

## Short Note

## Records of Postmortem Attentive Behavior on an Irrawaddy Dolphin (*Orcaella brevirostris*) Calf and Implications for Conservation in Kuching Bay, Sarawak, East Malaysia

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Postmortem Attentive Behaviors (PABs), also known as epimeletic behaviors, have been observed in terrestrial mammalian species, such as primates, giraffes, and elephants (Nakamichi et al., 1996; Douglas-Hamilton et al., 2006; Li et al., 2012; Strauss & Muller, 2013), as well as in aquatic mammals (Reggente et al., 2016; Bearzi & Reggente, 2017; Bearzi et al., 2017). In cetaceans, epimeletic behavior is described as one or more adults attending to an injured, distressed, dying, or deceased animal by keeping it afloat if sinking, pushing it down if buoyant, performing “resuscitation” attempts, and/or carrying it on the dorsum, head, rostrum, or in the mouth (Reggente et al., 2016; Bearzi & Reggente, 2017). Most records of cetacean PAB involved Indo-Pacific humpback dolphins (*Sousa chinensis*), common bottlenose dolphins (*Tursiops truncatus*), and Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) (e.g., Porter, 2002; Kuczaj et al., 2015; Bearzi et al., 2017, 2018; Cheng et al., 2018; Reggente et al., 2018; Pedrazzi et al., 2022). Until now, only one case of this behavior has been documented in Irrawaddy dolphins (*Orcaella brevirostris*) from Balikpapan Bay, Indonesia (Kreb et al., 2020). Herein, we describe a rare event of PAB towards an Irrawaddy dolphin calf in Kuching Bay, Sarawak, East Malaysia, and its implications for conservation.

Identified as an Important Marine Mammal Area (IUCN-MMPATF, 2019), the Kuching Bay is home to four species of coastal cetaceans, namely Irrawaddy dolphins, Indo-Pacific finless porpoises

(*Neophocaena phocaenoides*), Indo-Pacific humpback dolphins, and Indo-Pacific bottlenose dolphins (Minton et al., 2011). The best mark-recapture abundance estimate for Irrawaddy dolphins in the Kuching Bay, based on data collected between 2007 and 2010, was 233 (CV = 22.5%; 95% CI 151 to 360; Minton et al., 2013). The 95% confidence interval of this estimate overlapped with that of the line transect estimate generated for the same species in the same area between 2010 and 2012: 149 (CV = 27.9%; 95% CI 87 to 255). Mark-recapture studies indicated that the population has a high degree of site fidelity and year-round residency (Minton et al., 2013). The representative range and core area of Irrawaddy dolphins estimated using fixed kernel range estimates were 246.42 km<sup>2</sup> and 37.22 km<sup>2</sup>, respectively, with the core area located in the Salak Estuary (Figure 1; Zulkifli Poh, 2013; Peter et al., 2016a). The Kuching Bay Irrawaddy dolphin population appears to be one of the largest in Borneo as other Bornean populations number fewer than 100 individuals (Minton et al., 2016; Peter et al., 2016a).

Kuching Bay includes two main bays connected by a series of rivers and inland mangrove channels (Figure 1). There are several national parks within the vicinity, namely the Kuching Wetlands National Park on the west (also a RAMSAR site), the Talang-Satang National Park ~10 km offshore, the terrestrial Bako National Park to the east, and Mount Santubong National Park (Figure 1).

Throughout their range, Irrawaddy dolphins are associated with estuarine environments and bays

Small-scale artisanal fisheries and tourism both introduce potential sources of stress, injury, and mortality for Irrawaddy dolphins (Peter et al., 2016b). This study can be the impetus for Kuching Bay to be considered a Marine Protected Area (MPA) by the authorities, where limited take zones and no take zones are introduced to reduce bycatch of marine mammals and also to provide refuge for fisheries resources, which have been shown to benefit fisheries as well as protected species (e.g., Barneche et al., 2018; Marshall et al., 2019).

Presently, there are no laws or guidelines in place in Sarawak to regulate aquatic conduct or vessel speed under any circumstances. Considering that the calf might have died following a blunt force trauma from a boat strike, authorities should consider adopting and enforcing vessel speed restrictions for all types of vessels within the core areas known to host the highest densities of dolphins (Minton et al., 2011, 2013). Boat strikes from whale-watching vessels have been linked to unsustainable rates of mortality (May-Collado et al., 2014; Trejos & May-Collado, 2015; Kassamali-Fox et al., 2020), and speed restrictions have been suggested as a method for reducing strikes. Speeds below 10 kts are associated with lower risks of fatal injury for whales (Conn & Silber, 2013; Currie et al., 2017; Crum et al., 2019) and may be sufficient to allow smaller vessels time to detect and avoid dolphins when they surface. Speed restrictions have been determined to be effective in reducing manatee deaths in Florida in the U.S. (Calleson & Frohlich, 2007; Timmel et al., 2008), and a restriction of 10 kts applied to all vessels using the Kuching Bay could help to reduce the risk of boat strikes in important Irrawaddy dolphin habitat.

This short note demonstrates the importance of collecting detailed photographic and video data as well as carcasses and/or biological samples during the observation of unusual events or behaviors. In this case, the data collected during the event and the postmortem analysis of the carcass allowed greater insight into the social bonds of Irrawaddy dolphins in Kuching Bay, as well as the threats affecting the population. It is hoped that careful description of this event in the scientific realm as well as through more popular media can be used to influence perceptions of the general public and decision makers to enact and support measures that will reduce threats for a species with advanced cognitive capabilities and social and maternal bonds rivaling those of humans.

**Note:** A supplemental video for this short note is available in the “Supplemental Material” section of the *Aquatic Mammals* website: [https://www.aquaticmammalsjournal.org/index.php?option=com\\_content&view=article&id=10&Itemid=147](https://www.aquaticmammalsjournal.org/index.php?option=com_content&view=article&id=10&Itemid=147).

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