

# Balikpapan, Adang and Apar Bays IMMA

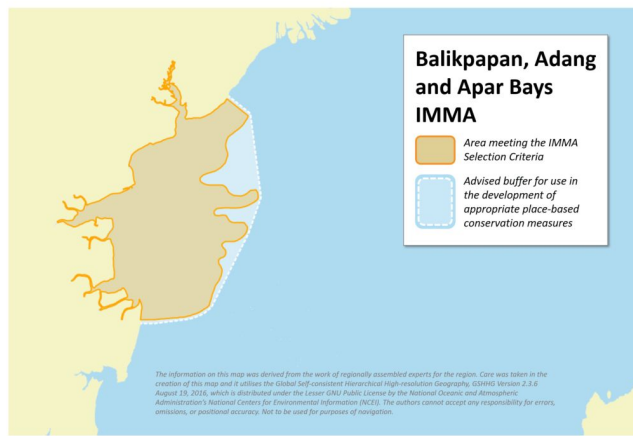
## Summary, continued.

Balikpapan Bay contained a unique haplotype, and demonstrated the population's genetic divergence from other sampled South(east) Asian populations. Within the IMMA, population estimates are only available for the Irrawaddy dolphin population in Balikpapan Bay, and the best and most recent estimate in 2015 is 73 individuals from mark-recapture analyses. The population demonstrated high site-fidelity with up to 54% of individually identified dolphins being re-sighted at least once between survey years. The dugong population in Balikpapan Bay was estimated at roughly 12 individuals.

## Description

Balikpapan, Adang and Apar bays are situated along the eastern most part of the Sunda shelf in East Kalimantan, Indonesia. The bays and part of their feeding rivers provide core habitat for Irrawaddy dolphins and dugongs. The bays are connected with narrow and shallow coastal shelf habitat, which is mostly used by finless porpoises and Indo-Pacific bottlenose dolphins. The bays provide specific feeding, breeding and nursing areas for Irrawaddy dolphins and dugongs. Extensive seagrass locations have been identified for Balikpapan Bay and its overall presence was recorded in the two other bays based on information from local informants and photographs, although no dedicated surveys have been performed as yet.

Periodic boat-based line-transect surveys lasting 78 days in total with a total survey effort of 4000 km were conducted in Balikpapan Bay in East Kalimantan



## Area Size

6 285 km<sup>2</sup>

## Qualifying Species and Criteria

Irrawaddy dolphin – *Orcaella brevirostris*

Criterion A; B (1); C (1); D (1)

Dugong – *Dugong dugon*

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

## Marine Mammal Diversity

*Orcaella brevirostris*, *Dugong dugon*

*Neophocaena phocaenoides*, *Tursiops aduncus*

## Summary

Balikpapan, Adang and Apar bays in East Kalimantan, Indonesia provide core habitat for Endangered Irrawaddy dolphins (*Orcaella brevirostris*), Vulnerable dugongs (*Dugong dugon*) and finless porpoises (*Neophocaena phocaenoides*) and Near Threatened Indo-Pacific bottlenose dolphins (*Tursiops aduncus*). Irrawaddy dolphins and dugongs mostly occupy the inner bay areas, while finless porpoises and Indo-Pacific bottlenose dolphins occur in the river mouths and near shore waters of each bay. All three bays serve as feeding, mating, calving and nursing areas for Irrawaddy dolphins. Genetic samples collected from Irrawaddy dolphins in

in the years 2000, 2001, 2008, 2011 and 2015 and 3 days (181 km) in 2018 after a major oil spill. Most sightings between 2000-2015 were made of Irrawaddy dolphins (n=136) followed by dugongs (n=10), Indo-Pacific bottlenose dolphins (n=8) and finless porpoises (n=6).

Besides the Irrawaddy dolphins and dugongs observed mostly within the bays, finless porpoises and Indo-Pacific bottlenose dolphins have been recorded during surveys between 2000-2015 in the coastal shelf waters outside the bay and the downstream portions of Balikpapan Bay (Figure 1 & 2). The most recent population estimate in 2015 was 73 individuals based on photo-id mark-recapture analyses. A decrease in population density in the inner Bay area was observed from 0.45 dolphins/km<sup>2</sup> in 2000-2001 (CV = 24%) to 0.34 and 0.32 dolphins/km<sup>2</sup> in 2008 and 2015 (CV = 31% and 25%).

