IWDG

Irish Whale and Dolphin Group

CELTIC MIST SCIENTIFIC SURVEYS 2023

FAIR SEAS REPORT

CELTIC MIST
RESEARCH VESSEL

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Irish Whale and Dolphin Group

The Irish Whale and Dolphin Group (IWDG) was established in December 1990 and is now an internationally recognised all-Ireland group dedicated to "the conservation and better understanding of cetaceans (whales, dolphins and porpoise) in Irish and other waters through increasing awareness, research, education, welfare activities and collaboration".

Ireland's waters

Ireland's territorial waters are seven times that of its landmass providing a myriad of marine habitats, from sheltered bays and the shallow waters of the continental shelf to deep complex canyon systems and abyssal plains.

The south and west edges of Ireland's maritime area are places where relatively shallow waters, about 200 metres deep, suddenly slope away to depths of 4,000 metres below the surface. It is a highly productive part of our ocean where cold nutrient-rich water is pushed up the slopes by ocean currents. These nutrients mean the water here is full of life and makes for a perfect feeding ground a variety of marine species.

Fin whales recorded from Celtic Mist in 2022. © IWDG/ Thomas Power

Irish waters are one of the most important places in Europe for cetaceans. There are at least 26 cetacean species present in Irish waters, from the harbour porpoise to the largest animal on the planet, the blue whale. That's over a quarter of the world's species of cetaceans. Some species are migratory, like humpback and fin

whales, while others are resident all year-round. Irish waters are also a globally important area for other marine megafauna like basking sharks and seals.

Celtic Mist surveying in the Shannon Estuary. Photo taken by IWDG member Marcus Hogan

Celtic Mist

R.V Celtic Mist was donated to the IWDG in 2011, by the family of Ireland's former Taoiseach, Charles J. Haughey. At 17m, *Celtic Mist* has become IWDG's flagship vessel, equipped to accommodate eight people. *Celtic Mist* has surveyed Irish inshore and offshore waters since 2012, successfully circumnavigating Ireland on several occasions, including in 2022 and completed an expedition to Iceland in search of humpback whales in 2018. Coastal communities are visited during the summer months with members of the public encouraged to visit the yacht to learn about Ireland's rich marine life while promoting marine conservation. In May 2019 the education programme Floating Classroom begun where pupils undertake unique ocean educational activities and learn about marine mammal surveying both in the classroom and onboard the vessel. In 2023, a new survey programme began onboard in partnership with the Fair Seas campaign.

Fair Seas

The Fair Seas campaign is led by a coalition of Ireland's leading environmental non-governmental organisations and networks. Fair Seas seeks to protect, conserve, and restore Ireland's unique marine environment, with the ambition to see Ireland become a world leader in marine protection, giving our species, habitats, and coastal communities the opportunity to thrive.

Fair Seas aims to build a movement of ocean stewardship across Ireland that energises and empowers people, to advocate for ambitious and robust legislation,

provide impartial scientific data and research, and propose a network of effective well managed marine protected areas. The Fair Seas campaign produced a report in 2022 titled *Revitalising Our Seas* which compiled the initial assessment based on available data which supports the designation of Areas of Interest based on occurrence, density and richness of certain species and habitats. The report identified 16 Areas of Interest for marine protected area (MPA) designation in Irish waters (Figure 1). The network of Areas of Interest for MPA designation covers just under 36% of Ireland's Maritime Area. An Area of Interest is defined as a key biodiversity hotspot for one or more species of conservation interest.

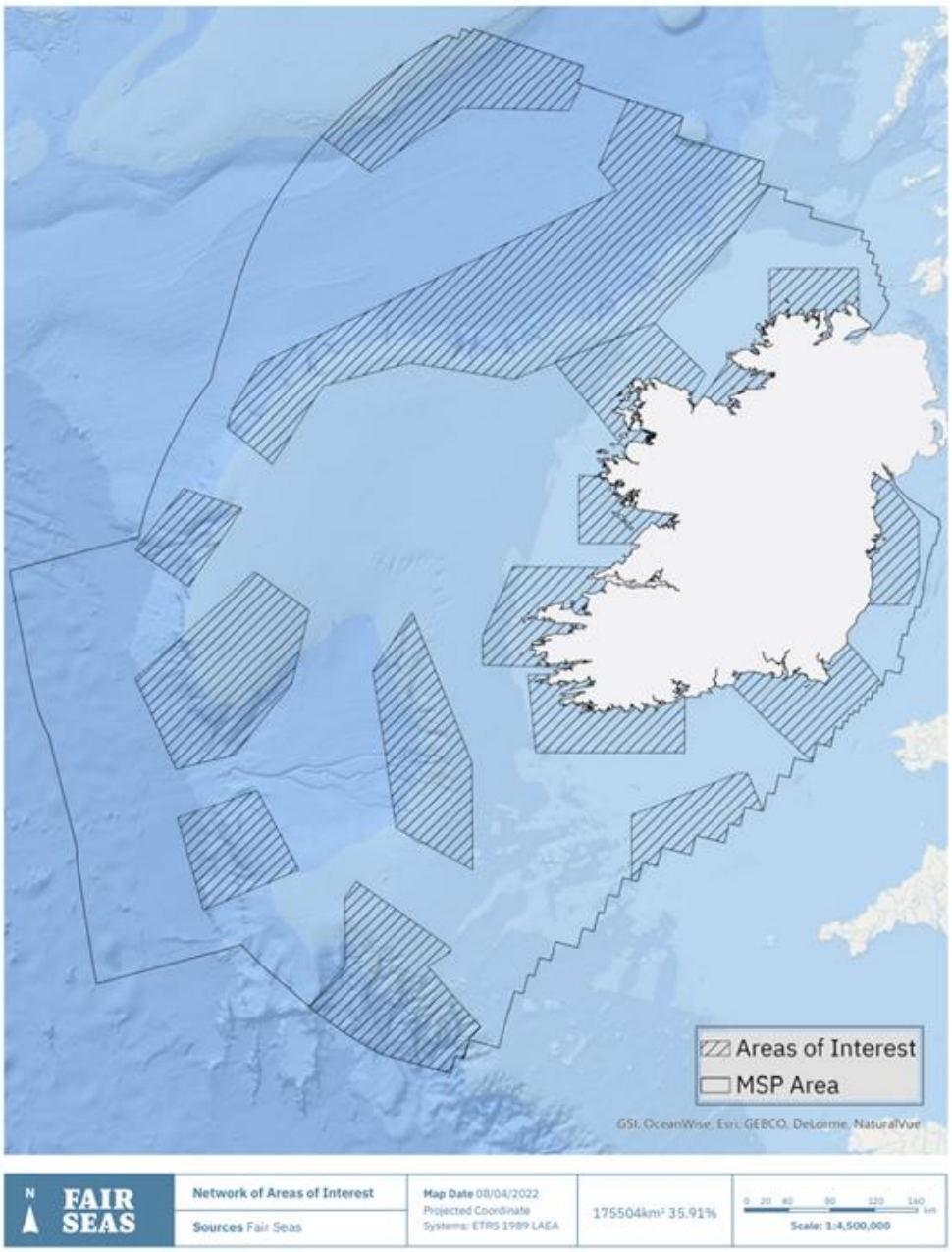

Figure 1: Map of full network of Areas of Interests within Ireland's maritime area identified by the Fair Seas campaign.

