	A1, C1	1422	4784	Revised boundary digitised based on NPWS seabird subsites GIS layer. Only sections of the subsite layer containing a site that met criteria were included in boundary. The initial boundary was also cropped using a sea cliff layer showing the length of sea cliff sites along coast so as to include the seabird specific habitat only. Boundary delineated for seabird triggers only through consultation with Irish seabird expert (Stephen Newton) and seabird abundance records available via the Seabirds Count colony census records published in November 2023. Initial boundary delineation ideas were also
47	Old Head of Kinsale	Common Guillemot, European Herring Gull, European Shag, Lesser Black-backed Gull, Northern Fulmar, Razorbill	none	3362		

						presented for comment to marine relevant stakeholders during the Irish seabird IBA project funded by the Flotilla Foundation (2023 - 2025).
48	Bull and Cow Rocks	Black-legged Kittiwake, European Storm-petrel, Northern Gannet	A1, C1, A4, B2a	20076	20345	Existing IBA boundary used. Only seabird information updated for the existing site.
48	Bull and Cow Rocks	Common Guillemot, European Herring Gull, Great Black-backed Gull, Razorbill	none	269		
49	Sheep's Head and Mizen Head peninsulas	Black-legged Kittiwake	A1, C1	1322	2889	Existing IBA boundary used. Only seabird information updated for the existing site.
49	Sheep's Head and Mizen Head peninsulas	Black Guillemot, Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Great Cormorant, Lesser Black-backed Gull, Northern Fulmar, Razorbill	none	1567		

Detailed summary about population estimates and criteria triggered for each species at each site available from BirdWatch Ireland.

Marine sites

From the analysis of tracking data and aerial surveys to identify high use areas at sea, 24 marine sites which met the IBA criteria were identified. These are shown in Figure 6. Table 3 outlines the species which meet the criteria and Table 4 gives full details of these marine sites.

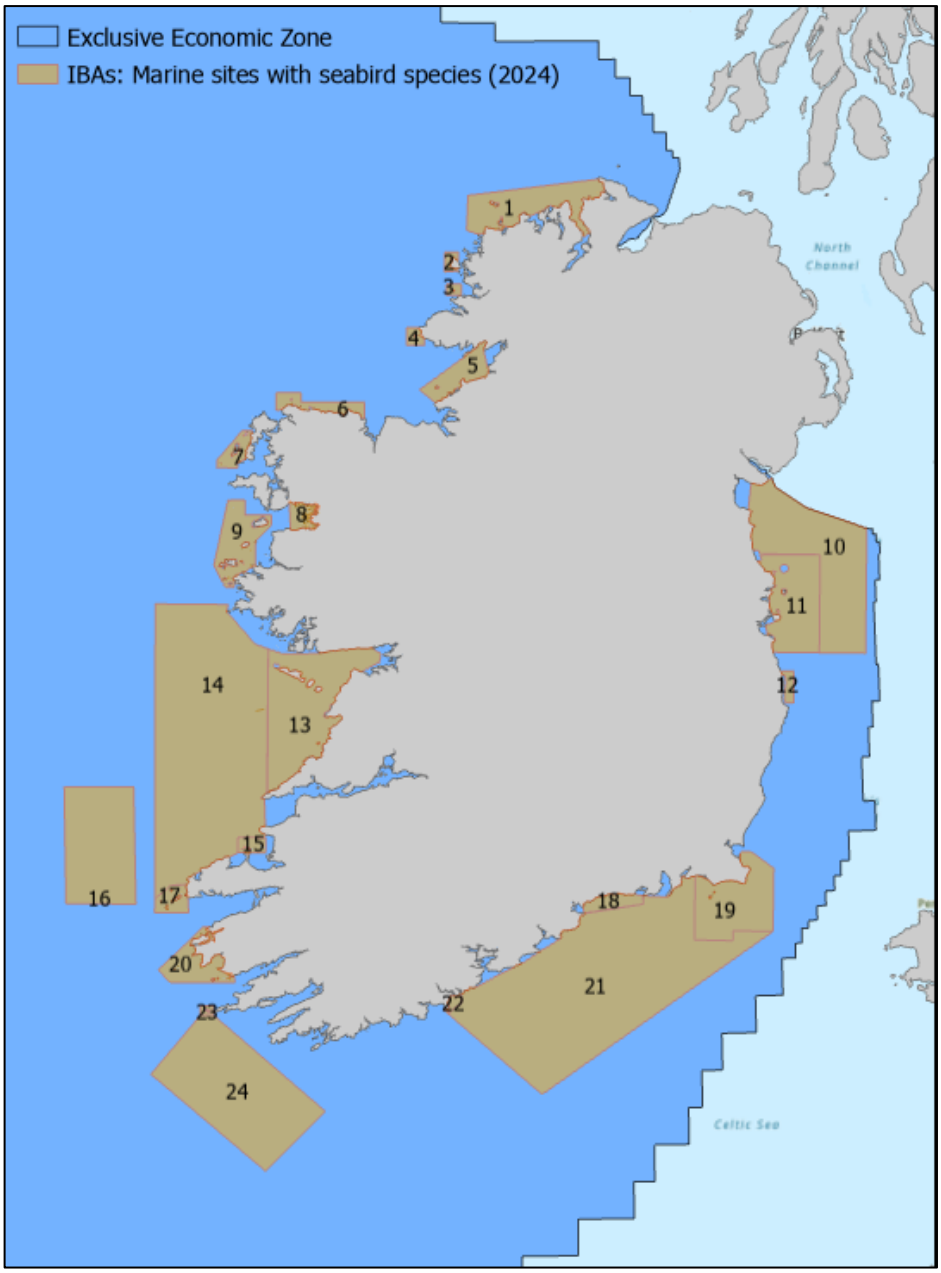


Figure 6: Marine sites: At sea sites with sufficient numbers of birds meeting IBA criteria

Table 3: Species or species groups (in relation to ObSERVE II or MarPAMM data) and sites at which they trigger IBA criteria, for the marine sites.

Common name	Sites	Criteria Met	At-sea distribution data source
Arctic Tern	3, 7, 9, 13, 19	C6	Seaward extension
Atlantic Puffin	1, 6, 9, 11, 13, 19, 20	A1, C1, B3b, C4	Seaward extension, tracking data
Auks	5, 10, 11, 12, 13, 18, 19, 21	B2a	observe surveys
Black Guillemot	2, 3, 4, 9, 11, 13, 15	B2a	Seaward extension
Black-backed gull	5, 10, 11, 13, 18, 19, 20, 21, 22	B2a	observe surveys
Black-legged Kittiwake	1, 2, 3, 4, 6, 9, 10, 11, 13, 17, 19, 20, 22, 23	A1, B1b, C1	Seaward extension, tracking data
Black-legged kittiwake	5, 10, 11, 13, 18, 19, 21, 22	A1, B1b, C1	observe surveys
Common Guillemot	11, 13, 19	B3b, C4	Seaward extension
Common Tern	11, 13, 19	C6	Seaward extension, tracking data
European Herring Gull	11, 13, 18, 22	B1b	Seaward extension
European Shag	5, 7, 9, 11, 17	B2a	Seaward extension, tracking data
European Storm-petrel	3, 6, 7, 9, 17, 20, 23	A4, B2a, C2, C6, B3b, C4	Seaward extension
Great Black-backed Gull	4, 11, 13	B2a	Seaward extension
Great Cormorant	11, 13, 19	B2a	Seaward extension
Herring-common gull	1, 3, 5, 13, 18, 19, 21, 22, 24	B1b	observe surveys
Large gull species	21	B1b	observe surveys
Leach's Storm-petrel	6, 9	A1, C1, C2, C6	Seaward extension
Little Tern	8, 12, 13, 19	C6	Seaward extension
Manx Shearwater	9, 10, 11, 13, 14, 17, 19, 20, 21	A4, B2a, C4, B3b	Seaward extension, tracking data
Manx shearwater	11, 13, 14, 15	B2a, A1, C4	observe surveys
Mediterranean Gull	19	C6	Seaward extension
Northern Gannet	5, 9, 10, 11, 16, 18, 19, 20, 21, 23, 24	B2a, A4, B3b, C4	observe surveys, Seaward extension, tracking data
Petrel species	16, 24	B2a	observe surveys
Razorbill	1, 10, 11, 13, 19	B2a	Seaward extension, tracking data
Roseate Tern	11, 19	A4, B1b, C2, C6	Seaward extension
Sandwich Tern	1, 13, 19	B2a, C6, C2	Seaward extension
Waterbirds	10	B1b, B2a	MarPAMM

Five of 24 regular breeding seabird species assessed did not have sufficient numbers of birds at sites to meet IBA criteria. However, these species are still found throughout a number of the identified sites.

Common name	Sites species present at (albeit with population sizes below IBA thresholds)
Black-headed Gull	1, 2, 3, 4, 13, 14, 19
Common Gull	1, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14, 15, 20
Great Skua	2, 3, 4, 5, 6, 7, 9, 14, 17
Lesser Black-backed Gull	1, 3, 4, 5, 6, 7, 9, 10, 11, 13, 14, 15, 17, 18, 19, 20, 21, 22
Northern Fulmar	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 14, 15, 17, 18, 19, 20, 21, 22

Table 4: Marine IBA species summary data.

Map label	Site name	Species	Season	Data source	Criteria met	Count of trigger species (mat. inds.)	Delineation notes
1	North Donegal coast and islands marine extension	Atlantic Puffin, Black-legged Kittiwake Razorbill, Sandwich Tern	Breeding,	Seaward extension, ObSERVE surveys	A1, C1, B1b, B2a, C6	10349	Site delineated via seaward extension for Atlantic Puffin (4km), Black-legged Kittiwake (2km), Razorbill (31.2km, decay function), Sandwich Tern (9km), species with population estimates meeting criteria from adjacent colonies. The channel from the Lough Swilly region is included given the Sandwich Terns which move through this area from breeding colonies. The top 1% of areas used in winter by Herring-Common gull, as indicated by the ObSERVE II at-sea survey data, also fall within the boundary. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.
1	North Donegal coast and islands marine extension	Arctic Tern, Black Guillemot, Black-headed Gull, Common Guillemot, Common Gull, Common Tern, European Herring Gull, European Shag, European Storm-petrel, Great Black-backed Gull, Lesser Black-backed Gull, Little Tern, Northern Fulmar Herring-common gull	Breeding Winter	Seaward extension	none	NA	
2	Árainn Mhór marine extension	Black Guillemot, Black-legged Kittiwake	Breeding	Seaward extension	B2a, A1, C1	1255	Site delineated via seaward extension for Black Guillemot (4.9km) and Black-legged Kittiwake (2km), species with population estimates meeting criteria from adjacent colonies. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria.
2	Árainn Mhór marine extension	Black-headed Gull, Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Great Skua, Northern Fulmar, Razorbill	Breeding	Seaward extension	none	NA	
3	Roaninish marine extension	Arctic Tern, Black Guillemot, Black-legged Kittiwake, European Storm-petrel	Breeding, Winter	Seaward extension, ObSERVE surveys	C6, B2a, A1, C1, A4, B1b	6942	Site delineated via seaward extension for Arctic Tern (6.1km), Black Guillemot (4.9km), Black-legged Kittiwake (2km), European Storm-petrel (1km), species with population estimates meeting criteria from adjacent colonies. The top 1%

3	Roaninish marine extension	Black-headed Gull, Common Guillemot, Common Gull, European Herring Gull, European Shag, Great Black-backed Gull, Great Cormorant, Great Skua, Lesser Black-backed Gull, Northern Fulmar, Razorbill Herring-common gull	Breeding	Seaward extension	none	NA	of areas used in winter by Herring-common gulls, as indicated by the ObSERVE II at-sea survey data, also fall within the boundary. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.
4	Rathlin O'Birne - Malin Beg marine extension	Black Guillemot, Black-legged Kittiwake, Great Black-backed Gull	Breeding	Seaward extension	B2a, A1, C1	1221	Site delineated via seaward extension for Black Guillemot (4.9km), Black-legged Kittiwake (2km), Great Black-backed Gull (6.7km), species with population estimates meeting criteria from adjacent colonies. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria.
4	Rathlin O'Birne - Malin Beg marine extension	Black-headed Gull, Common Guillemot, Common Gull, European Herring Gull, European Shag, European Storm-petrel, Great Cormorant, Great Skua, Lesser Black-backed Gull, Northern Fulmar, Razorbill	Breeding	Seaward extension	none	NA	
5	Outer Donegal Bay (marine extension)	Auks, Black-legged kittiwake, European Shag, Herring-Common gull, Northern Gannet	Summer, Breeding, Winter	ObSERVE surveys, Seaward extension	B2a, A1, B1b, C1	1373	Site delineated via seaward extension for European Shag (9.2km), species with population estimates meeting criteria from adjacent colonies. The top 1% of areas used in winter by Herring-common gulls, and in summer by Auks, Black-backed gull, Black-legged kittiwake, Northern Gannet, as indicated by the ObSERVE II at-sea survey data, also fall within the boundary. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird
5	Outer Donegal Bay (marine extension)	Black Guillemot, Common Gull, European Herring Gull, European Storm-petrel, Great Black-backed Gull, Great Skua, Lesser Black-backed Gull, Northern Fulmar Black-backed gull	Breeding	Seaward extension	none	NA	

							abundance in marine waters around Ireland in the summer and winter.
6	North Mayo coast and islands marine extension	Atlantic Puffin, Black-legged Kittiwake, European Storm-petrel, Leach's Storm-petrel	Breeding	Seaward extension	A1, C1, B1b, A4, C2, C6	12676	Site delineated via seaward extension for Atlantic Puffin (4km), Black-legged Kittiwake (2km), European Storm-petrel (1km), Leach's Storm-petrel (1km), species with population estimates meeting criteria from adjacent colonies. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria.
6	North Mayo coast and islands marine extension	Black Guillemot, Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Great Skua, Lesser Black-backed Gull, Manx Shearwater, Northern Fulmar, Razorbill	Breeding	Seaward extension	none	NA	
7	Inishkea-Inishglora-Duvillaun complex marine extension	Arctic Tern, European Shag, European Storm-petrel	Breeding	Seaward extension	C6, B2a, A4	10322	Site delineated via seaward extension for Arctic Tern (6.1km), European Shag (9.2km), European Storm-petrel (1km), species with population estimates meeting criteria from adjacent colonies. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria.
7	Inishkea-Inishglora-Duvillaun complex marine extension	Black Guillemot, Common Gull, European Herring Gull, Great Black-backed Gull, Great Skua, Lesser Black-backed Gull, Little Tern, Northern Fulmar	Breeding	Seaward extension	none	NA	
8	Clew Bay	Seabirds: Little Tern Wetland birds: Eurasian Oystercatcher, Northern Lapwing, Eurasian Curlew, Bat-tailed Godwit, Black-tailed Godwit	Breeding Winter	Seaward extension	C6 B1a, C1	48 1116	Existing IBA boundary used from the original 2009 IBA assessment for Ireland. In 2009, the boundary reflected a site used by a significant number of Brent Geese. In 2024, the site was initially identified as meeting criteria for the seabird species only. Further investigation using available waterbird data (from the Irish Wetland Bird Survey) indicated the site is also used by a significant number of wetland birds. The site was initially identified via seaward extension for Little Tern (3.5km), species with population estimates meeting criteria from adjacent colonies. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria.
8	Clew Bay	Arctic Tern, Common Gull	Breeding	Seaward extension	none	NA	

9	South Mayo - North Connemara Islands marine extension	Arctic Tern, Atlantic Puffin, Black Guillemot, Black-legged Kittiwake, European Shag, European Storm-petrel, Leach's Storm-petrel, Manx Shearwater, Northern Gannet	Breeding	Seaward extension	C6, A1, C1, B2a, A4, C2	32202	Site delineated via seaward extension for Arctic Tern (6.1km), Atlantic Puffin (4km), Black Guillemot (4.9km), Black-legged Kittiwake (2km), European Shag (9.2km), European Storm-petrel (1km), Leach's Storm-petrel (1km), Manx Shearwater (2.3km), Northern Gannet (4km), species with population estimates meeting criteria from adjacent colonies. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria.
9	South Mayo - North Connemara Islands marine extension	Common Guillemot, Common Gull, Common Tern, European Herring Gull, Great Black-backed Gull, Great Cormorant, Great Skua, Lesser Black-backed Gull, Northern Fulmar, Razorbill	Breeding	Seaward extension	none	NA	
10	Northwest Irish Sea	Black-legged Kittiwake, Black-legged kittiwake, Manx Shearwater, Northern Gannet, Razorbill, Waterbirds Auks, Black-backed gull	Summer, Winter, Breeding,	ObSERVE surveys, tracking data, Seaward extension, MarPAMM	B2a, A1, B1b, C1, A4, C4, B3b	187807	Site delineated from tracking data for Black-legged Kittiwake (from Lambay Island), Manx Shearwater (from Lundy, England), Manx Shearwater (from Skomer, Wales). Seaward extension estimates for Razorbill (31.2km, decay function), species with population estimates meeting criteria from adjacent colonies, also support delineation of the site. The top 1% of areas used in winter by Auks, and in summer by Auks, Black-backed gull, Black-legged kittiwake, as indicated by the ObSERVE II at-sea survey data, also fall within the boundary. Large numbers of waterbirds use the Dundalk Bay area, as evidenced from the MarPAMM report. Animal tracking data used to support delineation of the site follows methods detailed in Beal et al. (2021, Methods in Ecology & Evolution) and the track2kba R package. The method facilitates identification of an important core area from tracking data. Abundance of birds within the core areas is also determined in the analysis. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.
10	Northwest Irish Sea	Arctic Tern, Atlantic Puffin, Black Guillemot, Black-legged Kittiwake, Common Guillemot, Common Gull, Common Tern, European Herring Gull, European Shag, Great Black-backed Gull, Great Cormorant, Lesser Black-backed Gull, Manx Shearwater, Northern Fulmar, Northern Gannet, Roseate Tern	Breeding	Seaward extension, tracking data	none	NA	

