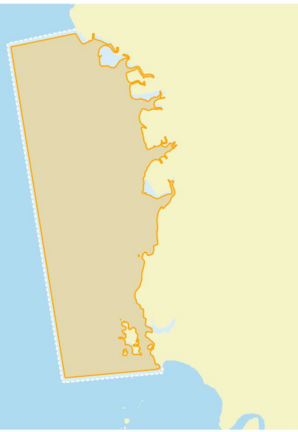


Matang Mangroves and Coastal Waters IMMA

Area meeting the IMMA Selection Criteria

Advised buffer for use in the development of appropriate place-based conservation measures



Area Size

2,386 km²

Qualifying Species and Criteria

Irrawaddy dolphin – *Orcaella brevirostris*

Criterion A; B (2); C (1, 2)

Indo-Pacific humpback dolphin – *Sousa chinensis*

Criterion A; B (2); C (1, 2)

Indo-Pacific finless porpoise –

Neophocaena phocaenoides

Criterion A; B (2); C (1, 2)

Other Marine Mammal Species

Documented

Stenella longirostris, *Tursiops aduncus*

Summary

The Matang Mangroves and Coastal Waters IMMA lies between the latitudes 4°09'-4°54'N in the state of Perak, northwestern Peninsular Malaysia. It is an extensive area comprising mangrove forests within a series of riverine and estuarine waterways that lead out into a shallow but productive intertidal mudflat coastal region. The area constitutes one of Peninsular Malaysia's most intensive fisheries grounds. The IMMA also hosts a significant locally occurring population of Indo-Pacific humpback dolphins (*Sousa chinensis*) within the riverine waterways, estuaries and areas closest to the coastal shoreline, while Irrawaddy

Matang Mangroves and Coastal Waters IMMA

Summary, continued.

dolphins (*Orcaella brevirostris*) are sighted year-round near the estuaries and further off the coast in silty bottom areas, measuring <20m in depth. The western edge of this IMMA also contains habitat for Indo-Pacific finless porpoises (*Neophocaena phocaenoides*). Ongoing research since 2013 has revealed that the area provides important feeding, breeding, nursing and socialising grounds for both the Indo-Pacific humpback dolphins and Irrawaddy dolphins.

Description

The Matang mangroves and coastal waters IMMA lies between the latitudes 4°09'-4°54' N in the northwest coast of Peninsular Malaysia in the state of Perak. Matang's coastal waters are part of the Straits of Malacca, the body of water that separates Peninsular Malaysia and Sumatra, Indonesia. The coast is covered with an extensive acreage of mangrove forests within a series of riverine and estuarine waterways that lead out into a shallow but productive intertidal mudflat coastal region (Ariffin and Nik Mohd Shah, 2013). The inshore waters are generally shallow and measure less than 6 m deep, with the maximum water depth in the IMMA reaching only 32 m. Several fishing villages are found in this area, where artisanal and commercial fishermen engage in gillnetting, trawling and cockle culture. This area is one of Peninsular Malaysia's most intensive fisheries grounds, both in commercial (trawl) and artisanal fisheries as well as aquaculture. The Matang mangroves and the adjacent mudflats are important nursery and feeding grounds for marine fish and invertebrates, supporting one of the most productive fishing grounds in Malaysia.

However, the area constitutes one of the top fish landing sites in Malaysia, whereby Perak state contributes approximately 23.7% of total marine fish landings in the country (Department of Fisheries Malaysia, 2020).



