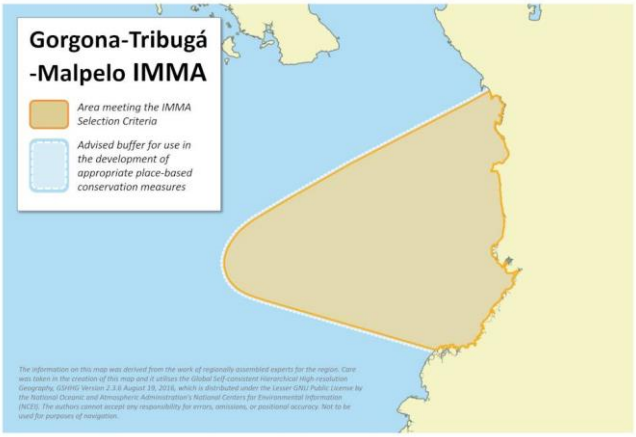


## Area Size

144 510 km²

## Qualifying Species and Criteria

Pantropical spotted dolphin – *Stenella attenuata*

Criterion B (1)

Common bottlenose dolphin – *Tursiops truncatus*

Criterion B (1)

Humpback whale – *Megaptera novaeangliae*

Criterion C (1)

## Marine Mammal Diversity

Criterion D (2)

*Megaptera novaeangliae, Stenella attenuata, Tursiops truncatus, Physeter macrocephalus, Stenella coeruleoalba, Delphinus delphis, Grampus griseus, Steno bredanensis, Peponocephala electra, Pseudorca crassidens, Globicephala macrorhynchus, Kogia sima, Balaenoptera edeni*

## Summary

This IMMA encompasses the Colombian Pacific coastline between Sanquianga National Park in the south, and extends to Cupica Gulf in the north. It also includes the offshore Malpelo Ridge area to the west. This is an area of high marine mammal species diversity, with 11 odontocete and two mysticete species occurring regularly,

# Gorgona-Tribugá-Malpelo IMMA

## Summary, continued.

including the Vulnerable (VU) sperm whale (*Physeter macrocephalus*). Additionally, this area serves as wintering habitat important for reproduction and migration of the Southern Hemisphere population of humpback whales (*Megaptera novaeangliae australis*), referred to as 'Breeding Stock G' by the International Whaling Commission. It also hosts small resident populations of common bottlenose (*Tursiops truncatus*) and pantropical spotted dolphins (*Stenella attenuata*). The area is under pressure from a range of human activities that can present a considerable risk for marine mammals.

## Description:

This IMMA starts at Sanquianga National Natural Park (NNP) in the south and extends northward along Colombia's mainland coast to include Uramba Málaga Bay NNP, Tribugá Gulf, and Cupica Gulf. The area extends westward to include the coastal Gorgona Island NNP and the offshore Malpelo Ridge area (including Malpelo Island) (Figure 1).

This region is characterized by high humidity and temperatures, a high tidal range, and an irregular coastline, that comprises a wide range of habitats, including rocky cliffs, wide sandy bays, mangrove forests, mud flats, sandy bottoms, rocky substrates, and coral reefs (Cantera & Contreras, 1993; Díaz, 2002; Jaramillo & Bayona, 2000).

The average sea temperature is 25°C, and salinity varies between 20 ppm and 35 ppm in coastal and offshore waters, respectively. In the coastal portion of

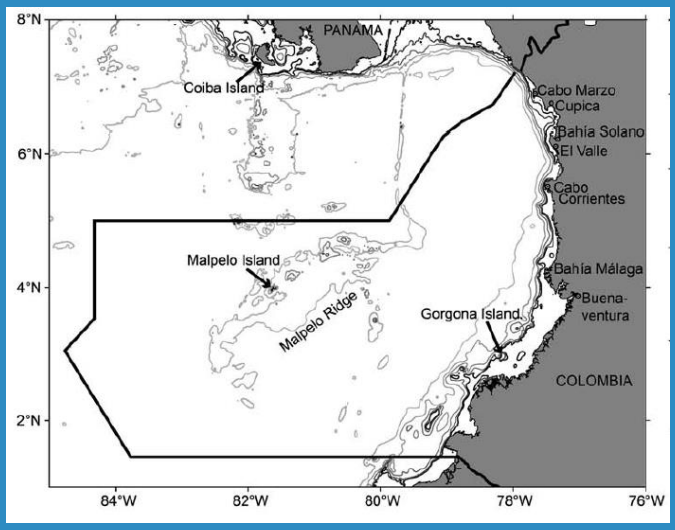


Figure 1: Colombia's exclusive economic zone (EEZ) in the Pacific Ocean. Bathymetric contours correspond to the 100, 200, 500, 1000 and 2000 m isobaths (reproduced from Palacios et al., 2012).