11	Dublin Islands and cliffs marine extension	Atlantic Puffin, Auks, Black Guillemot, Black-legged Kittiwake, Black-legged kittiwake, Common Guillemot, Common Tern, European Herring Gull, European Shag, Great Black-backed Gull, Great Cormorant, Manx Shearwater, Manx shearwater, Northern Gannet, Razorbill, Roseate Tern	Breeding, Summer, Winter	Seaward extension, ObSERVE surveys, tracking data	A1, C1, B2a, B1b, B3b, C4, C6, A4, C2	257868	Site delineated given the top 1% of areas used in summer by Auks, Black-legged kittiwake, Manx shearwater, Northern Gannet, and in winter by Auks, as indicated by the ObSERVE II at-sea survey data, fall within the boundary. Seaward extension estimates for Atlantic Puffin (4km), Black Guillemot (4.9km), Black-legged Kittiwake (2km), Common Guillemot (33.1km, decay function), Common Tern (6.4km), European Herring Gull (14.9km), European Shag (9.2km), Great Black-backed Gull (6.7km), Great Cormorant (7.1km), Northern Gannet (4km), Razorbill (31.2km, decay function), Roseate Tern (4.1km), species with population estimates meeting criteria from adjacent colonies, also support delineation of the site. Tracking data for Black-legged Kittiwake (from Lambay Island), Common Tern (from Rockabill), European Shag (from Lambay Island), Manx Shearwater (from Lundy, England), Manx Shearwater (from Skomer, Wales), Northern Gannet (from Lambay Island) also supported delineation of this site. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. Animal tracking data used to support delineation of the site follows methods detailed in Beal et al. (2021, Methods in Ecology & Evolution) and the track2kba R package. The method facilitates identification of an important core area from tracking data. Abundance of birds within the core areas is also determined in the analysis.
11	Dublin Islands and cliffs marine extension	Arctic Tern, Common Gull, Lesser Black-backed Gull, Manx Shearwater, Northern Fulmar, Black-backed gull	Breeding	Seaward extension, tracking data	none	NA	
12	Wicklow Murrough marine extension	Auks, Little Tern	Winter, Breeding	ObSERVE surveys, Seaward extension	B2a, C6	1723	Site delineated via seaward extension for Little Tern (3.5km), species with population estimates meeting criteria from adjacent colonies. The top 1% of areas used in winter by Auks, as indicated by the ObSERVE II at-sea survey data, also fall within the boundary. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for

							IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter. Given the ObSERVE II data for Auks indicated a very large area for the top 1% of areas used across the EEZ, the boundary of the new site was aligned to the existing "The Murrough SPA" in this instance.
13	Greater Galway Bay Inner marine extension	Arctic Tern, Atlantic Puffin, Black Guillemot, Black-legged Kittiwake, Black-legged kittiwake, Common Guillemot, Common Tern, European Herring Gull, Great Black-backed Gull, Great Cormorant, Little Tern, Manx Shearwater, Manx shearwater, Razorbill, Sandwich Tern	Breeding, Summer	Seaward extension, ObSERVE surveys, tracking data	C6, A1, C1, B2a, B1b, B3b, C4, A4	93491	Seaward extension estimates for Arctic Tern (6.1km), Atlantic Puffin (4km), Black Guillemot (4.9km), Black-legged Kittiwake (2km), Common Guillemot (33.1km, decay function), Common Tern (6.4km) , European Herring Gull (14.9km), Great Black-backed Gull (6.7km), Great Cormorant (7.1km), Little Tern (3.5km), Razorbill (31.2km, decay function), Sandwich Tern (9km), species with population estimates meeting criteria from adjacent colonies, also support delineation of the site. Tracking data for Manx Shearwater (from Blaskets) also supported delineation of this site. Site supported in delineated given the top 1% of areas used in summer by Auks, Black-backed gull, Black-legged kittiwake, Manx shearwater, and in winter by Herring-common gull, as indicated by the ObSERVE II at-sea survey data, fall within the boundary. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. Animal tracking data used to support delineation of the site follows methods detailed in Beal et al. (2021, Methods in Ecology & Evolution) and the track2kba R package. The method facilitates identification of an
13	Greater Galway Bay Inner marine extension	Black-headed Gull, Common Gull, European Shag, European Storm-petrel, Lesser Black-backed Gull, Northern Fulmar, Auks, Black-backed gull, Herring-common gull,	Breeding, Winter	Seaward extension, ObSERVE surveys	none	NA	

							important core area from tracking data. Abundance of birds within the core areas is also determined in the analysis.
14	Greater Galway Bay Outer marine extension	Manx Shearwater, Manx shearwater	Breeding, Summer	tracking data, ObSERVE surveys	A4, B2a, B3b, C4	55878	Site delineated given the top 1% of areas used in summer by Manx shearwater, as indicated by the ObSERVE II at-sea survey data, fall within the boundary. Tracking data for Manx Shearwater (from Blaskets) also supported delineation of this site. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter. Animal tracking data used to support delineation of the site follows methods detailed in Beal et al. (2021, Methods in Ecology & Evolution) and the track2kba R package. The method facilitates identification of an important core area from tracking data. Abundance of birds within the core areas is also determined in the analysis.
14	Greater Galway Bay Outer marine extension	Arctic Tern, Atlantic Puffin, Black Guillemot, Black-headed Gull, Black-legged Kittiwake, Common Guillemot, Common Gull, Common Tern, European Herring Gull, European Shag, European Storm-petrel, Great Black-backed Gull, Great Cormorant, Great Skua, Lesser Black-backed Gull, Little Tern, Manx Shearwater, Northern Fulmar, Razorbill, Sandwich Tern	Breeding	Seaward extension	none	NA	
15	Magharees and Tralee Bay marine extension	Black Guillemot, Manx shearwater	Breeding, Summer	Seaward extension, ObSERVE surveys	B2a	1107	Site delineated via seaward extension for Black Guillemot (4.9km), species with population estimates meeting criteria from adjacent colonies. The top 1% of areas used in summer by Manx shearwater, as indicated by the ObSERVE II at-sea survey data, also fall within the boundary. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.
15	Magharees and Tralee Bay marine extension	Arctic Tern, Common Gull, Common Tern, European Herring Gull, European Shag, European Storm-petrel, Great Black-backed Gull, Great Cormorant, Lesser Black-backed Gull, Little Tern, Manx Shearwater, Northern Fulmar, Sandwich Tern	Breeding	Seaward extension, tracking data	none	NA	
16	Blasket Islands pelagic extension	Northern Gannet	Summer	ObSERVE surveys	B2a	2298	Site delineated given the top 1% of areas used by Northern Gannets in the summer, as indicated by the ObSERVE II at-sea survey data, fall within the boundary. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.
16	Blasket Islands pelagic extension	Manx Shearwater, Petrel Species	Breeding, Summer	ObSERVE surveys, tracking data	none	NA	

17	Blasket Islands marine extension	Black-legged Kittiwake, European Shag, European Storm-petrel, Manx Shearwater	Breeding	Seaward extension, tracking data	A1, C1, B2a, A4, B3b, C2, C4, C6	378807	Site delineated via seaward extension for Black-legged Kittiwake (2km), European Shag (9.2km), European Storm-petrel (1km), Manx Shearwater (2.3km), species with population estimates meeting criteria from adjacent colonies. Tracking data for Manx Shearwater from the Blaskets also supported delineation of this site. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. Animal tracking data used to support delineation of the site follows methods detailed in Beal et al. (2021, Methods in Ecology & Evolution) and the track2kba R package. The method facilitates identification of an important core area from tracking data. Abundance of birds within the core areas is also determined in the analysis.
17	Blasket Islands marine extension	Black Guillemot, Common Guillemot, Great Skua, Lesser Black-backed Gull, Northern Fulmar, Razorbill	Breeding	Seaward extension	none	NA	
18	Mid Waterford marine extension	Black-legged kittiwake, European Herring Gull	Winter, Breeding	ObSERVE surveys, Seaward extension	A1, B1b, C1	2970	Site delineated via seaward extension for European Herring Gulls (14.9km), species with population estimates meeting criteria from adjacent colonies. Delineation also supported because the top 1% of areas used in winter by Auks, Black-backed gulls, Black-legged kittiwake and Herring-common gull, as indicated by the ObSERVE II at-sea survey data, also fall within the boundary. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.
18	Mid Waterford marine extension	Black Guillemot, Common Guillemot, European Shag, Great Black-backed Gull, Great Cormorant, Lesser Black-backed Gull, Manx Shearwater, Northern Fulmar, Northern Gannet, Razorbill Auks, Black-backed gull, Herring-common gull, Northern Gannet	Breeding	Seaward extension, tracking data	none	NA	
19	Saltees - Lady's Island marine extension	Arctic Tern, Atlantic Puffin, Black-legged Kittiwake, Black-legged kittiwake, Common Guillemot, Common Tern, Great Cormorant, Little Tern, Manx Shearwater, Mediterranean	Breeding, Winter, Summer	Seaward extension, tracking data,	C6, A1, C1, B2a, B1b, B3b, C4, A4, C2	242465	Site delineated from tracking data for Atlantic Puffin (from Little Saltee), Manx Shearwater (from Skomer, Wales). Seaward extension estimates for Arctic Tern (6.1km), Atlantic Puffin (4km), Black-legged Kittiwake (2km), Common Guillemot (33.1km, decay function), Common Tern (6.4km), Great

		Gull, Northern Gannet, Razorbill, Roseate Tern, Sandwich Tern		ObSERVE surveys			Cormorant (7.1km), Little Tern (3.5km), Manx Shearwater (2.3km), Mediterranean Gull (11.5km), Northern Gannet (4km), Razorbill (31.2km, decay function), Roseate Tern (4.1km), species with population estimates meeting criteria from adjacent colonies, also support delineation of the site. The top 1% of areas used in winter by Auks, Black-backed gulls, Black-legged kittiwake, Herring-Common gull, Northern Gannet, and in summer by Auks, as indicated by the ObSERVE II at-sea survey data, also fall within the boundary. Animal tracking data used to support delineation of the site follows methods detailed in Beal et al. (2021, Methods in Ecology & Evolution) and the track2kba R package. The method facilitates identification of an important core area from tracking data. Abundance of birds within the core areas is also determined in the analysis. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.
19	Saltees - Lady's Island marine extension	Black-headed Gull, European Herring Gull, European Shag, Great Black-backed Gull, Lesser Black-backed Gull, Northern Fulmar Auks, Black-backed gull, Herring-Common Gull	Breeding	Seaward extension	none	NA	
20	Skelligs - Doulus - Lamb's Head marine extension	Atlantic Puffin, Black-backed gull, Black-legged Kittiwake, European Storm-petrel, Manx Shearwater, Northern Gannet	Breeding, Summer	Seaward extension, ObSERVE surveys	A1, B3b, C1, C4, B2a, A4, C2, C6	179503	Site delineated via seaward extension for Atlantic Puffin (4km), Black-legged Kittiwake (2km), European Storm-petrel (1km), Manx Shearwater (2.3km), Northern Gannet (4km), species with population estimates meeting criteria from adjacent colonies. The top 1% of areas used in summer by Black-backed gulls, as indicated by the ObSERVE II at-sea survey data, also fall within the boundary. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. At-sea survey data used to support delineation of the site was collected and analysed under the
20	Skelligs - Doulus - Lamb's Head marine extension	Arctic Tern, Black Guillemot, Common Guillemot, Common Gull, European Herring Gull, European Shag, Great Black-backed Gull, Great Cormorant, Lesser Black-backed Gull, Northern Fulmar, Razorbill	Breeding	Seaward extension	none	NA	

							ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.
21	Northeast Celtic Sea	Black-legged kittiwake, Manx Shearwater, Northern Gannet Auks, Black-backed gull, Herring-common gull, Large gull species (Collective numbers supporting B3b criteria)	Winter, Summer, Breeding	ObSERVE surveys, tracking data	B2a, A1, B1b, C1, A4, B3b, C4	167457	Site delineated from tracking data for Northern Gannets (from Great Saltee), Manx Shearwater (from Little Saltee), Manx Shearwater (from Skomer, Wales). The top 1% of areas used in winter by Auks, Black-backed gull, Black-legged kittiwake, Herring-common gull, Northern Gannet, and in summer by Black-backed gull, Black-legged kittiwake, Large gull species, as indicated by the ObSERVE II at-sea survey data, also fall within the boundary. Animal tracking data used to support delineation of the site follows methods detailed in Beal et al. (2021, Methods in Ecology & Evolution) and the track2kba R package. The method facilitates identification of an important core area from tracking data. Abundance of birds within the core areas is also determined in the analysis. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.
21	Northeast Celtic Sea	Atlantic Puffin, Black Guillemot, Black-legged Kittiwake, Common Guillemot, European Herring Gull, European Shag, Great Black-backed Gull, Great Cormorant, Lesser Black-backed Gull, Manx Shearwater, Northern Fulmar, Northern Gannet, Razorbill	Breeding	Seaward extension	none	NA	
22	Old Head of Kinsale marine extension	Black-legged kittiwake, European Herring Gull	Winter, Summer, Breeding	ObSERVE surveys, Seaward extension	A1, C1, B1b	2188	Site delineated via seaward extension for Black-legged Kittiwake (2km), European Herring Gull (14.9km), species with population estimates meeting criteria from adjacent colonies. The top 1% of areas used in winter by Black-backed gulls, Herring-common gulls, and in summer by Black-backed gull, Black-legged Kittiwake, as indicated by the ObSERVE II at-sea survey data, also fall within the boundary. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.
22	Old Head of Kinsale marine extension	Common Guillemot, European Shag, Great Black-backed Gull, Lesser Black-backed Gull, Northern Fulmar, Razorbill Black-backed gull, Black-legged Kittiwake, Herring-common gull	Breeding	Seaward extension	none	NA	

23	Bull and Cow Rocks marine extension	Black-legged Kittiwake, European Storm-Petrel, Northern Gannet	Breeding	Seaward extension, tracking data	A1, C1, A4, B2a	26272	Site delineated via seaward extension for Black-legged Kittiwake (2km), European Storm-Petrel (1km), Northern Gannet (4km), species with population estimates meeting criteria from adjacent colonies. Tracking data for Northern Gannets from Bull Rock also supported delineation of this site. The boundary was selected based on the current "The Bull and The Cow Rocks SPA", given the high alignment in boundaries during the IBA assessment process. Seaward extension methodology follows methods from Critchley et al. (2018, Biological Conservation, vol. 224), adapted by Handley et al. (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. Animal tracking data used to support delineation of the site follows methods detailed in Beal et al. (2021, Methods in Ecology & Evolution) and the track2kba R package. The method facilitates identification of an important core area from tracking data. Abundance of birds within the core areas is also determined in the analysis.
23	Bull and Cow Rocks marine extension	Common Guillemot, European Herring Gull, Great Black-backed Gull, Razorbill	Breeding	Seaward extension	None	NA	
24	Bull Rock pelagic extension	Herring-Common gull, Northern Gannet	Summer, Breeding	ObSERVE surveys, tracking data	B1b, B2a	10221	Site delineated given the top 1% of areas used by Herring and Common Gulls, Northern Gannets in the summer, as indicated by the ObSERVE II at-sea survey data, fall within the boundary. Tracking data for Northern Gannets from Bull Rock also supported delineation of this site. Animal tracking data used to support delineation of the site follows methods detailed in Beal et al. (2021, Methods in Ecology & Evolution) and the track2kba R package. The method facilitates identification of an important core area from tracking data. Abundance of birds within the core areas is also determined in the analysis. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.
24	Bull Rock pelagic extension	Black-legged Kittiwake, Common Guillemot, European Herring Gull, European Storm-Petrel, Great Black-backed Gull, Northern Gannet, Razorbill, Petrel species	Breeding	Seaward extension, ObSERVE surveys	None	NA	

Detailed summary of population estimates and criteria met per species and site available from BirdWatch Ireland.

Discussion

These results show that, from the data collated in this report, 73 sites across Ireland and in Irish seas where identified that support sufficient numbers of seabirds to meet IBA criteria; a globally recognised standard to identify important sites for birds. Of these sites, 49 primarily represent sites for seabird colonies ("Terrestrial IBAs"), while 24 represent important marine areas for seabirds ("Marine IBAs").

For the marine environment, adopting the proposed IBAs as SPAs would increase the area of the EEZ designated as SPA by 6.6% from the current 1.6% of the EEZ to 8.2%. Adopting the IBAs as SPAs would also increase the Natura network as a whole (i.e., both SPAs and SACs), by 6.2%, from 10.3% to 16.5% of the Irish EEZ. These figures are detailed in Table 5 and illustrated in Figure 7.

Table 5: Designations within Ireland's EEZ by area (km2) and relative proportion

Spatial designation unit	**Area km^2**	**Proportion of EEZ covered (%)**
EEZ (Exclusive Economic Zone)	428004	
SPAs & SACs: marine components	44029	10.3
SPAs: marine components	7042	1.6
SACs: marine components	38814	9.1
IBAs: marine components	32682	7.6
Unique coverage of EEZ by IBAs compared to existing SPAs and SACs:		
IBAs, less SPAs & SACs: marine components	26748	6.3
IBAs, less SPAs: marine components	28064	6.6
Total coverage of EEZ by new spatial designations from the IBA project:		
IBAs + SPAs + SACs: marine components	70777 (↑ 6.2%)	16.5
IBAs + SPAs: marine components	35106 (↑ 6.6%)	8.2

A critical and central objective of environmental management is to conserve important high-quality sites of either national or international biodiversity value; evaluated according to the system in question (Visconti *et al*. 2019). Once the most important sites and the species associated with them have been identified, it is then essential to consider the activities which are putting pressure on species, or threaten them, when making recommendations for conservation management.

