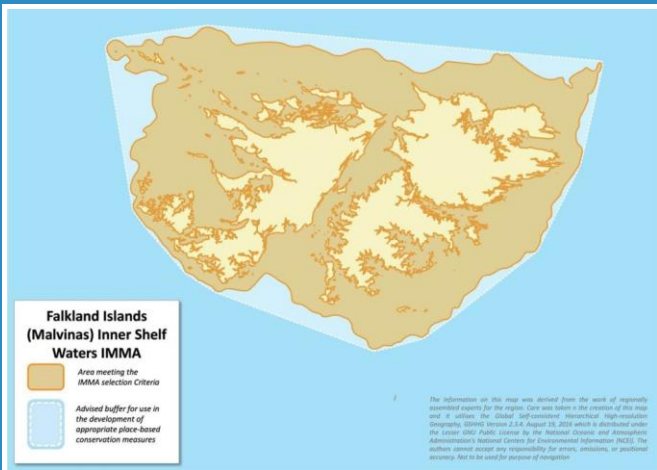


Falkland Islands (Malvinas) Inner Shelf Waters IMMA

Summary:

This IMMA encompasses inner shelf waters from the coast to 100 m water depth around the Falkland Islands (Malvinas)*. It supports a globally-significant and annually-persistent seasonal feeding aggregation of Endangered sei whales (*Balaenoptera borealis schlegelii*), and provides important year-round habitat used for calving and feeding by Peale's dolphins (*Lagenorhynchus australis*) and Commerson's dolphins (*Cephalorhynchus commersonii*). The coastline provides breeding habitat for a globally-significant South American fur seal (*Arctocephalus australis*) population, and for the post-sealing recoveries of local breeding populations of southern elephant seal (*Mirounga leonina*) and South American sea lion (*Otaria byronia*). It also hosts an important moulting and resting aggregation of southern elephant seals from breeding populations of the South Georgia Stock. The IMMA is occupied by a high diversity of marine mammals, with other regular species including southern right whale (*Eubalaena australis*), humpback whale (*Megaptera novaeangliae*), minke whales (*Balaenoptera acutorostrata* & *B. bonaerensis*) and the killer whale (*Orcinus orca*).

*Since 1965 the nomenclature used by the United Nations for statistical processing is Falkland Islands (Malvinas), which acknowledges the dispute that exists concerning the sovereignty of the Islands.



Area Size

23 643 km²

Qualifying Species and Criteria

Sei whale – *Balaenoptera borealis*

Criterion A; C (2)

Southern elephant seal – *Mirounga leonina*

Criterion B (2); C (1)

Peale's dolphin – *Lagenorhynchus australis*

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

Commerson's dolphin –

Cephalorhynchus commersonii

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

South American fur seal – *Arctocephalus australis*

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

South American sea lion – *Otaria byronia*

Criterion C (1, 2)

Marine Mammal Diversity

Criterion D (2)

Balaenoptera borealis, *Mirounga leonina*,
Lagenorhynchus australis, *Cephalorhynchus commersonii*, *Arctocephalus australis*,
Otaria byronia, *Eubalaena australis*,
Orcinus orca, *Megaptera novaeangliae*,
Balaenoptera acutorostrata,
Balaenoptera bonaerensis

