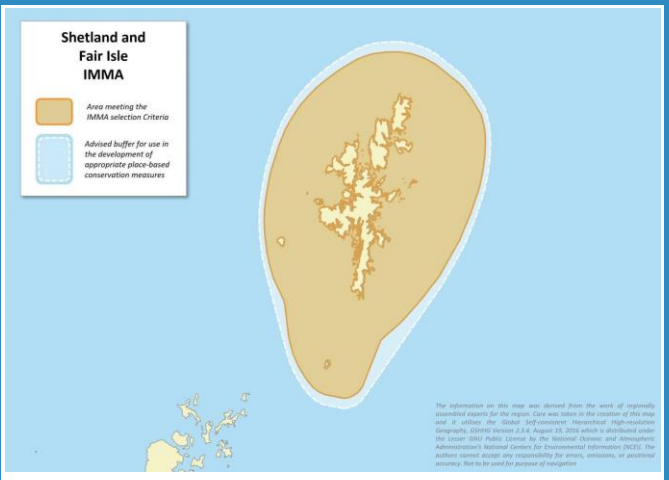

Area Size

14 208 km²

Qualifying Species and Criteria

Harbour seal – *Phoca vitulina*

Criterion B (2); C (1, 2)

Harbour porpoise – *Phocoena phocoena*

Criterion B (2); C (1, 2)

Grey Seal – *Halichoerus grypus*

Criterion C (1)

Killer whale – *Orcinus orca*

Criterion C (1,2)

Minke whale – *Balaenoptera acutorostrata*

Criterion C (2)

Humpback whale – *Megaptera novaeangliae*

Criterion C (2, 3)

Marine Mammal Diversity

Criterion D (2)

Balaenoptera acutorostrata, Grampus griseus, Halichoerus grypus, Lagenorhynchus acutus, Lagenorhynchus albirostris, Megaptera novaeangliae, Orcinus orca, Phoca vitulina, Phocoena phocoena

Shetland and Fair Isle IMMA

Summary

The IMMA of Shetland and Fair Isle comprises an archipelago of >100 islands situated 75 km from the continental shelf edge. Its northerly position, exposure to Atlantic currents and varied habitats support a diverse range of marine mammals. Cetacean species such as killer whales (*Orcinus orca*), Risso's dolphins (*Grampus griseus*) and harbour porpoises (*Phocoena phocoena*) are found here. Some pods of killer whales are considered semi-resident, Risso's dolphins have shown site fidelity to particular areas and harbour porpoises are present year-round and form large aggregations of up to 200 individuals in the autumn and winter. Other cetaceans occur seasonally including common minke whales (*Balaenoptera acutorostrata*), which aggregate in the late summer/autumn, and humpback whales *(Megaptera novaeangliae),* which use Shetland to rest and feed during migration. This area is also an important pupping and haul-out area for seals, particularly harbour seals (*Phoca vitulina*), which, around Shetland, are an important part of the inshore killer whale diet. The continental shelf and nearshore deep-water areas are important for large baleen whales, deep diving species and occasional large pods of pelagic dolphins, such as Atlantic white-sided dolphin (*Lagenorhynchus acutus*).

Description:

The Shetland Isles comprise an archipelago of >100 islands and are bounded to the north-west by the Shetland-Faroe Channel beyond the edge of the continental shelf, with depths reaching 400 m. The bathymetry of the region is complex, with deep

waters occurring unusually close to shore and coastal cliffs around many islands continuing below sea level for 50–80 m. In addition, several major basins, exceeding 150 m deep, are present <20 km offshore – most notably in St Magnus Bay, the Fetlar Deep and East Unst Trough. Large deeps also occur west of Foula (see Scottish Government National Marine Plan interactive (NMPi)). Muddy sands and sandy muds occur in the more sheltered bays and coves around the islands. Close to the islands, carbonate or shell-rich gravels occur, as well as rocky reefs, reflecting the rich nearshore marine fauna. Further offshore, sands predominate with large areas of mixed sediments. Intensified tidal currents exist between the various islands and at headlands, where topography constrains the flow and differences in tidal timings to the east and west of Shetland cause high flow rates than might be expected in an area of limited tidal range. The warm North Atlantic drift passes north of Shetland from which two arms bend around both ends of the island archipelago southwards into the North Sea. Several marine protected areas (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) have been established in the region although none for Annex II Habitats Directive cetacean species. These have been incorporated into UK law under the Conservation of Species and Habitats Regulations (2017).

