

# Short Communication: Marine litter ingestion by a Bryde's whale (*Balaenoptera edeni*) in Mindanao, Philippines, and the need for consistent long-term recording of single-individual strandings

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## ABSTRACT

Strandings provide opportunities to collect data on interactions between megafauna and marine litter which help address the limited information available on the impacts of litter in developing countries, such as the Philippines. However, the perception that single-individual strandings yield minimal data restricts the scope of publication, resulting in the limited dissemination of potentially valuable information. Here we present a case of plastic ingestion by a Bryde's whale in the Philippines and discuss the importance of consistent long-term collection of strandings data and the value of publishing these results.

**KEYWORDS:** STRANDINGS; POLLUTANTS; DEBRIS; PHILLIPINES; ASIA; BRYDE'S WHALE

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## INTRODUCTION

Marine litter is globally recognised as a major threat to cetaceans due to the risk of entanglement and ingestion (IWC, 2020; Panti *et al.*, 2019; Kühn *et al.*, 2020), but the impacts of marine litter on megafauna at the population level are still unknown (Senko *et al.*, 2020). Inherent challenges and methodological constraints when studying wildlife interactions with litter exacerbate this situation, such as funding availability, inconsistent record keeping, inadequate population assessments and the lack of expertise (Claro *et al.*, 2019; Abreo *et al.*, 2019b). Litter ingestion is particularly insidious as cases of plastic ingestion are often only identified after a necropsy has taken place, which highlights the importance of conducting a full necropsy on beached carcasses with subsequent reporting of the results (Simmonds, 2012; Obusan *et al.*, 2016).

Litter is a major threat to marine megafauna in the Philippines, where there have been at least 33 recorded events of entanglement and plastic ingestion, the majority of which – at least 67% – ended in mortality (Abreo *et al.*, 2019a; 2019b). Omeyer *et al.* (2023) stress the significant knowledge gap regarding these interactions in Southeast Asia, exacerbated by the lack of information about baleen whales, including the Bryde's whale (*Balaenoptera edeni*). Important information is unavailable, such as population trends, number of mature individuals and rate of reproduction (Cooke *et al.*, 2018). In the Philippines, the Bryde's whale is considered 'Data Deficient', which means there is significant uncertainty about their presence in territorial waters (Alava *et al.*, 2012). This combined lack of information makes it impossible for researchers to estimate or ascertain the true impacts of marine litter on these species.

As strandings are relatively rare events, ensuring the maximum amount of information is published would greatly help our understanding of these impacts. Here we present a case of litter ingestion by a Bryde's whale in

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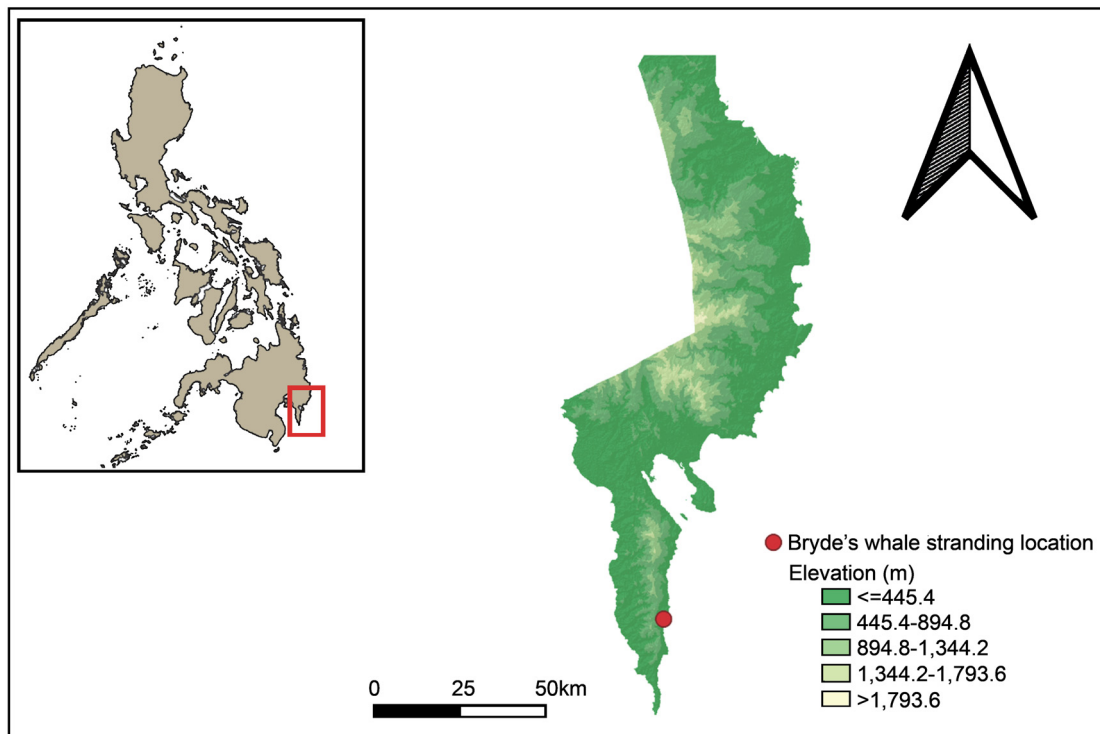


Fig. 1: Map of Davao Oriental province showing the stranding location of the Bryde's whale.

the southern Philippines and discuss the importance of consistent long-term collection of strandings data and the value of publishing these results.