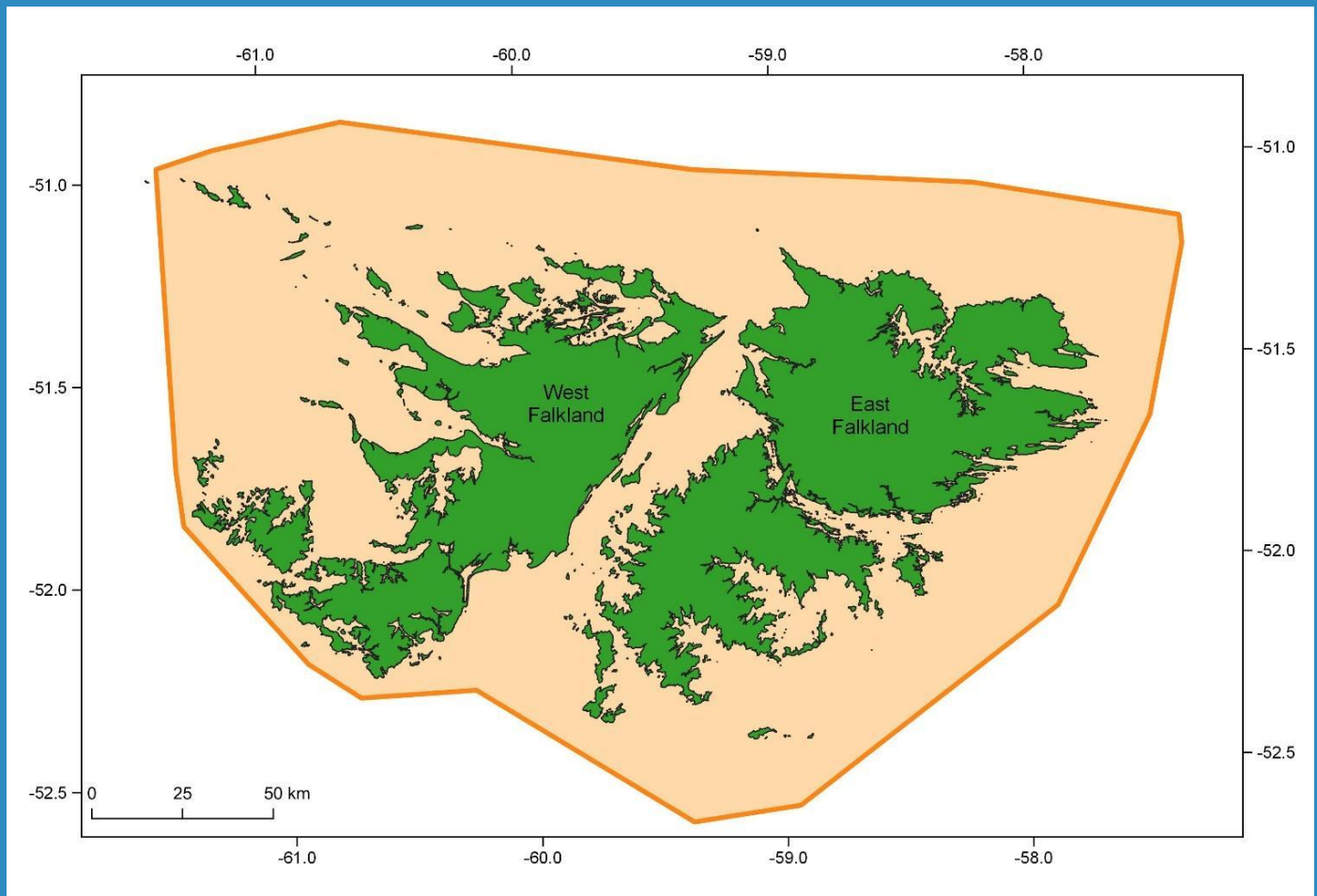


Figure 1: The extent of the Falkland Islands Inner Shelf Waters KBA recognised for sei whales by the IUCN in April 2021. Excerpt from Weir (2021).

Description:

This IMMA extends from the shoreline to the 100 m depth isobath around the coast of the Falkland Islands (Malvinas) (hereafter referred to as the 'Islands'), a subantarctic archipelago located at the eastern end of the Patagonian Shelf. It comprises marine neritic habitat located over the shallowest portion of the continental shelf, including bays, inlets and marine channels between land masses. The offshore boundaries of the site are located <45 km from land. Inshore sea surface temperatures range from 2°C in winter to 14°C in summer (Otley et al., 2008).

The Islands are situated in the path of a northbound cold-water current originating from the Antarctic Circumpolar Current (Peterson & Whitworth, 1989).

When the current meets the continental slope to the south of the Islands, it splits and runs along the east and west coasts, creating upwelling and high marine productivity. Prevailing westerly winds and tidal processes also circulate nutrients and further enhance productivity. The site supports feeding and spawning areas for a variety of squid and fish species (Arkhipkin et al., 2013). High densities of swarming crustaceans, including euphausiids, amphipods and squat lobster (*Munida gregaria*), form the basis of the marine food-web and support higher-level predators including seabirds, pinnipeds and baleen whales. The site has been recognised by the IUCN as a Key Biodiversity Area (KBA) for endangered sei whales (*Balaenoptera borealis*) since April 2021 (<https://www.keybiodiversityareas.org/site/factsheet/49174>), and represents an exceptional sei whale feeding habitat in a global context (Weir, 2021).