Figure 1: Sumburgh Head, South Shetland. Photo credit: PGH Evans

Figure 2: Fair Isle from aerial view. Photo credit: PGH Evans

Criterion B: Distribution and Abundance Sub-criterion B2: Aggregations

The area provides important habitat for harbour porpoises (*Phocoena phocoena*), occurring year-round within the IMMA (Waggitt et al., 2020). Seasonal aggregations have been recorded for the species including estimated aggregations of 50-100 individuals within sheltered bays in Shetland (Shetland Cetacean Group / SBRC / UHI Shetland, unpublished data), and loose groups numbering 100 to 200 individuals have been recorded on occasions during a four-year porpoise study (1992-95) (Evans, 1997a; Sea Watch sightings database). Density distribution maps have been produced for several cetacean species including the harbour porpoise (Waggitt et al., 2020; Evans et al., 2021). These incorporate environmental variables into the density models and indicate the importance of the shelf seas around the Northern Isles (Shetland and Orkney) with above average densities of harbour porpoises. Modelling temporal changes between the 1980s and 2010s from surveys shows that densities of porpoises in summer months were higher in the region in earlier decades (1980s-90s), as reflected also in the abundance estimates from SCANS surveys between 1994 and 2016 (Hammond et al., 2002, 2013, 2017).

