

Area Size

1,767,353 km²

Qualifying Species and Criteria

Southern elephant seals – *Mirounga leonina*

Criteria C1, C2

Antarctic fur seals – *Arctocephalus gazella*

Criteria C1, C2

Kerguelen Commerson's dolphin –
Cephalorhynchus commersonii kerguelenensis

Criteria A, B1

Marine Mammal Diversity

Arctocephalus gazella, *Arctocephalus tropicalis*,
Balaenoptera acutorostrata, *Balaenoptera bonaerensis*, *Balaenoptera musculus brevipinna*,
Cephalorhynchus commersonii kerguelenensis,
Eubalaena australis, *Globicephala melas edwardii*,
Hydrurga leptonyx, *Hyperoodon planifrons*,
Lagenorhynchus cruciger, *Megaptera novaeangliae*, *Mesoplodon layardii*, *Mirounga leonina*, *Orcinus orca*, *Phocoena dioptrica*,
Physeter macrocephalus, *Ziphius cavirostris*

Heard Island, Kerguelen and Surrounding Waters IMMA

Summary

The Heard and Kerguelen Islands are located in the middle of the Indian Ocean sector of the Southern Ocean. The islands themselves provide terrestrial breeding and moulting sites for Antarctic fur seals (*Arctocephalus gazella*), and southern elephant seals (*Mirounga leonina*). The IMMA encompasses the Kerguelen Plateau surrounding these islands, an area associated with high seasonal productivity. Satellite tracking studies indicate that both species feed in the waters over the plateau, as well as its shelf edge and a particularly rich offshore feeding ground to the east. These productive waters also serve as a foraging ground for pygmy blue whales (*Balaenoptera musculus brevipinna*), and host resident populations of killer whales (*Orcinus orca*) and a unique, endemic subspecies of Kerguelen Islands Commerson's dolphins (*Cephalorhynchus commersonii kerguelenensis*).

Description

The IMMA area includes three Australian/French subantarctic islands (Kerguelen, Heard and MacDonald) and surrounding waters, including bathymetric and oceanographic features of ecological importance for top predators around the islands (Koubbi et al., 2016). Kerguelen is surrounded by the Kerguelen-Heard Plateau, a major obstacle for the eastward flowing Antarctic circumpolar current, generating complex circulation in this area. While the subantarctic front lies along the northern flank of the plateau, the polar front flows just south of Kerguelen Island and meanders in the eastern area. The Fawn Trough, located south of Heard Island, acts as a bottleneck, channeling nearly all of the cold polar waters south of the polar front (i.e., the Antarctic Surface Water and the Circumpolar Deep Water). The plateau is a major source of iron, a limiting nutrient, fueling the most important spring bloom (in terms of amplitude and extent) in the Indian Ocean sector of the Southern Ocean (d'Ovidio et al., 2015).

The distribution of marine organisms, from phytoplankton to top predators such as marine mammals, is affected by the mesoscale activity occurring in the Antarctic Circumpolar Current, particularly downstream of the Kerguelen-Heard Plateau (Bailleul et al., 2010; Cotté et al., 2015; Della Penna et al., 2017; O'Toole et al., 2017).

The IMMA encompasses the core at-sea distributions of the pinniped populations (defined using satellite tracking and numerous devices recording their diving activity). At-sea distribution of marine mammals includes the Kerguelen Plateau and the area extending downstream of the plateau, which feature the subantarctic and polar fronts all of which are important foraging habitats for pinnipeds from Kerguelen and Heard Islands (Guinet et al., 2001; Lea et al., 2002; Bailleul et al., 2007; Bost et al., 2009).

Criterion B: Distribution and Abundance

Sub-criterion B1: Small and Resident Populations

A small population of Commerson's dolphin, separated from the main South American population, inhabits the coastal waters of the Kerguelen Islands (Crespo et al., 2017). Robineau et al. (2007) classify this population as a subspecies of *Cephalorhynchus commersonii* (*C. commersonii kerguelenensis*) based on several characteristics including geographic isolation, and morphological and genetic differences. The IMMA includes the entire known range of this subspecies. The species is currently red-listed as Least Concern while the subspecies is unassessed. The global species assessment from the IUCN Red List states "The Kerguelen subspecies is restricted in range and is therefore probably very small in number and relatively vulnerable to any anthropogenic threats" (Crespo et al., 2017).

Criterion C: Key Life Cycle Activities

Sub-criterion C1: Reproductive Areas

The islands themselves provide terrestrial breeding and moulting sites for Antarctic fur seals (*Arctocephalus gazella*), and southern elephant seals (*Mirounga leonina*). Some islands around Kerguelen have restricted access, such as Iles Leygues, Iles Nuageuses or Iles Clugny. Several zones on the main island are open to scientific investigations (the islands of Baie du Morbihan, some part of the Peninsula Rallier du Baty, etc.). Annual counts of pinnipeds are

conducted on the Courbet Peninsula by the scientists of the polar program (CNRS CEBC UMR7372, France), logistically supported by the French Polar Institute and the Natural Reserve.



