



Short Communication

An opportunistic encounter with a pod of Short-finned pilot whales (*Globicephala macrorhynchus* Gray, 1846) in the Lakshadweep archipelago

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Observations of short-finned pilot whales (*Globicephala macrorhynchus*) in the wild are relatively infrequent. This study reports an opportunistic live sighting recorded on 12 February 2024 in the Lakshadweep Islands of the southeastern Arabian Sea, based on vessel-based visual observations conducted aboard FORV *Sagar Sampada*. The sightings occurred (10°43'74" N; 73°27'35" E), a small pod of six individuals, each approximately 3 m in length at 1800 m depth. Environmental conditions at the sighting location were evaluated using both on-field and satellite-sourced datasets. Sea surface temperatures (SST) ranged between 29 and 31.5 °C, while salinity values indicated moderately stable oceanic conditions. Chlorophyll concentrations were relatively low, signifying oligotrophic surface waters during the observation period. These environmental characteristics may influence prey availability and influence the habitat use by short-finned pilot whales in the southeastern Arabian Sea.

[**Keywords:** Cetacea, *Globicephala macrorhynchus*, Indian EEZ, Live sighting, Ship-based observation, Toothed whale]

Introduction

The *Globicephala macrorhynchus* Gray, 1846 is a widely distributed oceanic delphinid that lives in warm waters around the world^{1,2}. These whales are commonly associated with deep offshore areas, particularly near continental edges, around oceanic islands, and where the sea floor drops steeply³⁻⁸. They are often seen where their prey, such as squids and deepsea fish, are abundant⁹⁻¹⁰. Records of short-finned pilot whales in the Indian Ocean are relatively limited, with sporadic reports from Indian waters, Sri Lanka, and adjacent regions. Most available information is

derived from occasional sightings, reports of stranded animals, and a few surveys in Indian waters and nearby regions. Based on this, there is a need for research to understand where these whales are found and the habitats they prefer¹¹⁻¹². The Lakshadweep islands, located in the southeastern Arabian Sea, have a complex underwater landscape with seamounts and oceanic conditions that support a wide variety of marine life. There are also plenty of oceanic squids here, which are important food for pilot whales. Even though the environment seems suitable, there haven't been many systematic studies of whales and dolphins in Lakshadweep¹³⁻¹⁷. Building on this context, our study describes an opportunistic sighting of short-finned pilot whales in the Lakshadweep Islands and explores surrounding environmental conditions using both on-site observations and satellite data.

Materials and Methods

We carried out an exploratory survey on board FORV *Sagar Sampada* (cruise No. 402) from 1 – 15 February 2024 as part of the Deep Ocean Mission (DOM), to document seamount-related biodiversity around the Lakshadweep archipelago. Opportunistic marine mammal observations were made by a trained Marine Mammal Observer (MMO) positioned on the vessel's bridge, with systematic visual observations conducted from 0700 to 1900, using bigeye 25×150 MT binoculars. We scanned the surrounding waters and took photos with a Nikon D5 camera and a 400 mm telephoto lens. For each observation, recorded key details such as the date, time, GPS location, water depth, distance to the animal, sea condition, wind, visibility, etc. We confirmed species identification with photos using standard field identification guides^{1,11}.

The sightings occurred about 300 km from the coast, in waters about 1,800 meters deep. To understand the site environment, used both direct measurements and satellite data. Also collected vertical profiles of temperature, salinity, and dissolved oxygen with a Conductivity–Temperature Depth (CTD) system. For sea surface conditions, satellite data sets were obtained for daily Sea Surface Temperature (SST) from <https://podaac.jpl.nasa.gov/dataset/MUR-JPL-L4-GLOB-v4.1> and for an eight-day running mean of Sea

Surface Salinity (SSS) from https://podaac.jpl.nasa.gov/dataset/SMAP_RSS_L3_SSS_SMI_8DAY-RUNNINGMEAN_V5. Furthermore, weekly composites of chlorophyll concentration for the second week of February 2024 were obtained from https://oceandata.sci.gsfc.nasa.gov/cgi/getfile/AQUA_MODIS.20240210_20240217.L3m.8D.CHL.chlor_a.4km.NRT.nc for the observation on February 12th, 2024.

