

Sindhurg-Karwar IMMA

Summary (continued)

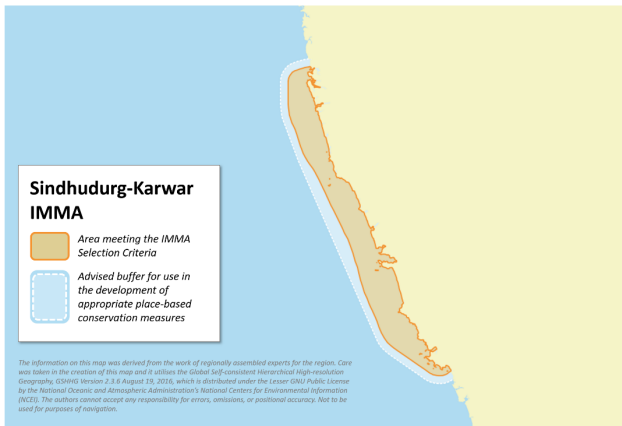
Other species reported from within this species-diverse area include Endangered blue whales (*Balaenoptera musculus*), Bryde's whales (*Balaenoptera edeni*), pantropical spotted dolphins (*Stenella attenuata*), Indo-Pacific bottlenose dolphins (*Tursiops aduncus*), common dolphins (*Delphinus delphis*), killer whales (*Orcinus orca*), humpback whales (*Megaptera novaeangliae*), dwarf sperm whales (*Kogia sima*), false killer whales (*Pseudorca crassidens*) and striped dolphins (*Stenella coeruleoalba*). The humpback whales observed in this IMMA are part of the Endangered Arabian Sea sub-population, which remains in the Arabian Sea year-round rather than performing long migrations to temperate or polar feeding grounds.

Description

The west coast of India has a wide continental shelf, gradually sloping in the Konkan coastal stretch from southern Maharashtra to northern Karnataka (Sindhurg-Goa-Karwar). The nearshore, shallow (up to ~40m) waters are rich with rivers flowing into the sea from the Western Ghats making this a suitable habitat for the two primary species – *S. plumbea* and *N. phocaenoides*. Deeper waters are known to host *B. musculus*, *B. edeni*, *Tursiops aduncus*, *Stenella longirostris*, *Stenella attenuata*, *Delphinus delphis*, and others.

Criterion A: Species or Population Vulnerability

Sousa plumbea and *Neophocaena phocaenoides*, are listed as Endangered and Vulnerable respectively on the IUCN Red List. The mortality rates for both species in this region ranged from 6-15 animals per year between 2014-2019 (MMRCNI 2019). These are resident populations that might be showing some local movement within this ~260 km area.



Area Size

4,327 km²

Qualifying Species and Criteria

Indian Ocean humpback dolphin – *Sousa plumbea*
Criteria A, B1

Indo-Pacific finless porpoise – *Neophocaena phocaenoides*
Criteria A, B1

Marine Mammal Diversity (D2)

Balaenoptera musculus, *Balaenoptera edeni*,
Delphinus delphis, *Kogia sima*, *Pseudorca crassidens*, *Megaptera novaeangliae*, *Sousa plumbea*, *Tursiops aduncus*, *Neophocaena phocaenoides*, *Orcinus orca*, *Stenella attenuata*,
Stenella coeruleoalba

Summary

The coastal region of southern Maharashtra (Sindhurg), Goa and northern Karnataka (Karwar) in India hosts at least 12 species of whales and dolphins. Among these species, Endangered Indian Ocean humpback dolphins (*Sousa plumbea*) and Vulnerable finless porpoises (*Neophocaena phocaenoides*) are the most frequently observed. Dedicated cetacean surveys in both Sindhurg and Goa (Karwar Bay) indicate that these two species are present year-round, and are likely resident. Stranding response networks in the area show that the mortality rates of both these species are relatively high, with fisheries bycatch from both artisanal and commercial fisheries presenting the most significant threat.

