

Chilika Lagoon IMMA

Description

Chilika Lagoon is a brackish water lagoon located in Orissa, India (19° 28'N - 19° 54'N and 85° 05'E - 85° 38'E) and is separated from the Bay of Bengal by a spit which is 1-1.5km wide and 20 km long. It is connected to the sea by a ~10 km long outer channel, leading to a single artificially dredged mouth (in September 2000) that varies in position and width after every monsoon. The lagoon maintains the influx and circulation of salt water via this single opening and is highly productive in fish diversity and volume, given its brackish water ecosystem.

The lagoon is oblong in shape, with a maximum length of ~64 km and an average mean width of ~12 km (Max=22 km, min=200 m), shrinking in size from ~1165 km² in the wet season (June- September) to ~900 km² in summer (March-May). The Mahanadi River basin in north Chilika drains into the lagoon via rivulets throughout the year, bringing with it agricultural run-off. During the monsoon, more than 50 rivulets run into Chilika from its northern and western aspects. The lagoon is relatively shallow; depths are <6 m even during the wet season. The salinity and pH in the lagoon vary depending on the region of the lagoon and the season and range between 0-45 ppt and 7.0-10.9 pH respectively. The lagoon can be divided into four sectors - the northern, central, and southern sectors and the outer channel. Most of the lagoon has a muddy substrate, with the shores in the southern and central sectors becoming weed-infested or unreachable due to the presence of fishing enclosures. The outer channel has sea grass beds with sandy substrate and muddy substrate with seaweed. A wetland of high social and ecological importance, Chilika lagoon is listed as a RAMSAR site and undergoes regular maintenance dredging to prevent silt collection in the northern sector and the outer channel.

The population of Irrawaddy dolphins here was first recorded by Annandale in 1875 and recent studies have estimated that the population is small (Pattanaik et al., 2007; Sutaria, 2009; and Sutaria and Marsh, 2011).



Area Size

319 km²

Qualifying Species and Criteria

Irrawaddy dolphin – *Orcaella brevirostris*

Criteria A, B1

Summary

Chilika Lagoon is a brackish water lagoon in southern Orissa, India. The lagoon is separated from the Bay of Bengal by a spit which is 1-1.5 km wide and 20 km long. The opening to the sea varies in position and width after every monsoon. A small population of 112-140 Irrawaddy dolphins (*Orcaella brevirostris*) is resident in Chilika lagoon based on photo-identification studies from 2003-2010. Mating chases were observed from February to April; and calf sightings peaked in December-January. Dolphins were observed feeding on a range of bony fishes, scat fishes, *Scoliodon sp.* and mullet. There is no known movement of dolphins from, or into, the lagoon, with humpback dolphins and Bull sharks dominating the coast outside the lagoon. Documentation of Irrawaddy dolphins outside the lagoon is from the mangroves of Bhitarkanika, 250-300 km north of Chilika. The primary threats to the population in Chilika is fisheries entanglement and unmanaged dolphin-watching tourism.



Figure 1: A sub-adult Irrawaddy dolphin in Chilika lagoon. Photo: Dipani Sutaria



Figure 2: A newborn Irrawaddy dolphin and adult in Chilika lagoon. Photo: Dipani Sutaria

Criterion A: Species or Population Vulnerability

Irrawaddy dolphins are listed as globally Endangered and decreasing by the IUCN Red List of Threatened Species (Minton et al., 2017). The estimated population in this IMMA is small, at 112-140 animals (Sutaria, 2009). The population in Chilika is also resident based on photo-identification data from 2004 to 2010, making Chilika an important area for this species. In Chilika, Irrawaddy dolphins live in close proximity to intense fishing activities and annual mortality rates reached as high as 7% (Pattanaik et al., 2007; Sutaria, 2009; D'Lima, 2014), primarily from fisheries entanglements. Such high mortality rates make the population vulnerable to stochastic and anthropogenic pressures (Sutaria, 2009). Habitat loss from the accumulation of silt is one of the major pressures on this brackish water system.