2023 Research Programme

Survey Methodology

During the 2023 season the IWDG conducted surveys onboard *R.V Celtic Mist* within two Areas of Interest (AOI) highlighted in the *Revitalising Our Seas* report: the Southwest Coast and Loop Head to Kenmare River AOI's. This survey programme was designed to capture the maximum amount of data within these areas and increase our knowledge of the marine life within these sites.

Blasket Islands, Co. Kerry. © IWDG/ Becky Dudley

Areas of Interest

The southwest Coast Area of Interest (AOI) measures 7,333km² and stretches from Cork harbour to Dursley island. It is an area identified as exhibiting high levels of species richness for cetaceans, with the highest densities of fin whales observed within Ireland's Exclusive Economic Zone (EEZ), as well as high densities of humpback whales, Risso's dolphins, minke whales, harbour porpoise and common dolphins.

The Southwest Coast Area of Interest (AOI) measures 6,705 km². It stretches from the Iveragh Peninsula, Co. Kerry in the south to Loop Head, Co. Clare in the north. The Area exhibits high densities of bottlenose dolphins as it is adjacent to the Lower River Shannon Estuary SAC, which is home to the genetically discrete Shannon bottlenose dolphin population. This population is resident to the estuary but areas outside the current SAC boundaries, such as Brandon and Tralee Bay are thought to be highly important to the population (Leveque et al., 2016). The IWDG has recommended the expansion of the SAC to incorporate Brandon and Tralee Bay which are within the AOI.

This site has the highest levels of minke whales and humpback whales recorded within the EEZ, with 30% and 45% of all sightings respectively. High densities of Risso's dolphins and common dolphins also occurred within this site.

Skipper Liam Quinn onboard Celtic Mist. © IWDG/ Becky Dudley

Visual Data Collection

Members are trained in cetacean survey techniques upon joining the vessel by IWDG's full-time onboard biologist. Visual watches are undertaken by the marine biologist and trainee biologist which each survey will also typically have onboard, and IWDG members onboard using standard line transect methodology for cetaceans (Buckland et al. 2001) whenever sea conditions are suitable. The observers are positioned either side of the mast on *Celtic Mist's* foredeck scanning a 90° arc ahead of the vessel for marine wildlife, although sightings outside of this area, and species recorded when no observers were stationed at the mast, were still recorded but categorised as 'off effort' and noted as a casual sighting.

Observers scanned the area by eye and using binoculars (10x50). Observers remained 'on watch' for no longer than an hour at a time with a minimum of an hour off to minimize any fatigue. When only one observer was available a change in effort was logged to 'single observer'.

When animals were spotted information was entered into Logger, a data logging programme (©IFAW, Logger 2010) including the time, location angle in relation to the vessel, distance from the vessel, and the animal's direction of travel when first sighted. The animal is then thoroughly observed to gather additional information such as behaviour and the best estimate of group size. Sightings were identified to species level where possible, with species identifications being graded as definite, probable, or possible. When species identification could not be confirmed, sightings

were downgraded to unidentified categories in accordance with criteria established for the IWDG's cetacean sightings database (IWDG 2024).

Environmental conditions were collected every 30 minutes, or when a significant change occurred. During the surveys observers also looked out for aggregations of feeding birds to provide a wider picture of the marine ecosystem. A feeding aggregation was defined as a group numbering twenty or over that were exhibiting feeding behaviour such as circling, diving, and surface feeding. The number and species of each aggregation was recorded.

IWDG member Emma Gordon onboard Celtic Mist. © IWDG/ Becky Dudley

Photo Identification

The IWDG uses photo-identification to monitor various species as they occur. Photo identification is a non-invasive technique which uses identifying features for each species, such as the dorsal fin, fluke, or unique pigmentation, to recognise and track individuals within the population. Catalogues are maintained by the IWDG for bottlenose dolphins within the Shannon Estuary and other coastal waters and for large baleen whales such as humpback whales and fin whales through the Whale Track project.

During the surveys photographs were taken of species where photo identification can be used. The Code of Conduct outlined in the Marine Notice No. 15 of 2005 is always followed if the animal is approached.

The 'Fenit three', bottlenose dolphins found around Fenit harbour. © IWDG/ Becky Dudley

Anthropogenic Impacts

Information was also collected on the distribution of fishing pots. Pots (also known as creels) are a type of trap typically used to catch bottom-crawling shellfish, such as crabs and lobsters. They can be deployed individually, in fleets where pots are laid on the seabed and connected to a vertical line with buoys at both ends, or connected to static nets.

Entanglement in static fishing gear has been identified as a significant cause of anthropogenic morbidity and mortality of baleen whales worldwide (Dolman & Brakes 2018; Hamilton & Baker 2019). Whale entanglement has been identified as the largest cause of anthropogenic mortality in baleen whales in Scottish waters, with ropes associated with pot fishing thought to be the most frequent type of entanglement (SMASS 2019). Minke whales and humpback whales are of particular conservation concern in northeastern Atlantic waters (Leaper et al. 2022).

During the surveys the distance (up to 1000 meters away) to individual buoys was recorded by the observers when they were perpendicular to the boat on either side of the vessel. The presence of marine litter on the surface was also recorded during the surveys. The type of litter and colour were recorded when perpendicular to the observer.

2023 Season Review

Overall

During the 2023 season, which ran from between April and September, nine week-long surveys took place, with an addition three surveys focusing on the Shannon Dolphin population (data collected during these surveys were not included in this report). Surveys started in Kinsale, Co. Cork, and finished in Kilrush Co. Clare. In total, *Celtic Mist* travelled 3214.4 km, with 2332.9 km whilst observers were 'on effort' (Figure 2), the majority of which was conducted with two observers (2004.7km). Surveys were carried out in coastal waters over the whole of the southwest coastline, with effort concentrated around the departure/arrival ports of our surveys, including Cork harbour, Bantry, Co. Cork