this IMMA, the Colombian Current predominates, which runs from north to northeast, interacting with the low-salinity Chocó Current that moves along the coast from north to south. The continental shelf (depths <200 m) and slope (200–2000 m) are wide south of 4°N but very narrow to the north, especially between Corrientes Cape and the border with Panamá (Cantera, 1993; Pabón et al., 1998; Palacios et al., 2012).

Offshore, the IMMA's most prominent feature is the Malpelo Ridge, which is a submarine mountain range running on a southwest-northeast axis, rising to the surface from depths greater than 2000 m at Malpelo Island (Palacios et al., 2012). Malpelo Island is composed of barren rocks and steep edges with several underwater habitats including coral formations, vertical rock walls, sands and gravel, tunnels and caves, which support important populations of large predators and pelagic species (UNESCO, 2005).

The nearshore waters of the area are influenced by coastal and pelagic upwelling events throughout the year (Díaz et al., 2008), especially in the periods of February-April and November-December (Villegas, 1997a,b; Villegas & Málikov, 2006). This upwelling causes high productivity, particularly around Gorgona and Malpelo islands (Pineda, 1995; Herrera et al., 2011). Upwelling events are influenced by the movements of the Inter-tropical Convergence Zone (ITCZ), which in turn lead to high levels of cloud cover and precipitation, as well as variable winds (Díaz et al., 2008). Nutrient-rich flows from rivers into coastal waters provide an additional source of productivity in nearshore areas (Cantera, 1993; Díaz, 2002).

This area has the potential to be delineated and managed for marine mammal conservation, since it includes eight Marine Protected Areas (MPAs): 1) Sanquianga NNP, 2) Gorgona Island NNP, 3) Uramba Málaga Bay NNP, 4) Utría NNP, 5) Tribugá-Cabo Corrientes Regional Integrated Management District, 6) Malpelo Fauna and Flora Sanctuary, 7) Yuruparí-Malpelo National Integrated Management District, and 8) Colinas y Lomas Submarinas de la Cuenca Pacífico Norte National Integrated Management District. It also includes Tribugá Gulf, a pristine area designated as a "Hope Spot" by Mission Blue in 2019, and also recently included as a new biosphere reserve by UNESCO in 2023. Tribugá Gulf hosts a high diversity of marine mammals and its principal economy is based on artisanal fishing and tourism (Botero-Acosta et al., 2019; Figure 2). Additionally, some coastal patches in this IMMA present a high degree of risk for marine mammals based on the documented threats (Avila & Giraldo, 2022; Figure 3).


Figure 2: Tribugá Gulf, Colombian Pacific. Photo by Isabel C. Avila.