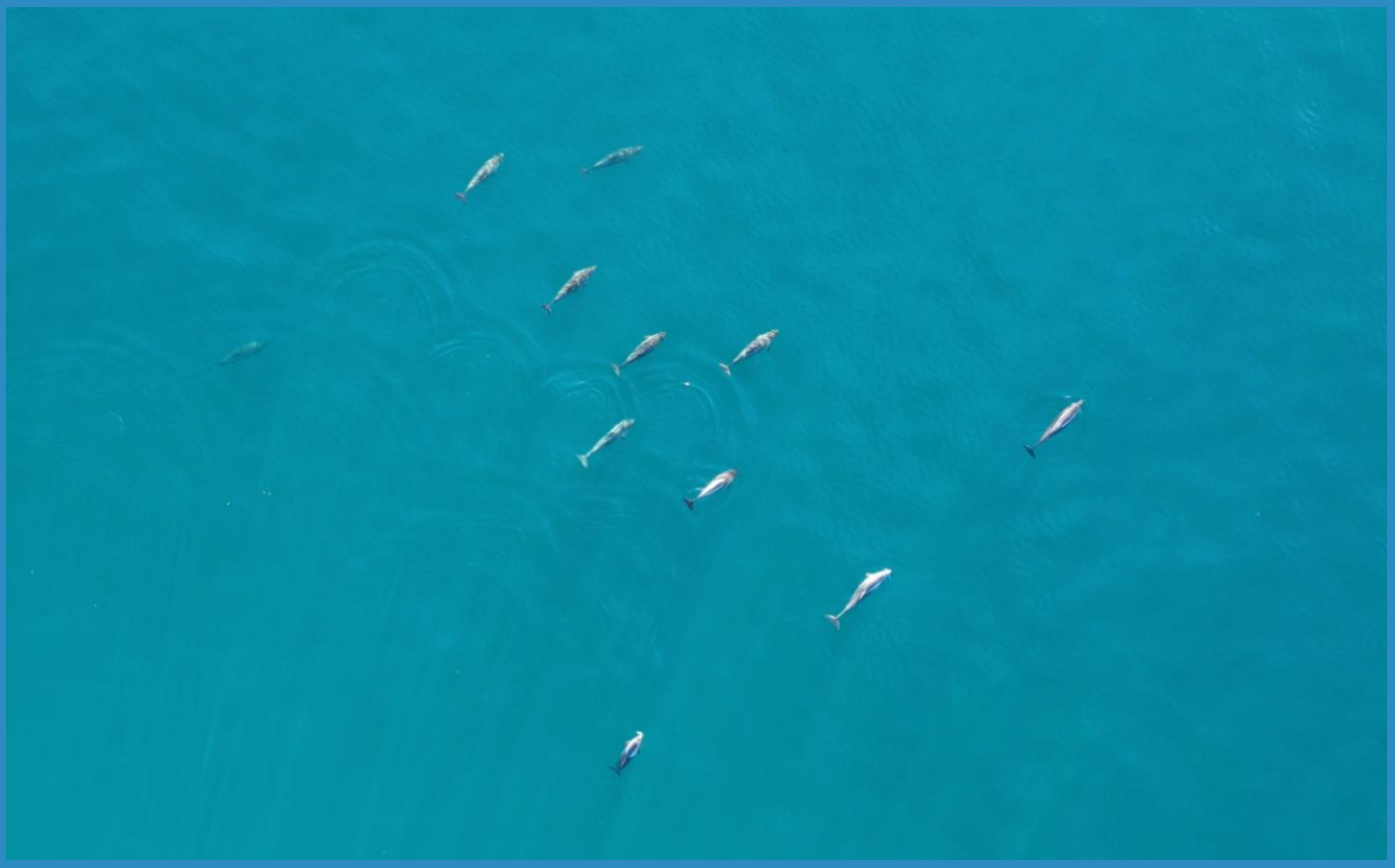

Figure 3: Aggregation of harbour porpoises (*Phocoena phocoena*) from aerial view. Photo credit: Sophie Smith - UHI Shetland

Figure 4: Harbour porpoises (*Phocoena phocoena*) surfacing in this IMMA. Photo credit: Hugh Harrop / Shetland Wildlife

Figure 5: Grey seals (*Halichoerus grypus*) on small skerries in this IMMA. Photo credit: PGH Evans

Although depleted by around 40% compared to the early 2000s, there is still a relatively high abundance of harbour seals (*Phoca vitulina*) at haul out sites in Shetland. The population is estimated to be almost 4,500 individuals (Special Committee on Seals (SCOS) 2022) which accounts for around 10% of the UK harbour seal population. There are two Special Areas of Conservation (SACs) designated for harbour seal, one Site of Special Scientific Interest (SSSI) for grey seal and 47 designated seal haulouts.

Criterion C: Key Life Cycle Activities
Sub-criterion C1: Reproductive Areas

Harbour porpoises are known to utilise this area for mating, as observed directly during studies on the species in 1990-94 (Evans, 1997b), and shown by recent drone footage and visual observations collected by UHI Shetland and community members as part of a dedicated porpoise study. Small calves of harbour porpoises are regularly recorded in summer throughout the region (Evans, 1996, 1997b; WDC, unpublished data; Shetland Cetacean Group, unpublished data) and the Scottish Marine Animal Strandings Scheme has several reports of porpoise neonates.

Mating activity by killer whales (*Orcinus orca*) has also been observed in the area (Walker & Harrop, 2003), whilst small calves are documented within a few weeks of being born and can be tracked for years as they remain with the mothers (see Scottish Killer Whale Photo ID catalogue). Studies undertaken as part of the Ecological Consequences of Orca Predation on Seals project (ECOPredS) have documented mating attempts, calf nursing and provided insight into family lineages. The animals seen in Shetland waters are split into three groups

based on photo-ID evidence: offshore animals that associate with the herring and mackerel fisheries; 'transient' or Icelandic animals that have been recorded travelling between Scotland and Iceland; and others that, as "semi- residents," – spend the bulk of their time in Scottish waters (Bolt et al., 2009; Deecke et al., 2011; Luque et al., 2006; Samarra & Foote, 2015). Three main pods are deemed to be semi-resident and are present in the area year-round.