The Irrawaddy population showed a year-round presence and high site-fidelity, with a highest overlap of identified individuals among survey periods during survey years of 57%, while 53% of all identified individuals were recorded in at least two survey years (Kreb et al., 2020). No estimates are available yet for Adang and Apar bays only species occurrence based on reports from wildlife services and social media pictures. A migration between the three bays is assumed but needs to be further investigated using photo-id studies. Seagrass beds were identified that were used by the dugongs in Balikpapan Bay (Figure 3). The population was estimated at around a dozen individuals, and a neonate was observed by de Bruijn (2002), and another one found stranded in 2015 (De Bruijn, 2002, Budiono, 2003, De longh et al., 2007, Kreb et al., 2020). It is also assumed that the dugongs move between the Balikpapan, Adang and Apar Bays since they are capable of migrating 600 km over a period of several days.

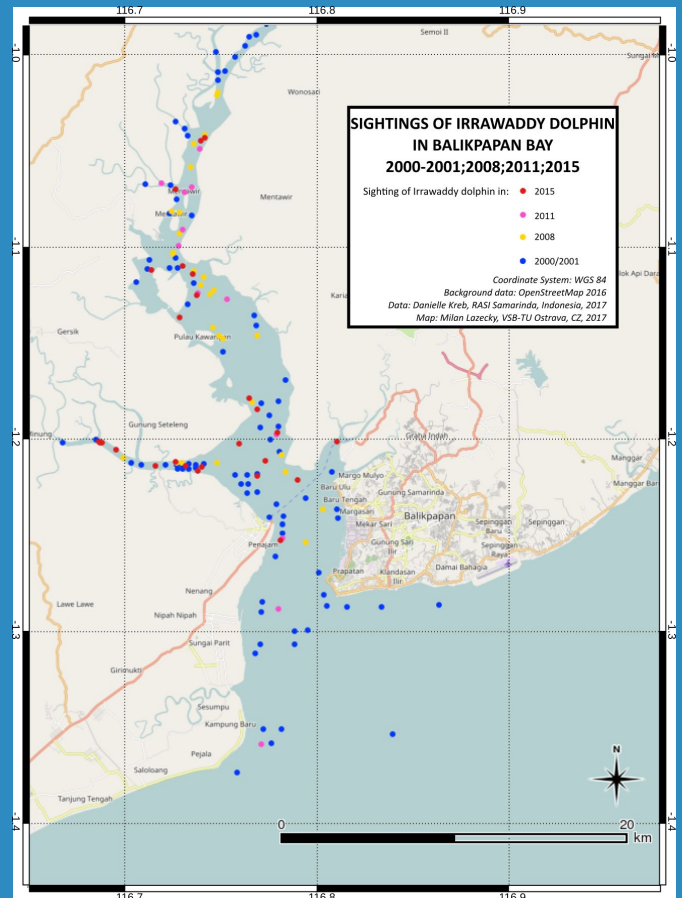


Figure 1: Sightings of Irrawaddy dolphins in Balikpapan Bay 2000-2015. Photo: Yayasan Konservasi RASI