Figure 1: Indo-Pacific humpback dolphins (top) and Irrawaddy dolphins (bottom) in the coastal waters of Matang, Perak, Malaysia
Photo: MareCet Research Organization

Matang's coastal waters are home to Indo-Pacific humpback dolphins (*Sousa chinensis*), Irrawaddy dolphins (*Orcaella brevirostris*) and Indo-Pacific finless porpoises (*Neophocaena phocaenoides*) (Ponnampalam, 2013; Kuit et al., 2014). The research of Kuit et al. (2014, 2019, 2021) using systematic boat-based surveys has revealed that the area is important feeding, breeding, nursing and socialising grounds for both humpback dolphins and Irrawaddy dolphins (Figure 1). Humpback dolphins have a patchy

distribution pattern, and are mostly encountered in the estuaries, particularly off Kuala Sangga Besar, and sometimes enter rivers such as Sungai Sangga Besar, Sungai Sepetang and Sungai Jarum Mas (Kuit et al., 2019; Figure 2). Irrawaddy dolphins are found throughout the coastal waters of Matang while finless porpoises are found furthest from shore in the coastal waters and have not been observed in the estuaries (Kuit et al., 2019; Figure 2). These species are resident in the area and are found year-round. Eco-tourism and dolphin-watching in Kuala Sepetang has been gaining traction in the past few years, and wildlife-watching activities in Matang include dolphin-watching tourism. A guideline for dolphin-watching tourism in Matang was recommended to reduce negative impacts from tour interactions to the dolphins (Kuit et al., 2014).

Criterion A: Species or Population Vulnerability

Indo-Pacific humpback dolphins (*Sousa chinensis*) (hereafter referred as humpback dolphins) and Indo-Pacific finless porpoises (*Neophocaena phocaenoides*) (hereafter referred as finless porpoises) are listed as VU on the IUCN Red List of Threatened Species (Jefferson et al. 2017; Wang and Reeves, 2017), whereas Irrawaddy dolphins (*Orcaella brevirostris*) are listed as EN (Minton et al. 2017).

However in Malaysia, all three species are further listed as Marine Endangered Species and protected under the Fisheries Act 1985 and Fisheries (Control of Endangered Species) Regulation (Amendment) 2008. The main fishing gears inshore that entangled humpback dolphins and Irrawaddy dolphins are gillnets, driftnets and trammel nets, whereas trawls were the more fatal bycatch gear offshore that entangled mostly finless porpoises (Kuit & Ponnampalam, 2021; Figure 3).

