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First record of gillnet entanglement of a common minke whale calf (*Balaenoptera acutorostrata*, Lacépède, 1804) in Haiti, Greater Antilles, with a note on the local and regional fishing techniques

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Information on the presence of the minke whale (*Balaenoptera acutorostrata*) in tropical waters is scarce, but the Caribbean Sea has historically been considered a wintering ground for the population of the North Atlantic Ocean (Winn & Perkins, 1976; Mitchell, 1991; Jefferson et al., 2015). The peak of historical occurrences of the species in this region typically occurs between December and March (Mitchell, 1991; Bolaños-Jiménez et al., 2021) which commonly overlaps with human marine activities in the area. Marine mammal bycatch (*i.e.*, incidental mortality and injury in fishing gear), is recognized as one of the main factors limiting or reducing marine mammal populations (Read, 2008; Reeves et al., 2013). The fishing methods and gear potentially harmful to minke whales in the area include longlines, gillnets, and trammel nets (NRC, 1988). In this note, we document the first confirmed occurrence of the minke whale in Haitian waters and describe the characteristics of the net operation leading to the whale's demise.

In February 2017, a small whale got entangled and drowned in a single layer gillnet, off Côte des Arcadins, Gulf of Gonave, Haiti, in the Greater Antilles (approx. 18°55'27" N, 72°39'44" W, Fig. 1). The fishers landed and photographed the body and shared the pictures and related information with Haiti Ocean Project researchers (JA; see Acknowledgments). The description of the whale and the net operation we present here is based on photographs and additional information provided by the fishers who operated the net, and onsite witnesses.

The whale was identified as a common minke whale based on diagnostic characteristics visible in the photographs (Fig. 2) including a sleek body, a V-shaped head seen from above, and white patches on the flippers (Jefferson et al., 2015). Based on anatomical features visible in Fig. 2, the total length of the whale was estimated between 2.5 and 3.0 m, consistent with the length of neonates (Jefferson et al., 2015), but no fetal folds were visible. As length at birth and weaning have been calculated at between 2.0 - 2.8 m and at about 4.7 m, respectively, this individual was probably a calf. According to several witnesses interviewed by a research assistant, the presumed mother of this calf stayed in the area for approximately one week around the date of entanglement.

So far, this is the first and only bycatch record available for the Caribbean Sea (see Bolaños-Jiménez et al., 2021), indicating a potentially low level of bycatch on the species in the region. This is consistent with Borobia et al. (2023), who found that the most important threats to marine mammals in the Caribbean Sea are noise pollution and vessel strikes.

The date of this event (February) matches the peak of common minke whale presence in the Caribbean Sea (Mitchell, 1991; Bolaños-Jiménez et al., 2021). Interestingly, this is the first confirmed record of the presence of the species in Haitian waters, contributing to the growing knowledge of threats and the spatiotemporal distribution of the species in the WCR.

Keywords:
bycatch, Caribbean Sea, minke whale, incidental mortality, Greater Antilles

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Figure 1. Map of the study area indicating the entanglement site (red triangle) of a minke whale *Balaenoptera acutorostrata* in Haiti, 2017. Basemap downloaded from Bing (https://www.microsoft.com/en-us/maps).

Figure 2. External aspect of the minke whale calf entangled in a single layer gillnet off Côtes des Arcadins, Gulf of Gonave, Haiti, during February 2017, showing diagnostic characters (indicated by red arrows). Photo credits: Anonymous, courtesy Jose Roy, local divemaster.

While the fisheries sector plays an important role in Haiti's economy, Haitian small-scale fishing remains relatively unproductive compared to other island nations in the Caribbean (David et al., 2021). Artisanal fishing in Haiti is primarily characterized by oar-driven or sail-fitted canoes and wooden skiffs, and only more recently have fiberglass motorboats been introduced in order to check FADs (Fish Aggregating Devices) that are increasingly anchored offshore. There are at least 13 fishing grounds identified in Haiti, where over 28,000 boats are distributed and utilize at least 592 docking points of entry to the sea. Motorboats make up less than 5% of fishing vessels, which means that large-scale deployment of nets is limited and reliance