### The event

On 1 May 2021, a male Bryde's whale measuring 8.8m stranded in a coastal community in Langka, Mati City, Davao Oriental, Mindanao, Philippines (N 6°31'5.424"; E 126°12'49.986") (Figure 1). First responders removed plastic sheets lodged in the oesophagus while the animal was alive. The responders pulled out two pieces of plastic, but these might have been a single piece of plastic ripped in two as they had similar characteristics (pers. comm., D. Carriedo, 2 May 2021) (Figure 2 Top). These sheets were not retained by the first responders. The whale died a few hours after it stranded; the exact time lapse is unknown. The gastro-intestinal tract of the carcass was opened for further investigation. A further single clear plastic bag measuring 15 × 26.5cm was recovered from the forestomach (Figure 2 Bottom). There was no necrotic tissue observed in the oesophagus, which suggests the whale had recently ingested the plastic sheets.

## DISCUSSION

This is the second recorded stranding of a Bryde's whale in Mindanao and only the second recorded case of plastic ingestion for this species in the Philippines. The first stranding event occurred on 16 October 2020 when a Bryde's whale stranded in the municipality of Don Marcelino, Davao Occidental, Mindanao. No other information is available, except for photos of the carcass, estimated size (6–7m) and general location which was posted on social media. The first recorded case of plastic ingestion by a Bryde's whale in the Philippines occurred in the province of Guimaras in 2017 (Abreo *et al.*, 2019b). Between 2005–18, there were at least 12 individual strandings of Bryde's whale in the Philippines, but no information is available on the possible role or influence of marine plastics in 11 of these cases (Aragones *et al.*, 2017; 2019).

Data based on rare or infrequent strandings can be powerful with consistent effort over an extended period of time, helping to develop insights into species distribution, morphology and the potential impacts of threats, such as marine litter, which could help shape conservation and management decisions (Thompson *et al.*, 2013).





Fig. 2: (Top) First responder holding the plastic sheet (red box) removed from the Bryde's whale oesophagus which was not retained. (Bottom) Plastic bag recovered from the Bryde's whale forestomach (coin diameter: 27mm for size reference).

There is a general perception that strandings which involve a single or few individuals yield minimal data, but Simmonds (2012) argues that, when these data are collated, information from single-individual stranding events can make a significant contribution to our understanding of marine litter interactions. For example, the only information on marine litter ingested by whale sharks (*Rhincodon typus*) are from single-individual strandings (Haetrakul *et al.*, 2009; Sampaio *et al.*, 2018; Abreo *et al.*, 2019a). The same is true for Deraniyagala's beaked whales (*Mesoplodon hotaula*) where the only information on plastic ingestion is from a single individual stranded in Davao Gulf, Philippines (Abreo *et al.* 2016b). Without the publication of data from these events, the potential impact of plastics on this species would still be unknown. Consistent long-term effort to publish single-individual stranding events can therefore help build a record of interactions between cetaceans and litter which facilitates greater public engagement with the problem.

This Short Communication highlights the importance of proper stranding investigations. In this case, insufficient stranding response knowledge resulted in lost information, such as the number of plastic sheets ingested by the whale. This stranding event provides a glimpse into the possible impacts of marine litter on baleen whales in the Philippines. Publications reporting standardised data can serve as a repository for information on marine litter interactions which can be easily collated to improve our understanding of the impacts on a larger ecological scale (IWC, 2020; Provencher *et al.*, 2017).

Sheet plastics, such as plastic bags, are a common type of plastic ingested by cetaceans and other marine fauna in the Philippines and elsewhere (Abreo *et al.*, 2016a; van Franeker *et al.*, 2018). Plastic sheets were among the anthropogenic materials ingested by a Bryde's whale stranded in Malaysia (Gunalan *et al.*, 2013). There is now further evidence that various cetacean species also ingest microplastics (Zantis *et al.*, 2021). The impacts of microplastics on cetaceans are largely unknown and many researchers are unable to conduct microplastics research due to resource shortages and methodological constraints. To the best of our knowledge, no data on the presence or impacts of microplastics have been reported from the Philippines.

Due to the vast coastline and relatively small number of experts conducting necropsies, most stranding events in the Philippines are not fully investigated, which means valuable information on the impact of plastic as a potential cause of mortality is lost. A recent study suggests only 25% of cetacean strandings are necropsied in the Philippines (Coram *et al.*, 2021). There is an urgent need to build knowledge, expertise and infrastructure to increase the number of trained personnel who can attend and investigate strandings. Increasing the capacity of local governments and strengthening the existing network of volunteers (e.g., Philippine Marine Mammal Stranding Network) is a step in the right direction (Tiongson *et al.*, 2021). A repository of tissue samples and ingested plastics is also important. In this case, the tissue samples are stored in Davao Oriental State University and the recovered plastic (Figure 2 Bottom) is stored at the University of the Philippines Mindanao. Both are available for further analysis.

Table 1

Summary of stranding data from the stranding considering the minimum standardised data for plastic ingestion suggested by Provencher *et al.* (2017) with additional information on tissue sample and ingested plastic storage.

Common name and species	Bryde's whale
Sex	Male
Age	No data
Timing of sampling	1 May 2021
Location	Langka, Mati City, Davao Oriental, Mindanao, Philippines (N 6°31'5.424"; E 126°12'49.986")
Method of sampling	Necropsy
Sample size	1
Frequency of occurrence of ingested plastics	100%
Mean, median and range of mass of ingested plastics/individual	N/A
Mean, median and range of all plastics reported by debris category	N/A
Size of plastics reported by size classes	Macroplastic – 15 × 26.5cm
Type of plastic	User plastic – sheet (plastic bag)
Colour	Clear
Tissue samples storage	Davao Oriental State University
Plastic samples storage	University of the Philippines, Mindanao



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