

RAPID ASSESSMENT OF SEA TURTLE AND MARINE MAMMAL BYCATCH IN THE
UNION OF THE COMOROS

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Introduction

Incidental catch in commercial fishing gears poses a serious threat to many sea turtle and marine mammal populations (Lewison et al., 2004), but the impacts of bycatch in small-scale artisanal fisheries is relatively unknown. The present study was part of an international initiative, coordinated by Project GloBAL (Global Bycatch Assessment of Long-lived species), to develop and test a rapid assessment protocol to quantify artisanal fishing effort and bycatch of sea turtles and marine mammals in data-deficient areas.

The Union of the Comoros is situated at the northern end of the Mozambique Channel, equidistant from continental Africa and Madagascar. It comprises three volcanic islands: Grande Comore, Anjouan and Mohéli. The islands host a number of ecologically important and vulnerable coastal habitats including coral reefs mangroves and seagrass (Ahamada et al., 2004; Anasse et al., 2003), which support high marine biodiversity.

Mohéli hosts one of the most important green turtle (*Chelonia mydas*) populations in the Indian Ocean (estimated 5000 nesting females) and a smaller population (< 50 nesting females) of hawksbill turtles (*Eretmochelys imbricata*; Ben Mohadji and Paris, 2000). These species are Endangered and Critically Endangered, respectively (IUCN, 2007). Smaller numbers of green turtles (<50 nesting females) also nest on Anjouan or Grand Comore (Ben Mohadji and Paris, 2000; Mortimer, 1993). The hunting and trade of marine turtles is prohibited by Comorian law, but turtles are still hunted for their meat (Hauzer et al., in press). A National Turtle Conservation Action Plan (Ben Mohadji & Paris, 2000) has been completed but not fully implemented apart from a few community-based projects (Ahamada, 2001; C3-Comores, 2007). Although the National Turtle Conservation Action Plan did not recognize

bycatch as a threat, accidental capture of immature turtles in nets has been reported (Mortimer, 1993).

Directed hunting of dugong (*Dugong dugon*) in the Comoros was a problem in the past, but the key contemporary threat is accidental capture in gillnets (Alfthan & Davis 2006; Davis & Poonian 2007; Fatouma, 2004). Data from incidental sightings indicate that dugong are extremely rare but when they occur are primarily on Mohéli (Fatouma, 2004). Few scientific studies of cetaceans have been conducted in the Comoros, although thirteen species have been reported (Kiszka et al., 2006).

Materials and Methods

Turtle and marine mammal bycatch in artisanal fisheries in the Comoros was investigated through structured interviews of fishers and analysis of existing fishery data. A total of 25 out of 44 landing sites were sampled on Grande Comore and 5 out of 13 sites were sampled on Mohéli (all outside of Mohéli Marine Park). Anjouan was omitted from the sampling because of political unrest. Sites were selected using stratified sampling with strata based on the number of boats at each village (UNEP, 2002) to achieve a geographically representative sample from each island and to include both large (>50 boats) and small (<50 boats) fishing communities.

Fishers were questioned about their boat and gear characteristics, fishing patterns and incidence of bycatch. An identification guide (Richmond, 2002) was shown to interviewees to assist in bycatch species identification. Fishers were selected at random and interviewed individually, though as landing sites were small, often every fisher at a given site was interviewed. At times, specific fishers were put forward (e.g. senior and/or experienced

fishers). A total of 409 interviews (234 short and 175 long) were conducted out of the estimated 8,500 fishers in the Comoros (Union des Comores, 2005).

Results and Discussion

Reported boat specifications were similar on both islands, although boats used on Mohéli tended to be larger (pirogues: 3.9 ± 1.7 m; motorized boats: 5.9 ± 0.8 m) and motorized boats had larger engines (21.5 ± 11.5 HP) compared to those on Grande Comore (pirogues: 3.6 ± 0.8 m; motorized boats: 5.3 ± 1.3 m, 15.0 ± 2.0 HP). It was noticeable that motorized boats were much more frequent than in previous surveys reported by Abdoulhalik, 1998: an increase from 25% to 40% and from 32% to 52% on Grande Comore and Mohéli respectively. Lines targeting pelagic fish were the most common fishing gear used on both islands (97% of fishers on Grande Comore and 91% of fishers on Mohéli). On Grande Comore, line fishing was larger-scale with fishers using multiple (up to 180) hooks on each line. Gillnets targeting reef fish were also more frequent on Mohéli (4.4% of fishers compared to 2.9% on Grande Comore). Fishers on Grande Comore spent more time at sea than their Mohélian counterparts with 78% fishing for 26-30 days month⁻¹.

Fifty-four percent of Grand Comorian fishers and 28% of Mohélian fishers reported that they had caught turtles, whether accidentally or deliberately. Green turtles were the most commonly captured species (76% and 89% of total reported turtle captures on Grande Comore and Mohéli respectively). Fishers reported mortality rates of captured turtles (all species) to be 63% on Grande Comore and 12% on Mohéli although real rates were probably higher. It was not always clear during interviews as to whether turtles caught were actually bycatch or whether the fisher had caught them intentionally. Turtle meat is extremely popular in the Comoros (Ben Mohadji & Paris, 2000; Mortimer, 1993), so much of what was reported as

bycatch may have been caught intentionally. Also, fishers' interpretation of an 'accidental' capture was often ambiguous (e.g., they may have reported turtle capture to be 'accidental' if catching turtles was not the main aim of the fishing trip). Awareness-raising activities on Mohéli may have helped reduce bycatch mortality and intentional capture of sea turtles, as bycatch rates were lower on that island than on Grand Comore. However, turtles are more easily available on Mohéli, since they regularly nest on the beaches, so these results could merely reflect a lesser need to capture them from boats.

On Grande Comore, two out of the 10 gillnet fishers interviewed reported captures of dugong, and another six captures were reported by line fishers. Six out of these eight dugong captures were reported from the village of Mitsamiouli, north-west Grande Comore, where dugong may be foraging on abundant seagrass beds (Anasse et al., 2003). Three captures of dugong were reported by fishers on Mohéli, two of which were in gillnets, even though gillnets were only used by three of the fishers interviewed. Gillnets are therefore a clearly identifiable threat to dugong in the Comoros.

Bycatch of cetaceans was reported by 11% of fishers on Grande Comore and 5.8% of fishers on Mohéli, and mortality in these occurrences was relatively low (11% on Grande Comore and 25% on Mohéli). Fishers said they tended to release dolphins caught in their gear, since they have no value as food; however, some fishers killed dolphins to stop them from eating fish stocks. Species reported as bycatch included (from most to least common): spinner dolphin (*Stenella longirostris*), Indian Ocean bottlenose dolphin (*Tursiops aduncus*), humpback dolphin (*Sousa chinensis*) and Risso's dolphin (*Grampus griseus*). The Common Dolphin (*Delphinus delphis*) was also identified by fishers but has not been recorded as

present in Comorian waters to date and was probably a misidentification of the spinner dolphin.

Conclusions

Capture of turtles by fishers, particularly on Grande Comore, was shown to be a serious threat to these species in the Comoros. Since turtles are rarely likely to be captured completely accidentally, awareness-raising and alternative income generation for fishers are potential means to reduce turtle mortality. Gillnets were identified the primary bycatch-related threat to dugong, however their use in the Comoros appeared to be minimal and they are already prohibited by Mohéli Marine Park and a number of village associations. Cetaceans were rarely captured, and mortality was low.

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