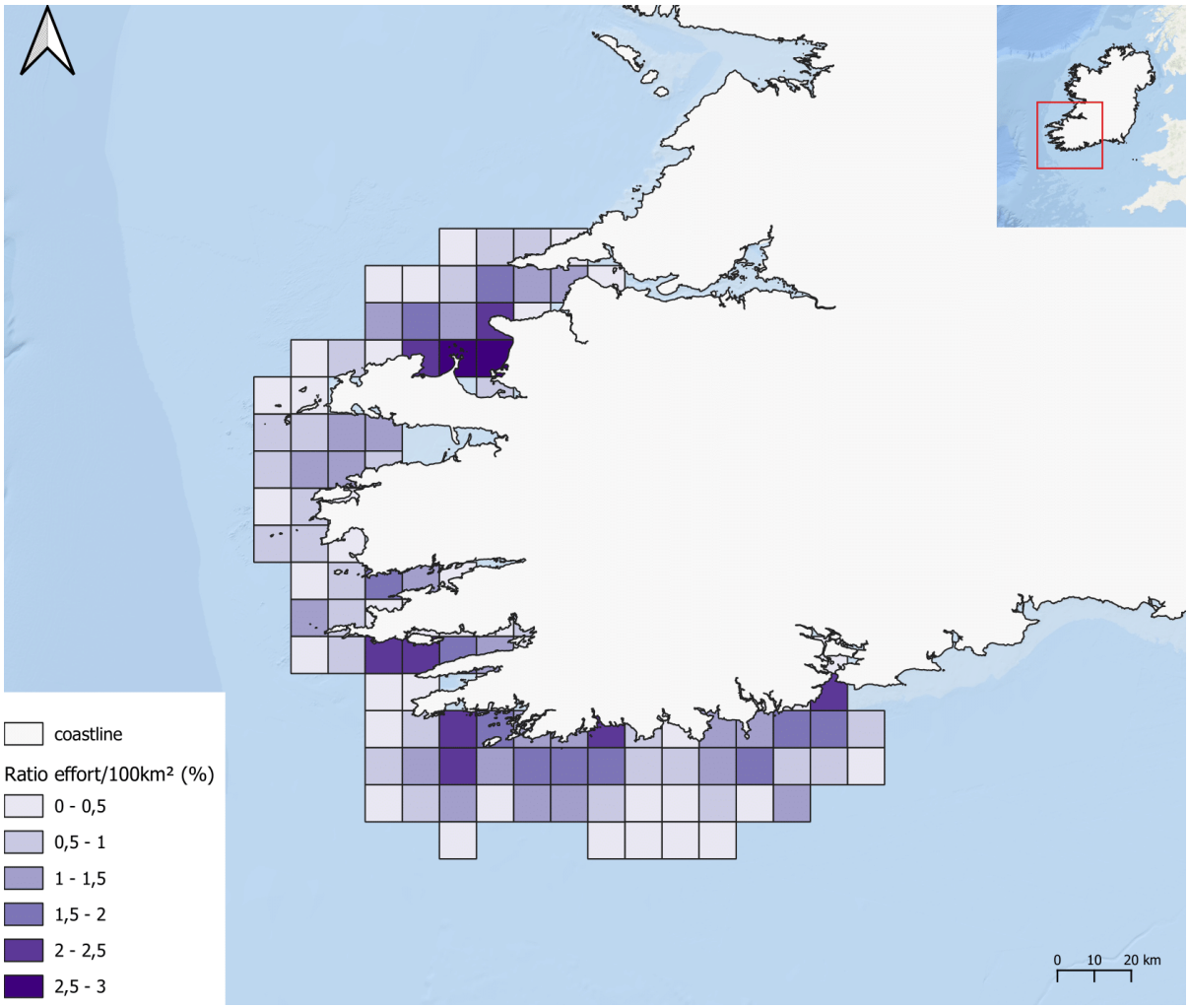

Figure 2: Effort conducted per 100km² onboard Celtic Mist during 2023.

During the season we recorded 462 sightings of 11 different species of marine megafauna: seven species of cetaceans, two pinniped and two fish species (Table 1). Common dolphins (*Delphinus delphis*) were the most sighted species making up 48% of the total sightings, followed by grey seals at 22%, and minke whales at 12%.

Table 1: Sightings recorded on Celtic Mist during the 2023 season.

Species	Scientific name	Sightings	Individuals
Bottlenose dolphin	*Tursiops truncatus*	25	103
Basking Shark	*Cetorhinus maximus*	1	1
Blue shark	*Prionace glauca*	1	1
Common Dolphin	*Dephinus delphis*	224	1507
Common seal	*Phoca vitulina*	8	9
Fin whale	*Balaenoptera physalus*	8	13
Grey seal	*Halichoerus grypus*	101	287
Harbour porpoise	*Phocoena phocoena*	25	60
Minke whale	*Balaenoptera acutorostrata*	55	64
Northern bottlenose whale	*Hyperoodon ampullatus*	3	5
Risso's dolphin	*Grampus griseus*	1	3
Unidentified cetacean	*N/A*	3	3
Unidentified dolphin	*N/A*	6	27
Unidentified whale	*N/A*	1	1
	TOTAL	**462**	**2084**

Aggregations of feeding birds were encountered throughout the surveyed area and consisted of four different species: unidentified juvenile gull, northern gannet, kittiwake, and Manx shearwaters (Figure 3). Although aggregations were seen throughout the survey area, here was a clear species divide, with Manx shearwater aggregations recorded mostly on the south coast and northern gannet aggregations in the southwest.

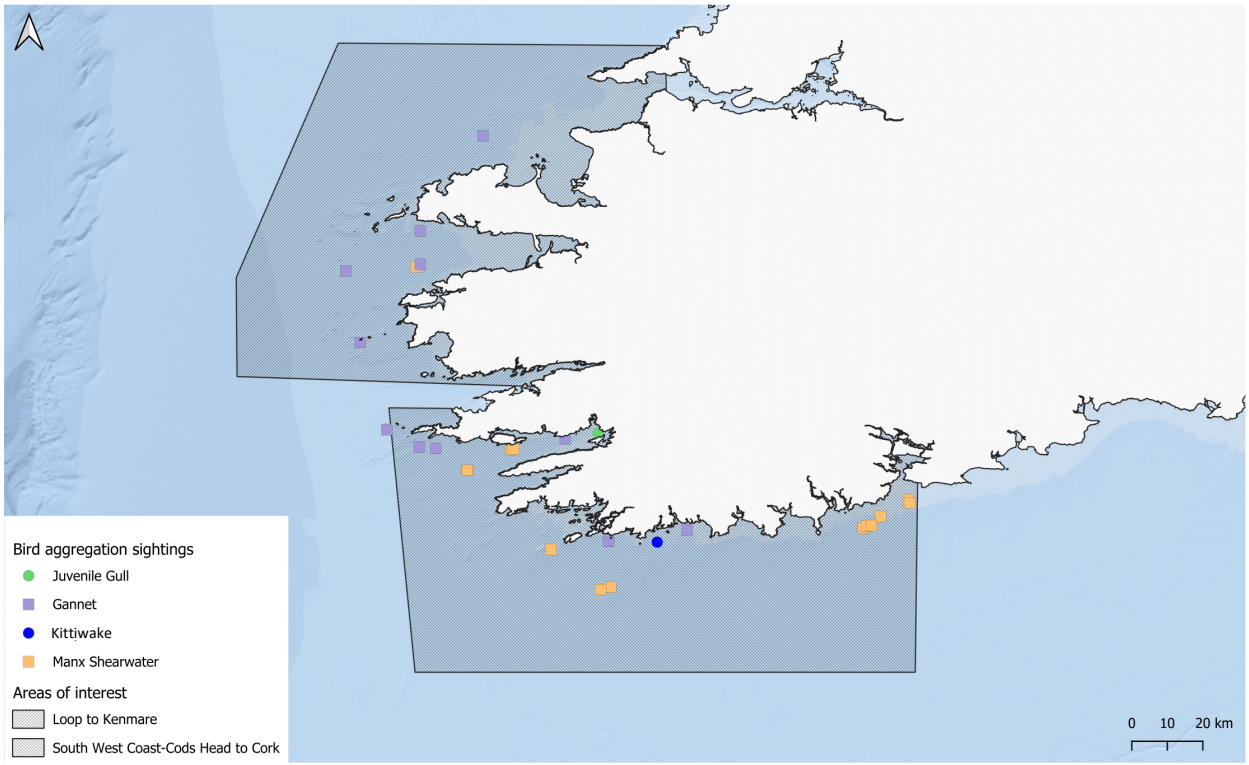

Figure 3: Aggregations of feeding birds recorded during the 2023 season.

