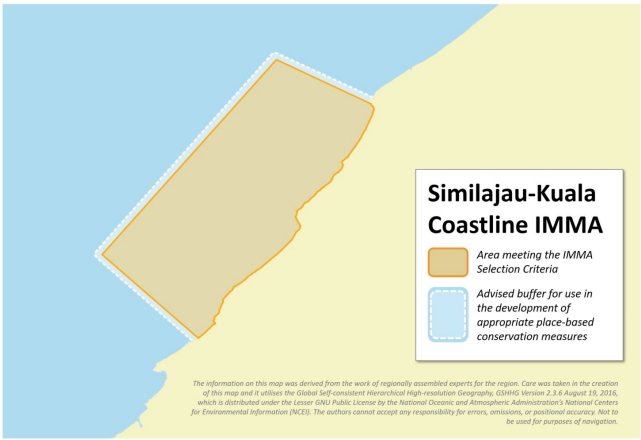

Area Size

1 235 km^2

Qualifying Species and Criteria

Irrawaddy dolphin – *Orcaella brevirostris*

Criterion A; B (1)

Finless porpoise – *Neophocaena phocaenoides*

Criterion A; B (1)

Indo-Pacific Humpback dolphin – *Sousa chinensis*

Criterion A; B (1)

Summary

The Similajau to Kuala Nyalau coastline encompasses approximately 455 km^2 of coastal waters in the Bintulu district, Sarawak, Malaysian Borneo. While a few small rivers empty into this stretch of coastline, it does not include any major estuaries or bays. It does encompass the coastal waters of Similajau National Park, a terrestrial park increasingly hemmed in by oil palm plantations, a major industrial park and a liquefied natural gas plant. Research conducted over a period of six years reveals that Irrawaddy dolphins, finless porpoises and humpback dolphins are frequently sighted along this coastline. Photo-identification studies indicate a high rate of site fidelity for Irrawaddy dolphins that appear to be resident year-round, while finless porpoises were encountered more

Similajau-Kuala Nyalau Coastline IMMA

Summary, continued.

frequently here than in any other study site in Sarawak. Observations of Irrawaddy dolphin and finless porpoise calves and feeding behaviour demonstrate that these coastal waters are important habitat for both species.

Description

The Similajau to Kuala Nyalau coastline is located in the Bintulu division of the state of Sarawak, Malaysian Borneo. The Similajau to Kuala Nyalau coastline is a straight area of coast that runs approximately from north to south, interspersed with rivers and streams of varying sizes at fairly regular intervals. The area encompasses the entire coastline bordering the Similajau National Park and the area offshore from the fishing village of Kuala Nyalau. When the Sarawak Dolphin Project started to conduct surveys in this area in 2008, the fishing village and a liquid national gas terminal 10 km south of the park were the only coastal developments in the area. As of 2018, the majority of the land around the fishing village has been converted from secondary forest to oil palm plantations, and the area between the village and the national park now hosts a large-scale industrial park with a deep-water port and aluminium smelter plant. Survey designs from 2008 to 2013 have focused on the collection of baseline data on the distribution and habitat preferences of cetacean species pre-construction for comparison with similar studies to be conducted during and post-development.

Figure 1: Three adult Irrawaddy dolphins in the Similajau-Kuala Nyalau IMMA. Photo: Sarawak Dolphin Project

Figure 2: Indo-Pacific humpback dolphin sighted in front of Golden Beach in the Similajau-Kuala Nyalau IMMA.
Photo: Sarawak Dolphin Project

Irrawaddy dolphins, finless porpoises and humpback dolphins are the most frequently sighted coastal cetaceans along this coastline (Minton et al., 2011). The best mark-recapture estimate for Irrawaddy dolphins in this area based on photo-identification data collected between 2008 and 2015 (a weighted mean of estimates derived from individuals represented by photos of their left sides (n=81) and right sides (n=69)) was 189 (CV = 23%, 95% CI = 122-292). These estimates overlap well with those derived from line transects conducted between 2010 and 2013 (170, CV = 38%, 95% CI = 81-356) (Peter et al., 2017). The best line transect estimate for finless porpoises derived from the same study was 107 (CV = 35.5%, 95% CI = 54-213, Sarawak Dolphin Project, unpublished data).