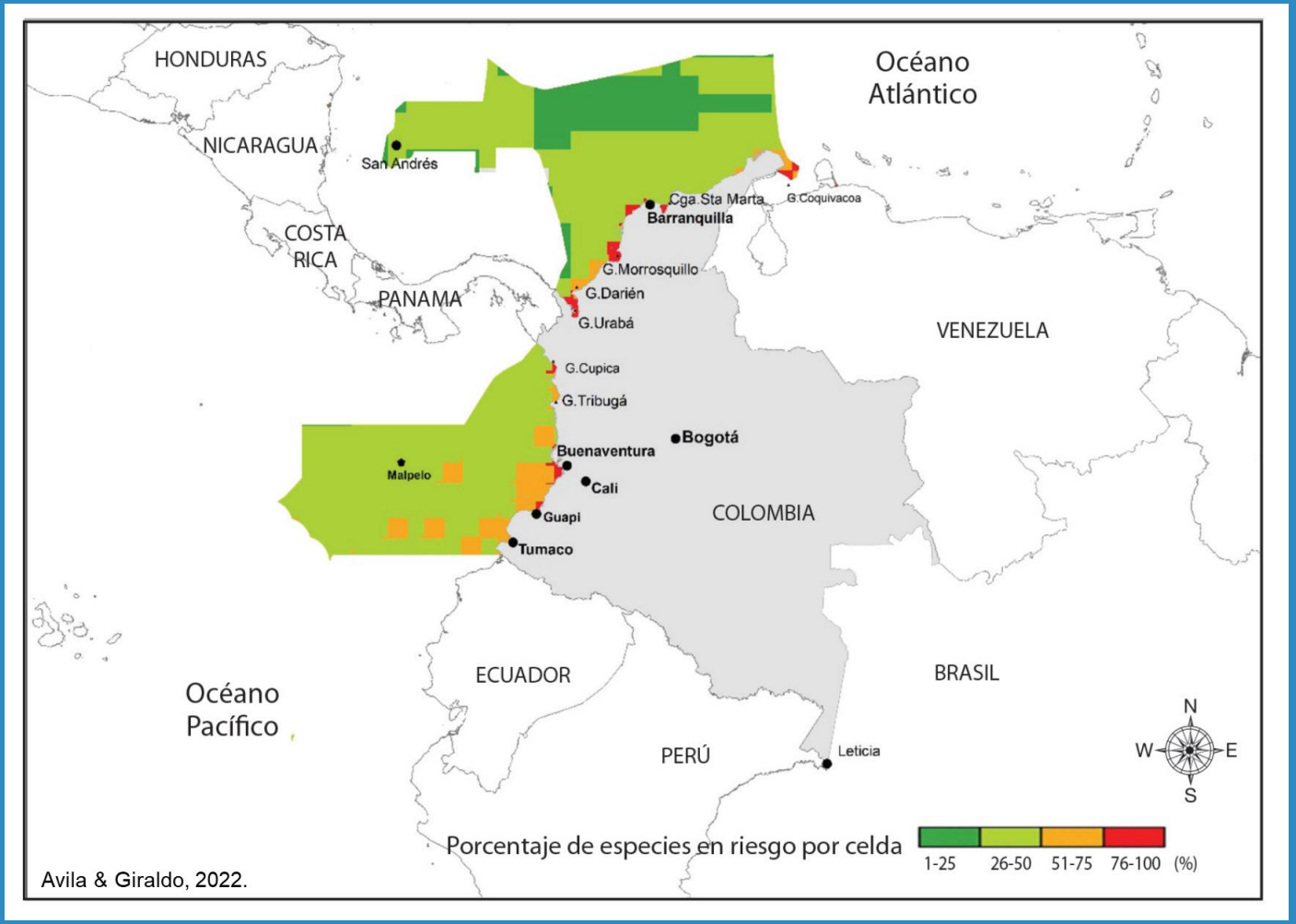


Figure 3: Risk map for all species of marine mammals in Colombia between 1991 and 2020 with all threats together. The red areas represent high risk areas or "hotspots" which indicate the areas where more than 75 % of the species present are documented with threats. (reproduced from Avila & Giraldo, 2022).

## Criterion B: Distribution and Abundance Sub-criterion B1: Small and Resident Populations

Common bottlenose dolphins (*Tursiops truncatus*) are frequently observed in both coastal and offshore waters of the Colombian Pacific (encounter rates of 3.48/1000 km; Palacios et al., 2012; Figures 4 and 5). Although most groups have been reported to comprise between six and 20 individuals, mostly in nearshore habitat (<1 km from shore), the mean group size for the entirety of Colombian Pacific waters is 25 individuals, ranging between one to 300 individuals (Palacios et al., 2012). It is common to observe groups with neonates and calves, which suggests the reproduction of this species in the area (Avila et al., 2013). Activities documented for this species include feeding, socializing, resting, and slow transit (Avila et al., 2013; Van Waerebeek et al., 2017). Distribution of this species is concentrated in the Gulf of Tribugá to the north and Malpelo Ridge to the west (Herrera et al., 2011; Palacios et al., 2012). Resident groups have been documented particularly in Malpelo Island (offshore waters) and Uramba Málaga Bay NNP (coastal waters) (Herrera et al., 2011; Avila et al., 2013; Chávez et al., 2018; Burbano-López et al., 2022), which could be supported by prey availability. The pantropical spotted dolphin (*Stenella attenuata*) is also commonly observed in costal and offshore waters (encounter rates of 3.08 groups/100 h in Malpelo Island; Herrera et al., 2011), with an overall encounter rate of 2.29 groups/1000 km for the Colombian EEZ (Palacios et al., 2012; Figures 6 and 7). Pantropical spotted dolphins have often been

observed in groups of up to 500 individuals (Valencia, 2006), with an average group size of 22 individuals (Avila et al., 2013). It is common to observe groups with neonates and calves, and a crude birth rate of 0.16 (proportion of calves with respect to the total number of individuals, including calves) has been calculated for the population in Gorgona Island NNP in years 2003-2004 (Flórez-González et al., 2004).

