Baseline

Impacts of the traditional baited basket fishing trap “gargoor” on green sea turtles Chelonia mydas (Testudines: Cheloniidae) Linnaeus, 1758 from two case reports in the United Arab Emirates

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A B S T R A C T

The United Arab Emirates fisheries consist of highly diverse fish communities, and the most popular equipment used by fishermen to harvest them is a traditional baited basket fishing trap known locally as “gargoor”. Gargoors are dome-shaped traps made from galvanized steel; they have a circular supporting base and a funnel-like entrance. Unintended impacts of gargoores on marine fauna include bycatch of non-target species and, when lost, ghost fishing. However, there is very little information on sea turtle interaction with gargoores. In this paper we present two case reports from the eastern coast of the UAE of green sea turtle strandings associated with gargoor interactions. The first case report describes a turtle that was discovered trapped inside a lost or abandoned gargoor. The second case report describes another turtle that suffered from extensive perforation of the gastrointestinal tract resulting from the ingestion of 32 pieces of rusty gargoor fragments.
seven extant species of sea turtles. Examination of their historic accounts shows significant population declines over the last three generations (estimated at 48% to 67%) in all the main oceanic basins where they are known to occur (Seminoff, 2004). This is believed to be a result of overexploitation of green sea turtles in all of their stages of life (Seminoff, 2004). Green sea turtles were, and still are in some cases, harvested using harpoons, grapnels, entangling nets, drift nets and hooks (Márquez, 1990). Even nesting females, and their eggs, are harvested directly from nesting beaches (Seminoff, 2004). Other threats also include the deterioration of marine and nesting habitats as well as incidental mortality due to the activities of marine fisheries (Seminoff, 2004). Green sea turtles are often caught as by-catch in gill nets, beach seines, shrimp trawls, and set nets (Márquez, 1990). However, the incidence of sea turtle by-catch in gargoors has rarely been reported in literature. In this report, we present two case studies from the city of Kalba on the eastern, Gulf of Oman coast of the United Arab Emirates that demonstrate some of the risks associated with green sea turtle interaction with gargoors.

A green sea turtle stranding was discovered on the 16th of August 2017 during the daily patrols of the Environment and Protected Areas Authority (EPAA) rangers on the beach of the Alqurm Wa Lehhfaiiah Protected Area. The stranded turtle was found dead, inside a gargoor. The specimen was extracted from the trap for further examination (see Fig. 2). The specimen was observed to be a condition code 3-B as per Standard Protocol for Postmortem Examination on Sea Turtles (Poppi and Marchiori, n.d.). A thorough examination of the digestive tract and its contents showed that the specimen had consumed at least 32 metallic fragments which were mostly found lodged into the intestinal wall. It was later determined that the metallic fragments were found perforating the oesophagus, crop, stomach and intestines. One fragment was found lodged in the maxillary soft palate, with an associated localized but extensive necrotizing reaction resulting in severe oral abrasion. Diffuse hemorrhages and adhesions were observed within the mesenterium. Three metallic fragments perforated the crop and resulted in hepatic perforations with localized necrotizing reaction. As the carcass was frozen and thawed prior to postmortem examination, gross assessment of internal organ was compromised, however, significant hepatic congestion was suspected. No significant pathological abnormalities were detected in the rest of the organs.

Several observations indicate that the turtle was trapped and drowned inside an abandoned gargoor. The trap had bivalves (Pteria sp.) growing on it (see Fig. 2) indicating the cage was submerged for quite some time. The turtle had a straight carapace width of 42 cm and the cage entry width and length are respectively 44 cm and 66 cm. The funnel at the cage entrance was partially dislodged and will only swing into the cage but will not swing out. It is speculated that the funnel did not obstruct the turtle’s entry into the trap but did likely obstruct its exit from the gargoor.

Another green sea turtle stranding was discovered on the 16th of July 2017 during the daily patrols of EPAA rangers on the beach of the Alqurm Wa Lehhfaiiah Protected Area. The turtle was necropsied in collaboration with veterinary staff of the Breeding Center for Endangered Arabian Wildlife (BCEAW), Sharjah, to determine the cause of death. The stranding was observed to be a condition code 1 (Poppi and Marchiori, n.d.). Meaning the carcass was fresh and had not yet produced foul odor or begun to bloat.

