Area Size

3 663 km²

Qualifying Species and Criteria

Irrawaddy dolphin – *Orcaella brevirostris*
Criterion A; B (2)
Ganges River dolphins – *Platanista gangetica*
Criterion A; B (2)

Marine Mammal Diversity

Sousa chinensis, Neophocaena phocaenoides

Summary

The Sundarbans is the world's largest mangrove forest. Tidal waterways in the Bangladesh portion, which covers about 2/3s of the total forest, support globally significant populations of Endangered Ganges River dolphins (~225) and Irrawaddy dolphins (~451). Although no population estimates exist and salinity levels are higher in the Indian side of the Sundarbans, ecological similarities and scattered reports of Irrawaddy dolphin occurrence imply that these waterways are also important for this species. The occurrence in the IMMA of two Endangered dolphin species in relatively large numbers compared to other areas of their distribution means that the Sundarbans meet both Criterion A – Species or Population Vulnerability and Criterion B2 – Aggregations.
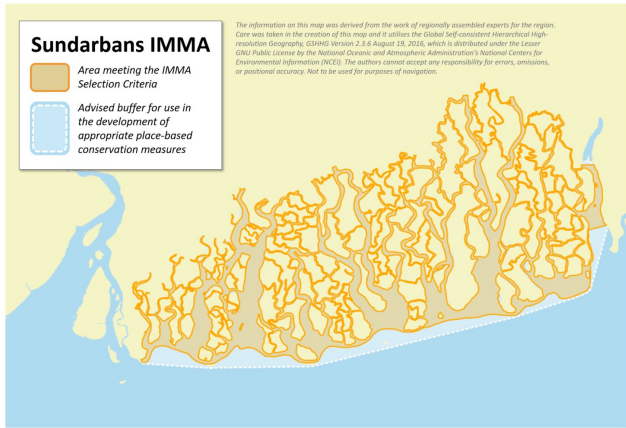
Sundarbans IMMA

Description

The IMMA in the Sundarbans includes the largest mangrove forest in the world encompassing about 577,000 ha, of which approximately 175,600 are inundated by a complex network of tidal and fluvial waterways, ranging from a few meters to a few kilometers wide (Hussain and Karim, 1994). Salinity levels in the Sundarbans are determined primarily by physical forcing from freshwater flow and to a lesser degree by diurnal tides. After construction of the Farakka Barrage significant increases in salinity levels were documented in the Indian side of the Sundarbans. Increased sediment deposition due to reduced river discharges has led to the gradual drying up of distributaries that previously contributed to repelling salinity encroachment (Mirza, 1998). An additional contributing factor to ecological alteration in the Sundarbans is the effects of global climate change especially sea-level rise (Smith et al., 2008).

Survey results indicate the Bangladesh side supports globally significant numbers of Irrawaddy *Orcaella brevirostris* and Ganges River dolphins *Platanista gangetica*, especially compared to other areas where the species have been surveyed. Independent observer teams made concurrent counts of Irrawaddy and Ganges River dolphins in mangrove channels of the Sundarbans in Bangladesh. These counts were corrected for missed groups using a mark-recapture model. Final averaged models incorporated group size, sighting conditions, and channel width as covariates, and generated abundance estimates of 451 individuals (CV = 9.6%) and 225 individuals (CV=12.6%) for Irrawaddy and Ganges River dolphins, respectively (Smith et al., 2006). Although Ganges River dolphins are often cited as occurring in the Indian side of the

Figure 1: Ganges River dolphin surfacing in Dolphin Sanctuary, Bangladesh. Photo: WCS Bangladesh

Sundarbans (Danda et al., 2017), confirmed records are limited to scattered reports of Irrawaddy dolphins in Marine Mammal Conservation Network of India Sightings and Strandings Database (2018).

Generalized additive models of sighting data indicated that Ganges River dolphin distribution is conditionally dependent on low salinity, high turbidity, and moderate depth during both low and high freshwater flow; and Irrawaddy dolphin distribution is conditionally dependent on low salinity during high freshwater flow, high and moderate depths during low and high freshwater flow, respectively; low and high-low extremes of turbidity during low and high freshwater flow, respectively; and high temperature and increasing numbers of large–small channel confluences during low freshwater flow. According to sighting data collected over a 3-year period, there are shared preferences for wide sinuous channels with at least two small confluences or one large confluence. The dependency exhibited by both species for environmental characteristics associated with abundant freshwater flow, including low salinity and the availability of confluences, make them

particularly vulnerable to habitat loss due to upstream water abstraction and sea-level rise (Smith et al., 2008).

Criterion A: Species or Population Vulnerability

The occurrence of globally significant populations of two Endangered dolphin species including the Ganges River dolphin assessed as IUCN Red List category Endangered [A2abcde + 3bcde + 4abcde] (Kelkar et al. 2022) and Irrawaddy dolphin assessed as IUCN Red List category Endangered [A2cd + 3cd + 4cd] (Minton et al., 2017).

Criterion B: Distribution and Abundance Sub-criterion B2: Aggregations

Large population sizes have been assessed for both Ganges River dolphins (n=225) and Irrawaddy dolphins (n=451), with relatively high encounter rates observed within the IMMA compared to other areas where both species occur (Smith et al., 2006). Similar mangrove channel habitat occurs across the border with India.

Figure 2: Irrawaddy dolphin, *Orcaella brevirostris*. Photo: WCS Bangladesh

Supporting Information

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