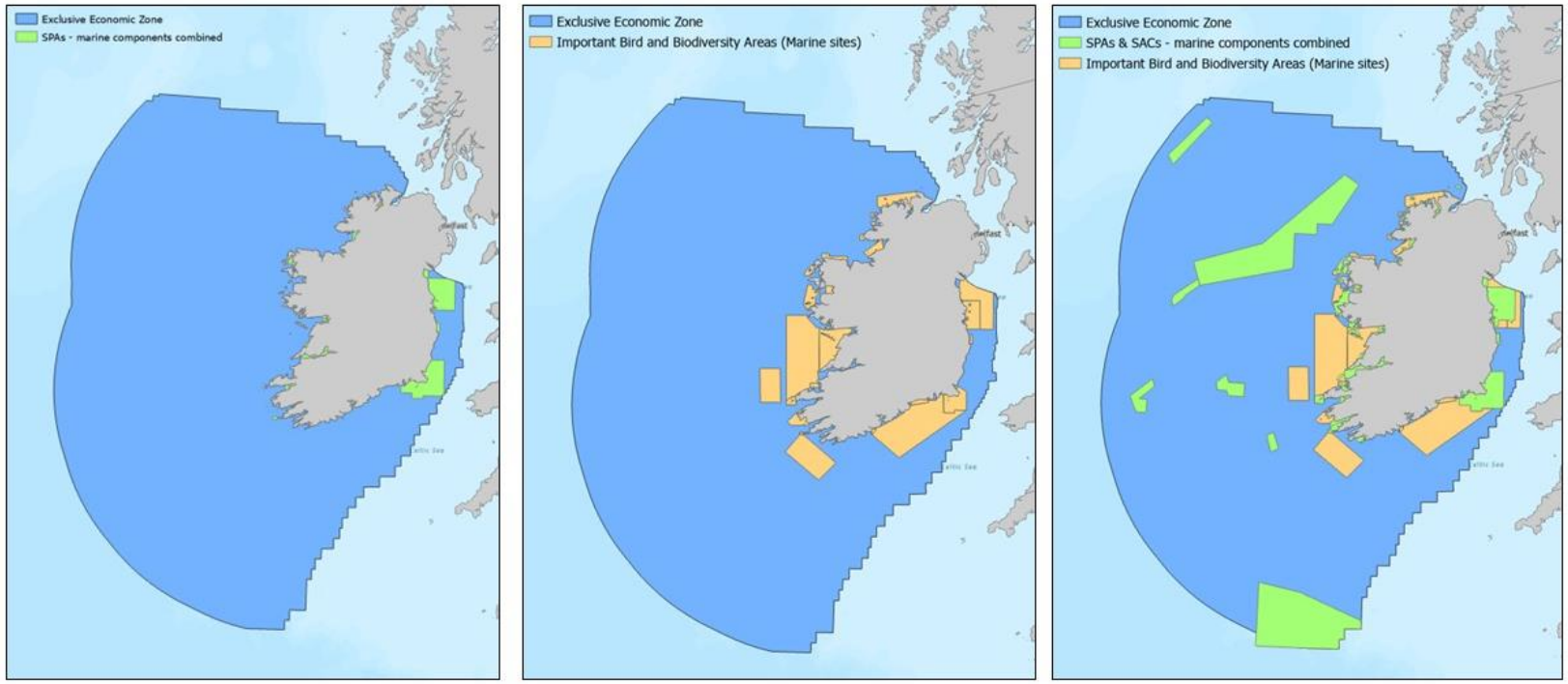


Figure 7: Ireland's EEZ showing marine SPAs (L), marine IBAs (middle) and all Natura sites with IBAs (R)

This IBA data should also be used to inform the spatial planning of marine activities in Irish waters. In particular, the development of avian sensitivity maps for marine activities, especially for offshore wind energy, would be a valuable next step. Similar to the terrestrial Bird Wind Sensitivity Mapping for Wind Energy Developments[2] GIS tool developed by BirdWatch Ireland, avian sensitivity mapping in the marine environment could help appropriately target areas suitable for the deployment of offshore renewable infrastructure. The underlying seabird data could be used for this purpose coupled with other data (e.g., on migratory terrestrial species) that could be incorporated to produce sensitivity maps and ultimately to aid planning and minimize the impacts to bird life.

[2] Mc Guinness, S., Muldoon, C., Tierney, N., Cummins, S., Murray, A., Egan, S. & Crowe, O. (2015). Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland. BirdWatch Ireland, Kilcoole, Wicklow, available, https://birdwatchireland.ie/app/uploads/2019/09/BWI-Bird-Wind-Energy-devt-Sensitivity-Mapping-Guidance_document.pdf

Conclusion

In this report, we have provided critical evidence which identifies those sites which meet IBA criteria for seabirds in Irish waters, comprising 49 for seabird breeding colonies and 24 marine sites of high use areas at sea. Considering seabirds are often regarded as sentinels of the health of the marine environment (Boersma 2008; Gagne *et al*. 2018; Hazen *et al*. 2019; Velarde *et al*. 2019), this work is essential to inform marine SPA designation and Marine Protected Area (MPA) delineation, as well as broader marine spatial planning requirements in Irish waters.

The EU Birds Directive requires Member States to designate SPAs covering the most suitable territories on land and at sea for species listed in its Annex I, as well as for regularly occurring migratory species not listed in Annex I. The most suitable territories must be identified using scientifically based ornithological criteria. Member States have some discretion regarding the criteria used, however, they must be applied such that the most suitable sites, both in terms of number and area, are identified, and all of these most suitable sites must then be designated as SPAs.[3]

The value of BirdLife's network of IBAs for informing the obligation to designate SPAs under the EU Birds Directive has been recognized by the European Court of Justice due to their identification based on robust and internationally recognised scientific criteria. IBAs have been used as an important reference for the designation of SPAs with national IBA inventories used as a basis to assess whether Member States have classified a sufficient number and size of territories as SPAs. [4]

We call on the Irish government:

1. To designate all seabird IBAs as SPAs.
2. Where seabird IBAs overlap current SPAs, to review the relevant SPAs with the new information provided in this report, and revise boundaries and species data as appropriate.
3. To develop management plans in an open and transparent way in consultation with relevant stakeholders, with clearly defined and quantifiable science-based conservation objectives for all SPAs, and establish the protection measures necessary to achieve these objectives.
4. To develop, or support the development of, and utilise avian sensitivity maps to inform the strategic spatial planning of marine activities, in particular the development of offshore renewables, to ensure a comprehensive approach to the protection of Irish birds in the marine environment.

[3] European Court of Justice, Case C-3/96 Commission v Netherlands, Case C-44/95 United Kingdom
[4] European Court of Justice, Case C-3/96 Commission v Netherlands; Case C-202/01 Commission v France; Case C-240/00 Commission v Finland; Case C-378/01 Commission v Italy; Case C-141/14, Commission v Bulgaria

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APPENDIX 1: DETAILED METHODS AND PROTOCOLS

Further details of the process followed to identify and reassess IBAs for seabird colonies and to identify new IBAs for seabirds in the marine environment.

Species assessed

We considered data for 24 regular breeding seabird species in Ireland. These are outlined in Tables 6 and 7 below, together with further information on their populations and status relevant to the process.

Table 6: Global population estimates, IUCN Red List assessment, and IBA specific considerations for the 24 species assessed.

Name			Global Red List			Specific IBA Criteria Considerations			
Group	Common	Scientific	Category	Criteria	Mature individuals (best estimate)	B1b	B2a	B3a	EU Birds Directive Annex 1 species
Auk	Atlantic Puffin	*Fratercula arctica*	VU	A4abcde	13000000	-	-	-	-
Auk	Black Guillemot	*Cepphus grylle*	LC	NA	950000	-	Yes	-	-
Auk	Common Guillemot	*Uria aalge*	LC	NA	12000000	-	-	-	-
Auk	Razorbill	*Alca torda*	LC	NA	1249000	-	Yes	-	-
Cormorant	European Shag	*Gulosus aristotelis*	LC	NA	156666	-	Yes	-	-
Cormorant	Great Cormorant	*Phalacrocorax carbo*	LC	NA	1166666	-	Yes	-	-
Gull	Black-headed Gull	*Larus ridibundus*	LC	NA	4200000	-	-	-	-
Gull	Black-legged Kittiwake	*Rissa tridactyla*	VU	A2abd+3bd+4abd	10100000	Yes	-	-	-
Gull	Common Gull	*Larus canus*	LC	NA	2066667	-	-	-	-
Gulls	European Herring Gull	*Larus argentatus*	LC	NA	1140000	Yes	-	-	-
Gulls	Great Black-backed Gull	*Larus marinus*	LC	NA	500000	-	Yes	-	-
Gulls	Lesser Black-backed Gull	*Larus fuscus*	LC	NA	1013334	-	-	-	-
Gulls	Mediterranean Gull	*Larus melanocephalus*	LC	NA	446000	-	-	-	Yes
Proc	Manx Shearwater	*Puffinus puffinus*	LC	NA	735000	-	Yes	-	-
Proc	Northern Fulmar	*Fulmarus glacialis*	LC	NA	7000000	-	-	-	-
Skua	Great Skua	*Catharacta skua*	LC	NA	32500	-	-	-	-
Storm-petrel	European Storm-petrel	*Hydrobates pelagicus*	LC	NA	475000	-	Yes	-	Yes
Storm-petrel	Leach's Storm-petrel	*Hydrobates leucorhous*	VU	A2bce+3bce+4bce	7500000	-	-	-	Yes
Sulid	Northern Gannet	*Morus bassanus*	LC	NA	1650000	-	Yes	-	-
Tern	Arctic Tern	*Sterna paradisaea*	LC	NA	1333333	-	-	-	Yes
Tern	Common Tern	*Sterna hirundo*	LC	NA	1733334	-	-	-	Yes
Tern	Little Tern	*Sternula albifrons*	LC	NA	200000	-	-	-	Yes
Terns	Roseate Tern	*Sterna dougallii*	LC	NA	140000	Yes	-	-	Yes
Terns	Sandwich Tern	*Thalasseus sandvicensis*	LC	NA	377500	-	Yes	-	Yes

Table 7: EU and Europe population estimates, IUCN Red List assessment, and IBA specific considerations for the 24 species assessed.

Name			European Union Red List			Europe Red List			Ireland Status
Group	Common	Scientific	Category	Criteria	Mature individuals (best estimate)	Category	Criteria	Mature individuals (best estimate)	BOCCI-4
Auk	Atlantic Puffin	Fratercula arctica	LC		1200000	EN	A2abcde+4abcde	7820000	RED
Auk	Black Guillemot	Cepphus grylle	LC		84800	LC		380000	AMBER
Auk	Common Guillemot	Uria aalge	LC		3320000	LC		3660000	AMBER
Auk	Razorbill	Alca torda	LC		371000	LC		763000	RED
Cormorant	European Shag	Gulosus aristotelis	LC		80100	LC		152000	AMBER
Cormorant	Great Cormorant	Phalacrocorax carbo	LC		489000	LC		926000	AMBER
Gull	Black-headed Gull	Larus ridibundus	VU	A2bcde	1880000	LC		3380000	AMBER
Gull	Black-legged Kittiwake	Rissa tridactyla	EN	A2abcd+3bcd+4abcd	481000	VU	A2abcd+3bcd+4abcd	3330000	RED
Gull	Common Gull	Larus canus	LC		545000	LC		2250000	AMBER
Gulls	European Herring Gull	Larus argentatus	VU	A2bcde+3bcde+4bcde	895000	LC		1130000	AMBER
Gulls	Great Black-backed Gull	Larus marinus	NT	A2bcde+3bcde+4bcde	76100	LC		196000	GREEN
Gulls	Lesser Black-backed Gull	Larus fuscus	LC		647000	LC		781000	AMBER
Gulls	Mediterranean Gull	Larus melanocephalus	LC		40100	LC		160000	AMBER
Proc	Manx Shearwater	Puffinus puffinus	LC		672000	LC		733000	AMBER
Proc	Northern Fulmar	Fulmarus glacialis	EN	A4abcde	769000	VU	A4abcde	6790000	AMBER
Skua	Great Skua	Catharacta skua	LC		19300	LC		27600	AMBER
Storm-petrel	European Storm-petrel	Hydrobates pelagicus	LC		825000	LC		825000	AMBER
Storm-petrel	Leach's Storm-petrel	Hydrobates leucorhous	LC	B2ab(v)	96700	NT	B2ab(v)	141000	RED
Sulid	Northern Gannet	Morus bassanus	LC		722000	LC		822000	AMBER
Tern	Arctic Tern	Sterna paradisaea	LC		413000	LC		1220000	AMBER
Tern	Common Tern	Sterna hirundo	LC		1120000	LC		1120000	AMBER
Tern	Little Tern	Sternula albifrons	LC		30700	LC		81600	AMBER
Terns	Roseate Tern	Sterna dougallii	LC		5500	LC		5500	AMBER
Terns	Sandwich Tern	Thalasseus sandvicensis	LC		128000	LC		258000	AMBER

1. Colony IBA assessment

Data preparation

We used

- The latest breeding colony data and population estimates, available from the recently published Seabirds Count census work (Burnell *et al.* 2023). We used the comparative dataset and datasets for sensitive species from JNCC.
- Colony counts from the Connemara Islands IBA were updated using the 2023 NPWS Report to Science Advisory & Research Directorate. Although there are other species at this site, only tern populations were counted in 2023 and were updated as part of the data preparation for population colony counts.

Colony data: converting population estimates

Population estimates for the 24 species came as either:

- AON - Apparently Occupied Nest
- AOS - Apparently Occupied Site
- AOT - Apparently Occupied Territory
- AOB - Apparently Occupied Burrow
- IND - Individual adults
- AOS / AON

For IBA assessment, units need to be in "mature individuals", where mature individuals are defined as: "*The number of individuals known, estimated or inferred to be capable of reproduction as defined in IUCN"*.

The IUCN aims to report global population estimates for species in the units of "mature individuals". Therefore, IBA assessments aim to align with this metric.

Using standard BirdLife conversion factors, counts were converted from a respective unit in the following way:

- AON x 2
- AOS x 2
- AOT x 2
- AOB x2
- IND x 2/3
- AOS / AON x2

Expert consultation agreed there was merit in using these standard conversions. No other conversion factor was suggested for species.

Colony data: evaluating data against colony concepts

We typically use a "best estimate", where available, for IBA identification.

We obtained the best estimate from the "site" estimate available in the comparative dataset from the Seabirds Count census work (see Results section).

We also included the confidential species data in our analysis.

	A	B	C	D	E	O	P
1	Species	Country	Admin Area/County	Master site	Site	Seabirds Count adjusted count	Count Unit
18654	Northern Gannet	Republic (	Cork	Bull Rock	The Bull	6388	AOS/AON
18655	Northern Gannet	Republic (	Mayo	Clare Island	Clare Whole Island	352	AOS/AON
18656	Northern Gannet	Republic (	Wexford	Great Saltee	Great Saltee Island	4722	AOS/AON

To determine which records formed part of a potential colony, we considered the IBA boundaries given these were identified for seabirds (and other species) in the past and were the key sites we are considering for the analysis.

We plotted and inspected the Seabirds Count data in relation to the IBA data, as shown in Figure 8.

Figure 8: Example of Seabirds Count point data in relation to the IBA data.

It was evident that some Seabirds Count point locations did not overlap IBAs when they most likely should have (the same issue was prevalent for the SPA layer and National Seabird Subsites layer kindly provided by NPWS).

We analysed how far away each point location was from the nearest polygon, see Figure 9.

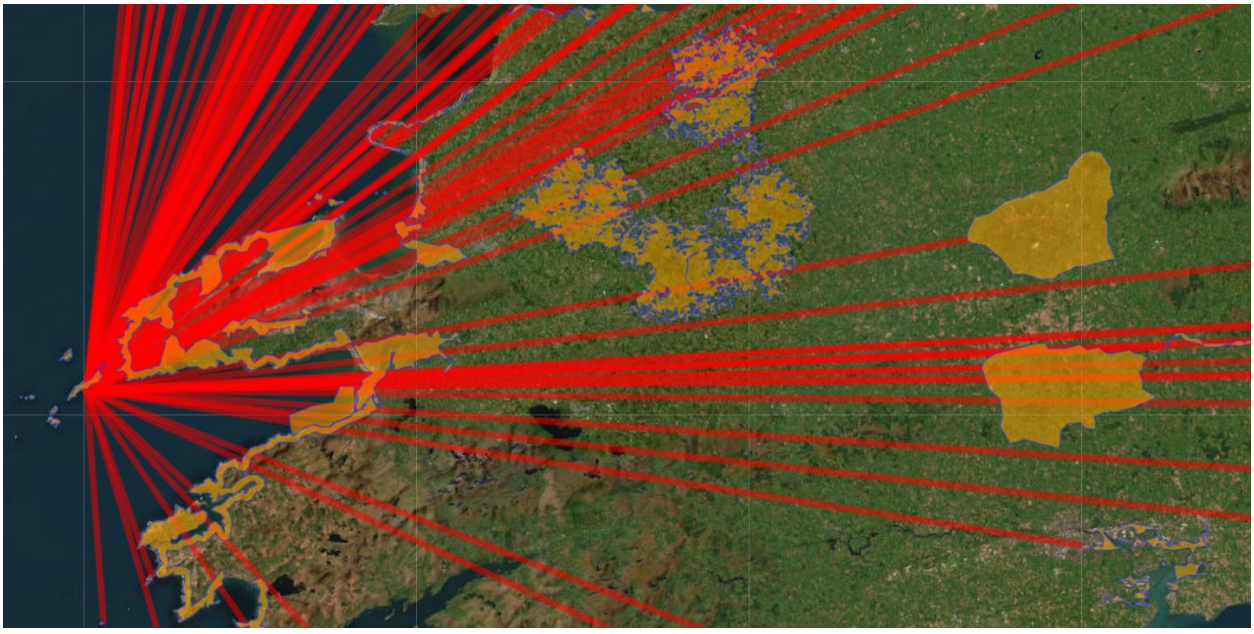


Figure 9: Example of distance between point location and the nearest polygon

Based on the distribution of the data (see Figure 10), we chose a threshold of 200 meters and assigned any point less than 200m from a polygon to the nearest polygon (IBA in this case).