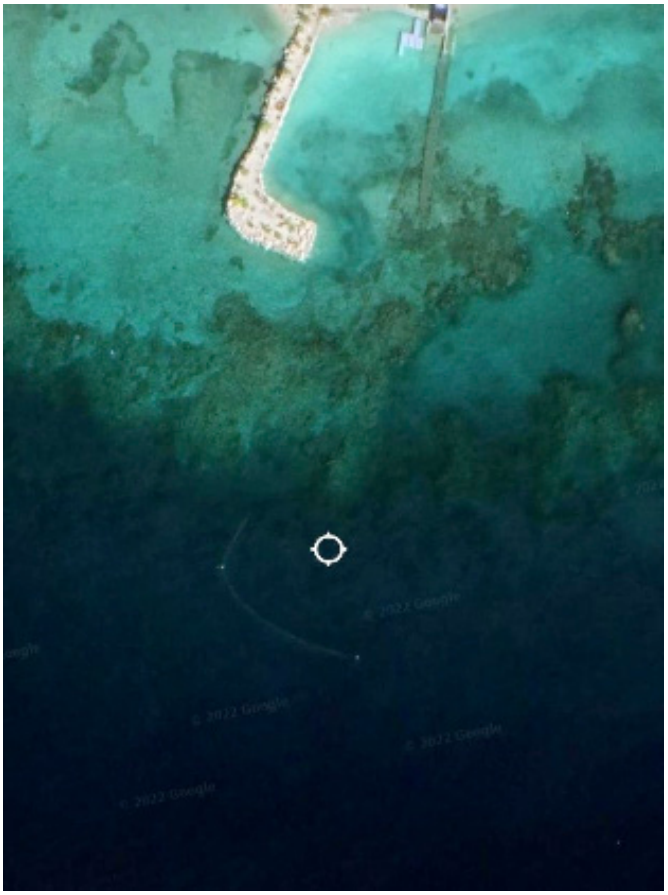

Figure 3. Satellite image of the deployment of a similar net in the same area where the 2017 minke whale (*Balaenoptera acutorostrata*) entanglement occurred (white circle) in Haiti. Downloaded from Google Earth, 18 November 2022.

on FADs and boat fishing is prevalent. A dozen boat-fishing techniques are utilized in Haiti, including equipment which is not very selective such as nets, trammels, and traps, with more selective techniques generally using fishing lines and hooks, such as ball fishing, fishing with multiple lines, longline fishing, and fishing with trolling lines. Fishing without boats is equally widespread in the country where fishers use casting nets, sheets, or tulle bags for catching assorted tiny fish ("pisket") in river mouths during the rainy season (David et al., 2021).

Fisheries of the Caribbean Sea are diverse and predominantly artisanal. In many locations, coastal communities depend upon fisheries for food and income, and small-scale fisheries serve an important role in local economies. Finfish and other marine bycatch in the Caribbean Sea are widespread and highly variable, but data on marine mammal bycatch is severely lacking because of the lack of resources, expertise, and technology to monitor or manage these events (SPAW-RAC, 2021).

Most of the fisheries in the region have been recognized as overexploited; yet even in countries where commercial fisheries are not present, artisanal hook-and-line inshore fisheries are increasing their uses of FADs, which have been implicated in marine mammal bycatch in many countries in the region (SPAW-RAC, 2021). Despite this entanglement of a minke whale, toothed whales may be impacted by interactions with fisheries more than migrating baleen whales, that generally do not feed in the Caribbean (SPAW-RAC, 2021).

The entanglement of cetaceans in fishing gear, both active and ghost, has been noted as an increasing issue of concern for the Caribbean Sea. At least 18 of the marine mammal species that occur in the Caribbean Sea have been recorded as interacting with fishing gear, and at least 16 species of marine mammals have been documented as bycatch in artisanal and commercial fishing gear, including longlines, gillnets, trawls, beach seines, and traps (Bolaños-Jiménez & Rojas Bracho, 2005; Bjorkland, 2011). Of the 16 species reportedly caught in fisheries in the region, the most frequent interactions include pilot whales (*Globicephala macrorhynchus*), Risso's dolphins (*Grampus griseus*), and beaked whales (Ziphiidae) (Bjorkland, 2011).

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