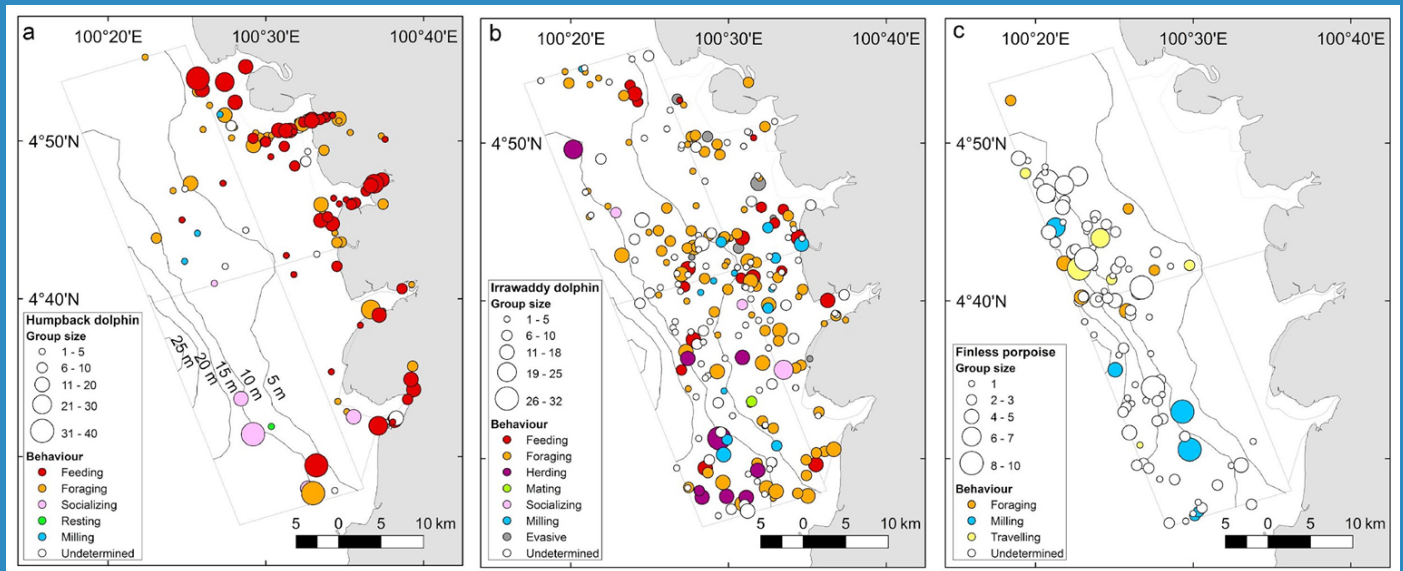


Figure 2: Spatial distribution of group size and behaviour of (a) Indo-Pacific humpback dolphin, (b) Irrawaddy dolphin, and (c) Indo-Pacific finless porpoise sightings in Matang. The size of the circle indicates the group size, and the colour of the circle indicates the predominant behaviour of the group. (Extracted from Kuit et al., 2019)

Criterion B: Distribution and Abundance

Sub-criterion B2: Aggregations

Systematic research from 2013 – 2016 in the area within the IMMA measuring 1152 km² and effort amounting 110 survey days across 11 surveys has found that there were 763 Irrawaddy dolphins (CV = 13, 95% CI = 588-990) and 600 finless porpoises (CV = 27%, 95% CI = 354-1016) in the surveyed area (Kuit et al., 2021). The annual abundance estimates of humpback dolphins ranged between 171 (95% CI = 148-208) in 2014–2015 and 81 (95% CI = 67-98) in 2015–2016, likely due to the presence of offshore individuals that moved in and out of the study area (Kuit et al., 2021). The estuarine strata were inhabited by 68 inshore humpback dolphins (95% CI = 63-73) in 2013–2014 to 87 (95% CI = 78-97) dolphins in 2014–2015 (Kuit et al., 2021). These animals are present year-round in Matang's estuaries and coastal waters. Group sizes of humpback dolphins ranged from 1 – 40 individuals (n = 124), whereas group sizes of Irrawaddy dolphins ranged from 1 – 32 individuals (n = 254) (Kuit, 2021). Irrawaddy dolphins in Matang coastal waters were observed to aggregate in large groups (≥ 10 individuals) and engage in herding behaviour (Kuit, 2021). Photo-identification data show that the inshore

humpback dolphins in the IMMA range across the five estuaries that feed into Matang's coastal waters, with many individual dolphins displaying high site fidelity. Further offshore, approximately 10 km onward, finless porpoises were recorded in groups of 1-10 individuals (n = 102) (Kuit et al., 2019).

Criterion C: Key Life Cycle Activities

Sub-Criterion C1: Reproductive Areas

Systematic research from 2013 – 2016 in the area within the IMMA has found that 59% (n = 73) of the total number of humpback dolphin sightings (n = 124) contained calves (including neonates) (Kuit, 2021). Sightings of humpback dolphins containing neonates constituted 1.6% (n = 2) of the species' total sightings. In January 2017, a female humpback dolphin that washed ashore dead in Matang was found to be pregnant with a near-term foetus (MareCet, unpublished data). Irrawaddy dolphin sightings that contained calves (including neonates) made up 28% (n = 70) of the total number of the species' sightings (N = 254). Sightings of Irrawaddy dolphin groups containing neonates constituted 0.4% (n = 1) of the species' total sightings (N = 254). Of the 254 Irrawaddy