Figure 3: An Indo-Pacific finless porpoise in the Similajau-Kuala Nyalau IMMA. Photo: Sarawak Dolphin Project

Despite their inconspicuous behaviour, the encounter rates for finless porpoises were higher in this study area than any other in Sarawak (Minton et al., 2011). Observations occurred in depths ranging between 2-15 m and this was the only coastal species to be observed beyond the 10 m contour line in this study area (Zulkifli Poh et al., 2017). Irrawaddy dolphins were found in shallower, more turbid waters, closer to shore and river mouths, and were never observed beyond the 10 m contour line (Minton et al., 2011). Group sizes of Irrawaddy dolphins ranged from 1-16 individuals with larger groups occurring only in the north of the industrial park portion of the study area (Peter et al., 2017).

Humpback dolphins were observed on four occasions along the northern boundary of the Similajau National Park in depths ranging from 4.5-9.2 m. Their group sizes ranged from 8-25 individuals (Sarawak Dolphin Project, unpublished data).

Thirty-two individually identified Irrawaddy dolphins showed a high-degree of site fidelity, with fewer than 15 km between sighting locations over a period of six years. In contrast, one individual dolphin travelled a minimum straight-line distance of 58 km from the northern tip of the study site southward in two days (Peter et al., 2017). Juveniles and calves were observed during 42.9% (n=33) of sightings of Irrawaddy dolphins in this area. Feeding and probable feeding behaviour were observed during 44.2% (n=34)

of the sightings (Peter et al, 2017). The high rate of site fidelity, coupled with the Irrawaddy dolphins' use of the entire study area and observations of calves and feeding demonstrate that these coastal waters are important habitat for the species.

The extremely high encounter rate with finless porpoises in the area also indicates that it is important for this species. 15% (n=12) of finless porpoise observations included calves or juveniles, and 3.8% (n=3) included observations of feeding or probable feeding behaviour. Note that behaviour was classified as 'undetermined' for 86.3% (n=69) of observations of this species, due to their highly inconspicuous behaviour. As such, it is likely that this low percentage is an under-estimate of the species' feeding frequency. During 21.3% (n=17) of the finless porpoises sightings, shrimp trawlers, fishing boats and fishing nets were observed (Sarawak Dolphin Project, unpublished data). Indeed, the two stranded finless porpoises examined in the study area had full stomachs with undigested prey, indicating that they had recently been feeding. Photo identification is not possible with this species, so it was not possible to determine whether or not the population is resident.

The rapid coastal development taking place north of the national park is likely to impact all cetacean species in the area through agricultural run-off laden with pesticides and fertilizers, industrial discharge, and the construction of jetties and ports extending into the nearshore habitat used by the cetaceans. Research has also revealed a significant overlap between cetacean distribution and fishing effort in the area, with unattended gillnets representing the most frequently used fishing gear and method (Zulkifli Poh et al., 2017). The increased industrial activity between the park and the fishing village of Kuala Nyalau is likely to result in a shift in fishing activity to the northernmost portion of the study area, where the largest groups of Irrawaddy dolphins are normally observed. This change will likely increase the risk of bycatch for this species, as well as finless porpoises. To date four strandings of finless porpoises and one Cuvier's beaked whale have been reported in the IMMA (Sarawak Dolphin Project, unpublished data). Two of the finless porpoise standings were linked to fisheries activity through evidence of entanglement or full oesophagi, indicating feeding immediately prior to death (Tregenza and Collet, 1998).