The coastline around the Islands predominantly consists of low cliffs interspersed with stone and sand beaches and rocky outcrops. In pristine areas, the beaches are bordered by tussock grass. The human population within the Islands is low and much of the coastline is remote and offers sheltered and undisturbed haul-out areas for pinnipeds including southern elephant seals (*Mirounga leonina*), South American fur seals (*Arctocephalus australis*) and South American sea lions (*Otaria byronia*). Large kelp forests occur around the coastline, further enhancing marine biodiversity and providing protected coastal areas used by pinnipeds and regionally-important populations of two dolphin species (Peale's dolphin *Lagenorhynchus australis* and Commerson's dolphin *Cephalorhynchus commersonii*) as rest, nursery and foraging areas.

Criterion A: Species or Population Vulnerability

The sei whale is listed as a globally endangered (EN) species by the IUCN. The waters around the Islands comprise a globally-significant feeding habitat (see Criterion B2 and C2 below), important for the southern sei whale's (*B. borealis schlegelii*) survival and recovery. The IMMA has already been fully recognised as a Key Biodiversity Area (KBA) (<https://www.keybiodiversityareas.org/site/factsheet/49174>) for the species using KBA Criterion A (see Weir, 2021 for a full rationale).

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

The IMMA supports a globally-significant seasonal aggregation of sei whales, including mother-calf pairs, juveniles, and adults of both sexes (Weir, 2021, 2022a). Robust abundance estimates yielded design- and model-based estimates of 700–900 animals along the west coast of the Islands (Weir et al., 2021).

The resulting density was at least two orders of magnitude higher than any recorded during large-scale abundance surveys for this species carried out worldwide (Weir et al., 2021). Habitat modelling and high numbers of incidental sightings in other areas support a likely occurrence of these densities all around the Islands (Baines & Weir, 2020; Weir, 2021). Movements of animals around the Islands have been evidenced by photo-identification and confirm linkage across the archipelago, supporting a single feeding aggregation (Weir, 2022b).

The entire IMMA coastline is a hotspot for the haul out of both sexes and all ages of southern elephant seals during the moult phase (November to April) of their yearly cycle. These haul out sites are also used for the resting phase of juveniles during the winter months. The moulting seals originate from breeding populations of the South Georgia Stock, including at least the Valdes Peninsula, South Georgia, and the South Shetland Islands (King George Island, Livingstone Island and Elephant Island: ESRG, unpublished tagging and re-sighting data). Tagging work has shown that many of the seals visiting the Islands to moult exhibit site fidelity across years, and the IMMA coastlines therefore comprise an important moulting destination for the South Georgia Stock. A full census of the moulting aggregations in the Islands is not yet available, and would be challenging to achieve because different age-sex classes moult at different times of year. However, regular counts at Sea Lion Island and opportunistic counts at other moulters is large, and much higher than the number of breeding seals observed at the same sites. Moreover, detailed daily counts at Sea Lion Island over various seasons to incorporate the timing of different sex and age classes during the moult, indicate that the total number of moulters over a season is approximately four times higher than single counts made during the peak haul out. Altogether, the available information suggests that a very large

number (in the order of tens of thousands) of southern elephant seals from the South Georgia Stock use the Islands during their moult, which is a crucial phase of their yearly cycle.

The total global population size of South American fur seals is around 219,000 animals (Cárdenas-Alayza et al., 2016), and the Islands host 50% of that population (Bayliss et al., 2021). The IMMA is therefore a globally-important aggregation site for that species, and is used for reproduction, foraging, moulting and resting behaviours.