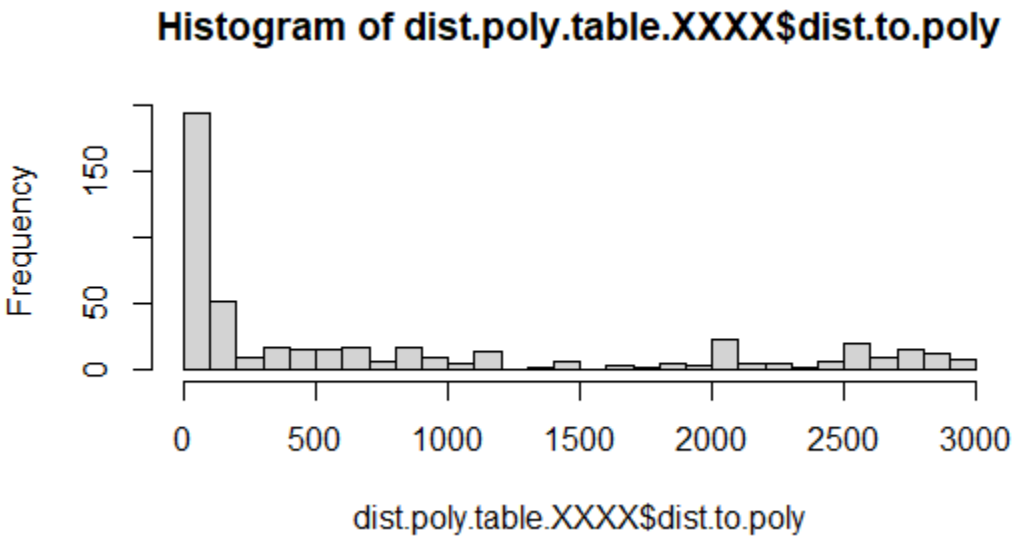


Figure 10: Distribution of distances of point data to polygons – see text for explanation.

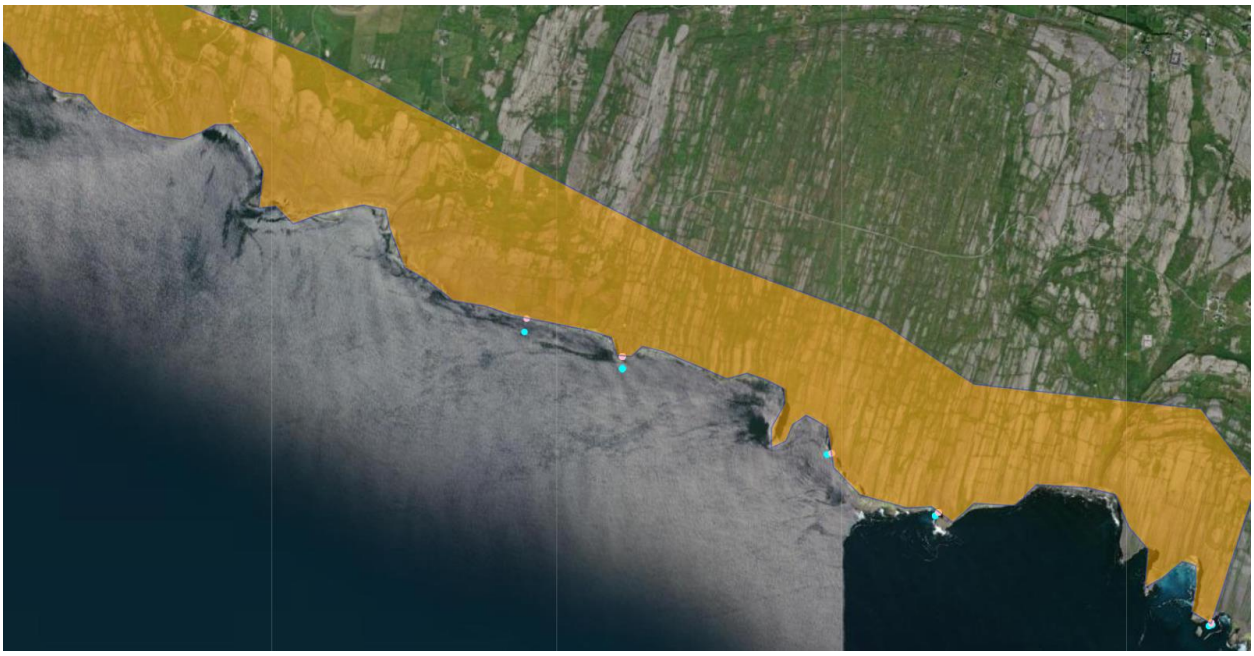


Figure 11: Example of adjusted point location data.

Because raw records from Seabirds Count data did not entirely overlap with existing IBA polygons, Figure 11 shows the original point locations (points in blue) compared to the point locations whose positions were adjusted to overlap the IBA polygons (points in pink). Points in pink were used for subsequent analyses. Following scoping analysis (histogram shown in figure 10), any point less than 200m from an existing polygon (IBA in this case) was adjusted to overlap the polygon. This helped us overcome discrepancies across the different spatial layers.

We were then able to determine which point locations overlapped an IBA.

We repeated the above data cleaning step for the National Seabird Subsites data.

Colony data: assessed against IBA criteria

We assessed data at four different levels:

- Seabirds Count "Site" data
- Seabirds Count "MasterSite" data: where Seabirds Count "Site" level data was summed per species per "MasterSite".
- "NPWS Site" data: where Seabirds Count "Site" level data was summed per species per "NPWS Site" (larger sites comprised of subsite units).
- "IBA Site" data: where Seabirds Count "Site" level data was summed per species per existing "IBA Site".

This allowed us to assess which records met IBA criteria, evaluated in such a way so as to account for differing possibilities of what one might consider a seabird colony.

Colony data: delineating final IBA polygons

For most existing IBA sites that met the criteria for seabirds, the current boundaries of the sites were used. For a number of sites the existing IBA boundaries were altered to better incorporate nearby areas for the species (see Delineation notes in sites). For example, the Connemara Islands IBA was extended to include an inlet with Lobinish Island for Sandwich Terns, where the Sandwich Tern breeding site also met IBA criteria.

New sites were delineated using a mix of reference polygons. These include: -

- SPA boundaries
- NPWS subsite layers for sections of coast
- Ireland Marine Spatial Planning layer (Fair Seas)
- Ireland coastline layer (EEA)
- Ireland coastline layer (Provinces of Ireland layer)

Delineation was decided on a site-by-site basis. This decision was based on the species information for trigger species and the most appropriate boundary shapefiles available. Boundaries were also delineated so that they connected well with the existing IBA network. Where new sites that met criteria were near existing IBAs, delineation of new sites would try match the boundaries of the new sites to existing coastal IBAs.

The Ireland coastline polygons typically provided a more suitable option for island sites. The NPWS subsite layer was applied when it produced a suitable site based on available information, not just for sites with criteria that were triggered by Black Guillemots (this was better for many stretches of coast). Existing SPA boundaries were used if deemed suitable, based on underlying species information at site.

2. Marine IBA assessment

To identify marine sites, we used a combination of methods to determine high use areas at sea meeting IBA criteria. These methods include:

- Seaward extension methods,
- Analysis of seabird tracking data,
- At-sea survey data

Seaward extension assessment

For all 24 species, we estimated high at-sea use areas around colonies by delineating seaward extension buffers around colonies. This is a pragmatic approach for assessing distributions; particularly in data sparse situations (Critchley *et al*. 2018, 2019; Handley *et al*. 2022) where studies involving the direct tracking of species have been limited. We mapped the distribution and estimated the abundance of birds at sea from individual colonies on a 1 km x 1 km grid.

Seaward extension: Buffer distance choice

- Seaward extension buffer distance choice was guided by the UK summaries provided in Woodward *et al*. 2019. Most buffer distance choices were the mean foraging range values from the 2019 report with alternate buffer choices selected for some species to align outputs with the concept that IBA sites should be "manageable units". See Table 8.
- For some species, instead of considering a foraging range, we considered sites where birds exhibit other key behaviours such as transiting, rafting, loafing around breeding colonies.
- For example, delineating a 336km buffer around a European Storm-Petrel colony does not likely yield a site suited to the concept of site-based "manageability". Rather, these types of areas can be considered in broader spatial planning processes. In the case of the European Storm-Petrel, we opted instead for a 1km buffer colonies as this approach has been used in previous IBA assessments.
- We recognise the commentary in *Woodward et al*. *"These metrics [choice of buffer size] may be applied throughout the impact assessment process for offshore wind [or other activities] from the initial screening stage to the apportioning of impacts to protected sites.* ***However, each metric has its strengths and weaknesses and it may be appropriate to make use of different metrics at different points throughout the process****. The use of these values in relation to the assessment of the impacts associated with offshore wind farms [or other activities] should be discussed and agreed with the Statutory Nature Conservation Bodies [i.e. relevant authority]."*

Table 8: Seaward extension buffer distances used to generate marine distribution maps for species and identify areas which could be assessed against IBA criteria.

Group	*Species*	*Mean foraging range (Woodward et al. 2019 report)*	Buffer-distance used for IBA analysis (km)	Source	Buffer type
Tern	Arctic Tern	6.1±4.4 (6)	6.1	Woodward *et al.* 2019 mean distance	Uniform
Auk	Atlantic puffin	62.4±34.4 (7)	4	Thaxter *et al.* 2012	Uniform
Auk	Black Guillemot	4.9 (1)	4.9	Woodward *et al.* 2019 mean distance	Uniform
Gull	Black-headed gull	7(1)	7	Woodward *et al.* 2019 mean distance	Uniform
Gull	Black-legged Kittiwake	54.7±50.4 (37)	2	Conservative estimate from tracking data review	Uniform
Auk	Common Guillemot	33.1±36.5 (16)	33.1	Woodward *et al.* 2019 mean distance	Decay
Gull	Common Gull	n/a	1	Conservative estimate in absence of other studies	Uniform
Tern	Common Tern	6.4±4.5 (10)	6.4	Woodward *et al.* 2019 mean distance	Uniform
Cormorant	Cormorant	7.1±3.8 (4)	7.1	Woodward *et al.* 2019 mean distance	Uniform
Cormorant	European shag	9.2±4.9 (17)	9.2	Woodward *et al.* 2019 mean distance	Uniform
Storm-petrel	European Storm Petrel	n/a	1	Aligned with buffer distance used in previous IBA assessments (Spain)	Uniform
Gull	Great Black-backed Gull	6.7 (1)	6.7	Woodward *et al.* 2019 mean distance	Uniform
Skua	Great Skua	67±31.5 (2)	2	Conservative estimate aligned to other studies (Handley *et al.* Falkland Islands work)	Uniform
Gull	Herring Gull	14.9±7.5 (7)	14.9	Woodward *et al.* 2019 mean distance	Uniform
Storm-petrel	Leach's storm petrel	657(1)	1	Aligned with buffer distance used in previous IBA assessments (Spain)	Uniform
Gull	Lesser Black-backed Gull	43.3±18.4 (16)	1	Conservative estimate from tracking data review	Uniform
Tern	Little Tern	3.5(1)	3.5	Woodward *et al.* 2019 mean distance	Uniform
Proc	Manx Shearwater	136.1±88.7 (4)	2.3	Follows Thaxter *et al.* 2012 given this was a rafting distance. A conservative	Uniform

				approach compared to large foraging distance.	
Gull	Mediterranean Gull	11.5(1)	11.5	Woodward *et al.* 2019 mean distance	Uniform
Proc	Northern Fulmar	134.6±90.1 (11)	2.3	Conservative estimate aligned with Manx Shearwater rationale	Uniform
Sulid	Northern Gannet	120.4±50 (19)	4	Carter *et al.* 2016	Uniform
Auk	Razorbill	61.3±33.4 (18)	31.2	Woodward *et al.* 2019 mean distance, excluding outlier colony (See report)	Decay
Tern	Roseate Tern	4.1±2.6 (2)	4.1	Woodward *et al.* 2019 mean distance	Uniform
Tern	Sandwich Tern	9±9.2 (9)	9	Woodward *et al.* 2019 mean distance	Uniform

Seaward extension: analysis

After a distance threshold was selected, buffers were delineated with either a uniform or logarithmic decay function to produce a seaward extension for each site. Buffers for Black Guillemots and Great Cormorants accounted for bathymetry. These are illustrated in Figure 12.

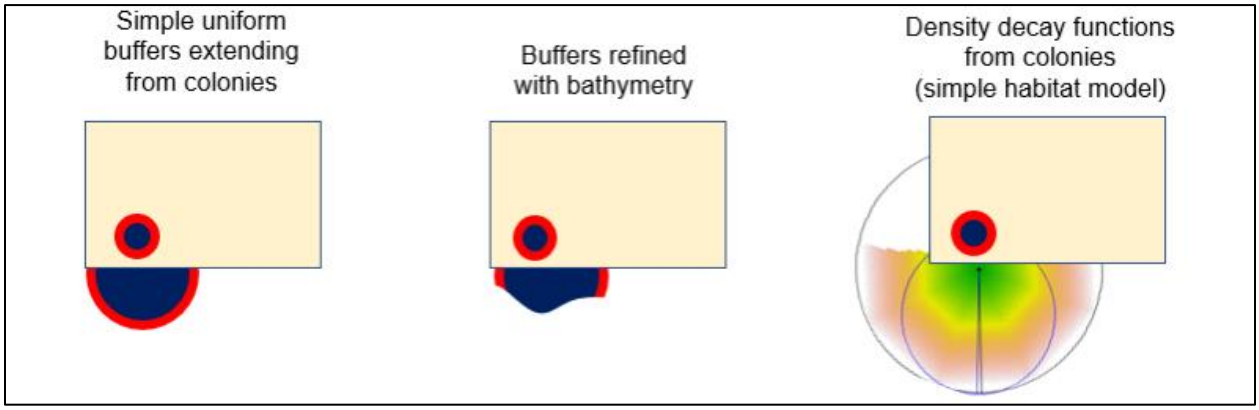


Figure 12: Buffers used to create seaward extensions to colonies[1].

We conducted a three-step analysis primarily using the "Site" count units data from Seabird Count records and supplemented with the new colony IBAs where relevant.

1. First, for all 24 species, we estimated high at-sea use areas around colonies. Buffers around colonies are outlined in Table 8. For each species layer produced, we tested areas against IBA criteria which require a certain proportion of the global / regional population to be at a site depending on the Red List status of a species.
2. We then summed the individual species layers to test for sites that met the IBA B3b criterion (aggregations, >13,400 mature individuals present of one or multiple species).
3. Finally, based on the newly identified colony IBAs, we took the records from those colonies meeting IBA B1b, B2a or C6 criteria (essentially a top 5 sites in the country type criteria) and applied buffers around input data (the "Site" count unit's data from Seabird Count records) for these colonies.

When identifying the final seaward extension sites per individual species that met IBA criteria, we merged the sites meeting criteria in steps 1 and 3 above to produce a single species layer with cells meeting criteria (accounting for overlap from nearby colonies). Sites identified from step 2 above acted as a supplemental layer in our final consideration of marine IBA sites produced.

Given the "Site" record also produced an output reflective of point-location input data (i.e. a simple buffer around a point), final seaward extension boundaries were manually revised where the associated colony IBA was less reflective of point-location data (i.e. for sites along cliffs or strips of coastline). Two examples are given below.

Seaward extension: examples of final boundary considerations

For the Wicklow Murrough marine extension site (see Figure 12), the site was delineated via seaward extension for Little Tern (3.5km), species with population estimates meeting criteria from adjacent colonies. Additionally, the top 1% of areas used in winter by Auks, as indicated by the ObSERVE II at-sea survey data, also fall within the proposed boundary. Seaward extension methodology follows methods from Critchley *et al.* (2018, Biological Conservation, vol. 224), adapted by Handley *et al.* (2021, FIMS, vol. 7) for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. At-sea survey data used to support delineation of the site was collected and analysed under the ObSERVE II Programme. The ObSERVE II data reflects an EEZ wide estimate of bird abundance in marine waters around Ireland in the summer and winter.