Figure 4: Adult and calf of bottlenose dolphin (*Tursiops truncatus*) in Uramba Málaga Bay National Park, Colombian Pacific. Photo by Isabel C. Avila.

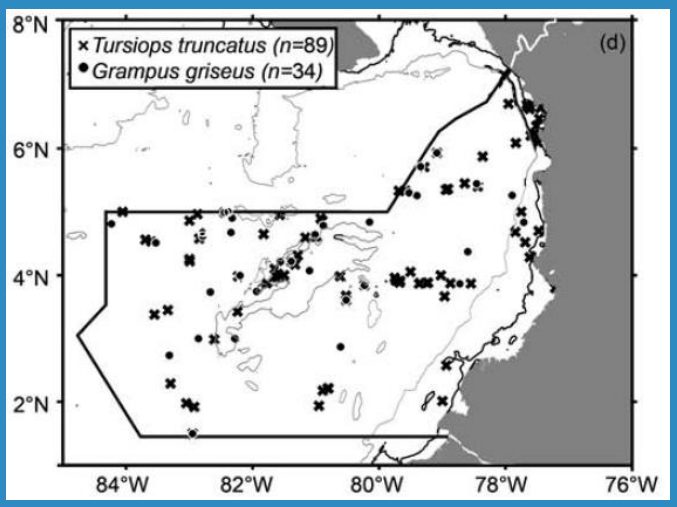


Figure 5: Distribution map of common bottlenose dolphin (*Tursiops truncatus*) and Risso's dolphin (*Grampus griseus*) in Colombia's Pacific EEZ (reproduced from Palacios et al., 2012).

Pantropical spotted dolphins have been observed both traveling and feeding in Gorgona Island (Valencia, 2006). This species has been reported mainly in coastal waters, particularly in Utría NNP, Uramba Málaga Bay NNP, and Gorgona Island NNP, where photo-identification studies have established year-round residency (Flórez-González & Capella, 2001; Valencia, 2006; Avila et al., 2013). In Gorgona Island and Uramba Málaga Bay, the species has been observed feeding (Rengifo et al., 1995; Londoño, 2005; Valencia, 2006), which could explain their residency patterns.


Figure 6: Adult of pantropical spotted dolphin (*Stenella attenuata)* in Tribugá Gulf, Colombian Pacific. Photo by Fundación Yubarta.

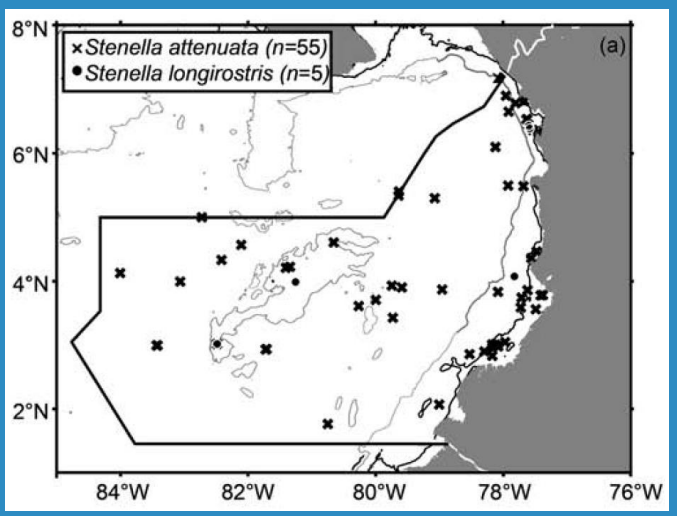


Figure 7. Distribution map of pantropical spotted dolphins (*Stenella attenuata*) and spinner dolphin (*Stenella longirostris*) in Colombia's Pacific EEZ (reproduced from Palacios et al., 2012).