The Indo-Pacific finless porpoise is highly affected by a wide range of fishing gear, both small-scale and commercial. In addition to expanding coastal fisheries, the region is undergoing major development; thermal power plant development, shipping port construction, a proposed nuclear power plant, mining, and tourism sector projects are all taking place in the region and could greatly impact the endangered or vulnerable marine mammals in the area.

Criterion B: Distribution and Abundance

Sub-criterion B1: Small and Resident Populations

Sousa plumbea and *Neophocaena phocaenoides* are both present year-round in the area but robust population estimates are not yet available. Based on photo-ID data close to 600 individual humpback dolphins have been identified in Sindhudurg, while no estimate is available for finless porpoises. These Criteria may be used for *Neophocaena* in the future after robust estimates are available.

Criterion D: Special Attributes

Sub-criterion D2: Diversity

The area has reported at least 12 species of cetaceans – Indian ocean humpback dolphin, Indo-Pacific finless porpoise, Blue whale, Bryde's whale, pantropical spotted dolphin, Indo-Pacific bottlenose dolphin, common dolphin, killer whale, humpback whale, dwarf sperm whale, false killer whale and striped dolphin. With the exception of the rarer striped dolphins, false killer whales and dwarf sperm whales, these species have been observed multiple times. Humpback whale vocalizations detected in the area attest to the areas' potential conservation significance for the Arabian Sea humpback whale sub-population.

Supporting Information

Bopardikar I., Sutaria D., Sule M., Jog K., Patankar V., Klinck H. 2018. Description and classification of Indian Ocean humpback dolphin (*Sousa plumbea*) whistles recorded off the Sindhudurg coast of Maharashtra, India. In Marine Mammal Science DOI:10.1111/mms.12479.

