

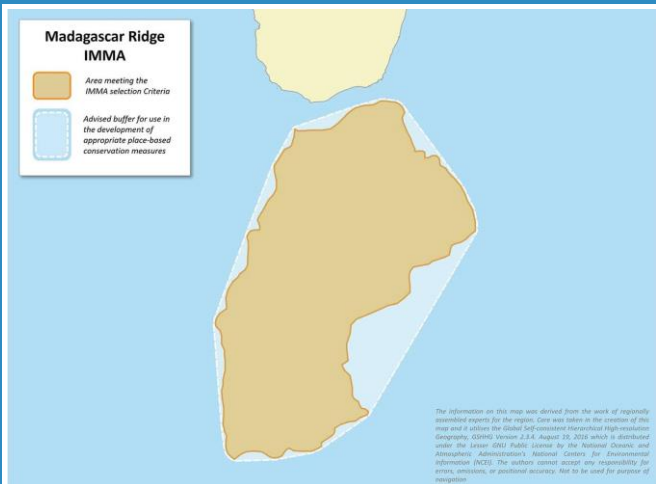
# Madagascar Ridge IMMA

## Summary

The Madagascar Ridge IMMA extends south from the southern coast of Madagascar into the wider Plateau of Madagascar and off the continental shelf. This IMMA is an important area for feeding pygmy blue whales (*B. m. breviceauda*), Bryde's whales (*Balaenoptera edeni brydei*), sperm whales, and potentially for other large whale species (i.e., fin whales, sei whales). Critically Endangered Antarctic blue whales (*B. m. intermedia*) were also recorded in the region. The Madagascar Ridge is also an important migratory corridor for migrating humpback whales (*M. novaeangliae*), southern right whales (*E. australis*) and potentially other species of large baleen whales, including male sperm whales and other baleen whales. At least 23 species of cetaceans are known to occur in this region, including 9 species of baleen whales and 14 species of toothed cetaceans.

## Description:

This region of the Madagascar Ridge (or Rise), including Walter Shoals, represents a massive elevation of the sea bottom, extending between Madagascar and the Western Indian Ridge for almost 700 miles. The crest of the ridge is wide, with depths from 1000 to 2500 m (at seamounts up to 567 m); the minimum depths on the Walters Shoals (15 m). The shoals are a cone with a flat top covered by coral reefs. The slopes of the shoal are steep; the angle of the incline is 6-12°. The tops of other mounts rising over the ridge are located in depths from 84 down to 567 m and deeper. In the southern part of the ridge between 31° and 35°S, depths between 900 - 1100 m are predominant.



## Area Size

412 817 km<sup>2</sup>

## Qualifying Species and Criteria

Sperm whale – *Physeter macrocephalus*

Criterion A; B (2)

Pygmy blue whale – *Balaenoptera musculus breviceauda*

Criterion A; B (2); C (2); C (3)

Antarctic blue whale –

*Balaenoptera musculus intermedia*

Criterion A

Bryde's whale – *Balaenoptera edeni*

Criterion C (2)

Humpback whale – *Megaptera novaeangliae*

Criterion C (3)

Sei whale – *Balaenoptera borealis*

Criterion A

## Marine Mammal Diversity

Criterion D(2)

*Eubalaena australis*, *Balaenoptera bonaerensis*,  
*Pseudorca crassidens*, *Caperea marginata*,  
*Berardius arnouxii*, *Ziphius cavirostris*, *Hyperoodon planifrons*, *Mesoplodon grayi*, *Mesoplodon layardii*,  
*Orcinus orca*, *Delphinus delphis*, *Stenella attenuata*, *Stenella coeruleoalba*, *Tursiops truncatus*, *Grampus griseus*, *Lagenodelphis hosei*,  
*Steno bredanensis*



Figure 1: Sperm whale (*Physeter macrocephalus*). Photo credit: Jeremy Kiszka / FIU



Figure 2: Sei whale (*Balaenoptera borealis*) aerial shot using drone in Seychelles. Photo credit: Jeremy Kiszka / FIU

The Madagascar Ridge meets several of the IMMA selection criteria, including it is a significant aggregation area for several species of cetaceans, including blue whales, sperm whales and potentially other species such as fin whales (Criterion B2). This is also a feeding ground for pygmy blue whales and Bryde's whales (Criteria C2) and migratory corridor for humpback whales, southern right whales and possibly other large whale species (C3), and as an area of high cetacean diversity with 23 species recorded so far (Criteria D2).