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

The Southern Hemisphere humpback whale (*Megaptera novaeangliae australis*) is a cosmopolitan and migratory cetacean that annually migrates to Colombian waters between May and December to

reproduce, give birth, and raise its calves (Avila et al., 2020). This population corresponds to IWC Breeding Stock G (BSG), which feeds in summer in southern Chile and the western Antarctic Peninsula, while it reproduces in winter in tropical waters of the eastern tropical and south Pacific, including Colombia (Stone et al., 1990; Rasmussen et al., 2007). Humpbacks are distributed mainly in Málaga Bay (3°56'N, 77°25'W), Gorgona Island (02°58'N, 78°11'W), and Tribugá Gulf (5°47'N, 76°41'W), but also there are sightings at Malpelo Island and surroundings (4°00'N 81°36'W) (Herrera et al., 2011; Palacios et al., 2012; Acevedo et al., 2017; Figures 8 and 9). Based on photo-identification techniques, 857 different individuals were identified in Málaga Bay in the 1990s, and 1366 were identified in 2003 around Gorgona Island (Flórez-González et al., 2007; Avila et al., 2013).

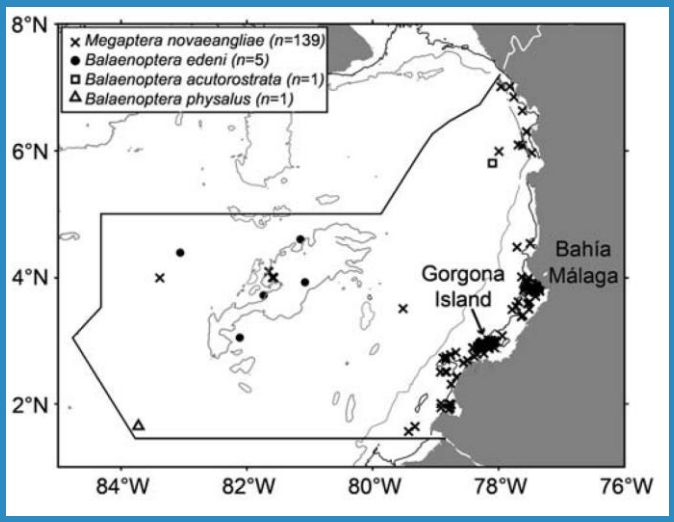


Figure 8: Distribution map for humpback whale (*Megaptera novaeangliae australis*), Bryde's whale (*Balaenoptera edeni*), minke whale (*Balaenoptera acutorostrata*), and fin whale (*Balaenoptera physalus*) in Colombia's Pacific EEZ (reproduced from Palacios et al., 2012).

This IMMA is a breeding site for *M. n. australis*, with 28%, 20.7%, and over 70% of observed groups containing calves in Gorgona Island NNP, Tribugá Gulf, and Uramba Málaga Bay NNP, respectively (Avila, 2000; Flórez-González et al., 2007; Botero-Acosta, 2017; Avila et al., 2020). A crude birth rate of 0.24 (proportion of calves with respect to the total number of whales, including calves) was


Figure 9: Mother and calf of humpback whale (*Megaptera novaeangliae australis*) in Uramba Málaga Bay National Park, Colombian Pacific. Photo by Isabel C. Avila.

documented in Gorgona Island for the years 2003-2004 (Flórez-González et al., 2004). Given the very high rate of increase of this population in the last two decades (181% with an annual average growth rate of 5.07% in 12 years from 2006 to 2018; Félix et al., 2021), it is likely that the proportion of groups containing calves and the crude birth rate in Colombia have been even higher in recent years. New studies are needed to determine the current number of animals visiting these areas annually. From 1986 to 2016 more than 20 re-sightings of photo identified humpback whales were documented between the western Antarctic Peninsula and Colombia (Stone et al., 1990; Garrigue et al., 2002; Stevick et al., 2004; Acevedo et al., 2017; Marcondes et al., 2021). Mitochondrial genetic markers and microsatellite loci data also demonstrate a strong affinity between animals sampled in the western Antarctic Peninsula and those from Colombia (Caballero et al., 2001, 2021).

Recently, a few sightings (<10 individuals) of humpback whales including adults and calves, have been reported between February and April (Avila et al., 2013; Palacios et al., 2012), which coincides with the breeding season of *Megaptera novaeangliae kuzira* from the North Pacific. However, no photo-identification records exist to confirm if these individuals are part of the North Pacific population.

