

Continental Shelf of the Northern Humboldt Current IMMA

Description:

The IMMA encompasses waters of the continental shelf of the northern Humboldt Current System, falling between 6° and 10°S, within Peru's EEZ.

Oceanographic features, including the Humboldt Current and associated wind forces, create strong upwelling and high levels of primary productivity in the offshore waters of northern Peru (Bakun & Weeks, 2008; Montecino & Lange, 2009). As a consequence warm subtropical waters move closer to the coast in summer and autumn, and coastal upwelling disperses them in winter and spring (Bakun & Weeks, 2008). This upwelling and its associated productivity allow the development of a high biomass of small pelagic fishes like anchoveta (Bakun & Weeks, 2008), which in turn serve as prey for several small cetacean species. (Garcia-Godos et al., 2007; Llapapasca et al., 2018; Gonzalez-Pestana et al., 2022).

Criterion A: Species or Population Vulnerability

The Peruvian/Chilean dusky dolphin (*Lagenorhynchus obscurus posidonia*) is genetically distinct from other dusky dolphins (Cassens et al., 2004), and is listed as Vulnerable (VU) on the IUCN Red List of Threatened Species (Mangel & Alfaro-Shigueto, 2019), mostly due to the impacts of bycatch on the population for over 4 decades (Read et al., 1988; Van Waerebeek et al., 1994, 1997, 2002). While there are no range-wide abundance estimates for *L. o. posidonia*, the population is thought to have been



Area Size

50 142 km²

Qualifying Species and Criteria

Burmeister's porpoise – *Phocoena spinipinnis*

Criterion A; C (2); D (1)

Dusky dolphin – *Lagenorhynchus obscurus*

Criterion A; C (2); D (1)

Marine Mammal Diversity

Otaria byronia, *Lontra felina*, *Delphinus delphis*,
Tursiops truncatus, *Megaptera novaeangliae*,
Grampus griseus, *Mesoplodon peruvianus*

Summary

The Humboldt Current generates high levels of productivity that support large populations of anchovies (*Engraulis ringens*) and other small pelagic fish off the coast of Peru. These conditions provide ideal habitat for a number of marine mammals, in particular small cetaceans. Burmeister's porpoises (*Phocoena spinipinnis*) and the Peru-Chile subspecies of dusky dolphins (*Lagenorhynchus obscurus posidonia*), use the continental shelf between 6° and 10° S as a core foraging ground. Both of these species' distribution overlap with both small-scale and industrial fisheries, which are thought to have led to population declines, highlighting the need for conservation measures for these species.



Figure 1: Large mixed pods of common and dusky dolphins (*Lagenorhynchus obscurus*) with seabirds associated is a typical occurrence in the Humboldt system. Photo credit: Sonja Heinrich.

severely depleted by human activities over the course of many decades, particularly off Peru (Read et al., 1988; Van Waerebeek, 1994; Van Waerebeek et al., 1997; Mangel et al., 2010; Alfaro-Shigueto et al., 2018). This decline is evidenced by a change in the species composition of cetaceans landed in central Peru through direct hunts and bycatch in fisheries between 1985 and 2017: Dusky dolphins comprised 77.5% of individuals in 1985-1990 (Van Waerebeek et al., 1994), 52.8% in 1991-1993 (Van Waerebeek, 1997); only 45% during 1995-1999, and had reduced to 25.4% during 2000-2017 (Van Waerebeek, 2002, 2018). This was interpreted as a decline in abundance of the subspecies due to impacts of fisheries.

In addition, El Niño events that affect their main prey, anchovies (*Engraulis ringens*) (Manzanillo & Naim, 2010), might also play an important role in determining the conservation status of the

subspecies. Human-induced threats are likely expanding in the future, and could lead to the extirpation of this subspecies off Peru. While the Burmeister's porpoises (*Phocoena spinipinnis*), is listed as Near Threatened (NT) on the IUCN Red List of threatened species (Felix et al., 2018), genetic studies suggest that the Peru population is distinct from the Chile-Argentina population (Rosa et al., 2005). Similarly to *L. o. posidonia*, Burmeister's porpoise has been impacted by incidental mortality in fisheries (Read et al., 1988; Van Waerebeek et al., 1997; Mangel et al., 2010; Torres & Sarmiento, 2018) as well as by use for human consumption (Mangel et al., 2010; Campbell et al., 2018), particularly in the northern portion of the species' range off Peru.

Criterion C: Key Life Cycle Activities

Sub-criterion C2: Feeding Areas

The productivity associated with upwelling in the Humboldt current (Bertrand et al., 2004) offers optimal foraging conditions for several small cetaceans (Llapapasca et al., 2018). Two species including the Burmeister's porpoise and the Peruvian/Chilean dusky dolphin use the area as a foraging ground (Reyes, 2009; Garcia Godos et al., 2007; Llapapasca et al., 2018). Large aggregations of foraging Burmeister's porpoises have been documented around Guanape island, Salaverry (Van Waerebeek et al., 2008). Clay et al. (2018) described habitat preferences for the species off Salaverry (8 S) to be within 20–30km of shore, in water depths of 50 m or less, and sea temperatures of around 17–18°C. These areas overlap with small-scale gillnet fisheries (Mangel et al., 2010; Torres & Sarmiento, 2018). Studies from stomach contents of Burmeister's porpoises incidentally captured in these fisheries found that anchovies composed 77.6% of prey items, followed by mote sculpin (*Normanichthys crockeri*) 8.8%, Chilean silversides (*Odontesthes regia*) 7.96%, and cephalopods (5.22%) (Garcia-Godos et al., 2007). The distribution of dusky dolphins in this region overlaps that of pelagic-neritic prey species (e.g. Peruvian anchovies, silverside and mackerels (*Scomber* sp.) (Llapapasca et al., 2018; SNP, 2022). Stomach content analyses revealed that dolphins' main prey are mote sculpin (*Normanichthys crockeri* – 76.0%) and anchovies (16.79%), followed by South Pacific hake (*Merluccius gayi* – 0.97%), and other species including slimitail lanternfish (*Lampanyctus parvicauda*), and Inca scad (*Trachurus murphyi*) (Garcia-Godos et al., 2007).

Criterion D: Special Attributes

Sub-criterion D1: Distinctiveness

Rosa et al. (2005) found fixed differences in mtDNA of

Burmeister's Porpoises between animals sampled in Peru and those sampled in Chile and Argentina. Results were consistent with levels of differentiation at a subspecies or higher level (Taylor et al., 2017). However, the basis for a change in taxonomy has not been evaluated. The genetic data also supported differences, though of a lesser degree, between the porpoises sampled in Chile and those in Argentina, which would be consistent with morphological differences between the animals in the two ocean basins reported by Corcuera et al. (1995). Globally dusky dolphin populations are generally considered stable and not severely threatened. However this is not the case for the Peruvian/Chilean dusky dolphin subspecies, especially in its range off Peru, where it is considered threatened.

Supporting Information

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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. 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) Continental Shelf of the Northern Humboldt Current IMMA Factsheet. IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task Force, 2023.

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