During necropsy it was observed that the gastrointestinal tract was moderately congested/hyperaemic with severe congestion observed in the oesophagus, crop and stomach. Several localized firm, blackish, extended nodules protruded intermittently from the surface of the mucosa of the gastrointestinal tract (see Fig. 3). These were later determined to be reactive necrotic lesions surrounding rusty metallic foreign body. Numerous 0.5–4.9 cm long thin, sharp metallic fragments were found perforating the oesophagus, crop, stomach and intestines. One fragment was located in the maxillary soft palate, with an associated localized but extensive necrotizing reaction resulting in severe oral abrasion. Diffuse hemorrhages and adhesions were observed within the mesenterium. Three metallic fragments perforated the crop and resulted in hepatic perforations with localized necrotizing reaction. As the carcass was frozen and thawed prior to postmortem examination, gross assessment of internal organ was compromised, however, significant hepatic congestion was suspected. No significant pathological abnormalities were detected in the rest of the organs.

A thorough examination of the digestive tract and its contents showed that the specimen had consumed at least 32 metallic fragments which were mostly found lodged into the intestinal wall. It was later determined that the metallic fragments were rusty pieces of gargoor mesh. This conclusion was reached initially by asking members of the local community for identification suggestions and was confirmed by microscope comparison of the appearance and thickness of the consumed metallic fragments to wires sampled from a fresh gargoor and a rusty gargoor (see Fig. 4).

We were unable to confirm what circumstances led to the consumption of these metallic fragments. We have observed the wire mesh of old, lost and abandoned gargoors found in the ocean of the region are frequently colonized by epibiotic growth and consequently speculate that turtles may attempt to feed on this growth, and in doing so inadvertently consume gargoor fragments that become increasingly rusted and brittle through decay.

The two cases presented demonstrate the significant potential
hazards that gargoor fish traps pose to non-target species both during their active use by fishermen, and after they have been abandoned on the ocean floor. In the second specimen it is unclear whether the ingested gargoor fragments were from an active or abandoned trap. The implications of the two cases suggest that capture of turtles by gargoor will likely be restricted to younger, smaller turtles, in contrast to the consumption of colonizing epibiota on the wire mesh could pose potentially lethal risks for all age groups. Given the size profiles of the gargoor entrance funnels one can speculate that intact entrances are less likely to allow entry by turtles, whereas entrances that have been damaged or decayed sufficiently to disconnect, even partially, may enable easier access and obstructed egress, thus pose an increased

Fig. 2. First green sea turtle specimen (16th of August 2017): Bivalve growth on gargoor [Top Left]. Stranding extraction from gargoor [Top Right]. Green sea turtle stranding evidently died by entrapment in a lost baited basket fish trap (gargoor) on the beach of the Alqurm Wa Lehhaffaiah Protected Area [Bottom]. (Photographed by Ali Al Kindi).

Fig. 3. Injuries sustained by the second green sea turtle specimen by ingestion of metallic fragments of gargoor: Localized blackish, extended nodule protruding from the outside of the oesophagus where it was punctured by a metallic fragment [Left], several nodules protruding intermittently from the serosal mucosa of the gastrointestinal tract [Right].
capture risk. There is a dearth of published records of such cases which may be an indication of low frequency of occurrence or low frequency of detection due to a disparity in marine debris ingestion studies and stranding monitoring programs in countries where gargours are used.

The threat posed by gargours to turtles, particularly those traps abandoned to decay in the corrosive marine environment has not been assessed in the UAE. Gill nets, shrimp trawls, beach seines, and set nets can also be hazardous and lethal (resulting from entanglement and drowning) for turtles, even when used as intended (Márquez, 1990). Additionally, injudicious deployment of gargours can also have undesired indirect impacts on sea turtles through the destruction of important forage habitats, by crushing of reef corals (Grandcourt et al., 2008; Seminoff, 2004).

These case records demonstrate an additional regional hazard that should be considered when developing holistic turtle conservation management strategies. Gargoor design and construction, deployment techniques, deployment locations, subsequent retrieval and maintenance, by-catch composition and associated cultural perceptions of gargoor effectiveness and ecological impact should all be considered for further study.

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