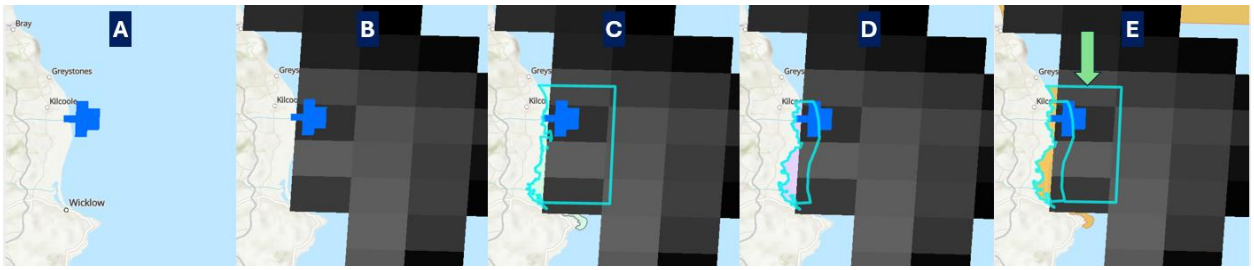


Figure 13: Wicklow Murrough marine extension site considerations. See text for full explanation.

Figure 13, the Murrough Wetlands (Co. Wicklow), showing (A) the Kilcoole Little Tern seaward extension meeting IBA criteria, identified during the project; (B) Auk winter data, from ObSERVE II, showing top 1% of areas used by birds in grey cells; (C) the existing Murrough SPA in blue highlight; (D) the existing North Wicklow coastal marshes IBA in blue highlight and (E), the new marine IBA identified – the Wicklow Murrough Marine Extension, indicated by the green arrow. This is an extension to the existing IBA and in this instance aligns with the existing SPA boundary. The choice to align with the existing SPA boundary in this instance was pragmatic, as the top 1% of areas used by Auks in winter extends along a large portion of the east coast – an area too large to identify as a practicable management unit.

For the North Mayo coast and islands marine extension (see Figure 14), the site was delineated via seaward extension for Atlantic Puffin (4km), Black-legged Kittiwake (2km), European Storm-Petrel (1km) and Leach's Storm-Petrel (1km) - species with population estimates meeting criteria from adjacent colonies. Seaward extension methodology followed methods from Critchley *et al.* (2018), adapted by Handley *et al.* (2021), for IBAs. Conservative buffers around breeding sites were delineated for species and these buffers were used to support identification of the marine area for assessment against the IBA criteria. All these species are capable of moving considerable distances beyond the conservative buffers used for the preliminary assessment. Hence the final boundary reflects a single marine area used by the species. The boundary is still conservative, compared to the distance these species can and do travel to forage.

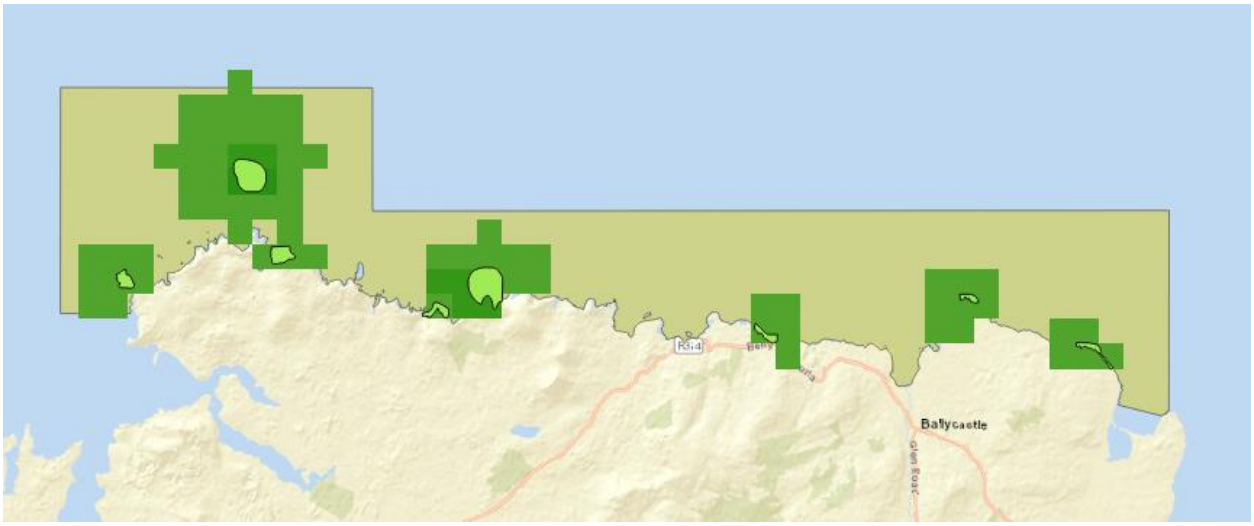


Figure 14: The North Mayo coast and islands marine extension site considerations. See text for full explanation.

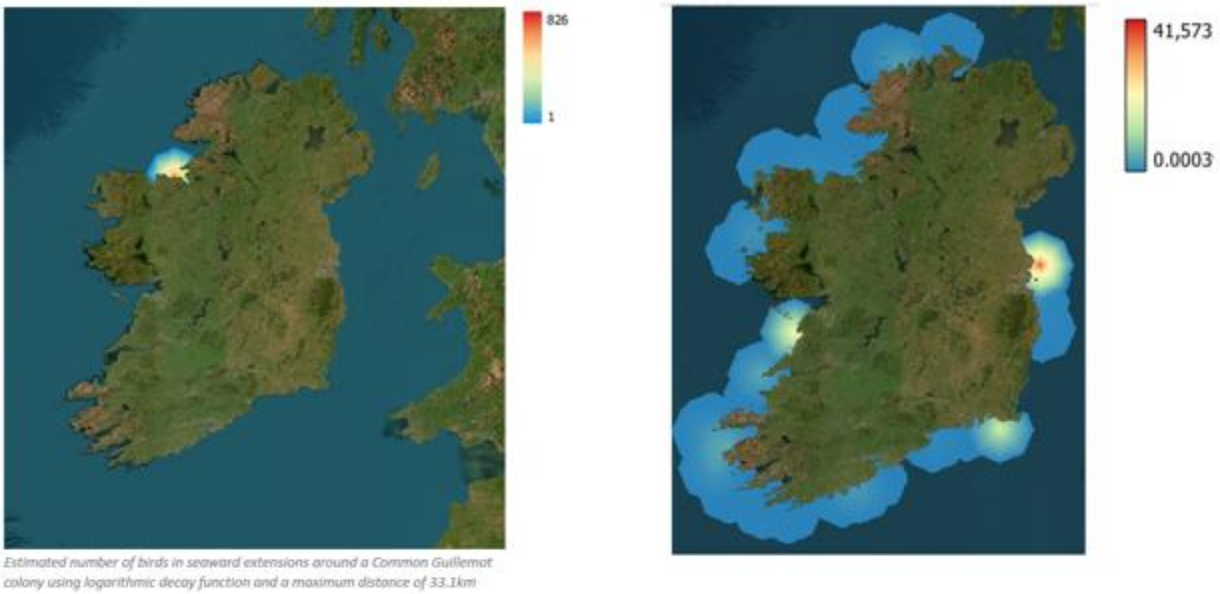
In Figure 14, IBAs for seabird colonies are represented by light green polygons. Important marine areas identified via seaward extension analysis are shown in dark green shade (raster cells). The final new marine IBA boundary (beige polygon), "North Mayo coast and islands marine extension", was delineated as a single unit for practicable management considerations. This single unit is warranted as the suite of species considered travel vast distances to forage compared to the buffer distances used in the preliminary analysis, which typically reflect distances around colonies where behaviours other than foraging occur frequently.

The application of the uniform function to estimate at-sea distribution around breeding locations for Atlantic Puffin is shown in Figure 15, whilst Figure 16 illustrates the application of the decay function estimate of at-sea distribution around breeding locations for Common Guillemot.

Seaward extension: uniform estimate example

Figure 15: Example of uniform estimate of at-sea distribution around breeding locations for Atlantic Puffin, with final sites meeting criteria indicated in the bottom panel.

Seaward extension: decay function estimate example



Estimated number of birds in seaward extensions around a Common Guillemot colony using logarithmic decay function and a maximum distance of 33.1km

Cells in the seaward extensions for Common Guillemot colonies that met IBA Criteria (No=0 & Yes=1)

Figure 16: Example of decay function estimate of at-sea distribution around breeding locations for Common Guillemot, with final sites meeting criteria indicated in the bottom panel.

Tracking data assessment

Goals:

We collated available tracking data for seabirds using Irish waters in order to:

1. Identify representative sites used by seabirds from specific colonies that meet IBA criteria.
2. Identify representative sites used by seabirds from specific colonies but which do not meet IBA criteria individually but may do collectively.
3. Support identification of other species which utilise IBAs, but do not trigger IBA criteria within a site.

What do we mean by a representative site?

We consider an identified site to be representative of the source population when enough animals largely use the same place within a defined area and are deemed to be aggregating; as determined by methods set out in Beal *et al*. (2021).

When tracking data are not representative of the source population, this can indicate that animals are more likely wide-ranging and dispersed species. Identifying broader areas for conservation action for these species will need to be considered in the context of the scale of management opportunities.

The seabird colony locations from which tracking data was considered for the purpose of identifying important bird areas in Irish waters is shown in Figure 17.

Figure 17: Seabird colony locations from which tracking data was considered for the purpose of identifying important bird areas at sea

Tracking data: Preparation

Raw data format:

All data was formatted to match the output (download) format of the BirdLife International seabird tracking database[5].

Assign data to dataGroups:

Tracks were assigned to dataGroups to ensure that any spatial aggregation patterns exhibited by a species during a given breeding stage are captured and not diluted by inclusion of data from other breeding stages with potentially very different distributions.

dataGroup = Species / Colony / Breeding stage + (Year / Age / Sex)

Where warranted: data may be further analysed by considering year, age, or sex specific differences in distribution patterns.

Raw data, pre-screen, assign to groups:

To apply the track2kba protocol for identifying representative sites, the recommendation is to have >10 birds tracked per dataGroup. For IBA assessment, it's preferable to start analyses from colonies which already meet IBA criteria. We therefore grouped data for Irish IBA analysis purposes.

- Group 1: >10 birds tracked (colony meets IBA criteria)
- Group 2: >10 birds tracked (colony does not meet IBA criteria, assess multi-species overlap areas)
- Group 3: <10 birds tracked (support data for sites)
- Group 4: Tracking data primarily beyond the Irish EEZ

Data groups for tracking data (i.e. unique species / colony / breeding status / stage combinations) considered for assessment and associated population estimates are set out in Table 9.

Group 1 data formed the core data for our analysis given Group 2 data did not overlap, limiting our ability to use this data for assessment of sites against IBA criteria. Group 3 data meeting IBA criteria, but where sample sizes were low, should be considered as priority locations for further tracking work to enhance knowledge for IBA delineation. Group 4 data meeting IBA criteria should be considered for possible IBA identification for seabirds in UK waters.

[5] BirdLife International 2023, Seabird Tracking Database, available, https://www.seabirdtracking.org/

Table 9: Tracking data: dataGroups (i.e. unique species / colony / breeding status / stage combinations) considered for assessment and associated population estimate used.

Group	IBA	EEZ	Species	Colony	Breed status	Breed stage	Pop est.	Pop units	Pop source	Best (Mat. Ind.)	Total birds
1	Yes	Yes	Atlantic Puffin	Little Saltee	breeding	chick-rearing	23209	AOB	SeabirdCount-JNCC-82202	46418	8[A]
1	Yes	Yes	Atlantic Puffin	Skomer Island (Wales)	breeding	chick-rearing	270	AOB	SeabirdCount-JNCC-84894	540	12
1	Yes	Yes	Black-Legged Kittiwake	Lambay Island	breeding	brood-guard	3320	AON	SeabirdCount-JNCC-85335	3546	14
1	Yes	Yes	Common Tern	Rockabill	breeding	nesting	2029	AON	SeabirdCount-JNCC-87354	4058	22
1	Yes	Yes	European Shag	Lambay Island	breeding	breeding	469	AON	SeabirdCount-JNCC-85335	938	29
1	Yes	Yes	Manx Shearwater	Bardsey (Wales)	breeding	chick-rearing	20675	AOS	SeabirdCount-JNCC-88452	41350	16
1	Yes	Yes	Manx Shearwater	Blaskets	breeding	chick-rearing	28961	AOS	SeabirdCount-JNCC-98256	57922	22
1	Yes	Yes	Manx Shearwater	Little Saltee	unknown	unknown	719	AOS	SeabirdCount-JNCC-84894	1438	48
1	Yes	Yes	Manx Shearwater	Lundy (England)	breeding	chick-rearing	5504	AOS	SeabirdCount-JNCC-98261	11008	21
1	Yes	Yes	Manx Shearwater	Skokholm Island (Wales)	breeding	chick-rearing	88945	AOS	SeabirdCount-JNCC-82602	177890	14
1	Yes	Yes	Manx Shearwater	Skomer Island (Wales)	breeding	chick-rearing	366211	AOS	SeabirdCount-JNCC-82202-82604	732422	243
1	Yes	Yes	Northern Gannet	Ailsa Craig (Scotland)	breeding	brood-guard	33226	AOS/AON	SeabirdCount-JNCC-86638	66452	16
1	Yes	Yes	Northern Gannet	Bull Rock	breeding	brood-guard	6388	AOS/AON	SeabirdCount-JNCC-98272	12776	14
1	Yes	Yes	Northern Gannet	Grassholm (Wales)	breeding	chick-rearing	36011	AOS/AON	SeabirdCount-JNCC-81736	72022	341
1	Yes	Yes	Northern Gannet	Great Saltee	breeding	brood-guard	4722	AOS/AON	SeabirdCount-JNCC-97585	9444	83
1	Yes	Yes	Northern Gannet	Lambay Island	breeding	brood-guard	926	AOS/AON	SeabirdCount-JNCC-85335	1852	3[A]
1	Yes	Yes	Northern Gannet	Little Skellig	breeding	brood-guard	35294	AOS/AON	SeabirdCount-JNCC-97630	70588	9[A]
1	Yes	Yes	Razorbill	Great Saltee	breeding	chick-rearing	5669	IND	SeabirdCount-JNCC-97585	3779.333	12

2	No	Yes	European Herring Gull	Dalkey Island	unknown	breeding	19	AON	SeabirdCount-JNCC-85792	38	24
2	No	Yes	European Herring Gull	Inishmurray	breeding	breeding	243	AON	SeabirdCount-JNCC-110005	486	16
2	No	Yes	European Herring Gull	Inishtrahull	breeding	breeding	6	AON	SeabirdCount-JNCC-83717	12	12
2	No	Yes	Lesser Black-Backed Gull	Inishmurray	breeding	breeding	353	AON	SeabirdCount-JNCC-110005	706	10
2	No	Yes	Lesser Black-Backed Gull	Inishtrahull	breeding	breeding	20	AON	SeabirdCount-JNCC-83717	40	24
2	No	Yes	Manx Shearwater	High Island	breeding	chick-rearing	818	AOS	SeabirdCount-JNCC-84938	1636	41
2	No	Yes	Manx Shearwater	Lighthouse Island (NI)	breeding	chick-rearing	3444	AOS	SeabirdCount-JNCC-97680	6888	166
2	No	Yes	Northern Fulmar	Little Saltee	unknown	breeding	167	AOS	SeabirdCount-JNCC-84894	334	18
3	Yes	Yes	Black-Legged Kittiwake	Rathlin Island (NI)	breeding	chick-rearing	13706	AON	SeabirdCount-JNCC-97681	27412	3
3	Yes	Yes	Black-Legged Kittiwake	Rathlin Island (NI)	breeding	incubation	13706	AON	SeabirdCount-JNCC-97681	27412	5
3	Yes	Yes	Black-Legged Kittiwake	Rockabill	breeding	incubation	455	AON	SeabirdCount-JNCC-87354	910	4
3	Yes	Yes	Common Guillemot	Lambay Island	breeding	brood-guard	59983	IND	SeabirdCount-JNCC-85335	39988.67	3
3	Yes	Yes	Common Guillemot	Lambay Island	breeding	incubation	59983	IND	SeabirdCount-JNCC-85335	39988.67	1
3	Yes	Yes	European Herring Gull	Irelands Eye	breeding	breeding	318	AON	SeabirdCount-JNCC-85389	636	3
3	No	Yes	European Shag	Great Saltee	breeding	chick-rearing	112	AON	SeabirdCount-JNCC-97585	224	5
3	Yes	Yes	European Shag	Lambay Island	breeding	incubation	469	AON	SeabirdCount-JNCC-85335	938	3
3	No	Yes	European Storm-Petrel	Inishtrahull	breeding	chick-rearing	675	AOS	SeabirdCount-JNCC-83717	1350	2
3	Yes	Yes	European Storm-Petrel	High Island	breeding	chick-rearing	3821	AOS	SeabirdCount-JNCC-84938	7642	7
3	No	Yes	Great Black-Backed Gull	Coliemore Harbour	unknown	unknown	NA	NA	Gull tracking for windfarms	NA	1
3	No	Yes	Great Black-Backed Gull	Dalkey Island	breeding	breeding	60	AON	SeabirdCount-JNCC-85792	120	1
3	No	Yes	Lesser Black-Backed Gull	Lambay Island	breeding	breeding	345	AON	SeabirdCount-JNCC-85335	690	2

3	No	Yes	Manx Shearwater	Inishtrahull	breeding	chick-rearing	50	AOS	SeabirdCount-JNCC-83717	100	3
3	No	Yes	Manx Shearwater	High Island	breeding	incubation	818	AOS	SeabirdCount-JNCC-84938	1636	6
3	No	Yes	Manx Shearwater	High Island	breeding	incubation	818	AOS	SeabirdCount-JNCC-84938	1636	6
3	Yes	Yes	Manx Shearwater	Bardsey (Wales)	breeding	incubation	20675	AOS	SeabirdCount-JNCC-88452	41350	6
3	Yes	Yes	Razorbill	Lambay Island	breeding	brood-guard	7353	IND	SeabirdCount-JNCC-85335	4902	5
3	Yes	Yes	Razorbill	Lambay Island	breeding	incubation	7353	IND	SeabirdCount-JNCC-85335	4902	5
3	Yes	Yes	Roseate Tern	Rockabill	breeding	nesting	1642	AON	SeabirdCount-JNCC-87354	3284	7
4	Yes	No	Black-Legged Kittiwake	Colonsay (Scotland)	breeding	incubation	3476	AON	See notes	6952	14
4	Yes	No	Black-Legged Kittiwake	Colonsay (Scotland)	breeding	chick-rearing	3476	AON	See notes	6952	61
4	Yes	No	Black-Legged Kittiwake	Maggie's Leap (NI)	breeding	breeding	656	AON	SeabirdCount-JNCC-98004-110551	1312	13
4	Yes	No	Black-Legged Kittiwake	Puffin Island (Wales)	unknown	unknown	313	AON	SeabirdCount-JNCC-84737	626	5
4	Yes	No	Black-Legged Kittiwake	Puffin Island (Wales)	breeding	incubation	313	AON	SeabirdCount-JNCC-84737	626	10
4	Yes	No	Black-Legged Kittiwake	Puffin Island (Wales)	breeding	brood-guard	313	AON	SeabirdCount-JNCC-84737	626	30
4	Yes	No	Manx Shearwater	Bardsey (Wales)	non-breeding	non-breeding	20675	AOS	SeabirdCount-JNCC-88452	41350	3
4	Yes	No	Manx Shearwater	Rum (Scotland)	breeding	chick-rearing	288894	AOS	SeabirdCount-JNCC-98243	577788	15

Tracking data: analysis details

Tracking data was analysed to identify core areas using the track2kba R package (Beal *et al*. 2021). In brief, this method allows for the identification of individual core areas for species, the assessment of sample representativeness, and the quantification of spatial overlap among individuals; this allows a sample population core area with an associated abundance estimate (when abundance data is available). The identified core area can be checked against global or regional criteria.