Anthropogenic Impacts

In total, 861 single buoys were recorded. Pots were recorded throughout the survey areas with concentrations found in Tralee and Brandon Bay, the Blasket islands and west of Cape Clear (Figure 4). However, these numbers haven't been adjusted for effort so higher concentrations are correlated with areas of higher effort and further analysis is required. However, the data indicates that pots occur throughout our southwest coastal waters.

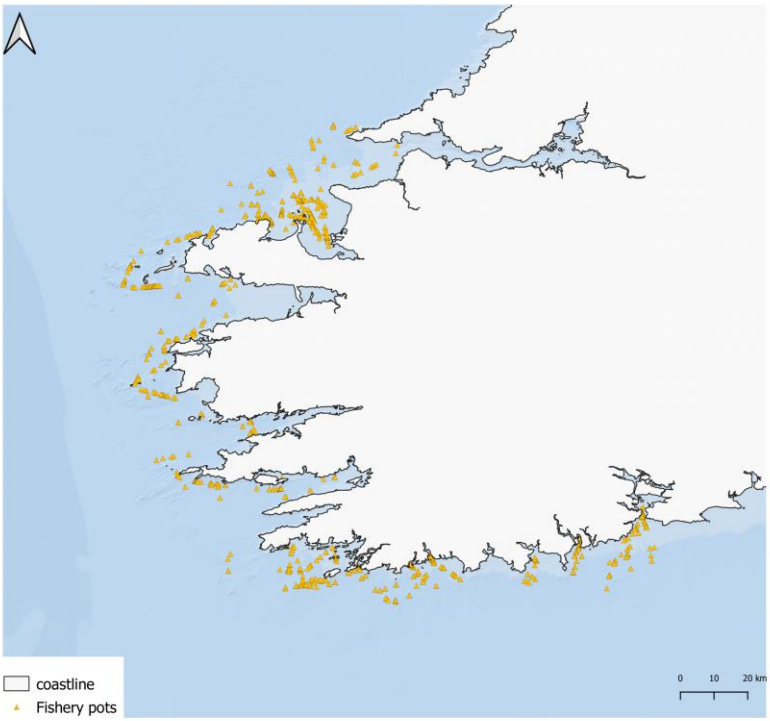

Figure 4: Distribution of fishing pots recorded during the 2023 season.

There were 114 occurrences of marine litter which ranged from food items such as plastic bottles, cans, food packages, to boating equipment such as fenders, and fishing gear including rope and palettes.

Fastnet Lighthouse, Co. Cork. © IWDG

Southwest Coast Area of Interest

In total, six surveys were carried out within the southwest coast AoI, with 1351.2 km of effort conducted. We recorded 310 sightings of 11 species of marine megafauna. The highest areas of species richness during the season were recorded in the Southwest AOI, with the highest levels within the AOI found around Cape Clear and Baltimore and Bantry Bay (Figure 5).

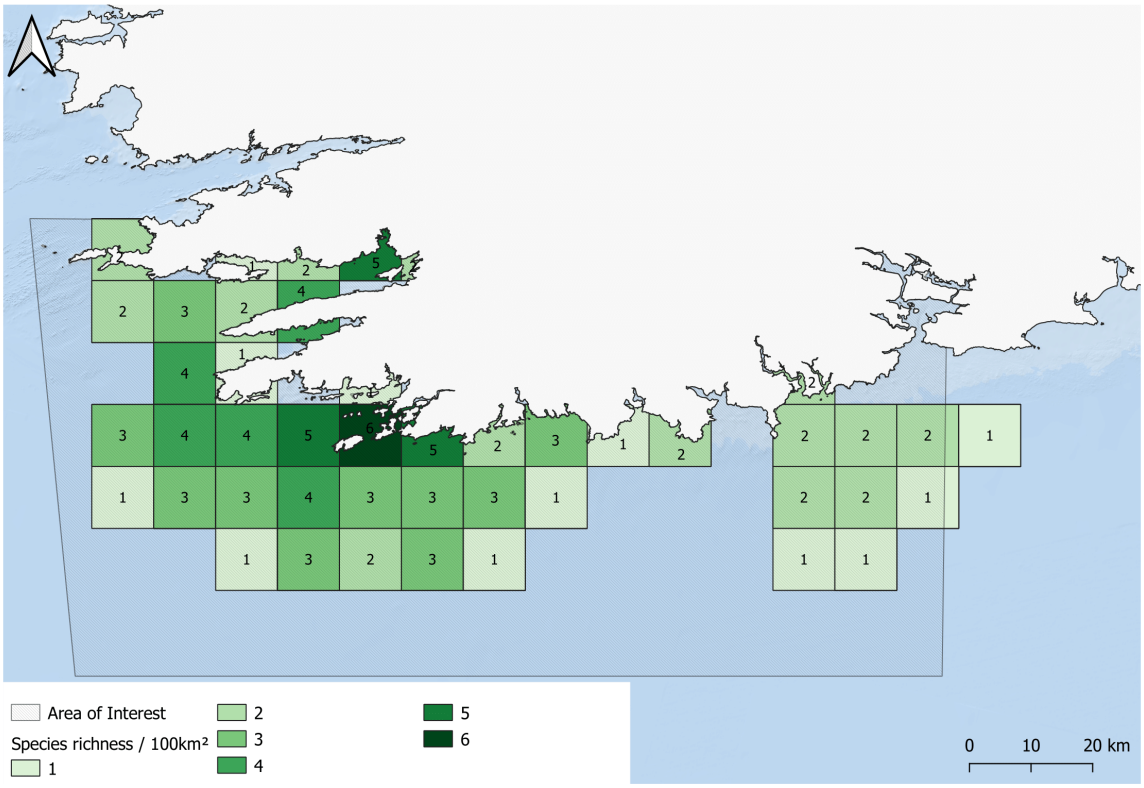

Figure 5: Species richness within the Southwest Coast Area of Interest recorded from Celtic Mist during the 2023 season.

Common dolphins were the most commonly sighted species and were recorded throughout the AOI, although higher densities were observed in the western half of the AOI, particularly off the coast of Toe Head, Co Cork (Figure 6).

Minke whales were also concentrated in the west of the AOI (Figure 7) and reflected the distributions presented in the *Revitalising Our Seas* report. The highest densities were observed in Bantry Bay. However, this may be due to higher effort, as Bantry was one of the departure points for the surveys.