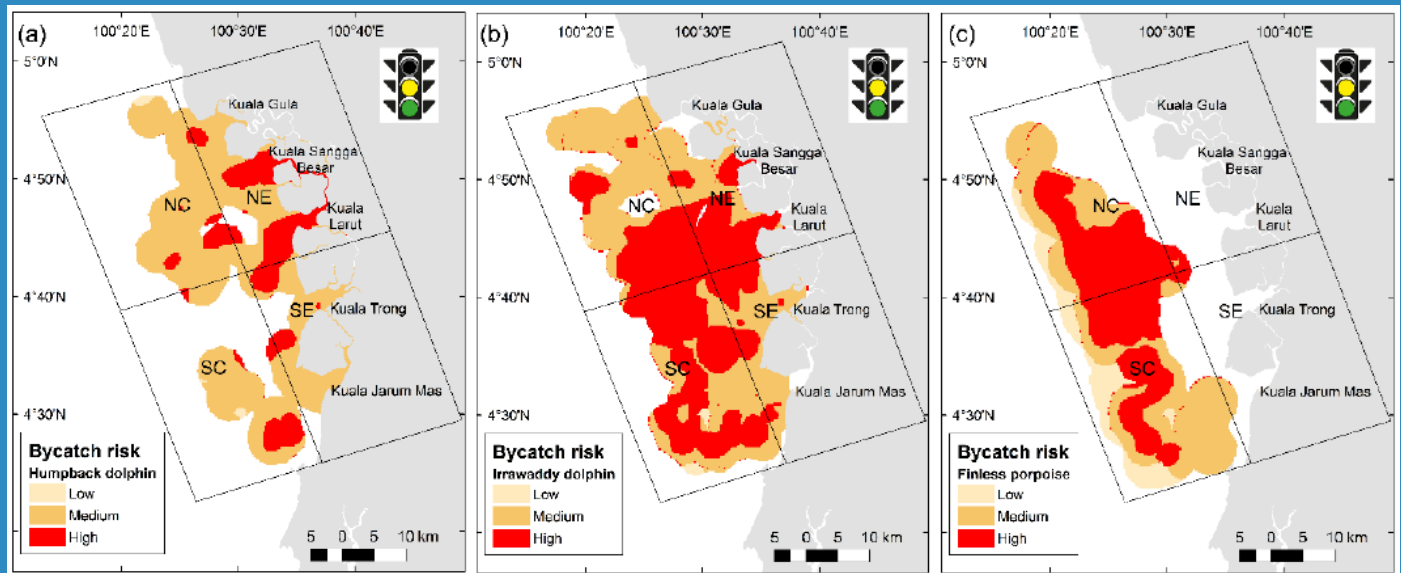


Figure 3: Estimated bycatch risk for (a) Indo-Pacific humpback dolphins, (b) Irrawaddy dolphins and (c) Indo-Pacific finless porpoises in Matang. Darker red indicates higher bycatch risk. (Extracted from Kuit & Ponnampalam, 2021)

dolphin groups sighted in the IMMA, 1.2% (n = 3) were recorded engaging in herd mating and sexual behaviour. Of the 128 humpback dolphin groups observed, 3.1% were recorded engaging in sexual behaviour (MareCet, unpublished data). In December 2013, a female finless porpoise that was accidentally bycaught in a trawl net was found to be pregnant with a near-term foetus (MareCet, unpublished data).

Sub-Criterion C2: Feeding Areas

Systematic research effort across 2013 – 2016 within the IMMA has found that humpback dolphins engaging in feeding or foraging behaviour constituted 74.3% (n = 95) of the total species' sightings (N = 128). Of the 95 humpback dolphin sightings categorised as feeding, 30.0% (n = 29) were of direct observations of the dolphins preying on marine catfish (Kuit et al., 2015). Stomach contents recovered from humpback dolphins found dead stranded in Matang contained remains of coastal fish and cephalopod species known to occur in the area (Kuit et al., 2015). Irrawaddy dolphin groups observed in the IMMA were found engaging in feeding or foraging behaviour in 50.8% (n = 129) of the species' total sightings (N = 254) (Kuit et al., 2015).

Supporting Information

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Acknowledgements

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**MARINE MAMMAL
PROTECTED AREAS
TASK FORCE**



Supported by:



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Environment, Nature Conservation,
Building and Nuclear Safety

based on a decision of the German Bundestag



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