Preparing data for analysis via track2kba entails:

- Pre-screen data: visual review
- Ensure data is arranged chronologically and removing duplicate records if necessary
- Speed filter data to remove erroneous locations
- Split central place foraging data into unique trips
- Assess number of complete vs. incomplete trips
- Removing locations near vicinity of colony
- Ensuring trip data has sufficient locations
- Review the sampling interval of data
- Determine appropriate interpolation interval
- Linearly interpolate data

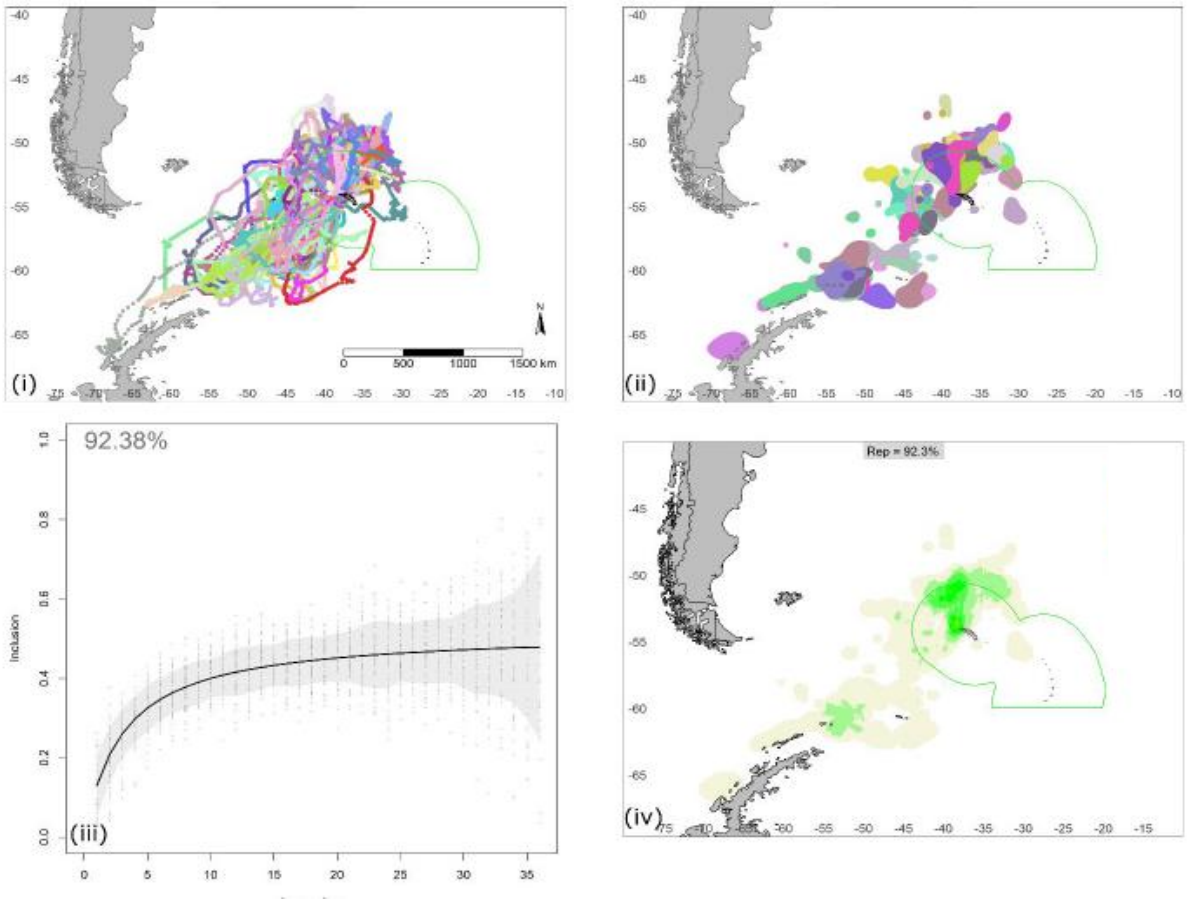


Figure 18: Example of the application of the track2kba R package as applied to Grey-headed Albatrosses during post-guard from Bird Island, South Georgia.

Figure 18 shows an example of the application of the track2kba R package as applied to Grey-headed Albatrosses during post-guard from Bird Island, South Georgia. Only the core area in green (when the data overlaps sufficiently and the representativeness score is >70%) is put forward for assessment against relevant criteria.

Figures 19 below shows an example of the final output considered from tracking data when applying the track2kba R package on Atlantic Puffin tracking data from birds breeding at Little Saltee (during the chick-rearing period).

Figure 19: Example of the final output considered from tracking data when applying the track2kba R package on Atlantic Puffin tracking data from birds breeding at Little Saltee (during the chick-rearing period).

Tracking data: species outputs

Following the cleaning of tracking data, and assessment following the track2kba protocol, all Group 1 data except Manx Shearwater from Skokholm (Wales), Northern Gannets from Ailsa Craig (Scotland) and Northern Gannets from Little Skellig was sufficiently representative to be used toward IBA delineation (i.e. core areas from individual birds overlapped sufficiently and representativeness was >70%). For the three groups where representative was <70%, this highlighted that birds from these colonies typically spread out over a comparatively large area, hence a representative core area was not identified.

Smoothing parameter outputs and representativeness scores for seabird tracking data analysed following the track2kba protocol are set out in Table 10. Representativeness scores reflect those for outputs used toward final IBA delineation. For Manx Shearwater and Northern Gannets outputs were based on smoothing parameters selected using the "ARS" approach, given these species typically exhibit area-restricted search. For all other species we used the "mag" parameter to select the smoothing parameter. Core utilisation distributions (UD) were assessed according to the 50% isopleth. Cells in red in Table 10 indicate data that did not satisfy the requirements for identifying possible marine IBAs, as per details in the track2kba protocol. Specifically, because the representativeness score was <70%, this indicates that birds from these colonies have a dispersed distribution at sea, which makes identifying a specific site difficult (according to the track2kba protocol).

Table 10: Smoothing parameter outputs and representativeness scores for seabird tracking data analysed following the track2kba protocol.

Group	IBA	EEZ	Species	Colony	Breed status	Breed stage	h (mag)	h (ref)	h (ARS)	Representativeness
1	Yes	Yes	Atlantic Puffin	Little Saltee	breeding	chick-rearing	2.77	2.28	13	84.79429
1	Yes	Yes	Atlantic Puffin	Skomer Island (Wales)	breeding	chick-rearing	3.56	4.29	14	82.61565
1	Yes	Yes	Black-Legged Kittiwake	Lambay Island	breeding	brood-guard	3.22	2.3	5	81.11835
1	Yes	Yes	Common Tern	Rockabill	breeding	nesting	2.24	1.13	8.5	89.6698
1	Yes	Yes	European Shag	Lambay Island	breeding	breeding	1.84	1.17	6	92.61022
1	Yes	Yes	Manx Shearwater	Bardsey (Wales)	breeding	chick-rearing	3.88	6.01	26	92.15523
1	Yes	Yes	Manx Shearwater	Blaskets	breeding	chick-rearing	4.32	8.4	22	95.45079
1	Yes	Yes	Manx Shearwater	Little Saltee	unknown	unknown	3.85	6.33	7	93.43754
1	Yes	Yes	Manx Shearwater	Lundy (England)	breeding	chick-rearing	4.74	10.92	9.5	82.04303
1	Yes	Yes	Manx Shearwater	Skokholm Island (Wales)	breeding	chick-rearing	4.94	15.43	27.5	69.57556
1	Yes	Yes	Manx Shearwater	Skomer Island (Wales)	breeding	chick-rearing	4.81	11.96	17	96.87719
1	Yes	Yes	Northern Gannet	Ailsa Craig (Scotland)	breeding	brood-guard	5.1	10.07	7	67.53621
1	Yes	Yes	Northern Gannet	Bull Rock	breeding	brood-guard	4.14	6.84	24	84.87666
1	Yes	Yes	Northern Gannet	Grassholm (Wales)	breeding	chick-rearing	4.61	8.21	8	97.56571
1	Yes	Yes	Northern Gannet	Great Saltee	breeding	brood-guard	4.42	9.68	10	93.39361
1	Yes	Yes	Northern Gannet	Lambay Island	breeding	brood-guard	3.42	2.35	6	91.07839
1	Yes	Yes	Northern Gannet	Little Skellig	breeding	brood-guard	4.4	9.55	4	28.06579
1	Yes	Yes	Razorbill	Great Saltee	breeding	chick-rearing	2.65	2.17	49	77.16606

At-sea survey data: ObSERVE II data

Seabird abundance data was collated from the ObSERVE II programme. This project, funded by the Irish government and run by University College Cork with partners IMARES, undertook extensive sets of aerial surveys of Ireland's marine waters. The aim of this work was to investigate the occurrence, distribution and abundance of key marine species, with an emphasis on seabirds and marine mammals, throughout Irelands Exclusive Economic Zone (EEZ).

Two sets of aerial data have been collected for this project, between 2015-2017 (ObSERVE I) and 2021-2022 (ObSERVE II). The data used in this analysis was from the aerial surveys carried out in winter and summer in 2021 and 2022 (ObSERVE II, Parradell *et al*. 2024). The abundance was calculated with GAM modelling at a 5x5km scale throughout Ireland's EEZ.

Data was considered in relation to the species / species groups available for auk species, Black-backed gulls, Black-legged Kittiwakes, Herring and Common gulls, large gulls, Manx Shearwaters, Northern Fulmars, Northern Gannets, and Petrel species.

ObSERVE II data for IBA assessment

Abundance data, indicating abundance of birds throughout Irelands EEZ, was received in 5x5km raster format. For each species / species group, we considered the top 1%, 5%, and 10% of areas with highest abundance. The top 1% of areas were deemed the most complementary to our analysis given the size of areas identified through this filtering was in alignment with the size of areas identified for assessment via tracking data and seaward extension approaches. The larger areas identified when considering the highest abundance in the top 5% and 10% areas will be more suited for identifying areas where broader area-based management measures could be suited for species (e.g. implementation of bycatch mitigation measures).

Given each of the species / species groups for which data were available (auk species, Black-backed gulls, Black-legged Kittiwakes, Herring and Common gulls, large gulls, Manx Shearwaters, Northern Fulmars, Northern Gannets, and Petrel species) had species for which IBA criteria were met via colony data, seaward extension, or tracking data analyses, and had species suited to application of IBA criteria B1b and B2a (akin to a top 5 sites per country criteria), except for the Northern Fulmars, we overlapped the top 1% of areas used to identify possible sites to be included as IBAs. These data complemented the marine assessments via seaward extension and tracking data analyses.

Figure 20 shows an example of our consideration of the top 5% and top 1% areas of overlap for species / species groups for the at-sea survey data abundance estimates. The top 1% of areas were deemed the most complementary to our analysis given the size of areas identified through this filtering was in alignment with the size of areas identified for assessment via tracking data and seaward extension approaches.

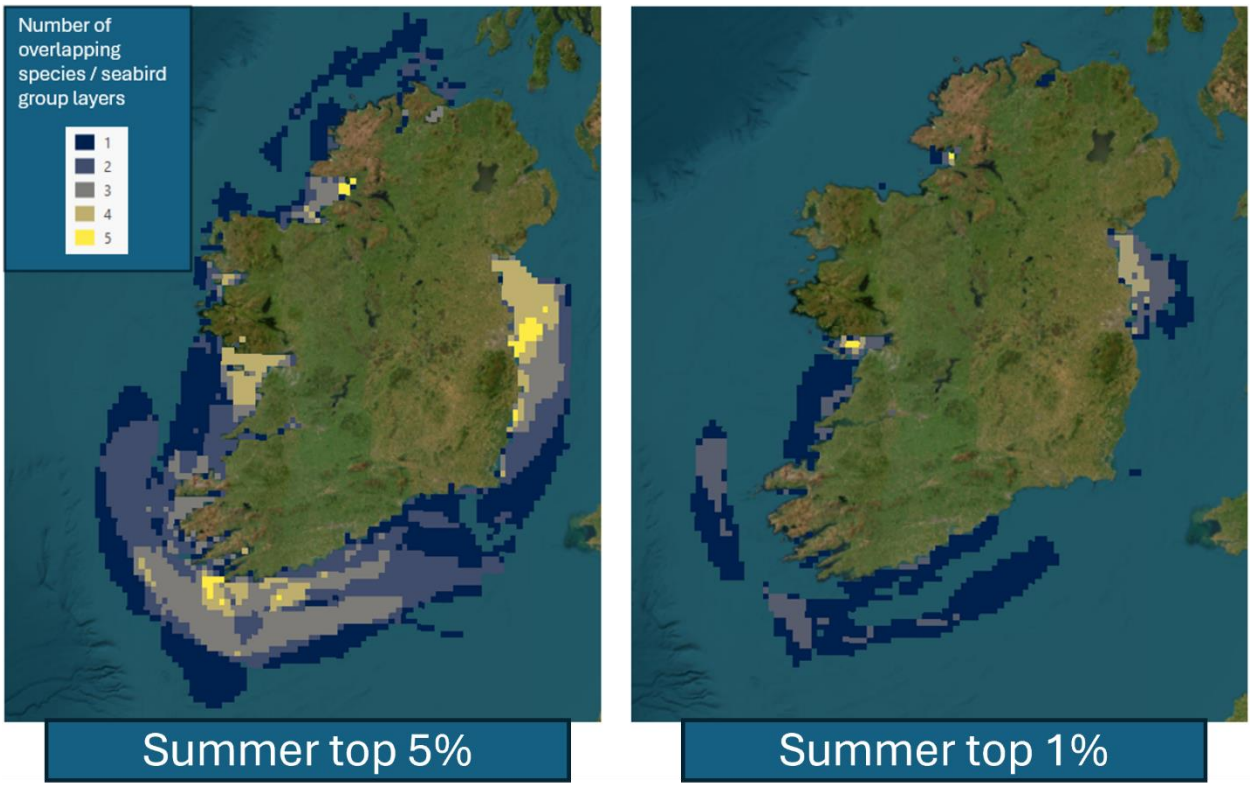


Figure 20: Example of the top 5% and top 1% areas of overlap for species / species groups for the at-sea survey data abundance estimates.

Other data sources

Two additional data sources were considered as part of the marine IBA assessment process, and guided delineation of specific sites where relevant.

MarPAMM, 2022- aerial surveys:

MarPAMM was a cross-border project to develop tools for monitoring and managing protected coastal marine environments in Ireland, Northern Ireland and Western Scotland. As part of this project, aerial surveys for waterbirds were carried out in two locations in 2022. These were Carlingford Lough SPA and Donegal Bay SPA during winter (HiDef), with an ESAS survey during summer for Donegal Bay SPA. Monitoring surveys and GPS tracking were carried out for Black-legged Kittiwakes in Newcastle, Co. Down and Maggie's Leap, Co. Donegal in 2019 and 2021.

These data highlighted the importance of the Northwest Irish Sea IBA for waterbirds (Sarda *et al*. 2022).

Migration bottlenecks: Seatrack report, 2014

Initiated in 2014, Seatrack[6] is a programme which maps the non-breeding movements of seabirds breeding on the North Atlantic. The INTERREG Atlantic Area project Future of the Atlantic Marine Environment (FAME)) contributed to the programme. BirdWatch Ireland, one of the FAME project partners, co-ordinated a seawatching scheme with sea watches conducted from coastal headlands from late July to early November, to monitor seabird migration. About 20 sites received coverage in Ireland but of these nine were sufficiently well covered over a four-year period (2010-2013), (Keogh *et al*. 2014).