The inner shelf waters around the Islands are occupied year-round by important proportions of the global populations of Peale's dolphin and Commerson's dolphin. The distribution of Peale's dolphins around the Islands extends continuously from the coast to the 200 m depth isobath (White et al., 2002). Habitat modelling predicts high occurrence of the species along many of the exposed coastlines (Baines & Weir, 2020) and in more pelagic areas adjacent to the 100 m depth isobath (Franchini et al., 2020). Combined abundance estimates for Peale's dolphins in the Atlantic part of their range are of ~21,800 animals (Heinrich & Dellabianca, 2019), of which an estimated 1,896 animals (CV = 0.33) occurred in coastal waters around the Islands (Costa & Cazzola, 2018). The proposed site therefore includes a significant proportion (8.7%) of the known Atlantic population of the species, which only occurs around the southern region of South America. Many of the same individuals have been photographed in coastal study areas over multiple years (Costa & Cazzola, 2018; Falklands Conservation, unpublished data), indicating long-term residency.

Densities of Commerson's dolphins around the Islands are highest in coastal and shallow shelf waters (White et al., 2002). Habitat modelling also supports the importance of inshore habitat for the

species (Baines & Weir, 2020; Franchini et al., 2020). Despite their discrete distribution, genetic analysis does not support the existence of a distinct subspecies around the Islands but rather indicates some migration between the Islands and South America (Kraft et al., 2021). Surveys of Argentinean waters (which comprise the majority of the global species range) from the coast to the 100 m isobath, estimated the abundance of Commerson's dolphin as ~40,000 animals (Pedraza, 2008) and 21,933 animals (Dellabianca et al., 2016) respectively; those estimates resulted from different methods and surveyed areas, but are in the same order of magnitude (Crespo et al., 2018). In that context, the 5,789 animals (CV=0.18; Costa & Cazzola, 2018) animals recorded in coastal waters around the Islands represents a meaningful proportion of the known Atlantic population. Many of the same individuals have been photographed over multiple months and years supporting their seasonal and long-term residency in the region (Costa & Cazzola, 2018; Weir, 2018; Falklands Conservation, unpublished data).

Criterion C: Key Life Cycle Activities

Sub-Criterion C1: Reproductive Areas

South American fur seals breed on islands and rocky outcrops around the coastline of the Islands, forming dense colonies at some localities. Following heavy exploitation by 19th Century sealers, the Islands now host the world's largest breeding population of the species, with an estimated pup abundance in 2018 of ~36,500 animals (Baylis et al., 2019a) and in 2021 of ~44,000 animals (Baylis et al., 2021). The Jasons in the north-west of the Islands are particularly important, accounting for 97% of total pup production in the Islands (Baylis et al., 2019a, 2021). Pups are born in the austral summer and are dependent on their mothers for approximately 11 months. Adult females also mate in the area shortly after giving birth. The Islands therefore represent an important reproductive habitat

used by a large proportion of the species for mating, pupping and a prolonged nursing period.

The coast of the IMMA is used for reproduction by southern elephant seals, with the two main current breeding colonies comprising Sea Lion Island with 730 breeding females in 2022 and Carcass Island with 173 breeding females in 2016 (Galimberti & Boitani, 1999; ESRG, unpublished data), and small scattered pockets of breeding seals elsewhere. These colonies comprise only a small proportion of the regional population, where the two major breeding areas are located at South Georgia (113,000 breeding females: Boyd et al., 1996) and at the Valdés Peninsula in Argentina (14,000 breeding females: Lewis et al., 2004). However, they are a remnant of previously-large breeding populations in the Islands that were decimated by intensive and indiscriminate sealing in the 1800s (Strange, 1972), and their slow recovery is therefore considered an important contribution to local biodiversity and to maintaining a demographic and genetic link between the South Georgia and Valdés Peninsula breeding areas (Fabiana et al., 2003).

A total of 5,375 (preliminary figure) southern sea lion pups were counted at 72 breeding sites around the coast of the Islands during the 2021 census (Baylis et al., 2021). This species experienced an order-of-magnitude decline in the Islands between the 1930s and 1960s due to commercial sealing and environmental factors, and the 5,375 pups counted in 2021 represent ~7% of the 1930s estimate of 80,555 pups (Baylis et al., 2015). The IMMA comprises an important regional reproductive area that is supporting recovery of the population within the Islands.

Inshore waters around the Islands are used year-round by significant populations of Peale's dolphins and Commerson's dolphins (see Criterion B1). The

IMMA comprises core habitat used by both species for mating, calving and nursing (Costa & Cazzola, 2018; Weir, 2018; Falklands Conservation, unpublished data), with young calves being observed particularly between December and March over the austral summer and autumn.

