Spatial Analysis to Inform Policy Recommendations for Shark and Ray Protection in Mozambique

PROPOSERS

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OBJECTIVES

The overall goal is to assist the government of Mozambique to improve the management of shark and ray populations and associated fisheries, through appropriate analysis and translation of data into science-based recommendations for policy and management. Key objectives include:

1. Improve spatial protection of threatened shark and ray species in Mozambique by conducting a marine spatial analysis to identify biodiversity hotspots and determine strategic areas for the development of new marine protected areas.
2. Develop recommendations for improved management and conservation of shark and ray species and their associated fisheries in Mozambique.
3. Develop strategic communication materials to create awareness of the poor conservation status of sharks and rays and the need to protect these species, and to provide recommendations for improved management and conservation.

SIGNIFICANCE

The southwest Indian Ocean (SWIO) has been identified as a global hotspot for shark and ray species richness, endemism and evolutionary distinctiveness, centered around southern Mozambique and northeast South Africa, with 130 shark and 86 ray species identified to date.[1] [2] There is extensive fishing pressure throughout the region and most fisheries are unregulated and unmonitored. This results in overexploitation of sharks and rays that are targeted or caught as bycatch. Slow growth rates, late maturity, and low reproductive capacity make sharks and rays highly susceptible to overfishing.[3]

Sharks and rays are important components of the artisanal fisheries and coastal communities in Mozambique. However, owing to heavy overexploitation, 42 species (34% of all Mozambique shark and ray species) are categorized as being “threatened with extinction” on the IUCN Red List of threatened species, i.e. Vulnerable (23 species), Endangered (10 species), or Critically Endangered (9 species).[4] [5] Despite this, sharks and rays remain targets in these fisheries and large proportions of shark and ray catches comprise threatened and CITES-listed species.[6] Millions of people living in coastal Mozambique are dependent on marine resources (including sharks and rays) for livelihoods and protein, and these human populations and their demand for marine resources continue to increase. Overexploitation of shark and ray species can have direct impacts on their populations, and indirect impacts through cascading effects on the ecosystems and trophic webs. As thousands of people living in coastal communities within Mozambique are dependent on fish, shark, and ray species, and other marine resources for their income and livelihoods, as well as cultural or traditional uses, sustainable utilization of these resources is paramount and as much a social issue as it is an ecological issue. Reduced mortality, improved conservation and management, and stricter trade controls are critically needed. However, policy and legislation for sharks, rays, and their fisheries in Mozambique are limited, and there is a paucity of biological, ecological and fishery data to support improved management.

This project will contribute to ongoing conservation efforts for threatened sharks and rays in Mozambique and indirectly the broader southwest Indian Ocean. Key outcomes of the project will include using improved biological and ecological knowledge of sharks and rays to inform management, providing recommendations for incorporation of conservation needs into marine protected area (MPA) regulations and management, and developing strategic communication materials to disseminate policy recommendations. The results of this project will contribute to the overall marine conservation work of Wildlife Conservation Society (WCS) while also providing important information and recommendations to the Mozambique government, with which WCS has a partnership.

BACKGROUND

WCS is working with the Mozambique, Kenyan and Tanzanian governments to develop national policy for sharks and rays, and has supported Madagascar in developing a National Plan of Action for shark and ray conservation. In recent years, WCS has also been working with the Nairobi Convention (Nairobi citation), a regional framework agreement under the United Nations Environment Program for marine and coastal management of the Western Indian Ocean (WIO) states, to advance shark and ray policy within the WIO region.[7] This project will focus on data from three of Mozambique's seven coastal provinces - Maputo, Inhambane, and Cabo Delgado, where threats to shark and ray populations proliferate. With a coastline spanning more that 1,500 miles, the research in Mozambique and the policy recommendations provided to the Mozambique government will be critical to the regional success of improved shark and ray conservation and management in the southwest Indian Ocean.

AVAILABLE DATA

Several surveys have been conducted to date, including baited remote underwater video (BRUV) surveys to collect ecological data on shark and ray populations, and landing site surveys to provide information on catches in the coastal artisanal fisheries. In addition, species distribution and habitat distribution data are publicly available online through various open source databases.

- *Ecological data (BRUV surveys):*
    - Cabo Delgado Province – c 100 samples (video analysis is complete and data are ready for analysis);
    - Southern Inhambane Province – c 140 samples (video analysis is complete and data are ready for analysis);
    - Maputo Province – c 120 samples (video analysis is complete and data are ready for analysis);
    - Northern Inhambane Province – intended 150 samples (video analysis to be completed by May/June 2020)
- Fishery surveys (data collected through mobile phone app and centrally stored). This dataset of catch records can inform management in terms of what species are there, and which species (with emphasis on IUCN threatened species) are being impacted by the fishery in that area.
    - Cabo Delgado and Inhambane Provinces, and Maputo city – weekly surveys since November 2018.
- Convention regulations, binding commitments and national legislation are available online.
- Species and habitat distribution data
    - GEBCO (publicly available)
    - World Database on Protected Areas (publicly available)

POSSIBLE APPROACHES

The project aims to contribute to improving the conservation status of sharks and rays in Mozambique, through spatial analyses of existing data, to identify possible policy reforms and inform government and resource users. Possible approaches include:

1. Conducting marine spatial planning analyses on existing data:
    a. Identification of biodiversity hotspots and ecologically important areas for shark and ray species using ecological and fisheries data.
    b. Identification of strategic areas for the development of new marine protected areas (MPAs) and/or the expansion/improvement of existing MPAs using ecological and fisheries data.
    c. Incorporation of shark and ray data and conservation requirements into MPA design and management plans.
2. Develop recommendations for improved management and conservation of shark and ray species and their associated fisheries:
    a. Desktop study to identify species- and gear-specific regulations for the protection of threatened shark and ray species (i.e. IUCN Red-listed threatened species and CITES-listed species) that government fisheries managers can use to develop improved policy and legislation
    b. Identify all of the binding requirements and voluntary commitments of the relevant signed/ratified conservation conventions that concern sharks and rays to which Mozambique is signatory, as well as resolutions and prohibited species of the relevant Regional Fishery Management Organizations (RFMOs) (i.e. the Indian Ocean Tuna Commission)
    c. Propose mechanisms to adhere to all binding requirements and voluntary commitments of relevant signed/ratified conservation conventions and RFMOs.
3. Develop strategic communication materials
    a. Raise the profile of the poor conservation status of sharks and rays in Mozambique by developing infographics and social media outputs
    b. Preparation of awareness materials to be disseminated in fishing communities in the three target provinces
    c. Preparation of relevant and concise information (i.e. policy briefs) that can presented to the Mozambique government to inform government and recommend (including recommendations from objectives 1 and 2) the necessary steps to improve the management and conservation status of threatened shark and ray species.

DELIVERABLES

- Marine spatial planning outputs identifying key areas for protecting sharks and rays;
- Recommendations for improvements to the MPA network in Mozambique and for inclusion into MPA management plans of specific regulations and gear restrictions for protecting threatened sharks and rays;
- Recommended species-level regulations and gear restrictions, to protect or reduce mortality of threatened and CITES shark and ray species;
- A list of binding requirements and voluntary commitments relating to sharks and rays that are imposed by conservation conventions, and proposed mechanisms to meet these obligations;
- Information that can be used in national policy briefs that detail all project outputs and findings and recommendations for improved management, policy and regulations, that can be presented to governments;
- Communication materials to raise awareness, such as infographics aimed at fishing communities.

INTERNSHIP

Wildlife Conservation Society will provide an internship for Summer 2019 focused primarily on advancing the goals of the group project. This internship can be either remote or based in the Maputo office, depending on funding.

SUPPORTING MATERIALS

Citations

1 Dulvy, N. K., Fowler, S. L., Musick, J. A., Cavanagh, R. D., Kyne, P. M., Harrison, L. R., Carlson, J. K., Davidson, L. N., Fordham, S. V., Francis, M. P., Pollock, C. M., Simpfendorfer, C. A., Burgess, G. H., Carpenter, K. E., Compagno, L. J., Ebert, D. A., Gibson, C., Heupel, M. R., Livingstone, S. R., … White, W. T. (2014). Extinction risk and conservation of the world's sharks and rays. *ELife*, *3*, e00590. https://doi.org/10.7554/eLife.00590.

2 Stein, R. W., Mull, C. G., Kuhn, T. S., Aschliman, N. C., Davidson, L. N. K., Joy, J. B., Smith, G. J., Dulvy, N. K., & Mooers, A. O. (2018). Global priorities for conserving the evolutionary history of sharks, rays and chimaeras. *Nature Ecology & Evolution*, *2*(2), 288–298. https://doi.org/10.1038/s41559-017-0448-4.

3 Worm, B., Davis, B., Kettemer, L., Ward-Paige, C. A., Chapman, D., Heithaus, M. R., Kessel, S. T., & Gruber, S. H. (2013). Global catches, exploitation rates, and rebuilding options for sharks. *Marine Policy*, *40*, 194–204. https://doi.org/10.1016/j.marpol.2012.12.034.

4 IUCN. 2001. *IUCN Red List Categories and Criteria: Version 3.1*. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, United Kingdom: 30 pp.

5 IUCN. 2019. *The IUCN Red List of Threatened Species*. Version 2019-2. https://www.iucnredlist.org.

6 Stein, 2018

7 United Nations. 1985. Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region. United Nations Environment Programme, Nairobi. 43 pp.

Budget and Justification

It is not anticipated that the proposed project would require additional funding beyond the $1,300 contributed by the Bren School.

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Group Project Committee

Bren School of Environmental Science and Management

University of California, Santa Barbara

January 24, 2020

RE: Spatial Analysis to Inform Policy Recommendations for Shark and Ray Protection in Mozambique

Dear Group Project Committee,

We are writing to express our support for the group project Spatial Analysis to Inform Policy Recommendations for Shark and Ray Protection in Mozambique. At Wildlife Conservation Society, Mozambique we have placed high strategic priority on identifying and strengthening protection of key biodiversity areas in the country, both in terrestrial and marine realms. Sharks and rays are one of our conservation priorities globally.

We push for applied conservation and applied science and engage closely with the Mozambique government on many of our activities. Protecting and managing important areas for sharks and rays is an important activity within our portfolio of projects working toward the protection of some of the strongholds for this group along the Southwestern Indian Ocean. This project will entail a spatial assessment that informs policy recommendations that can be presented to the government for policy changes on shark and ray protection.

We believe this group project could provide important insight regarding spatial priorities for protecting sharks and rays in Mozambique as well as identifying policies and conventions that would lead to better protection of these areas. The resulting insights will allow us to provide policy recommendations to the government and other stakeholders.

As part of our support we are prepared to offer a single internship, remotely. We are also interested to offer the internship in our office in Maputo but we have not secured funding for that. This implies that the intern will have to look for any funding opportunities. We also highlight that although we do not foresee any major issues, the publishing of the results is dependent on the authorization by the partner institution from the Government with which WCS has a partnership.

Sincerely,

James Bampton

WCS Mozambique Country Director