Low densities of harbour porpoise were recorded in the AOI (Figure 8). Harbour porpoise are a qualifying feature for the Roaring Water Bay and Islands Special Area of Conservation (SAC). However, sightings were significantly lower than expected in this area, with only four sightings of harbour porpoise within the SAC.

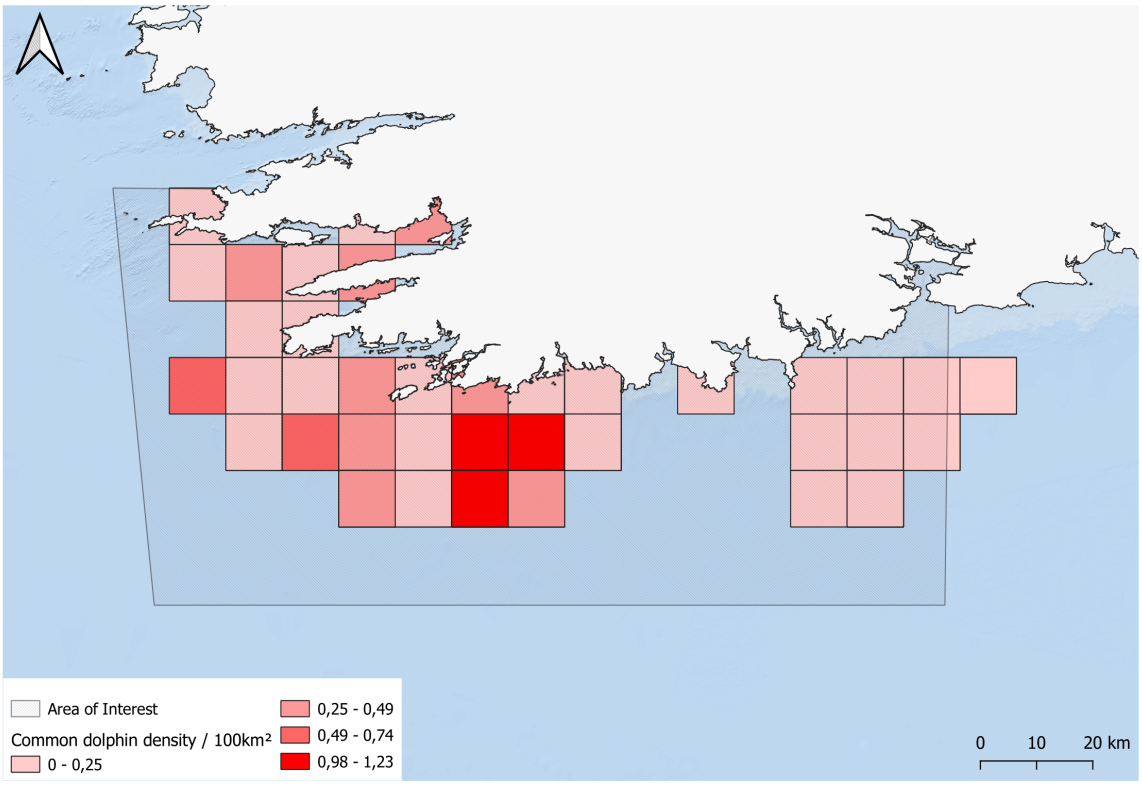

Figure 6: Densities per 100 km² of common dolphins recorded from Celtic Mist during the 2023 season.

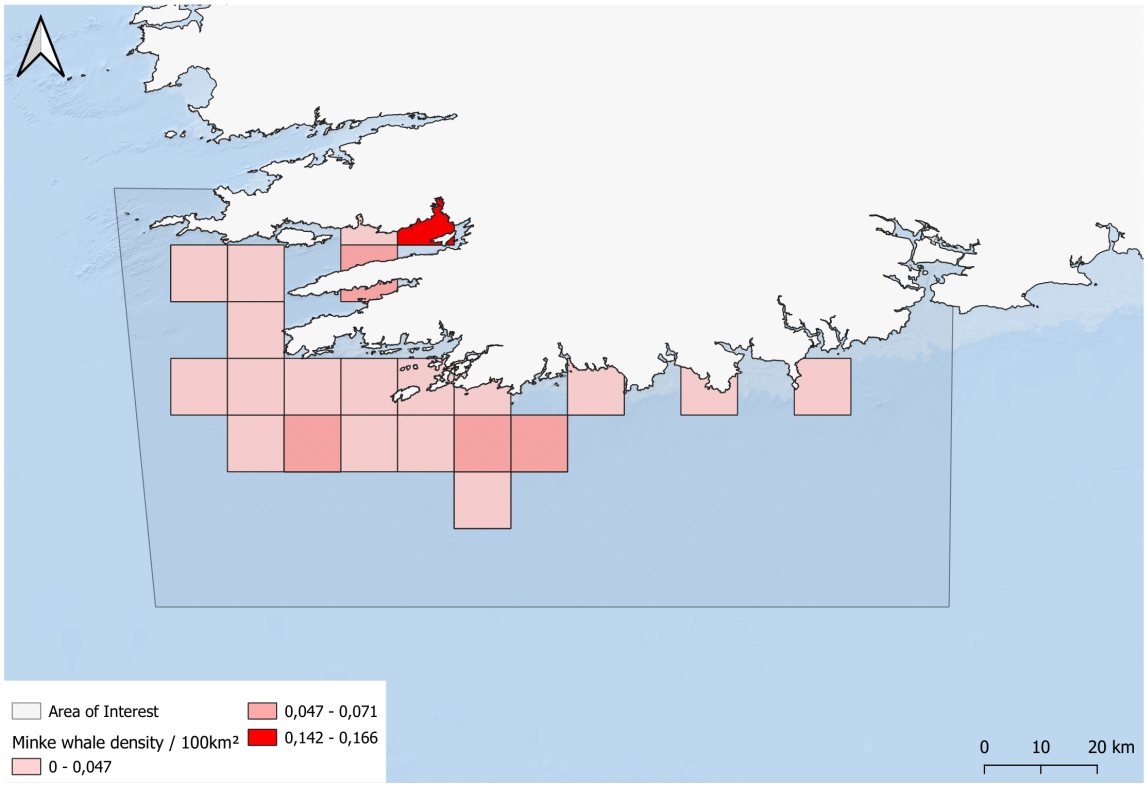

Figure 7: Densities per 100 km² of minke whales recorded from Celtic Mist during the 2023 season.