Result and Discussion

Marine mammal observations were conducted during daylight hours throughout the survey period. On 12th February 2024, while the vessel was travelling southeast at approximately 5 knots, a small pod of short-finned pilot whales was observed along the southeast side of Andrott Island ($10^{\circ}43'74''$ N; $73^{\circ}27'35''$ E) at 1535 hrs (Fig. 1), about 15 m from the vessel. Six individuals were identified, representing a mixed-age group consisting of 2 males, 2 females,

and 2 juveniles. The average group size for this species is typically around 20. Although pilot whales are typically reported in larger pods ranging from a few tens to several hundred individuals, smaller groups have also been documented in offshore waters¹². The observed short-finned pilot whale exhibited key morphological characters, including a robust, stocky body and a distinctly bulbous melon, a dorsal fin that is low, broad-based, pectoral fins that are relatively short, broad and curved. Also noticed, several individuals had scars, tooth rakes, and minor injuries. The blow characteristics were also observed, typically a low, bushy spout reaching 1 m in height. Behavioural observations included slow travel and occasional interaction near the vessel (see Fig. 2a–d). Similar observations have been earlier reported in the southeastern Arabian Sea¹³.

Regarding the environmental parameters, the temperature profiles indicated a warm upper

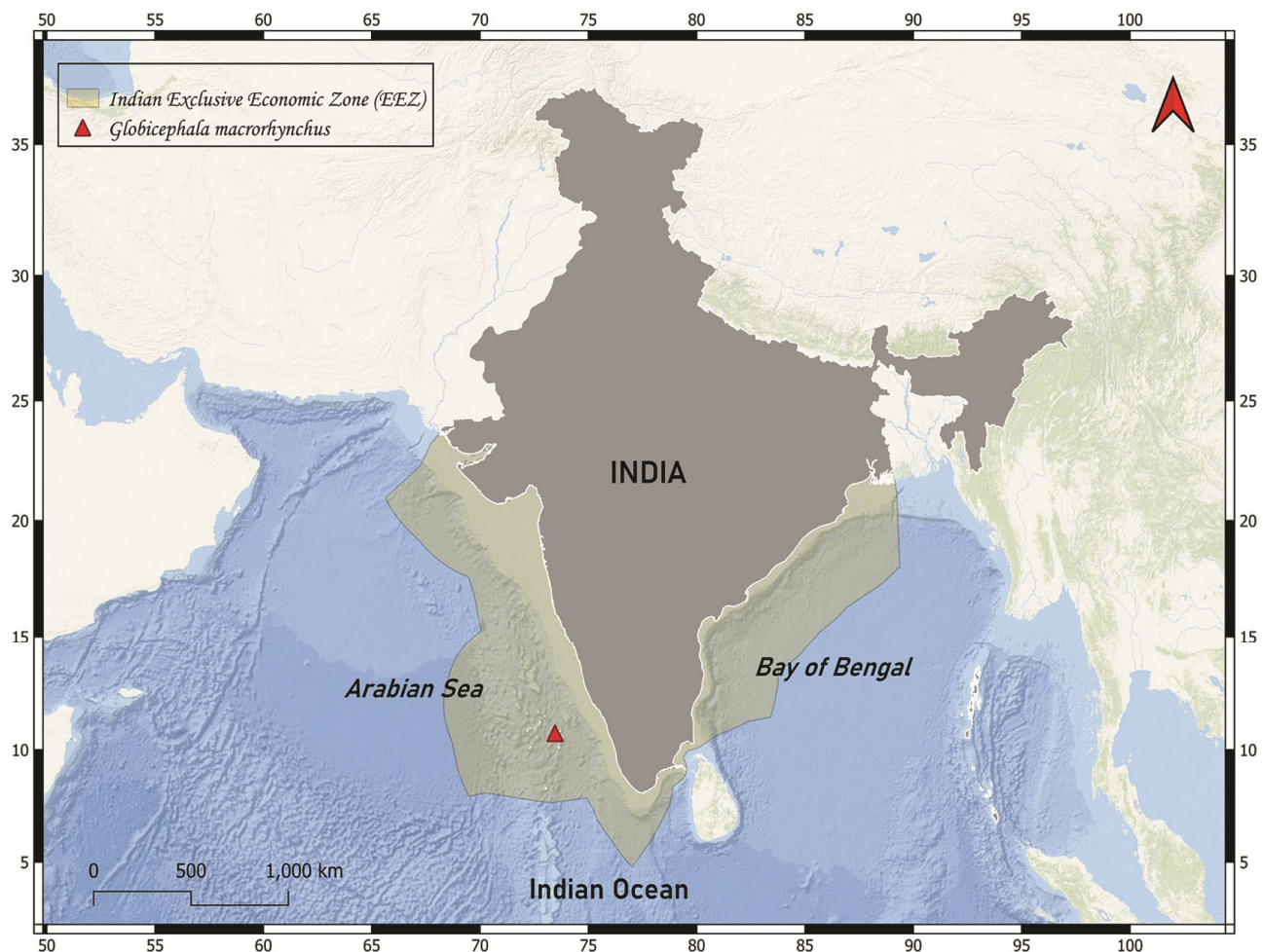


Fig. 1 — Sighting location of *Globicephala macrorhynchus* in the Lakshadweep Archipelago

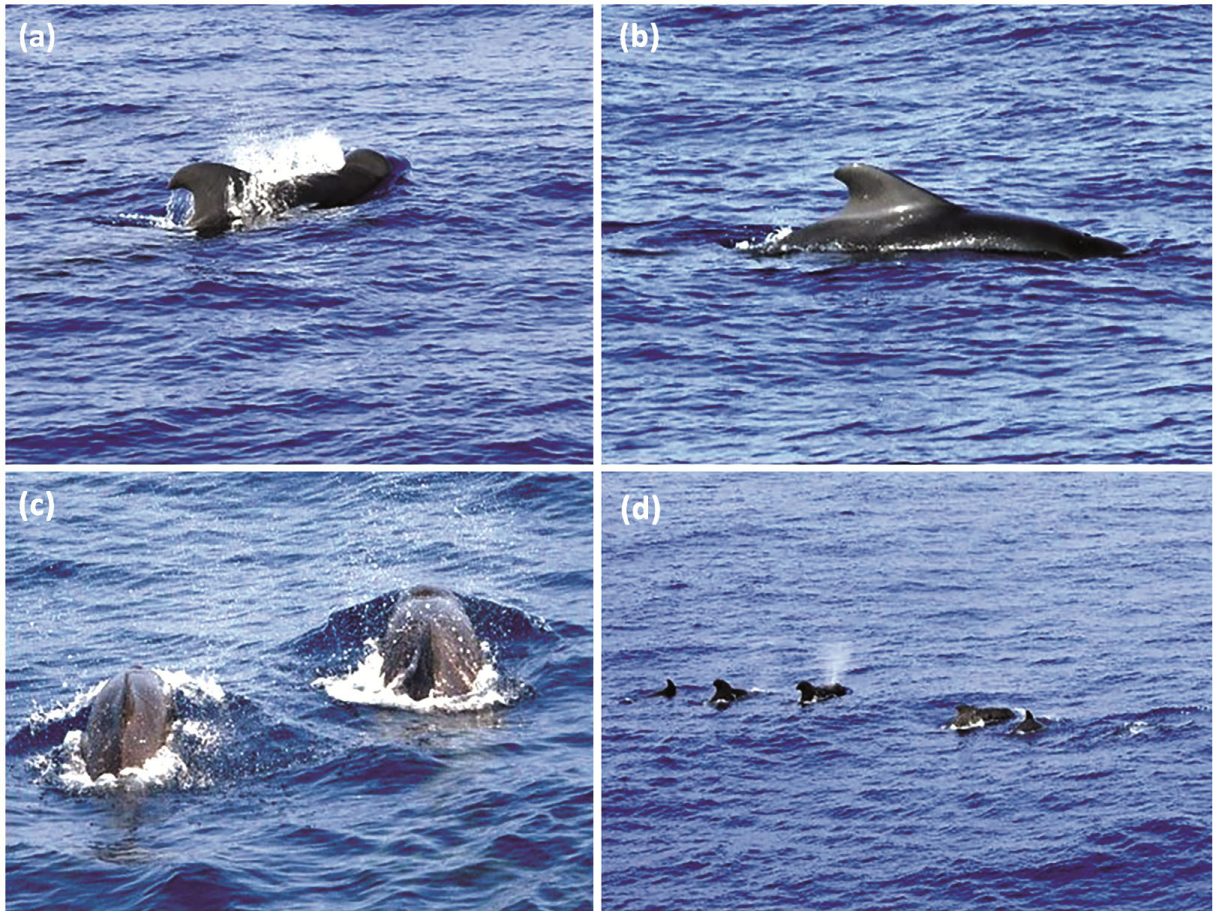


Fig. 2 — Few snapshots of short-finned Pilot whale *Globicephala macrorhynchus* at Andrott Island (Lakshadweep archipelago): a) Blow pattern exhibited by the pilot whales show a bushy spout; b) Resting activity; c) Two synchronising surfacing pilot whales; and d) Small pod of Pilot whale (group size 6)