Criterion B: Distribution and Abundance

Sub-criterion B1: Small and Resident Populations

Chilika supports a small population of resident Irrawaddy dolphins, physically isolated from coastal populations, vulnerable to fisheries entanglements, un-managed dolphin watching tourism traffic and habitat loss (Fig. 3). Given that the population is resident, and spends its entire lifecycle within the lagoon, Chilika is an area that is additionally important for breeding and calving. Mating chases were observed where the chased individual (a female) was seen belly-up with other individuals on top (Sutaria, 2009). The outer channel of the lagoon had a higher density of mother-calf pairs (Fig. 2) and juveniles than the rest of the lagoon, and new-born calves showing foetal curves were also sighted with adults (Sutaria, 2009; D'Lima, 2014). Mark-Recapture analysis of 80 photo-identified individual dolphins using natural

marks estimated the abundance of the population as 109 to 112 individuals at CV=0.07 (closed models); and 140 at CV=0.25 (open models), based on surveys from November 2004 to December 2006 (Sutaria, 2009). Their area of space use is not more than 400 km² with individual home-ranges as small as 1.7 km² showing how sensitive the population could be to changes in habitat features such as depth and salinity. The lagoon is highly productive, providing a rich source of prey to the dolphins. Multiple foraging strategies (both solitary and cooperative group foraging) have been observed in Chilika (Sutaria, 2009; D'Lima, 2014). Coastal surveys of Orissa have not sighted another such resident population (Sutaria, 2009; Orissa State Forest Department) making the population in Chilika an important source population for the species in India and regionally. The closest Irrawaddy dolphin sightings outside Chilika, are upstream in the mangroves of Bhitarkanika, 250-300km to the north. The IUCN Red List of Threatened Species lists all other isolated and semi-isolated populations of Irrawaddy dolphins in the species' range as Critically Endangered.

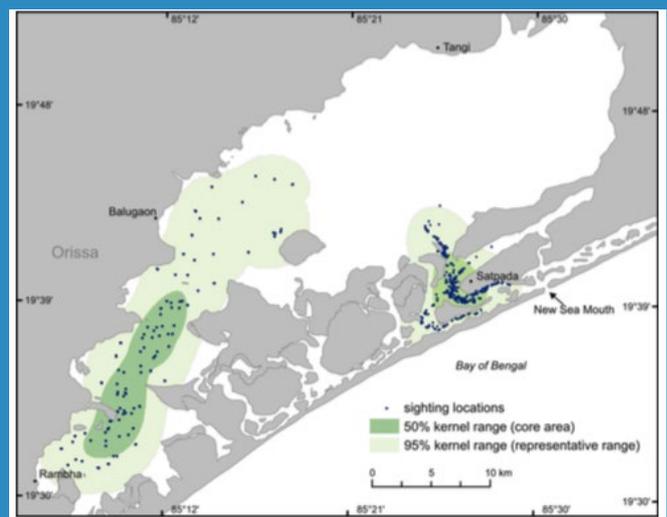


Figure 3: Distribution and occupancy of Irrawaddy dolphins (*Orcaella brevirostris*) in Chilika Lagoon. From: Sutaria, 2009

Supporting Information

D'Lima, C. 2014. Striking a balance between fishing, tourism and dolphin conservation at Chilika Lagoon, India. PhD thesis, James Cook University, Townsville, Australia.

Minton, G., Smith, B.D., Braulik, G.T., Kreb, D., Sutaria, D. and Reeves, R. 2017. *Orcaella brevirostris* (errata version published in 2018). The IUCN Red List of Threatened Species 2017: e.T15419A123790805. <http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T15419A50367860.en>. Downloaded on 25 October 2018.

Sutaria, D. 2009. Understanding species conservation in complex socio-ecological systems: case of Irrawaddy dolphins in Chilika Lagoon, India. PhD thesis. James Cook University, Townsville, Australia.

Sutaria, D. and Marsh, H. 2011. Abundance estimates of Irrawaddy dolphins in Chilika Lagoon, India, using photo-identification based mark-recapture methods. *Marine Mammal Science* 27(4): E338-E348.

Sutaria, D., Bopardikar, I., and Sule, M. 2017. Irrawaddy dolphins, *Orcaella brevirostris* from India. Primary paper SC/67A/SM/08. International Whaling Commission. Slovenia.

Pattanaik, A. K., Sutaria, D., Khan, M., and Behera, B. 2007. Review of the Status and Conservation of Irrawaddy Dolphins *Orcaella brevirostris* in Chilika Lake of India. Working paper series # 31. In 'Status and conservation of freshwater populations of Irrawaddy dolphins' pps 41-52. Wildlife Conservation Society, Phnom Penh, Cambodia.

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**MARINE MAMMAL
PROTECTED AREAS
TASK FORCE**



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