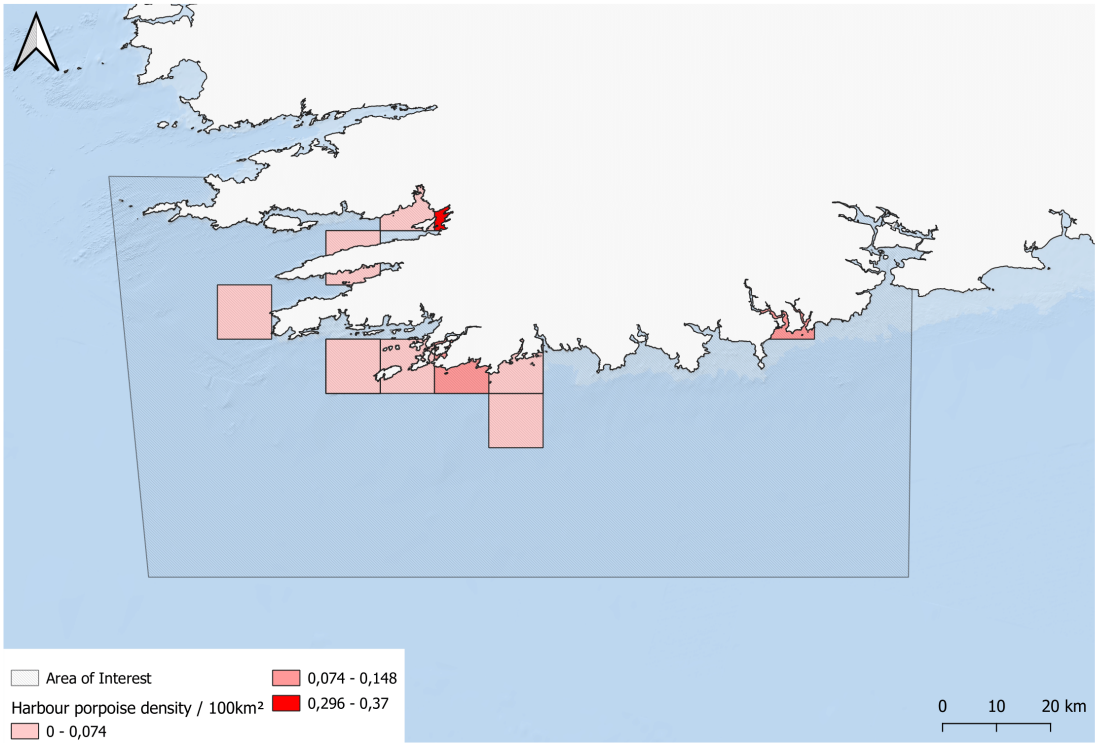

Figure 8: Densities per 100 km² of harbour porpoise recorded from Celtic Mist during the

Fin whales were seen eight times during season with 13 individual animals recorded. The sightings occurred in the Northwest of the AOI, from Mizen Head to Bantry Bay (Figure 9). This contrasts with the *Revitalising Our Seas* report as these areas previously had the lowest densities recorded within the AOI.

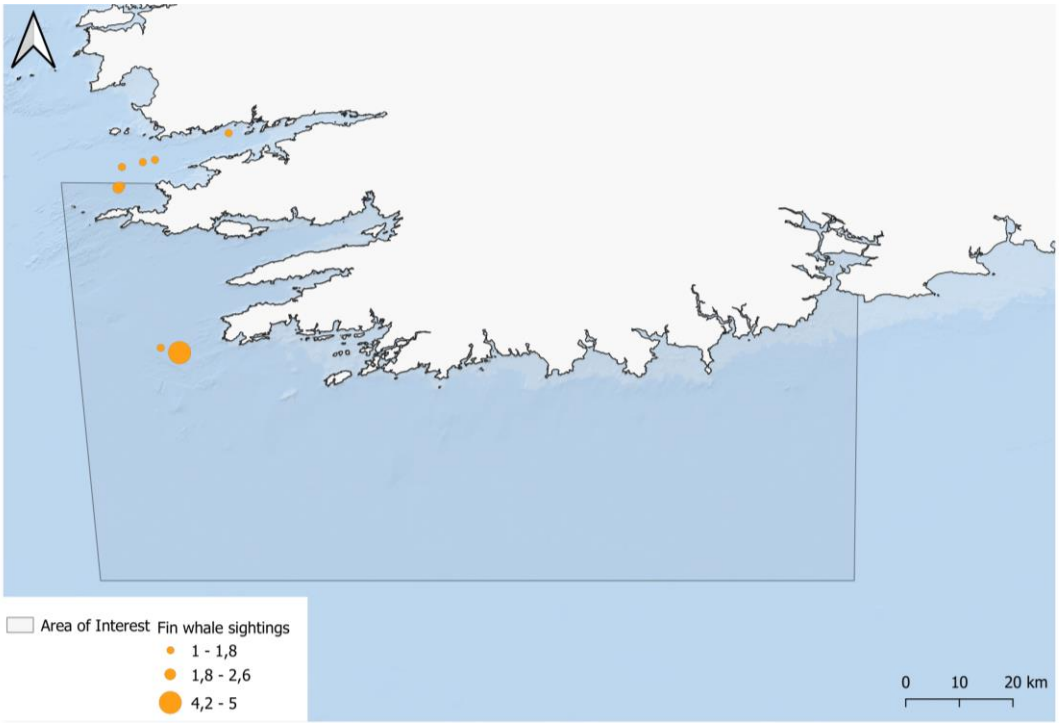

Figure 9: Fin whale sightings recorded from Celtic Mist during the 2023 season. season.

No humpback whales were recorded in the Southwest AOI, despite 36% of all sightings within the Irish EEZ occurring in this area from 2005-2021.

Fenit Harbour, Co. Kerry. © IWDG/ Susi Matejka

Loop Head to Kenmare Area of Interest

In total, five surveys occurred within this area, with 884.6km of effort conducted. There were 129 sightings of nine different species of marine megafauna. Common dolphins were again the most sighted species of cetaceans with sightings occurring throughout the coastal waters of the AOI (Figure 10). The highest densities were observed in Kenmare Bay, Co. Kerry and from the Dingle peninsula to Loop Head, Co. Clare.

