

Improving Shark And Ray Catch Data And Options For Their Conservation And Management In Kenyan Coastal Waters

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Background

Shark and ray populations worldwide are declining. A quarter of sharks and rays across the world are threatened with extinction, mainly due to overfishing. Due to their slow growth rates and late maturity, shark and ray populations are particularly vulnerable to overexploitation and are slow to recover.

Very little is known about the distribution and abundance of sharks and rays in Kenya, but there is increasing concern about their populations, due to a reduction in catch rates and size, and the high numbers of juveniles caught in Kenya's multi-gear artisanal fishery. A recent global study on reef sharks using baited remote underwater videos (BRUVs) recorded no sharks in Kenyan waters. Despite the small numbers of sharks in Kenya, it is clear from catch statistics that they are still being caught in artisanal fisheries.

In Kenya, fisheries data does not separate out different shark and ray species. Instead, shark and ray catches are aggregated into one convenient taxa group called "sharks, rays or nei" (not elsewhere indicated).

Using established methods for artisanal fisheries catch data collection in Kenya, during this study, field surveys were conducted by local community members to collect data on shark and ray catch landings at three landing sites in 2019. The information collected during this study contributed to a report produced by the Kenyan government on the status and threats to shark populations, for Kenya's National Plan of Action for sharks and rays.

Method

Fifteen community members, from five different Beach Management Units (BMUs) from areas with historically high shark and ray catch rates, were trained on shark and ray species identification and catch data collection. Due to budget constraints, species catch data were collected at three landing sites for at least ten days a month, for a period of eight months in 2019. The sites were located at Msambweni, on Kenya's south coast, and Kipini and Ngomeni, on the north coast. Shark and ray species were identified using photographs and identification guides. Total weight of shark landings, and total length and disk width of individuals species were measured.

Data were also collected on the fishing effort, such as gear type, crew numbers and time of each fishing trip, in order to calculate catch per unit effort (CPUE).

Results

A total of 22 species of sharks and rays, comprising 1,094 individuals from 10 families, were caught during the eight-month study period. Nine species, making up

81% of the landed individuals by number and 49.5% weight, were sharks. Thirteen species of rays contributed 18.9% of the total landings by number and 50.5% by weight. The family Carcharhinidae was the most abundant in terms of numbers of landed individuals (49.3%), followed by Sphyrnidae (24.2%). The most predominantly caught shark species were scalloped hammerheads (*Sphyrna lewini*) (30.1%) and grey reef sharks (*Carcharhinus amblyrhynchos*) (22.9%). The most abundant ray species caught were bluespotted ribbontail ray (*Taeniura lymma*) (23.7%) and giant guitarfish (*Rhynchobatus djiddensis*) (19.3%).

The highest number of sharks were caught using gillnets (44.2), followed by handlines (26.4%), which contributed the highest proportion by weight (37.3%) and had the highest CPUE of 16.5 ± 1.5 kg /fisher/trip. Species catch composition also varied by gear.

All individuals from the two most dominant shark species (*S. lewini* and *C. amblyrhynchos*) were caught before attaining maturity (total length at maturity (L_m), 210.5cm and 128cm respectively), while encountered individuals of the most commonly caught ray species (*T. lymma*) had all reached size at maturity (L_m 20.3cm), and all individuals of the second most predominantly caught ray (*R. djiddensis*) were below size at maturity (L_m 177 cm).

Conclusion

The high numbers of sharks and rays caught during the survey period indicate that sharks and rays constitute a large proportion of Kenya's artisanal fishery catches. This is of concern given that many of the most caught species are listed as endangered on the IUCN Red List. Of the two most caught shark species, *S. lewini* is categorised as Critically Endangered and *C. amblyrhynchos* listed as Endangered. Although the abundant species of ray (*T. lymma*) is listed as Least Concern, the second abundant species (*R. djiddensis*) is listed as Critically Endangered. IUCN has stated that rhino rays, such as *R. djiddensis*, are now the most threatened marine fish.

Additionally, a high proportion of the sharks and rays caught were below size of maturity. This included all individuals of *S. lewini*, *C. amblyrhynchos* and *R. djiddensis* encountered. Kenya's artisanal fishery primarily operates in shallow coastal waters, where sharks and rays most likely pup and their juveniles use as nurse grounds. Sharks and rays have relatively slow growth rates and reproduction rates, making them highly vulnerable to overexploitation, particularly if immature individuals are targeted, before they are able to breed.

An organising team is developing a strategic plan for the conservation of sharks in Kenya, using the IUCN SSC Conservation Planning Specialist Group principles. The data collected in this study are being used to support the organising team's shark and ray conservation strategy plan. The organising team is made of shark scientists and conservationists, Kenya government officials from Kenya Wildlife Service and Kenya Fisheries, shark fishers, and NGOs.

The organising team plans to hold a multi-stakeholder meeting, which will include shark fishers, tourism operators, NGOs, government agencies and other interested members of coastal communities, to create participatory agreements and recommendations through consensus. The organising team will then develop a conservation plan for Kenya's coastal sharks and rays with specific conservation action targets, through either reducing fishing mortality or protecting their critical habitats or a combination of both. This strategy will feed back into Kenya's

development of a NPOA for sharks and rays.