water column, with values exceeding 29 °C down to approximately 80 m (Fig. 3a). Such thermal conditions are consistent with those previously reported as favourable for pilot whale occurrence^{14,15}. Surface salinity within the upper 40 m ranged between 34.8 and 35 psu, while dissolved oxygen concentrations varied from 4 to 6.5 mg L⁻¹. Satellite-derived sea SST values were elevated (29 – 31.5 °C) in the surrounding region (Fig. 3b), reflecting the warm surface waters typical of the central and southern Arabian Sea. Similar associations between pilot whale occurrence and warmer SST regimes have been documented¹⁶. The SSS showed moderate values (34.4 – 35.2 psu) at the sighting region (Fig. 3c), situated between the northern part characterised by the Arabian Sea High Saline Water mass (ASHSW) and the southern part exhibiting the low saline (< 34 psu) waters of the Bay of Bengal. Chlorophyll concentration showed minimum values (< 0.2 mg m⁻³) in the vicinity of the pilot whale sighting location

(Fig. 3d). The Lakshadweep waters are the major spawning ground for oceanic squids, contributing to increased productivity in the region¹⁷.

Studies of free-ranging pilot whale populations have increased in recent decades, particularly through photo-identification to understand social structure and site fidelity¹⁸⁻²⁰. However, in India, offshore observations are still quite limited. The Lakshadweep archipelago has recently become a focus of conservation due to its high biodiversity, prompting the establishment of new protected areas²¹. Observations like this one add important baseline information about cetaceans in the region. Due to the lack of data on this species in Indian waters, more field surveys are required to understand its distribution and habitat associations. Opportunistic sightings during oceanographic cruises provide valuable early insights and can inform future monitoring. They are currently listed as “Data Deficient” on the IUCN Red List^{22,23}, which highlights the need for more ecological research. In India, all cetaceans come under