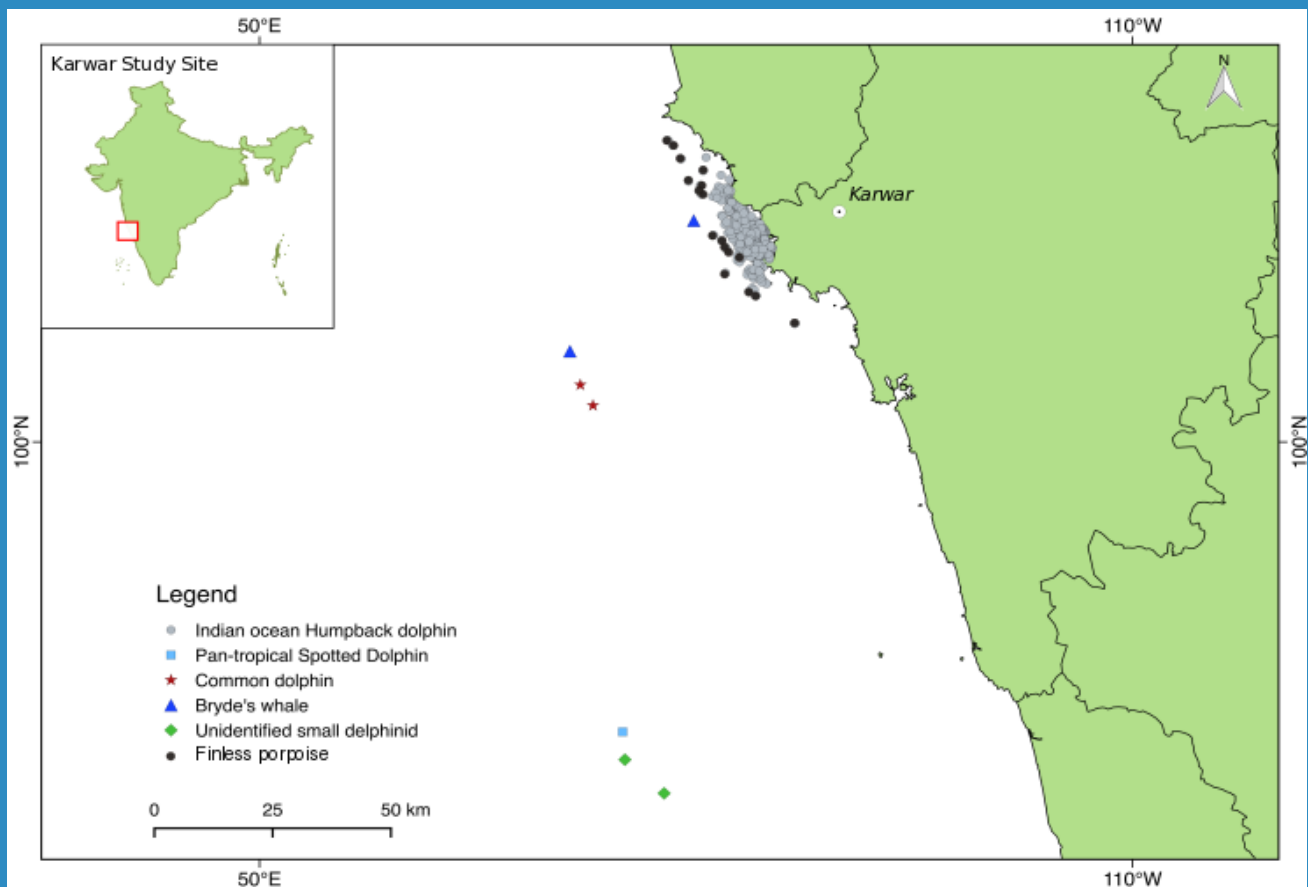


Figure 1: Sightings Indian Ocean humpback dolphin and Indo-Pacific finless porpoise in Karwar Bay and southern Goa (Jamalabad and Srinivasan 2017), along with offshore records of Bryde's whales, spotted dolphins and common dolphins, based on fishing vessel based surveys. Study period: 2015-2016 with 505hr of survey time and 20 fishing vessels involved. Map by Mahi Mankeshwar.

Jamalabad, A and Srinivasan, M. 2017. Fishery and coastal cetacean interactions off Karwar, Karnataka – a step towards understanding a little-known man-wildlife interface at sea. Paper presented at the Students Conference for Conservation Science, Bangalore.

Jamalabad, A. 2016. Fisheries and coastal cetacean interactions, livelihood-based solutions to mitigate impacts and potential conflict in Karwar, India. Report Submitted to the Inlaks Foundation, India.
MMRCNI .2019. Database of records from Maharashtra at <http://www.marinemammals.in/database/sightings-and-strandings/>

Sule M., Bopardikar I., Jog K., Jamalabad A., Panicker D., Tregenza N., Sutaria D.; A Review of *Neophocaena phocaenoides* Records from India, With A Special Focus on The Population in Sindhudurg, Maharashtra. A Paper Submitted to the IWC Sub-Committee, May 2017. Sc/67a/Sm/09.

Sutaria, D., and Jefferson, T. A. 2004. Records of Indo-Pacific Humpback Dolphin (*Sousa chinensis* Osbeck, 1765) along the coast of India and Sri Lanka – An Overview. Aquatic Mammals Special Issue 30(1) 125-136

Sutaria, D., Panicker, D., Jog, K., Sule, M., Muralidharan, R., and Bopardikar, I. 2015. Humpback dolphins (Genus *Sousa*) in India: an overview of status and conservation issues. In Advances in marine biology, vol. 72, pp. 229-256. Academic Press, 2015.

Sutaria D., Sule M., Jog K., Bopardikar I., Panicker D. 2017. Baleen Whale Records from the Arabian Sea, India. A Note Submitted to the IWC Sub-Committee, May 2017. SC/67a/CMP/03

Acknowledgements

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MARINE MAMMAL PROTECTED AREAS TASK FORCE

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