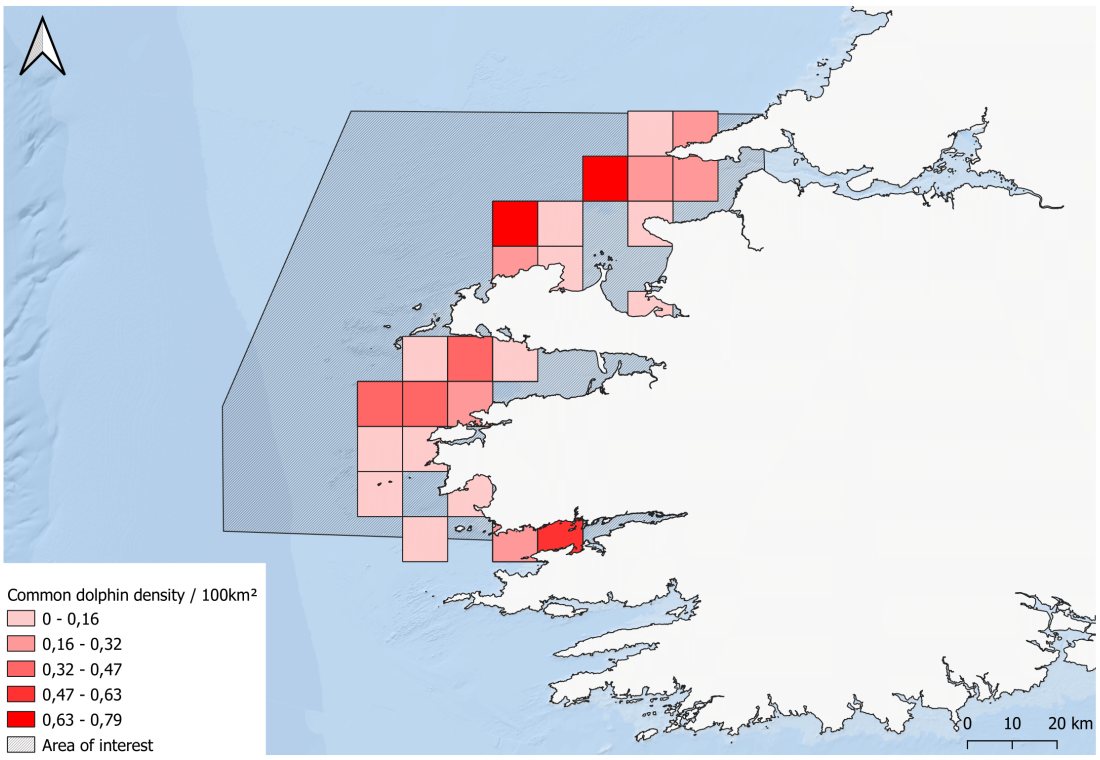

Figure 10: Densities per 100 km² of common dolphins recorded from Celtic Mist during the 2023 season.

The densities of bottlenose dolphins reflect the distribution outlined in the *Revitalising Our Seas* report, with high densities recorded in Brandon and Tralee Bay (Figure 11).

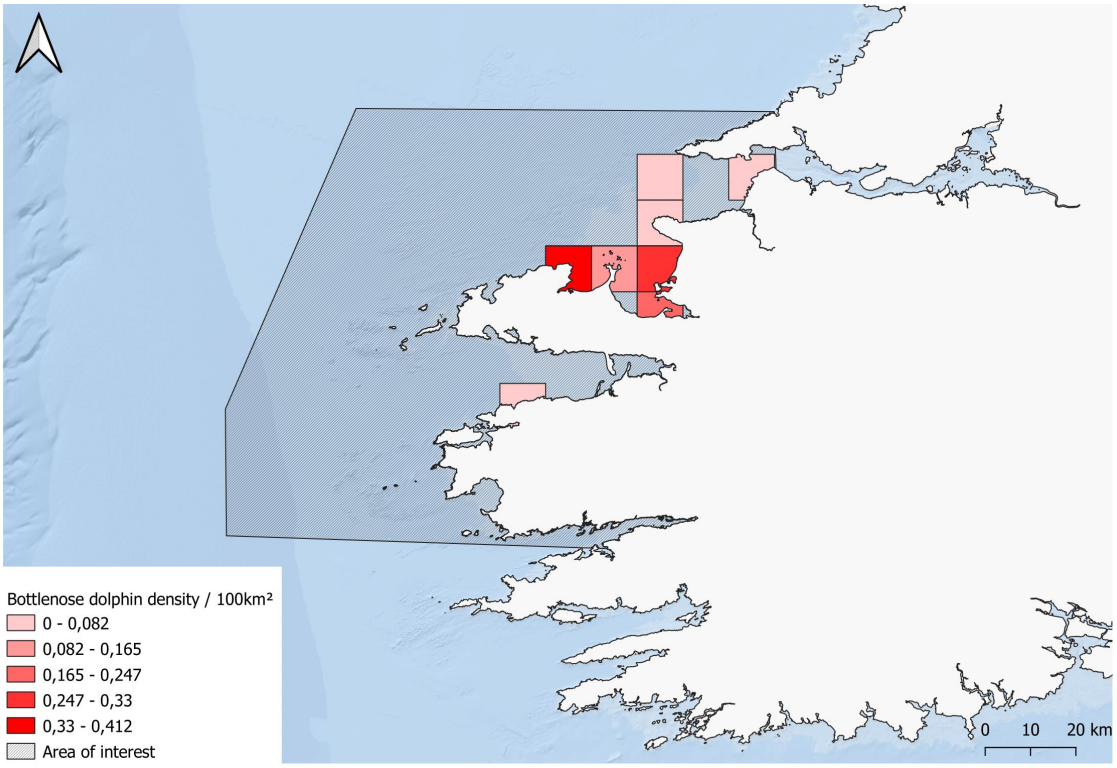

Figure 11: Densities per 100 km² of bottlenose dolphins recorded from Celtic Mist during the 2023 season.

Despite this AOI having the highest levels of minke whale densities within Ireland's EEZ as shown in the *Revitalising Our Seas* report, relatively low densities were observed during our surveys (Figure 12). Only six sightings of minke whales were recorded within the AOI, with four of these occurring in Dingle Bay.

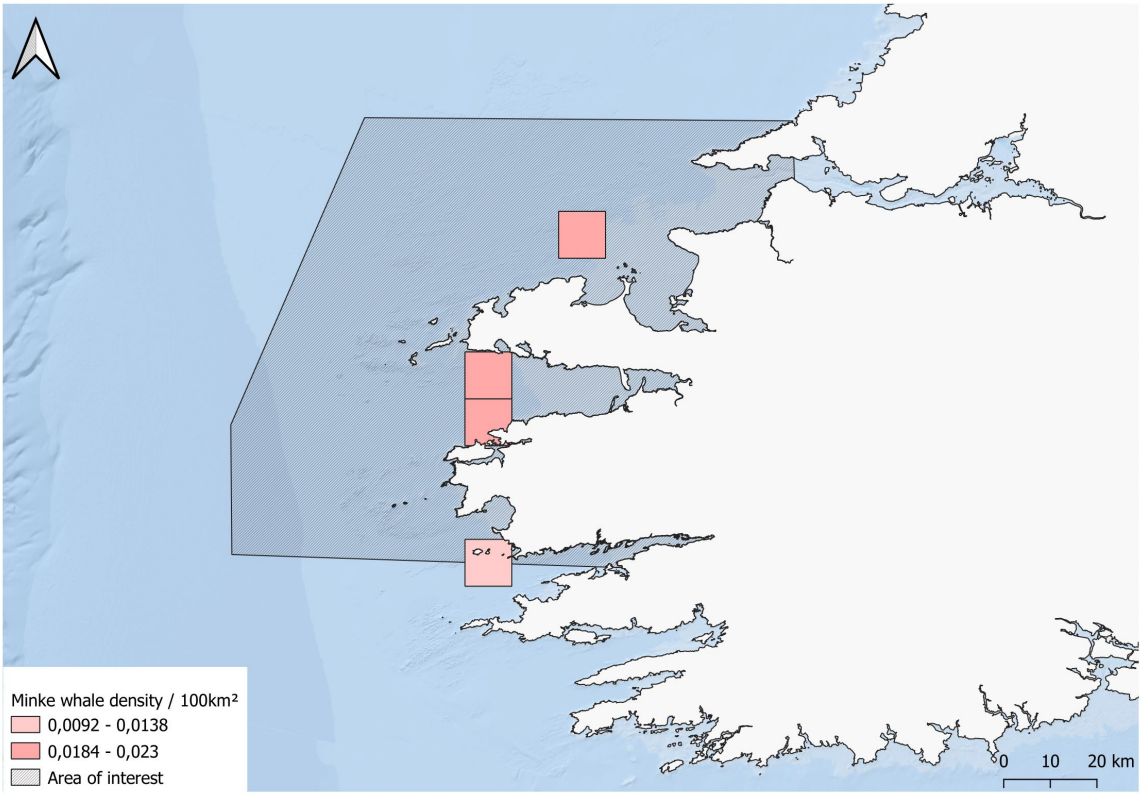

Figure 12: Densities per 100 km² of minke whales recorded from Celtic Mist during the 2023 season.