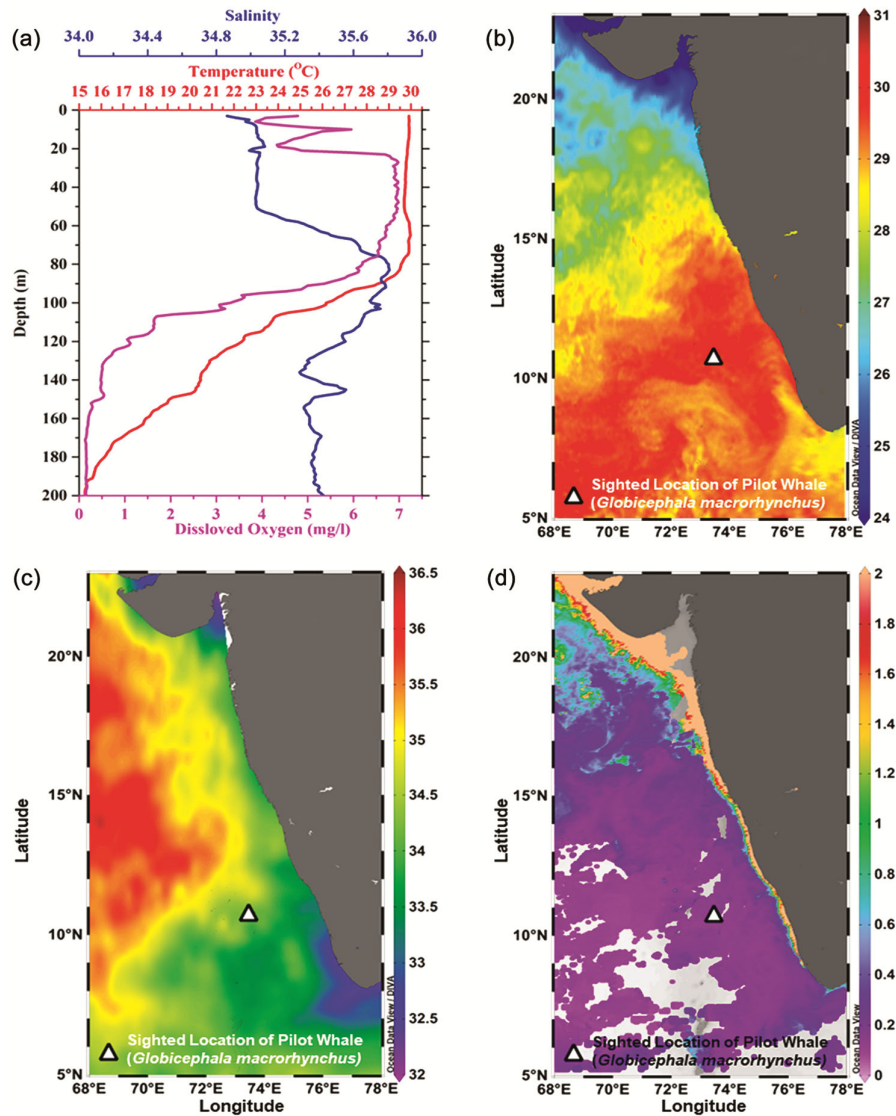


Fig. 3 — (a) *In-situ* profiles of temperature (°C), salinity (psu), and dissolved oxygen (mg/l) from CTD data; (b) Satellite data of sea surface temperature (°C); (c) 8-day running mean of sea surface salinity; and (d) Weekly composite of chlorophyll concentration (2nd week February 2024) in the Eastern Arabian Sea

Schedule I of the Wildlife (Protection) Act, 1972, underscoring their conservation importance.

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Conflict of Interest

The author declares no conflict of interest.

Ethical Statement

All applicable international, national, and/or institutional guidelines for the care and use of animals were followed.

Author Contributions

KMM & GK: Conceptualization, identification; KMM: Writing- original draft, photography; VSA: Editing; CVR: Data analysis and visualisation, writing, editing; RSK, SSC, NS: Writing- review & editing.