These sites were not used to inform delineation of marine IBAs given the challenge of estimating abundance suited for assessment against IBA criteria. Final marine IBA outputs were compared with these sites and the comparison indicated that the network of sites identified covered migration survey locations which had comparatively high abundance estimates (i.e. the observed migration bottlenecks where the highest numbers of birds were recorded).

[6] Seatrack, available, https://seatrack.net/

Delineating final marine boundaries

Delineating final marine boundaries occurred in a stepwise process.

Species specific marine layers meeting IBA criteria were developed by merging the seaward extension data and tracking data outputs (where relevant). This provided a single layer per species that could inform the IBA assessment process. The individual species layers were then stacked to identify areas of overlap across species, see Figures 21 and 22.

Similarly, for the at-sea survey data, all layers relevant to species / species groups were stacked to identify areas of overlap for both the summer and winter data relating to the top 1% of abundance data for each species / species group, see Figures 23 and 24 below.

With the merged seaward extension / tracking data (indicative of distribution during the breeding period) and merged at-sea survey data layers (indicative of distribution during the summer and winter), we considered which areas might be identified as unique sites for the purpose of marine IBA delineation.

The goal of the site delineation was to identify sites that captured species typical dispersal ability and were also of a distinct enough nature to provide a practical management unit for decision-makers.

If multiple adjacent small sites are all delineated as IBAs, this might well capture the unique dispersal ability of individual species. However, they may become so small that they are unfeasible to manage at a practical scale. Equally, if final sites are large because they capture all species overlapping important areas, then determining practical management recommendations for the entire site may also become unfeasible. The more unique species combinations which must be accounted for, the harder it becomes to determine the most appropriate scale at which to delineate the final site. It is therefore helpful to consider the scale at which other relevant management units have been delineated for the country or region in question and aim to align final IBAs accordingly. An example of our consideration of this is in Figure 25.

A preliminary set of boundaries were considered. In conjunction with expert consultation (seabird knowledge of the region) and through considering existing planning layers (marine SPA layers), final marine IBA boundaries were delineated, see Figure 26 below.

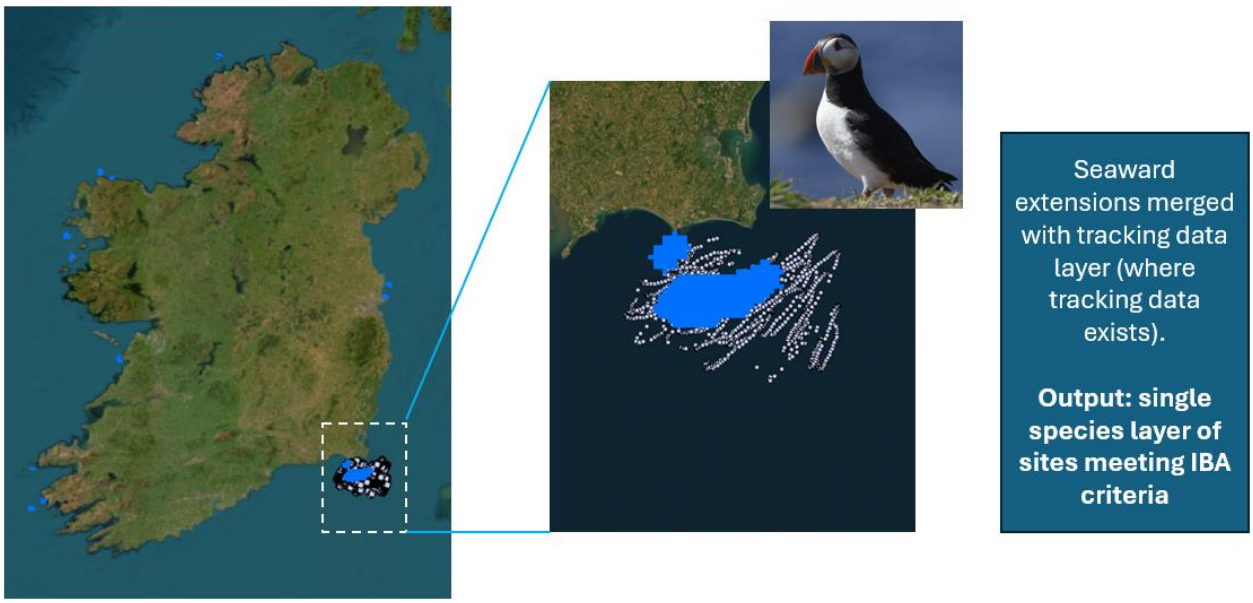


Figure 21:Atlantic puffin example of species-specific marine layer meeting IBA criteria (blue cells) developed by merging the seaward extension data and tracking data outputs.

Figure 21 shows Atlantic Puffin example of species-specific marine layer meeting IBA criteria (blue cells) developed by merging the seaward extension data and tracking data outputs. This provided a single layer that could inform the IBA assessment process. Individual species layers were then stacked to identify areas of overlap across species.

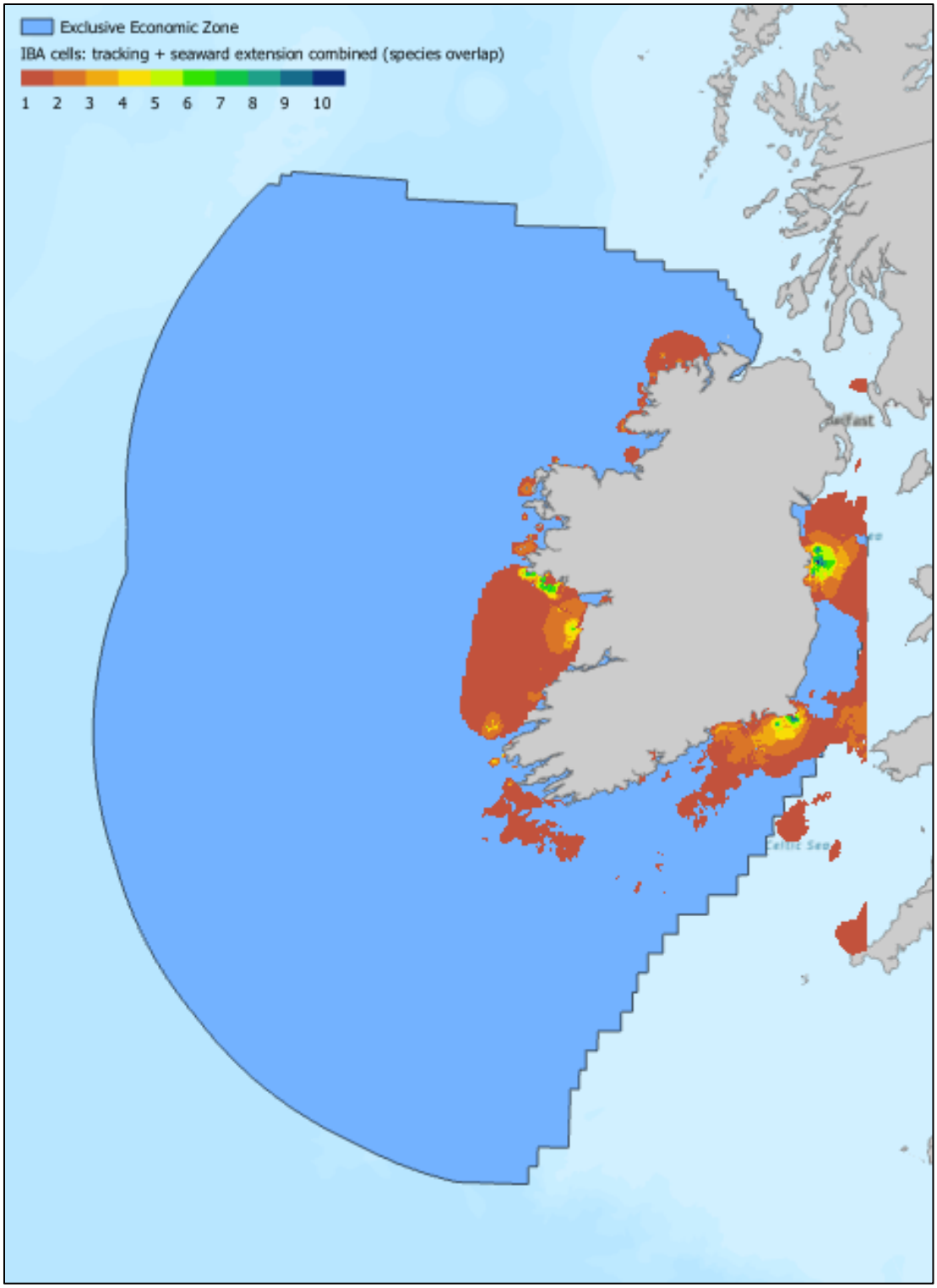


Figure 22: Overlap of species layers for combined seaward extension and tracking data to identify areas of overlapping cells meeting IBA criteria across species. 19 species layers were inputted into this assessment (those spp for which colony data met IBA criteria)

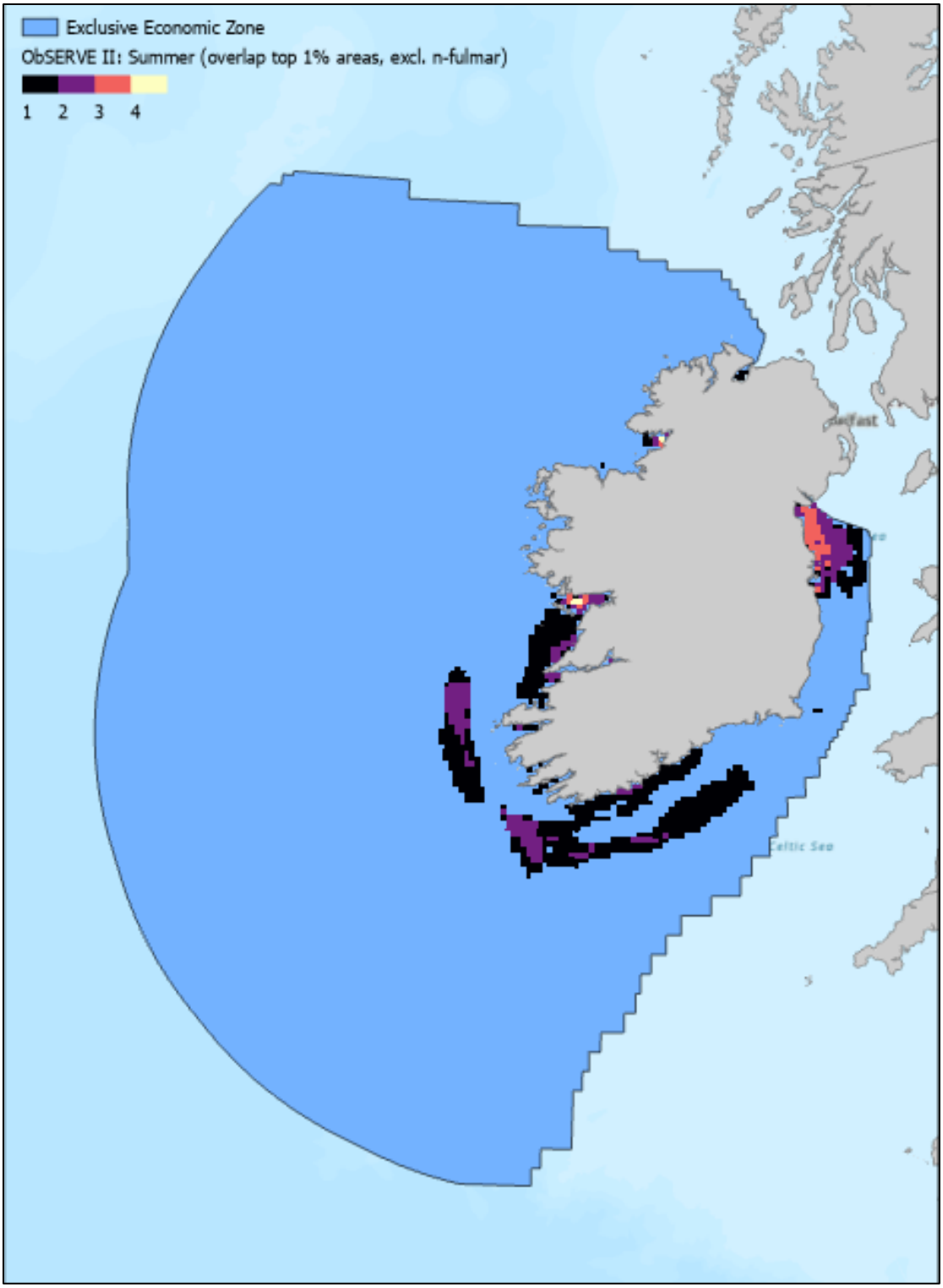


Figure 23: Overlap in the top 1% of abundance for species / species groups from the ObSERVE II data in summer

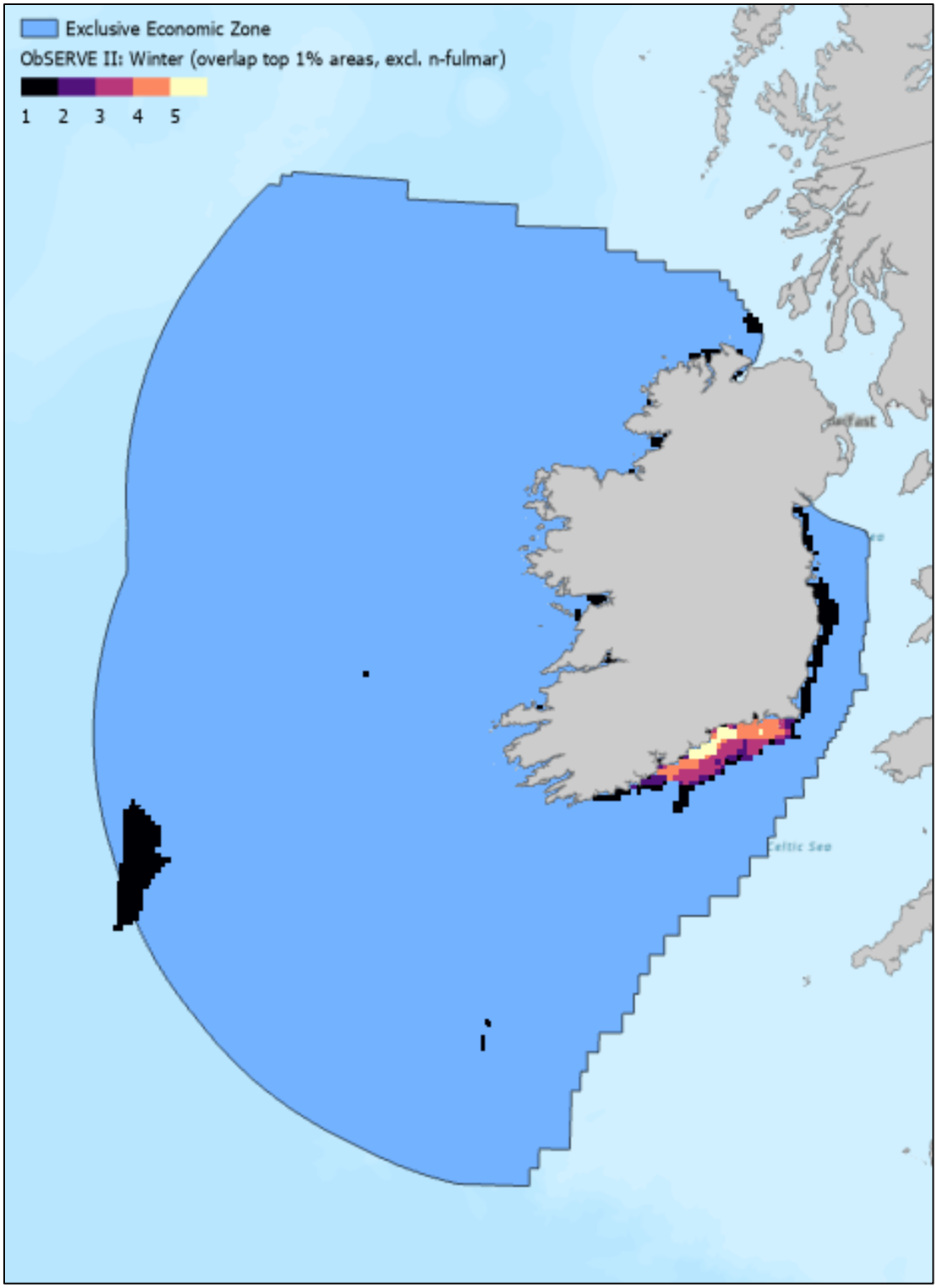


Figure 24: Overlap in the top 1% of abundance for species / species groups from the ObSERVE II data in winter