Figure 4: A scarred Irrawaddy dolphin the Similajau-Kuala Nyalau IMMA. Photo: Sarawak Dolphin Project

Criterion A: Species or Population Vulnerability

Finless porpoises and Irrawaddy dolphins are both species known to be restricted to nearshore coastal waters throughout their ranges, which in both cases are limited to Southeast Asia. Irrawaddy dolphins have been assessed as Endangered on the IUCN Red List of Threatened Species (Minton et al., 2017), and the assessment points out that the locally occurring population in Similajau to Kuala Nyalau represents one of the very few entirely coastal, as opposed to riverine or estuarine ecotypes, of Irrawaddy dolphins to have been studied in detail. Their distribution is always within the 10 m contour line suggesting an obligatory nearshore distribution (Peter et al., 2017). The introduction of oil palm plantations and a large-scale industrial park is likely to have significant impacts on the water quality and level of human

activity in the area's nearshore waters. Fishing activities are likely to become more intense in the area around and to the north of the fishing village as the waters around the industrial park are occupied by a jetty and deep-water port as well as high levels of industrial vessel traffic. As of 2017 four strandings had been reported in the fishing village, two of which were attributed to fisheries bycatch. Sixteen percent (n=4.8) of fishermen interviewed in the village reported having been involved in an incident of bycatch in the past seven years and the Irrawaddy dolphins and humpback dolphins were the species most commonly bycaught. As fishing and coastal development continue to expand, the 25 km long national park may serve as a small refuge for coastal cetaceans.

Criterion B: Distribution and Abundance Sub-criterion B1: Small and Resident Populations

Finless porpoises were observed regularly throughout all times of year and all years that surveys were conducted in the Similajau to Kuala Nyalau area, indicating a high likelihood of residence. Irrawaddy dolphins were also observed during every survey period, and photo-identification studies revealed a high-degree of site fidelity among some identified individuals, with less than 15 km between sighting locations over a period of six years (Peter et al., 2017). Both line-transect and mark-recapture estimates indicate a population size of fewer than 300 Irrawaddy dolphins (Peter et al., 2017), and