The resident harbour seal population breeds on the islands, although there are no recent pupping counts (SCOS, 2022). Two Special Areas of Conservation (SAC) are designated for harbour seal – Mousa SAC and Yell Sound Coast SAC. Small numbers of grey seals (*Halichoerus grypus*) also breed in Shetland and are surveyed every year, weather permitting. However, there has been no recent estimate of overall pup production for Shetland due to the difficulties in obtaining repeat counts at remote colonies (SCOS, 2022). A Site of Special Scientific Interest (SSSI) is designated in North Fetlar and a number of breeding haulouts are designated under the Marine Scotland Act 2010.

Sub-criterion C2: Feeding Areas

The combination of coastal and deep-sea features in such close proximity around Shetland provides important habitat for a diverse range of marine mammal prey species including sandeels (family Ammodytidae e.g. Mousa to Boddam MPA for sandeel grounds) and also commercial fish species such as herring (*Clupea harengus*) and mackerel (*Scomber scombrus*). Fish sonar surveys undertaken between 1992 and 1995 in south-east Shetland revealed significant associations between harbour porpoises and sandeels, in areas where several sandeel spawning grounds are located (Evans & Borges, 1995; Borges & Evans, 1997). Although sandeels have declined in abundance in the region since the early 1990s (Poloczanska et al., 2004; Lynam et al., 2013), the area remains important for porpoises, possibly related to a recovery in herring stocks in the region (Heessen et al., 2013; Evans & Waggitt, 2020a; Napier, 2022).

Minke whales (*Balaenoptera acutorostrata*) have been observed lunge feeding on shoals of fish in east Shetland such as Out Skerries, Whalsay, Mousa Sound and off Sumburgh Head (Evans, 1997a, b; Sea Watch, unpublished data; Shetland Cetacean Group, unpublished data), and stomach content analysis of minke whales shows that the predominant prey in the region are sandeels, herring and sprat (*Clupea sprattus*) (Olsen & Holst., 2001; Pierce et al., 2004).

Similarly, sightings of humpback whales *(Megaptera novaeangliae)* in Shetland have often included observations of feeding behaviour with minkes also feeding actively in the vicinity (Evans & Baines, 2010; Sea Watch Foundation sightings database). From shore-based watches, there are notable peaks in sightings and animal densities in late summer and autumn (Evans, 1997a, b; Sea Watch Foundation, unpublished data; WDC unpublished data; Shetland Cetacean Group unpublished data). Minke whales and humpback whales also show peak sightings that align with increases in sandeels and movements of sprats, herring and mackerel inshore.

The marine mammal species which come to feed on these prey, notably seals and harbour porpoises, in turn become prey to killer whales (Bolt et al., 2009). Studies undertaken as part of the Ecological Consequences of Orca Predation on Seals project (ECOPredS) have documented from 2019 to present predation events through visual observations from land and drone footage. Observations have shown that the inshore groups of killer whale (both the semi-resident pods and the pods that travel to Iceland) regularly target both seal species and porpoises and

Figure 6: Common minke whale (*Balaenoptera acutorostrata*) in Shetland. Photo credit: PGH Evans

Figure 7: Humpback whale *(Megaptera novaeangliae)* fluke. Photo credit: Hugh Harrop / Shetland Wildlife

Figure 8: Killer whales (*Orcinus orca*). Photo credit: Hugh Harrop / Shetland Wildlife

that this occurs year-round. In addition, the offshore group of killer whales have been observed offshore north and east of Shetland taking mackerel and herring from trawlers where numbers recorded closely associating with vessels are in the tens to low hundreds (Luque et al., 2006). The winter (October-March) pelagic trawl fishery for mackerel was identified as showing the strongest associations; During 33 hauls over 13 trips in January to February 2006, a total of 513 killer whales were observed, mainly north and east of Shetland (Luque et al., 2006). The authors concluded that during the mackerel fishing season, the whales were obtaining a significant proportion of their daily energy requirements from this source.