## Criterion D: Special Attributes
## Sub-criterion D2: Diversity

Although marine mammal observations have been reported throughout the entire Colombian Pacific EEZ (Gerrodette & Palacios, 1996; Hamilton et al., 2009; Palacios et al., 2012; Avila et al., 2013; Chávez et al., 2018; Botero-Acosta et al., 2019; Aguirre-Tapiero et al., 2019; Barragán-Barrera et al., 2020; Burbano, 2021; Pino, 2021), the highest density of sightings have been recorded in a roughly triangular area between Tribugá Gulf at the north, Gorgona Island at the south, and Malpelo Island at west. A total of 13 species of marine mammals have been documented as occurring regularly within the IMMA, with encounter rates (ER) higher than 0.5 groups per 1000 km of survey effort (Palacios et al., 2012). Seven additional species are also known to occur in the area with less frequency. The regularly documented species include two species of baleen whales and 11 odontocetes. Striped dolphin (*Stenella coeruleoalba* – ER=4.3); this species is frequently observed, mainly around Malpelo Island waters and between the corridor between Buenaventura coast and Malpelo Island (Herrera et al., 2011; Palacios et al., 2012); Humpback whale (*Megaptera novaeangliae australis* – ER=3.6); this species is described in Criteria C1 and C3; Bottlenose dolphin (*Tursiops truncatus* – ER=3.5); this species is highly frequent within the region, with occurrences increasing through the years: 2012=89; 2018=156; 2020=498 (Palacios et al., 2012; Chávez, 2018; Barragán-Barrera et al., 2020; Burbano-López et al., 2022); Pantropical spotted dolphins (*Stenella attenuata* – ER=2.3); this species is highly frequent within the region, with occurrences increasing trough years: 2012=55; 2018=325; 2020=756 (Palacios et al., 2012; Chávez, 2018; Barragán-Barrera et al., 2020; Burbano-López et al., 2022); Sperm whales (*Physeter macrocephalus* – ER=1.9); the density of sperm whales in Colombia's EEZ is one of the highest of the American Tropical Region with 3.8 individuals/1000 km² (Gerrodette & Palacios, 1996; Palacios et al., 2012; Avila et al., 2022); Common dolphins (*Delphinus delphis* – ER=1.7), with only the short-beaked form observed within the area (Gerrodette & Palacios, 1996). Risso's dolphins (*Grampus griseus* – ER=1.3); the species has been reported in offshore waters off Malpelo Island (Herrera et al., 2011). Rough-toothed dolphins (*Steno bredanensis* – ER=0.8); this species occurs predominantly in offshore waters, particularly around Malpelo Island (Herrera et al., 2011; Palacios et al., 2012); Melon-headed whales (*Peponocephala electra* – ER=0.5); sightings of this species occur mainly just offshore of the continental slope and off Malpelo Island (Palacios et al., 2012); False killer whales (*Pseudorca crassidens* – ER=0.5); this species has been reported predominantly in offshore waters, mainly off Malpelo Island (Herrera et al., 2011); Short-finned pilot whales (*Globicephala macrorhynchus* – ER=0.7); this species is observed mainly in offshore waters (Palacios et al., 2012); Dwarf sperm whales (*Kogia sima* – ER=0.5); individuals and small groups have been documented in both coastal and offshore waters of the IMMA (Palacios et al., 2012; Juhel et al., 2021); Bryde's whales (*Balaenoptera edeni* - ER=0.5); the species has been reported mainly in offshore waters, including over the Malpelo Ridge (Palacios et al., 2012), but also in coastal areas in the Tribugá Gulf (Vallejo et al., 2022). Several reports of unidentified rorquals (*Balaenoptera* sp.) throughout the entire area, particularly in waters around Malpelo Island, could belong to this species.

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## Acknowledgements

We would like to thank the participants of the 2022 hybrid IMMA Regional Expert Workshop for the identification of IMMAs in the South East Tropical and Temperate Pacific Ocean. We thank the Colombian participants who wrote and provided the necessary data to create and validate the importance of this IMMA. Funding for the identification of this IMMA was provided by the Global Ocean Biodiversity Initiative funded by the German government's International Climate Initiative (IKI). Support was also provided by Whale and Dolphin Conservation, the Promar Foundation, and the Tethys Research Institute.


Suggested Citation: IUCN-MMPATF (2023) Gorgona-Tribugá-Malpelo IMMA Factsheet. IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task Force, 2023.

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