References

- 1 Jefferson T A, Webber M A & Pitman R L, *Marine mammals of the world: a comprehensive guide to their identification*, 2nd edn, (Academic Press, Elsevier, San Diego), 2008, pp. 608. <https://www.doi.org/10.1016/C2012-0-06919-0>
- 2 Bernard H J & Reilly S B, Pilot Whales *Globicephala* Lesson, In: *Handbook of Marine Mammals, Vol 6: The 193 Second Book of Dolphins and the Porpoises*, edited by Ridgway S H & Harrison R, (Academic Press, London), 1999, pp. 245–279.
- 3 Dohl T P, Guess R C, Duman M L & Helm R C, *Cetaceans of central and northern California, 1980-1983: status, abundance, and distribution*, (Pacific OCS Region, Minerals Management Service, U.S. Department of the Interior), 1983, Contract14-12-0001-29090.
- 4 Hui C A, Undersea topography and the comparative distributions of two pelagic cetaceans, *Fish Bull*, 83 (1985) 472–475.
- 5 Heimlich-Boran J R, *Social organization of the short-finned pilot whale, Globicephala macrorhynchus, with special reference to the comparative social ecology of delphinids*, PhD Thesis, University of Cambridge, UK, 1993.
- 6 Montero R & Arechavala M, Distribution patterns, relationships between depth, sea surface temperature and habitat use of short-finned pilot whales south-west of Tenerife, In: *European Research on Cetaceans - 10. Proceedings of the Tenth Annual Conference of the European Cetacean Society, Lisbon, Portugal*, edited by Evans P G H, (European Cetacean Society), 1996, pp. 193–198.
- 7 Olson P A & Reilly S B, Pilot whales, *Globicephala melas* & *G. macrorhynchus*, In: *Encyclopedia of Marine Mammals*, edited by Perrin W F, Würsig B & Thewissen J G M, (Academic Press, London), 2002, pp. 898–903.
- 8 Wells R S, Fougères E M, Cooper A G, Stevens R O, Brodsky M, *et al.*, Movements and dive patterns of short-finned pilot whales (*Globicephala macrorhynchus*) released from a mass stranding in the Florida Keys, *Aquat Mamm*, 39 (2013) 61–72.
- 9 Boris M C, *Review of Small Cetaceans. Distribution, Behaviour, Migration and Threats. Illustrations by Maurizio Wurtz, Artescienza*, (UNEP / CMS Secretariat, Bonn, Germany), 2003, pp. 343.
- 10 Hohn A A, D S Rotstein, C A Harms & B L Southall, *Report on marine mammal unusual mortality event UMESE0501. Multispecies mass stranding of Pilot Whales (Globicephala macrorhynchus), Minke Whale (Balaenoptera acutorostrata), and Dwarf Sperm Whales (Kogia sima) in North Carolina on 15–16 January 2005*, (NOAA Technical memorandum NMFS-SEFSC), 2006, pp. 537, 222.
- 11 Vivekanandan E & Jeyabaskaran R, *Marine Mammal Species of India*, (Central Marine Fisheries Research Institute, Kochi, India), 2012, pp. 228.
- 12 Jeyabaskaran R, Sakthivel M, Rameshkumar P, Jayasankar J, Vysakhana P, *et al.*, Biosonar dysfunction and stranding of short-finned pilot whale *Globicephala macrorhynchus* at Manapad, southeast coast of India- An emphatic key in demystifying the enigma? *Indian J Geo-Mar Sci*, 47 (10) (2018) 2077-2086.
- 13 Sajikumar K K, Ragesh N & Mohamed K S, Behaviour of Short-finned Pilot Whales *Globicephala macrorhynchus* (Gray, 1846) (Mammalia: Cetartiodactyla: Delphinidae) in the southeastern Arabian Sea, *J Threat Taxa*, 6 (11) (2014) 6488–6492. <http://dx.doi.org/10.11609/JoTT.o3659.6488-92>
- 14 Raghunathan C, Senthil Kumar S, Kannan S D, Mondal T, Sreeraj C R, *et al.*, Mass stranding of pilot whale *Globicephala macrorhynchus* Gray, 1846 in North Andaman coast, *Curr Sci*, 104 (2013) 37-41.
- 15 Garrison L P & Palka D, *Abundance of short-finned pilot whales along the U.S. east coast from summer 2016 vessel surveys*, (PRBD Contribution #PRBD-2018-07, Miami: Southeast Fisheries Science Center, Protected Resources and Biodiversity Division), 2018, pp. 21.
- 16 Stepanuk J E, Read A J, Baird R W, Webster D L & Thorne L H, Spatiotemporal patterns of overlap between short-finned pilot whales and the US pelagic longline fishery in the Mid-Atlantic Bight: an assessment to inform the management of fisheries bycatch, *Fish Res*, 208 (2018) 309–320.
- 17 Mohamed K S, Sasikumar G, Koya K P S, Venkatesan V & Kripa V, *Final report of the NAIP CN-2 scheme – Utilization strategy for oceanic squids (Cephalopoda) in Arabian Sea: A value chain approach*, (CMFRI, Kochi), 2014, pp. 103.
- 18 Miyashita T, Kasuya T & Mori K, An examination of the feasibility of using photo-identification techniques for a short-finned pilot whale stock off Japan, *Report of the International Whaling Commission (Special Issue)*, 12 (1990) 425–428.
- 19 Shane S H & McSweeney D, Using photo-identification to study pilot whale social organization, *Report of the International Whaling Commission (Special Issue)*, 12 (1990) 259–263.
- 20 Auger-Methe M & Whitehead H, The use of natural markings in studies of long-finned pilot whale (*Globicephala melas*), *Mar Mamm Sci*, 23 (2007) 77–93.
- 21 Kamalakannan M, Raheem C N A, Banerjee D & Marimuthu N, Opportunistic sighting of a Sperm Whale *Physeter macrocephalus* Linnaeus, 1758 in Lakshadweep Archipelago, *J Threat Taxa*, 14 (8) (2022) 21733-21735. <https://doi.org/10.11609/jott.7692.14.8.21733-21735>
- 22 IUCN, *Guidelines for Application of IUCN Red List Criteria at Regional and National Levels: Version 4.0*. Gland, (Switzerland and Cambridge, UK), 2012.
- 23 Taylor B L, Baird R, Barlow J, Dawson S M, Ford J, *et al.*, *Globicephala macrorhynchus* The IUCN Red List of Threatened Species (2014), Version 2014.2. Accessed online at: www.iucnredlist.org; (Accessed on October 2024).