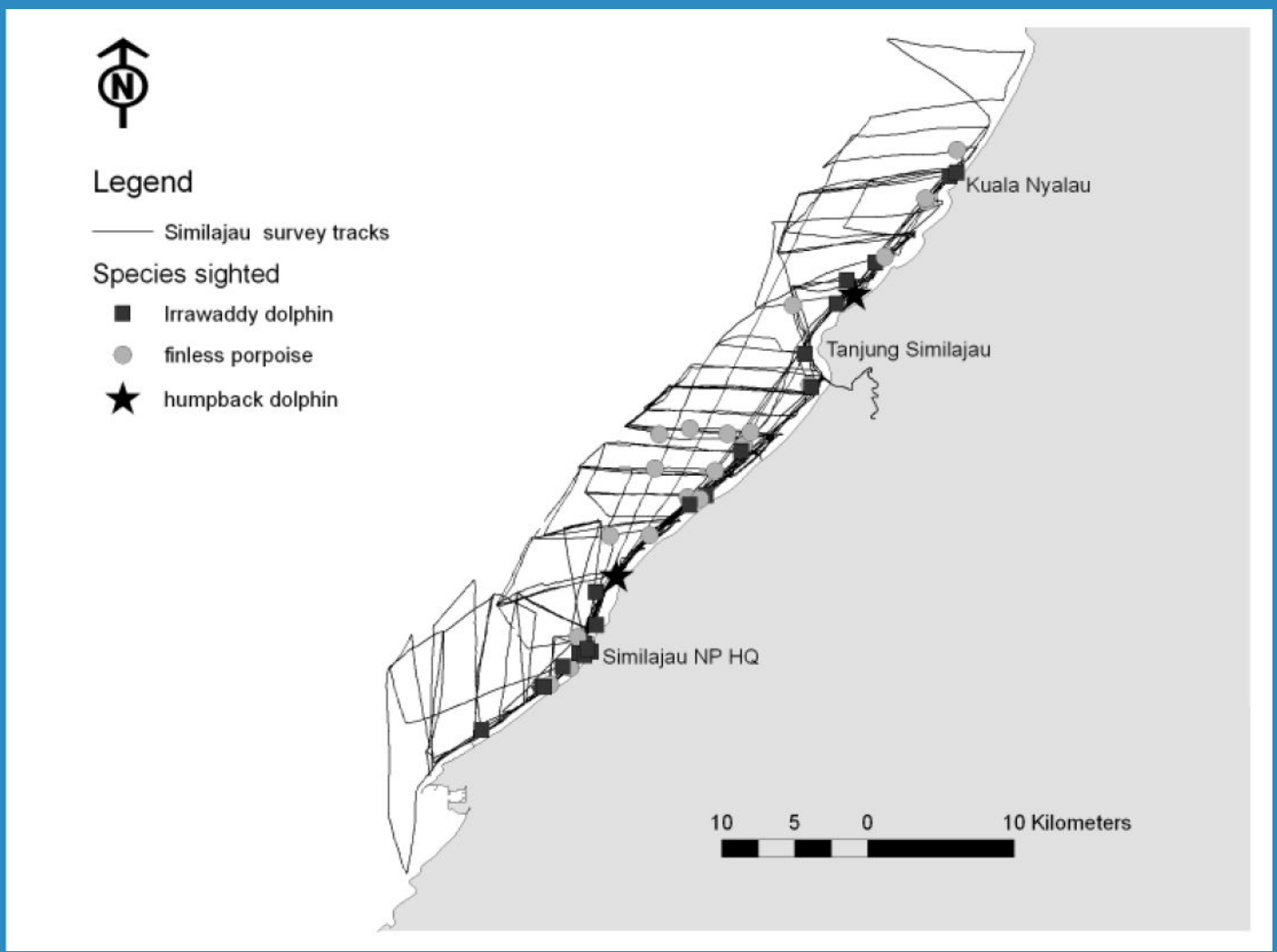

Figure 5: Survey tracks (total track, including on-and off-effort portions) and sightings (on-and off-effort) in the Similajau-Kuala Nyalau IMMA (Figure 2b from Minton et al., 2011).

unpublished line transect estimates for finless porpoises are in a similar range: 107 individuals (CV = 35.5%, 95% CI = 54-213).

Irrawaddy dolphin juveniles and calves were observed during 33 of the 77 sightings of Irrawaddy dolphins from March to September of the survey year. In the months of March, June and August, mother-calf pairs of finless porpoises were observed between Tanjung Payung, the northernmost boundary of the survey area and Tanjung Similajau, adjacent to the industrial zone. Depths in this area range from 2.4-6.7 m. Humpback dolphin calves were also recorded in the same areas in 2009, 2012 and 2013 (Sarawak Dolphin Project, unpublished data). Direct observations of feeding (chasing fish at the surface), or probable feeding behaviour (as indicated by deep fluke-up dives, the presence of fish at the surface of the water, or dolphins surfacing with mud on their bodies) was recorded during 44.2% of all Irrawaddy dolphin sightings recorded between 2008 and 2013 (n= 34, Peter et al., 2017). Furthermore, Irrawaddy dolphins were regularly observed in close proximity to fishing boats and fishing nets during 28.6% of encounters (n=22, Peter et al., 2016). Finless porpoise behaviour was difficult to classify in the area, as sightings were often limited to one or two brief surfacings before they were no longer detectable. However, the finless porpoises were seen to be feeding during three of 80 encounters and humpback dolphins also exhibited similar feeding behaviour during two of four encounters. 71% of the fishermen interviewed (n=21) reported that all three species of cetaceans feed on discarded fish such as anchovies (Sarawak Dolphin Project, unpublished data).

Supporting Information

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Acknowledgements

We would like to thank the participants of the 2018 IMMA Regional Expert Workshop for the identification of IMMAs in the Northeast Indian Ocean and Southeast Asian Seas region. Funding for the identification of this IMMA was provided by the Global Ocean Biodiversity Initiative funded by the German government's International Climate Initiative (IKI). Support was also provided by Whale and Dolphin Conservation and the Tethys Research Institute.

Suggested Citation: IUCN-MMPATF (2022) Similajau-Kuala Nyalau Coastline IMMA Factsheet. IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task Force, 2022.

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