Sub-Criterion C2: Feeding Areas

The IMMA comprises an important Southern Hemisphere feeding area for sei whales, and is one of few neritic feeding grounds documented for the species globally. Research since 2017 has shown that feeding aggregations of the species use the area between (at least) November and June each year (Weir, 2022a). Faecal sampling, suction cup tagging and observations of surface feeding, indicate that sei whales in the Islands predate crustaceans including squat lobster krill and amphipods including *Themisto gaudichaudii* (Weir et al., 2019; Jackson et al., 2022; Segre et al., 2022; Weir, 2022a). The seasonal foraging aggregations are persistent across years, and photo-identification has evidenced the same animals returning in different years, confirming long-term site fidelity to this feeding ground (Weir, 2022b).

The Islands are used year-round by resident populations of Peale's dolphins and Commerson's dolphins. Feeding has been difficult to observe in these species, although Commerson's dolphins have occasionally been seen preying on schools of small (unidentified) fish in shallow areas (Falklands Conservation, unpublished data). However, it is reasonable to presume that both species feed within the IMMA given the high site fidelity of individual animals over both the short (days) and long (years) term. Killer whales also feed throughout the region, on prey known to include pinnipeds and cetaceans including sei whales (Falklands Conservation, unpublished data).



Figure 2: Sei whales (*Balaenoptera borealis*) foraging in the IMMA. Photo credit: Caroline R. Weir / Falklands Conservation

Telemetry studies have shown that the inner shelf waters around the Islands comprise important foraging habitat for South American fur seals, particularly over the months where adult females are lactating (especially early in the season in summer and autumn) and remain closer to shore (Thompson et al., 2003). The majority of foraging dives occur in waters <100 m depth, although that varies between colonies (Thompson et al., 2003; Baylis et al., 2018). The IMMA also has high overlap with areas used for foraging by South American sea lions from haul outs located within the Islands, although those foraging areas continue into deeper waters beyond the proposed IMMA boundaries (Baylis et al., 2019b). While southern elephant seals do forage in the south-east region of the IMMA, the majority of their feeding occurs in deeper slope waters located south and south-west of the Islands (Augé et al., 2018; Baylis et al., 2019b) and that area is proposed as a separate IMMA.

Criterion D: Special Attributes

Sub-Criterion D2: Diversity

The shallow shelf waters of the IMMA provide important habitat for a high diversity of marine mammal species. Regionally-important populations of three species of pinniped (South American fur seal, southern elephant seal and South American sea lion) and two species of dolphin (Peale's dolphin and Commerson's dolphin) both breed and forage in the IMMA, as described under Criteria B and C.

The area is used as a neritic feeding ground by several species of baleen whale, particularly high densities of the endangered sei whale. Additionally, southern right whales (*Eubalaena australis*) use the area as a feeding ground during summer and autumn, and during their seasonal migrations (Weir & Stanworth, 2020). While no humpback whales (*Megaptera novaeangliae*) were recorded during

targeted boat-based whale surveys within the site in 2017 to 2020, an influx of this species occurred during 2021 (Weir, 2022a) and involved individuals actively lunge-feeding along the edges of giant kelp beds (*Macrocystis pyrifera*) and occurring as feeding aggregations in more open waters. While both right whales and humpback whales forage in the IMMA, robust information on their abundance and the importance of the site as a feeding ground for those species is not yet available. However, a strip of habitat located close to the north-east coast of the Islands is known to comprise an important winter reproductive area for southern right whales, and that area is proposed as a separate IMMA. The site is also used by minke whales (*Balaenoptera acutorostrata* / *B. bonaerensis*), potentially for both feeding (indicated by summer sightings close to kelp beds) and reproductive activity (calls have been recorded in winter during acoustic monitoring; Falklands Conservation, unpublished data).

Killer whales (*Orcinus orca*) also inhabit the IMMA, and the waters around Sea Lion Island (located off the south coast of the Islands) are used extensively by a small number of animals that prey on pinnipeds breeding on the island (<http://www.eleseal.org/>). Sea Lion Island is a discrete and important marine mammal habitat for which a separate IMMA is proposed, but the species is also known to range throughout the shelf shallow waters of this proposed site (e.g. Weir, 2018).

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