Sub-criterion C3: Migration Routes

The IMMA is an important habitat for migrating humpback whales, particularly in spring and autumn. Photo-ID research has recorded individuals present in Shetland which have also been photographed in Guadeloupe, the Azores, Cape Verde, Ireland and Norway, including the UK 's first match to both breeding and feeding grounds (Guadeloupe and Skerjvoy, Norway) (Jones et al., 2017; Scottish Humpback Photo ID catalogue). There have also been repeat matches between years of the same individuals returning to Shetland during their migration. Approximately 50% of the individual animals in the Scottish Humpback Photo ID catalogue (currently numbering 116 individuals) have been sighted in Shetland waters. Although, humpbacks can be sighted throughout the year, there are clear peaks particularly in the autumn which correspond with their migration to feeding areas; Shetland Cetacean Group, unpublished data)

A WWF report Protecting Blue Corridors highlighted that Shetland is within the migratory corridor for humpback whales (see Johnson et al., 2022). This report used satellite tagging data from a variety of sources including Whaletrack. UiT – The Arctic University of Norway, which has had tagged whales transiting close to Shetland along with a wealth of other scientific studies to identify migratory routes that require protection.

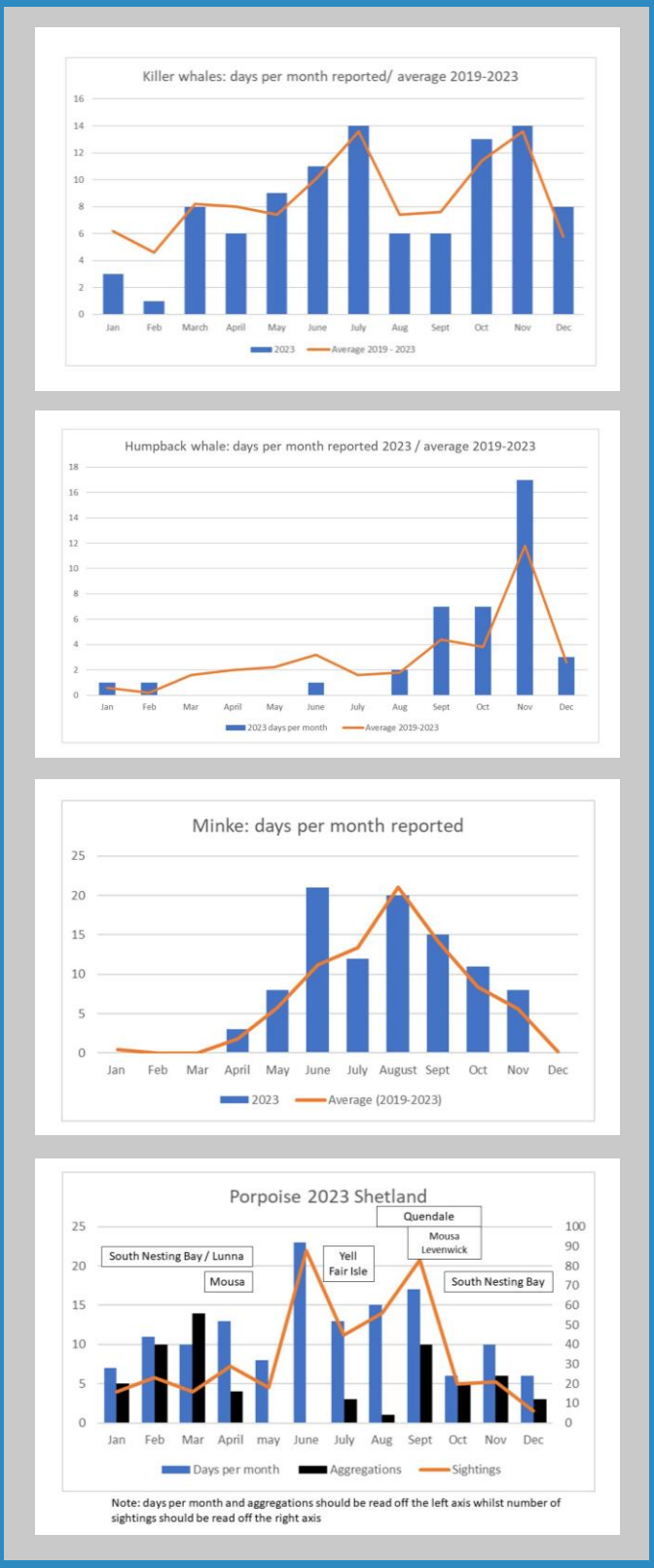

Figure 9: Sightings data of killer whales, humpback whales, minke whales and harbour porpoise of Shetland and Fair Isle IMMA from 2019-2023. Compiled by Karen Hall using Shetland Cetacean Group sightings data.

Criterion D: Special Attributes
Sub-criterion D2: Diversity

Seventeen species of cetacean and seven species of pinniped have been recorded in these waters, of which at least nine species of cetaceans and two species of seals occur regularly in the area, making it one of the most species-diverse areas in the British Isles (Evans, 1997a; Evans & Waggitt, 2020b). Shetland's proximity to the continental shelf edge and deep bottom topography support multiple species with varied habitat preferences. Habitats range from the continental slope down to 500 m depth, the shelf edge, shelf seas, islands and skerries and shallow coastal waters including