Figure 3: Blue whale (*Balaenoptera musculus*) in Seychelles. Photo credit: Jeremy Kiszka / FIU

## Criterion A: Species or Population Vulnerability

The Madagascar Ridge area is an area used by pygmy blue whales (*B. m. breviceauda*) for feeding during the austral summer (Kasuya & Wada, 1991; Best et al., 2003; Branch et al., 2007), by sperm whales (*Physeter macrocephalus*) and a migratory corridor for southern right whales and humpback whales (Best, 2007; Fossette et al., 2014). Surveys conducted in the region by Gambell et al. (1975) suggest that sperm whale is the most abundant large cetacean in the Madagascar Ridge area.

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

This region is an important habitat for blue whales, based on catch and sighting data (Branch et al., 2007), these are primarily pygmy blue whales. The sperm whale is the most abundant large cetacean species in the Madagascar Ridge area (Gambell et al., 1975). This region may have the highest densities of sperm whales in the southwestern Indian Ocean (Gambell et al., 1975). A compilation of available sighting records of blue and sperm whales throughout the western Indian Ocean (1972-2017) suggest that the Madagascar Ridge is one of the most critical habitats for these two species in the region (Tetley, Kiszka and Hoyt, unpublished data).

## Criterion C: Key Life Cycle Activities Sub-criterion C2: Feeding Areas

The Madagascar Ridge area is important for feeding pygmy blue whales (*B. m. breviceauda*) during the austral summer (Kasuya & Wada, 1991; Best et al., 2003; Branch et al., 2007). Best et al. (2003) estimated blue whale abundance as 424-472 in December 1996 from the southwest tip of Madagascar and along the Madagascar Ridge. Under a scientific research permit, Japanese whalers took large numbers of Bryde's whales (>100) in the vicinity of the Madagascar ridge during 1976-1979, with detailed descriptions of stomach contents indicating feeding (Kawamura, 1980; Ohsumi, 1980). These whales were described as *Balaenoptera edeni brydei*, which is distinct from coastal South African and southeastern Atlantic populations (Best, 2001). It could be used as a foraging ground for a large number of other species, but there currently is not supporting evidence.

## Sub-criterion C3: Migration Routes

The IMMA includes a migratory corridor for humpback whales (Best et al., 1998; Fossette et al., 2014; Cerchio et al., 2016) and southern right whales (Best, 2007). The southern Madagascar shelf is important breeding habitat for *Megaptera novaeangliae*, as satellite telemetry data indicated extensive use of this habitat during the height of the breeding season (Cerchio et al., 2016; Trudelle et al., 2016; Dulau et al., 2017). Blue whales, male sperm whales and other species of baleen whales such as fin, Bryde's and Antarctic minke whales also use this region as a migratory corridor (Gambell et al., 1975; Kasuya & Wada, 1991; Best, 2007). Kasuya and Wada (1996) report *B. physalus* sightings immediately south of Madagascar (25°-30°S, 45°-55°E) during December, likely on southern migration, but well south of 30°S from January to April in presumed feeding habitat.

## Criterion D: Special Attributes

### Sub-criterion D2: Diversity

A total of 23 species of cetaceans have been recorded in the Madagascar Ridge area, including 9 species of baleen whales and 14 species of toothed cetaceans (Cerchio et al., 2022). These include Humpback whale (*Megaptera novaeangliae*), Southern right whale (*Eubalaena australis*), Antarctic minke whale (*Balaenoptera bonaerensis*), Pygmy right whale (*Caperea marginata*), Cuvier's beaked whale (*Ziphius cavirostris*), Arnoux's beaked whale (*Berardius arnouxii*), Gray's beaked whale (*Mesoplodon grayi*), Strap-toothed whale (*Mesoplodon layardii*), Killer whale (*Orcinus orca*), False killer whale (*Pseudorca crassidens*), Common dolphin (*Delphinus delphis*), Pantropical spotted dolphin (*Stenella attenuata*), Rough-toothed dolphin (*Steno bredanensis*), Striped dolphin (*Stenella coeruleoalba*), Risso's dolphin

(*Grampus griseus*), Common bottlenose dolphin (*Tursiops truncatus*), Fraser's dolphin (*Lagenodelphis hosei*), Pygmy killer whale (*Feresa attenuata*) (Best et al., 1998; Fossette et al., 2014; Cerchio et al., 2016; Gambell et al., 1975; Kasuya & Wada, 1991).



Figure 4: Fraser's dolphins (*Lagenodelphis hosei*) in Mayotte. Photo credit: Jeremy Kiszka / FIU

## Supporting Information

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**MARINE MAMMAL PROTECTED AREAS TASK FORCE**

**IMMA**

Supported by:

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