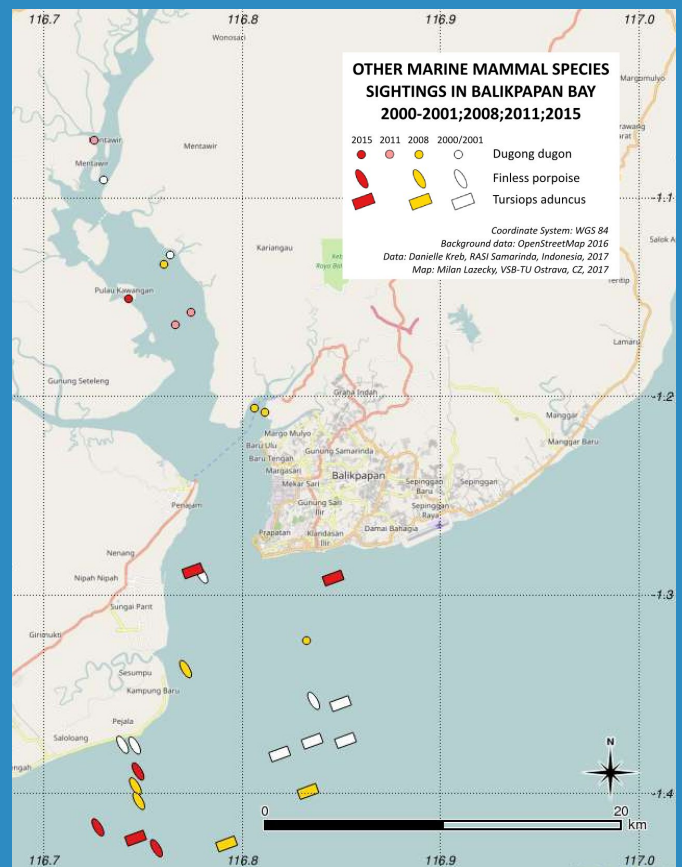


Figure 2: Sightings of Dugongs, finless porpoises and Indo-Pacific bottlenose dolphins in Balikpapan Bay between 2000-2015. Photo: Yayasan Konservasi RASI

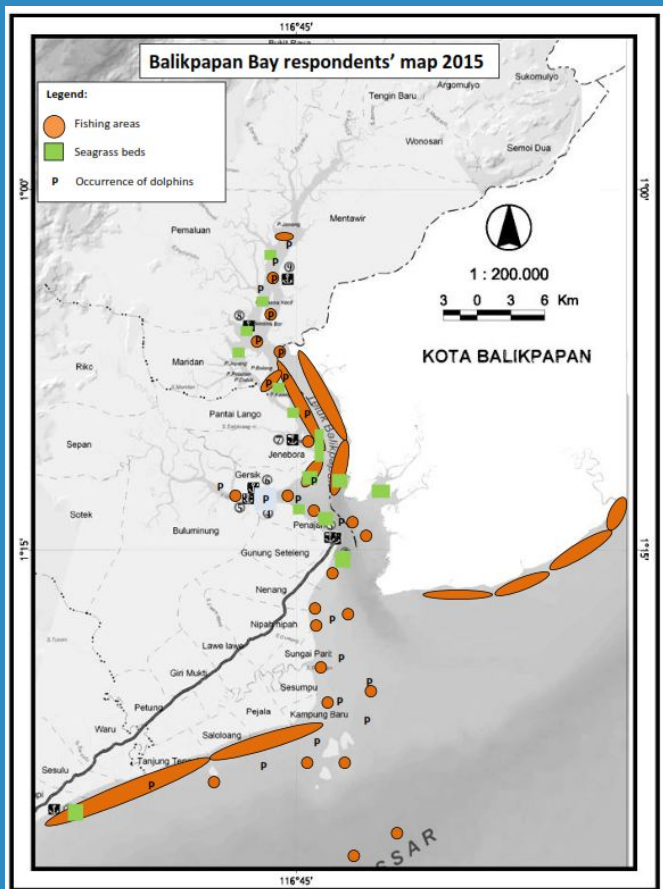


Figure 3: Seagrass areas identified within Balikpapan Bay (based on formal interviews with n=22 senior fishermen and conform ground checks). Photo: Yayasan Konservasi RASI

A shift in dolphin distribution was noted between the periods 2000-2002 and 2008–2015 with significantly lower occurrence in recent years in the lower Bay segment compared to upper Bay segments. Increased boat presence, unsustainable fishing methods, pollution and high sedimentation deposit in the lower segments may have likely caused the decline in distribution through reduced prey resources.

## Criterion A: Species or Population Vulnerability

Criterion A applies as the Irrawaddy dolphin is listed as Endangered on the IUCN Red List and a decline in the population was noted between 2000 and 2015 for Balikpapan Bay (Kreb et al., 2020). Dugongs are listed as vulnerable on the IUCN Red List. Based on interviews and direct observations, dugongs in Balikpapan Bay are increasingly rarely observed.