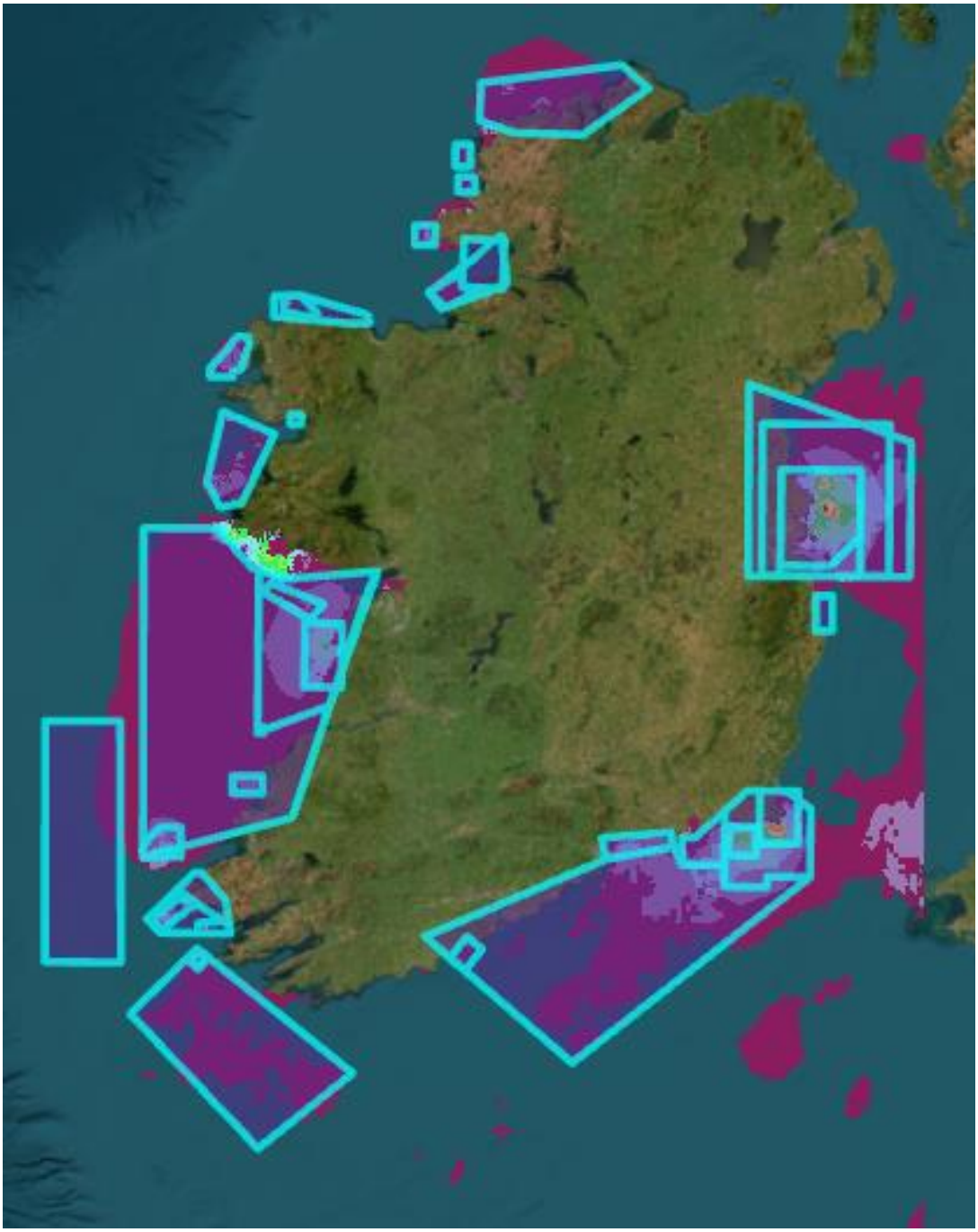


Figure 25: Overlapping species layers (seaward extension and tracking data IBA cells) overlaid by preliminary boundary considerations (blue highlight) for delineating unique IBAs.

In Figure 25 (at-sea survey data is not shown in this plot), we considered the two small squares in the south-east (within the IBA covering the Saltees and area around the Carnsore Point headland). These were ultimately deemed too small for practical planning purposes in the context of the final IBA boundary. Similar practical considerations were made for several of the final sites in relevant areas. Figure 26 below shows the final set of marine IBA boundaries.

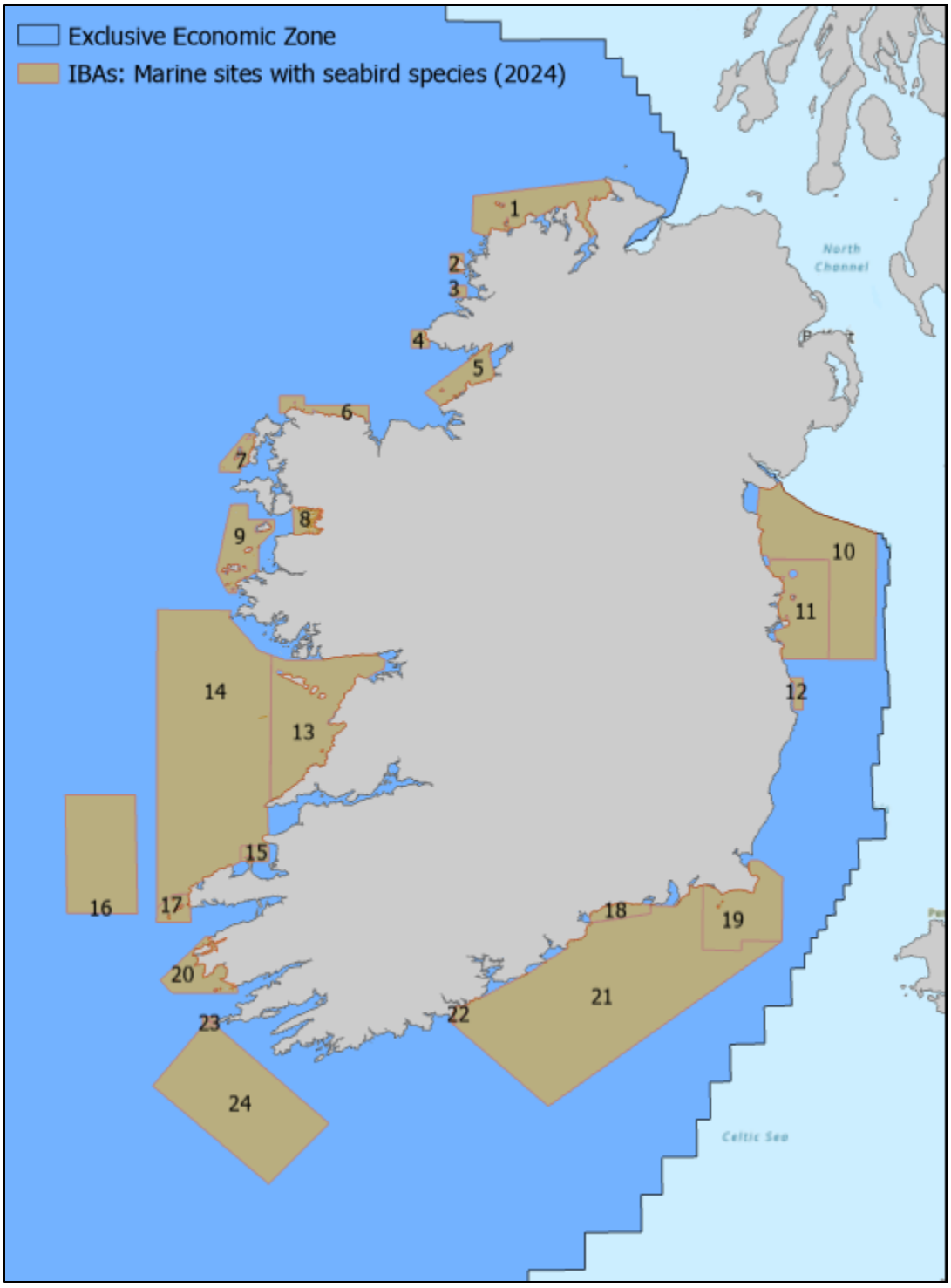


Figure 26: Final marine IBA boundaries for Ireland.

Appendix 2: Seabird tracking data overview

Table 11 sets out the tracking data reviewed for each species as part of the study and the key contributors of the tracking data. Most data sets were obtained from the Seabird Tracking database with permission of the organisation/author. Published references are given where available.

Table 11: Overview of seabird tracking data reviewed as part of the study and key data contributors.

Common name	**Colony**	**Data Owner**	**Organisation**	**Reference (where available).**
Atlantic Puffin	Little Saltee	Mark Jessop, Ashley Bennison	University College Cork	Bennison 2020
	Skomer	Annette Fayet	Norwegian Institute for Nature Research (NINA)	Fayet *et al.* 2021
Black-legged Kittiwake	Colonsay	RSPB	RSPB	
	Lambay	Stephen Newton	BirdWatch Ireland	Moss *et al.* 2016
	Maggy's Leap	Stephen Newton	BirdWatch Ireland	Sarda *et al.* 2022
	Puffin Island	Jonathan Green	Liverpool University	Carroll *et al.* 2015
	Rathlin	RSPB	Liverpool University	
	Rockabill	Stephen Newton	BirdWatch Ireland	
Common Guillemot	Lambay	Stephen Newton	BirdWatch Ireland	Moss *et al.* 2016
Common Tern	Rockabill	BirdWatch Ireland	BirdWatch Ireland	Moss *et al.* 2016
European Shag	Great Saltee	RSPB	(blank)	
	Lambay	Stephen Newton	BirdWatch Ireland	Moss *et al.* 2016
European Storm-Petrel	High Island	Adam Kane	University College Dublin	Critchley *et al.* 2020
	Inishtrahull	Stephen Newton	BirdWatch Ireland	Sarda *et al.* 2022
Great black-backed gull	Coliemore Harbour	Stephen Newton	BirdWatch Ireland	Moss *et al.* 2016

	Dalkey Island	Stephen Newton	BirdWatch Ireland	Moss *et al.* 2016
Herring gull	Dalkey Island	Adam Kane	University College Dublin	
	Inishmurray	Stephen Newton	BirdWatch Ireland	Sarda *et al.* 2022
	Inishtrahull	Stephen Newton	BirdWatch Ireland	Sarda *et al.* 2022
	Ireland's Eye	Stephen Newton	BirdWatch Ireland	Moss *et al.* 2016
Lesser black-backed gull	Inishmurray	Stephen Newton	BirdWatch Ireland	Sarda *et al.* 2022
	Inishtrahull	Stephen Newton	BirdWatch Ireland	Sarda *et al.* 2022
	Lambay	Stephen Newton	BirdWatch Ireland	Sarda *et al.* 2022
Manx shearwater	Bardsey	Ben Porter	(blank)	
	Blaskets	Mark Jessop, John Quinn	University College Cork	Critchley *et al.* 2020
	High Island	Mark Jessop, John Quinn	University College Cork	Critchley *et al.* 2020
	Inishtrahull	Stephen Newton	BirdWatch Ireland	Sarda *et al.* 2022
	Lighthouse Island	Oliver Padget	Oxford Navigation Group	Padget *et al.* 2022
	Little Saltee	Jamie Darby	University College Cork	Darby *et al.* 2022
	Lundy	Oliver Padget	Oxford Navigation Group	Padget *et al.* 2022
	Rum	Oliver Padget	Oxford Navigation Group	Padget *et al.* 2022
	Skokholm	Oliver Padget	Oxford Navigation Group	Padget *et al.* 2022
	Skomer	Oliver Padget	Oxford Navigation Group	Padget *et al.* 2022
Northern fulmar	Little Saltee	Jamie Darby	University College Cork	Darby *et al.* 2021
Northern gannet	Ailsa Craig	Keith Hamer, Ewan Wakefield	University of Glasgow, University of Leeds	Patrick *et al.* 2014
	Bull Rock	Stuart Bearhop, Thomas Bodey	Exeter university, Aberdeen university	Wakefield *et al.* 2013

	Grassholm	Stephen Votier, Bethany Clark	Heriot-Watt University, BirdLife	Patrick *et al.* 2014
	Great Saltee	Mark Jessop, Ashley Bennison	University College Cork	Bennison 2020
		Stuart Bearhop, Thomas Bodey	Exeter university, Aberdeen university	Wakefield *et al.* 2013
	Lambay	Stuart Bearhop, Thomas Bodey	Exeter university, Aberdeen university	Wakefield *et al.* 2013
	Little Skellig	Stuart Bearhop, Thomas Bodey	Exeter university, Aberdeen university	Wakefield *et al.* 2013
Razorbill	Great Saltee	Mark Jessop, John Quinn	University College Cork	Critchley *et al.* 2020
	Lambay	Mark Jessop, John Quinn	University College Cork	Critchley *et al.* 2020
Roseate tern	Rockabill	BirdWatch Ireland	BirdWatch Ireland	

Appendix 3: Review of Risk factors to Species

Globally recognized threats to seabird species were identified from the published systematic literature review of Dias *et al*. (2019), "Threats to seabirds: A global assessment". This review was performed by a team of seabird experts with support from the BirdLife International IUCN Red List team, the global Red List Authority (RLA) for bird species. Threats were classified according to the IUCN classification scheme[7].

This summary of threats to species at the global level serves as a starting point to understand which human activities might impact species at the site-specific level. Site-specific analyses will be necessary to fully understand the risk of a potential human activity to species at a specific site (IBA site in the context of this project).

Below, threats to seabirds on land (Table 12) and at sea (Table 13) are classified at the species and family level:

- Species level threats indicate there is at least one recognized study which has documented the impact of a threat to a species.
- Family level threats indicate there is at least one recognized study which has documented the impact of a threat to a species in that seabird family. Given species within a family share ecological traits, there may be potential for a recognised threat to impact related species within the same family. Therefore, where a threat is not specifically recognized to impact a particular species, understanding which threats are already documented to impact other species within the family serves as a critical starting point when considering the potential for a particular threat to impact a unique species.

[7] IUCN (2025). The IUCN Red List of Threatened Species. Version 2024-2. *Threats Classification Scheme (Version 3.3),* available https://www.iucnredlist.org/resources/threat-classification-scheme [accessed 4th February 2025]

Table 12: Threats on land from human activities - as per the Global Threats to Seabirds assessment from Dias et al. (2019).

Threats known to impact species at both the family (○) and species (●) level. Threats are considered by main habitat on Land

	Land and sea **Climate change & severe weather**	Land and sea **Human intrusions & disturbance**	Land **Agriculture**	Land **Diseases**	Land **Geological events**	Land **Hunting / trapping**	Land **Invasive alien species**	Land **Light pollution**	Land **Logging & wood harvesting**	Land **Natural system modifications**
ALCIDAE	○	○	○		○	○	○		○	○
Atlantic Puffin	●	●	●			●	●			
Black Guillemot							●			
Common Guillemot						●				
Razorbill	●					●	●			
HYDROBATIDAE	○	○		○		○	○	○		
European Storm-petrel							●			
Leach's Storm-petrel		●					●			
LARIDAE	○	○	○	○		○	○			○
Arctic Tern	●					●	●			
Black-headed Gull										
Black-legged Kittiwake	●									
Common Gull										
Common Tern		●				●				
European Herring Gull	●	●		●		●	●			
Great Black-backed Gull										
Lesser Black-backed Gull						●				
Little Tern	●	●				●				
Mediterranean Gull		●				●				
Roseate Tern						●				
Sandwich Tern		●				●				
PHALACROCORACIDAE	○	○	○	○	○	○	○			○
European Shag	●									
Great Cormorant										
PROCELLARIIDAE	○	○	○	○	○	○	○	○	○	○
Manx Shearwater						●	●	●		
Northern Fulmar							●			
STERCORARIIDAE	○					○				
Great Skua	●					●				
SULIDAE	○	○		○		○	○		○	
Northern Gannet										

	Land **Pollution**	Land **Problematic native species**	Land **Residential & commercial development**	Land **Transportation & service corridors**
ALCIDAE	◯	◯	◯	
Atlantic Puffin	•			
Black Guillemot				
Common Guillemot				
Razorbill				
HYDROBATIDAE	◯	◯	◯	
European Storm-petrel				
Leach's Storm-petrel		•		
LARIDAE	◯	◯	◯	
Arctic Tern				
Black-headed Gull				
Black-legged Kittiwake		•		
Common Gull				
Common Tern				
European Herring Gull	•	•		
Great Black-backed Gull				
Lesser Black-backed Gull	•			
Little Tern		•	•	
Mediterranean Gull			•	
Roseate Tern				
Sandwich Tern				
PHALACROCORACIDAE	◯	◯	◯	
European Shag		•	•	
Great Cormorant				
PROCELLARIIDAE	◯	◯	◯	◯
Manx Shearwater				
Northern Fulmar	•			
STERCORARIIDAE		◯		
Great Skua				
SULIDAE	◯	◯	◯	◯
Northern Gannet	•			

Table 13: Threats at sea from human activities - as per the Global Threats to Seabirds assessment from Dias et al. (2019)
Threats known to impact species at both the family (○) and species (●) level. Threats are considered by main habitat at sea.

	Sea **Aquaculture**	Sea **By-catch**	Sea **By-catch and Overfishing**	Sea **Energy production & mining**	Sea **Hunting / trapping**	Sea **Light pollution**	Sea **Overfishing**	Sea **Pollution**	Sea **Transportation & service corridors**
ALCIDAE	○	○	○	○		○	○	○	○
Atlantic Puffin		●	●	●				●	
Black Guillemot		●							
Common Guillemot			●					●	
Razorbill			●	●			●	●	●
HYDROBATIDAE			○	○		○		○	○
European Storm-petrel									
Leach's Storm-petrel								●	
LARIDAE	○	○	○	○	○		○	○	
Arctic Tern							●		
Black-headed Gull									
Black-legged Kittiwake			●					●	
Common Gull									
Common Tern									
European Herring Gull				●			●		
Great Black-backed Gull							●		
Lesser Black-backed Gull									
Little Tern									
Mediterranean Gull								●	
Roseate Tern		●							
Sandwich Tern									
PHALACROCORACIDAE		○	○	○			○	○	
European Shag			●					●	
Great Cormorant			●						
PROCELLARIIDAE	○	○	○	○	○		○	○	○
Manx Shearwater									
Northern Fulmar		●						●	
STERCORARIIDAE		○					○		
Great Skua		●					●		
SULIDAE		○	○	○	○		○	○	
Northern Gannet		●	●	●					

ENDs