fjords (locally referred to as voes). Regular species here include harbour porpoises, minke whales, humpback whales, killer whales, Risso's dolphins (*Grampus griseus*), white-beaked dolphins (*Lagenorhynchus albirostris*), Atlantic white-sided dolphins (*Lagenorhynchus acutus*), harbour seals and grey seals (Evans & Waggitt, 2020a, b; SCOS, 2022).

Shetland and Orkney are the most important areas in the UK for killer whales (Evans & Waggitt, 2020b), listed as Data Deficient by the IUCN Red List of Threatened Species (Reeves et al., 2017). Photo-ID data around Scottish waters have been compiled into a Scottish Killer Whale Photo ID Catalogue (Scullion et al., 2021), which contained around 220 individuals as of 2021. With the exception of the small 'West coast community' that occurs outside the boundaries of this IMMA, the majority of photo-identified individuals have been recorded in Shetland waters. The animals seen around Shetland are split into three groups based on photo-ID evidence: offshore animals that associate with the herring and mackerel fisheries, 'transient' or Icelandic animals that have been recorded travelling between Scotland and Iceland; and others that, as "semi- residents," – spend the bulk of their time in Scottish waters (Bolt et al.,

2009; Deecke et al., 2011; Luque et al., 2006; Samarra and Foote, 2015). Three main pods are deemed to be semi-resident and are present year-round in the waters around Shetland & Orkney.

Other species that are sighted occasionally on the shelf-slopes and deeper water at the edge of the IMMA include fin whales (*Balaenoptera physalus*), sei whales (*Balaenoptera borealis*), long-finned pilot whales (*Globicephala melas*), sperm whales (*Physeter macrocephalus*), and common dolphins (*Delphinus delphis*) (Evans & Waggitt, 2020b). Shetland also accounts for the majority of records in the UK of vagrant arctic seals (bearded seal, ringed seal, hooded seal, harp seal, and walrus) (Hall, 2008; Crawley et al., 2020). The shelf slope is important habitat for migrating great whales, and a century ago, supported a major whaling industry (Thompson, 1928; Brown, 1976; Ryan et al., 2022), taking, particularly, fin whales in the Shetland-Faroe Channel.

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