## Criterion B: Distribution and Abundance

### Sub-criterion B1: Small and Resident Populations

Locally occurring populations of Irrawaddy dolphin are often small and occupy small areas in relation to the species' total global population. In Balikpapan Bay, a shift in their distribution was observed with increased dependency on the upstream part and rivers of the bay. Criterion B1 also applies to the Dugong locally occurring population within the area, which is estimated to only number about 12 individuals (de Bruyn, 2002). These animals are dependent on the availability of increasingly decreasing sizes of seagrass meadows based in interview surveys (Kreb et al., 2020).

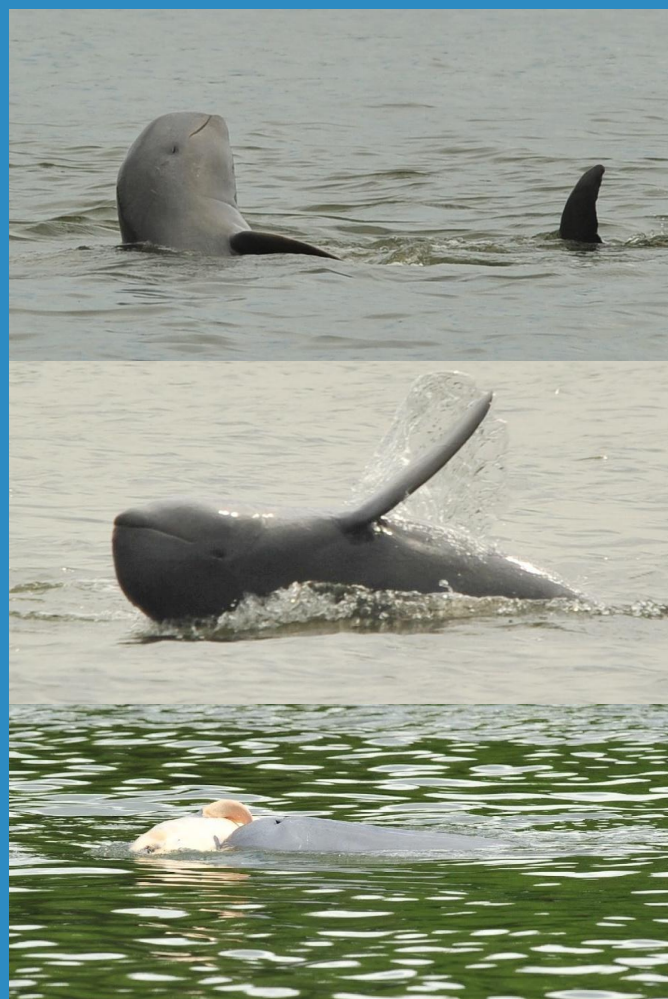


Figure 4: Photo most below shows an adult attending a calf three days after it died due to gillnet entanglement and was set afloat by a fisherman. Photos: Kreb, D./Yayasan Konservasi RASI



Figure 5: Irrawaddy dolphins showing many body scars, which distinguishes them from their riverine conspecifics, which appears to have a smooth skin pattern to a large extent. Photo: Kreb, D./ Yayasan Konservasi RASI

## Criterion C: Key Life Cycle Activities

### Sub-Criterion C1: Reproductive Areas

The locally occurring population of Irrawaddy dolphins uses Balikpapan Bay for breeding and as nursing areas (Kreb, 2004, Kreb et al., 2020). Mating behaviour has been observed as well as neonates and young calves within groups. A neonate dugong calf was observed by de Bruijn (2002) and another one found stranded and reported in 2015 by the District Fisheries Service.

## Criterion C: Key Life Cycle Activities

### Sub-Criterion C2: Feeding Areas

Dugong feeding trails have also been observed and several seagrass meadows were found inside the bay. Seagrass has also been described by local informants (fishermen) for Adang and Apar Bays.

## Criterion D: Special Attributes

### Sub-criterion D1: Distinctiveness

Mitochondrial DNA collected from Irrawaddy dolphins in Balikpapan Bay showed a genetic divergence from other South(east) Asian specimens with a unique haplotype for Balikpapan Bay (Yusmalinda et al., 2017).

## Supporting Information

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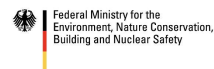
Figures 6 a-e: a) Finless porpoise; b-c) Indo-Pacific bottlenose dolphin, d-e) Irrawaddy dolphins.  
Photo: Kreb, D./ Yayasan Konservasi RASI



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