No humpback whales were recorded in the Loop Head to Kenmare River Area AOI, despite this site previously having the highest levels of humpback whales recorded within the EEZ.

Again, there were low densities of harbour porpoise recorded in the AOI (Figure 13). Harbour porpoise are a qualifying feature for the Blasket Islands SAC. However, no sightings were recorded within the SAC, despite effort being conducted within the area.

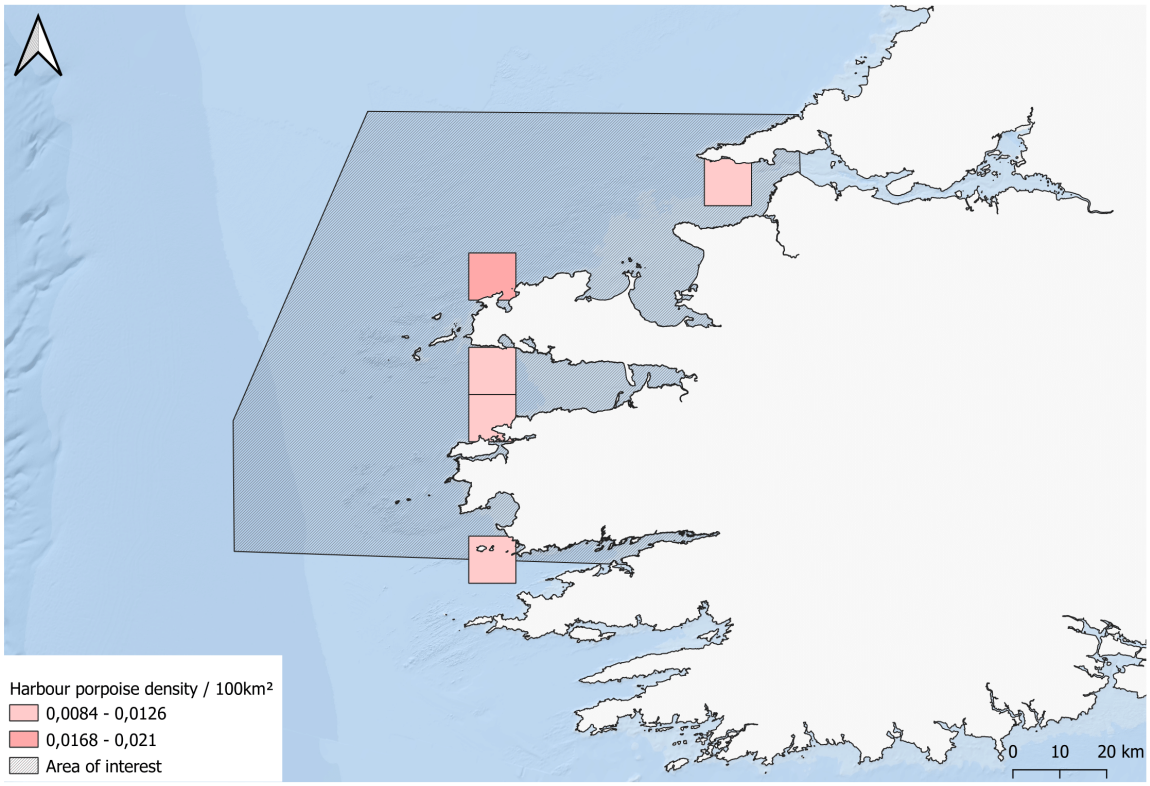

Figure 13: Densities per 100 km² of harbour porpoise recorded from Celtic Mist during the 2023 season.

Volunteers and Crew

None of the data collection would be possible without the volunteers and crew who dedicate their time in all aspects of the trips, as well as the huge effort it takes to maintain the vessel. This year we had 66 volunteers come onboard the research surveys, including 16 skippers and first mates. Thanks to everyone who joined us onboard in 2023!

A special thank you also goes to Hélène Quévreux who joined us this year as *Celtic Mist's* biologist and who managed the data collection onboard.



We also had five Fair Seas personnel join us onboard who assisted with data collection. Dr Donal Griffin, Fair Seas Coordinator summarised the spirit of *Celtic Mist* after he came onboard with us this year:

"What stood out to me over the course of the week was not only the upbeat, positive, and cheerful attitude we all seemed to share, but how many times the word 'volunteer' cropped up in our conversations. The levels of volunteerism among the crew were through the roof."

Conclusion

The report outlines the initial scientific outputs from the first year of the new cetacean research programme launched onboard *Celtic Mist* with the support of the Fair Seas Campaign. The season was a success with *Celtic Mist* travelling >3200 km along our west/southwest coastline. Line transect methodology was used to map the densities of key species outlined in the *Revitalising Our Seas* report. This methodology allowed us to collect effort corrected data, giving us a better understanding of cetacean distribution in our waters. Some of the key initial findings from the 2023 season include:

- Species richness mirrored the *Revitalising Our Seas* report, with the highest levels of biodiversity observed within the Southwest Coast AOI.
- Harbour porpoise sightings were low throughout the survey area despite both AOI surveyed including an existing SAC with harbour porpoise as a qualifying feature. Whilst further analysis is required to incorporate effort, this finding is part of a wider picture occurring in Irish waters, with declining

numbers of harbour porpoise in inshore waters observed during other surveys within three separate SACs: Roaringwater Bay (O'Brien and Berrow 2020), Rockabill to Dalkey Island (Berrow et al. 2021) and the Blasket Islands (O'Brien et al. 2022).

- Numbers of large baleen whales were low in both AOI with only eight sightings of fin whales within the Loop Head to Kenmare AOI and no sightings of humpback whales recorded in the whole survey area. This year the IWDG's Cetacean Sighting Scheme identified a northward shift in humpback whales, with most sightings reported in Co. Sligo and Co. Mayo. However, most of these sightings are classified as 'casual'. Effort corrected data from the surveys onboard Celtic Mist helps to confirm this change in distribution. It also highlights how different data collection methodologies can and should be used in combination with one another.
- New data collection methodologies to map anthropogenic threats were trialled throughout the season. Marine litter and pots numbers were recorded and amendments to the data collection were made when necessary to improve protocols. Monitoring within candidate MPAs should include human impacts and these methods will continue onboard Celtic Mist in future seasons.

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