Figure 1: An Antarctic fur seal pup nursing on Kerguelen Island.
Photo: Mary-Anne Lea

Criterion C: Key Life Cycle Activities

Sub-criterion C2: Feeding Areas

The at-sea movements of pinniped species have been studied using tracking devices of various types since the 1990s. Elephant seal and Antarctic fur seal data were collated by the Retrospective Analysis of Antarctic Tracking Data project (Ropert-Coudert et al., 2020), while at-sea sighting data were compiled in the Biogeographic Atlas of the Southern Ocean (Ropert-Coudert et al., 2014). Southern elephant seals exhibit two foraging strategies. Males mostly feed on the plateau, an important foraging ground for a community of top predators (Hindell et al., 2011), while females adopt a pelagic strategy (Bailleul et al., 2007). The latter are located in the "vicinity" of Kerguelen during their post-breeding trips (October – December) in an area corresponding to the spring bloom plume located on the Plateau and extending eastward. They perform longer trips during the extended post-moulting period (January- August), but still favour the region east of the Kerguelen Plateau where they use long-lived mesoscale eddies and cold water filaments that aggregate their fish prey (Cotte et al 2015; Della Penna et al., 2017). Juvenile male elephant seals are benthic foragers that feed on the Kerguelen Plateau and along the shelf edge (O'Toole et al., 2014). This

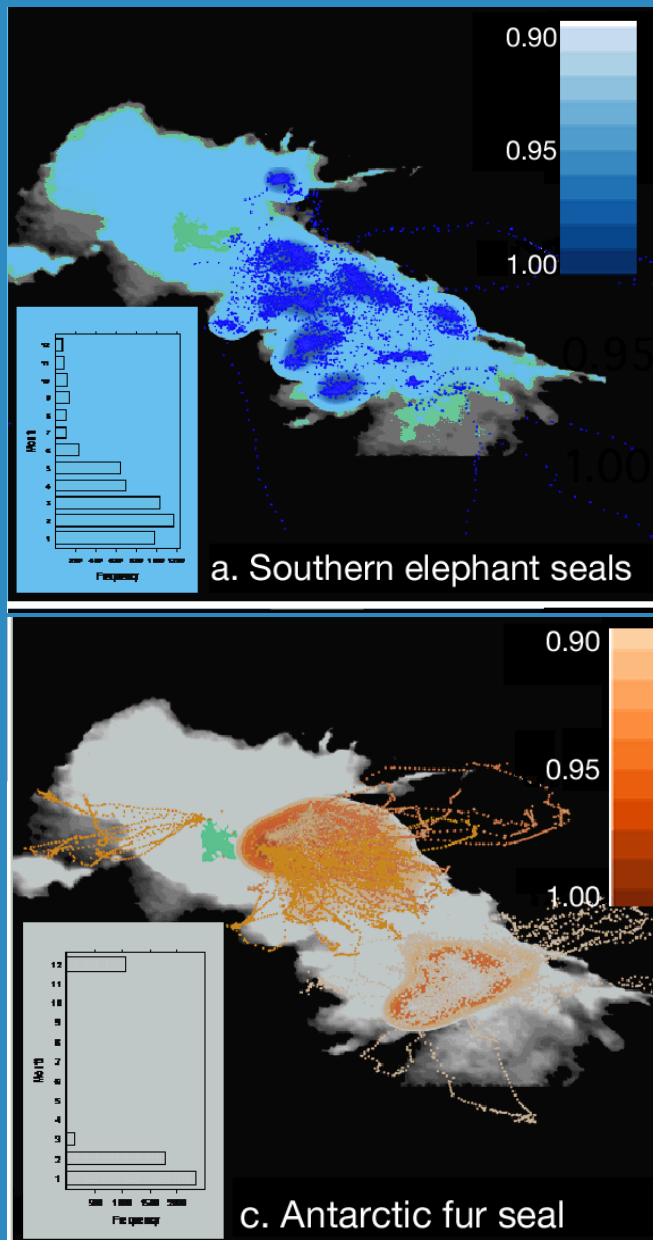


Figure 2: Kernel density estimates for southern elephant seals and Antarctic fur seals based on modelled telemetry locations. From: Hindell et al., 2011.

species is capable of diving up to 1500 m (McIntyre et al., 2010), but regularly dive between 300 – 500 m in benthic and pelagic environments (Guinet et al., 2014).

Antarctic fur seals perform relatively short trips during their breeding season (Nov.-Apr.). Animals from Kerguelen forage on the Kerguelen Plateau, as well as to the east of the Kerguelen Plateau along the shelf edge, while seals from Heard are distributed along the shelf edge, east of the Kerguelen Plateau or in the Fawn Trough (Fig. 2, Hindell et al., 2011). Adult female fur seals from Kerguelen and Heard Island perform most foraging dives around dawn and dusk (Lea et al 2002; Goldsworthy et al., 2010), diving up to 210 m to access their fish prey (Lea and Dubroca,

2003). The IMMA encompasses the plateau and the recirculation gyre east of the plateau, which covers an important part of the feeding activity of both seal species, and extends east to include the broader area where elephant seals forage during winter.

Supporting Information

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