

Whale Shark Conservation Hindered by Lack of Habitat Protection



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Submission: September 18, 2020; **Published:** September 24, 2020

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Keywords: Whale shark; Habitat protection; Toxic elements; Anthropogenic activities; Marine ecosystem, Waste recycling

Opinion



Figure 1: Whale shark encountered in the Gulf of Tadjoura with the left pectoral fin entangled in a floating fishing line.

Within the Gulf of Aden, Djibouti has long been known as a place frequented by whale sharks. Sharks gathering off the Djiboutian coasts are mostly juvenile males and form seasonal aggregations [1]. Considering the general lack of knowledge on this species, and that is listed as Endangered on the IUCN Red List, with a decreasing population [2,3], a comprehensive research study on the whale shark population has been carried out in the Gulf of Tadjoura (Djibouti) since 2016. Research findings showed that the Djibouti whale shark population comprises more than 190 individuals, which show site fidelity to this area by returning each year [4]. Whale sharks use Djibouti as a seasonal feeding ground in October-February, due to the increase in prey availability driven by the southwest monsoon that enhances the upwelling of nutrient rich waters [4]. The arrival of northeast monsoon winds prevents the upwelling phenomenon, causing the disappearance

of whale sharks [4]. The apparent absence of whale sharks has led to the hypothesis that sharks migrate to other locations. Other aggregation sites have been described in the nearby Seychelles [1], Saudi Arabia [5,6], Arabian Gulf and Gulf of Oman [7,8]; however, no animals have been tracked from one site to another, so their movements still remain unknown.

Although Djibouti has adopted protection measures for the whale shark conservation that forbid capture and commercial trade, previous studies have highlighted multiple major threats that undermine the whale shark conservation in this area of the world [4,9]. For instance, roughly 50% of the sharks we encountered in 2016-2019 were injured, consequently of the fact that they spend much of their time feeding at the surface and are easily exposed to boat collisions and floating fishing gears (Figure

1). The whale shark survival could be also negatively affected by marine pollution, which appears to be elevated in the Gulf of Aden [10,11]. Contaminants exposure has drastic implications for the health of sharks, as they accumulate high levels of elemental and organic toxicants [11-13]. However, as filter feeding animals, whale sharks are expected to bioaccumulate lower levels of available pollutants compared to higher trophic level sharks; however, whale sharks sampled in the Gulf of Tadjoura showed much higher concentrations of certain toxic elements, such as chromium, than those of predatory species from the same area [13].

While previous studies have provided important baseline information on the whale shark population and habitat use in the Gulf of Tadjoura [1,4], these findings also demonstrate the need to implement a new management strategy for the protection of this species. In the Gulf of Tadjoura, the core habitat for whale shark is located within a marine protected area (MPA); however, anthropogenic activities are still not effectively regulated. There is an urgent need to avoid fishery interactions and boat collisions by reducing vessel speed in proximity to shark hotspots. Moreover, the use of propeller guards might be adopted for tourist boats, especially considering that Djibouti has recently seen an increase in the number of foreigners visiting and residing in the country. Tourism is expanding in Djibouti because of interest in its marine ecosystem and opportunities for recreation activities [14]. Therefore, effective management of wildlife tourism should be implemented by licensing boats and establishing a maximum number of vessels per day, as well as a quota for the number of participants. A code of conduct for touristic activities should be used during each human-shark interaction to avoid potential disturbances.

Moreover, educational activities with the local community should be organized to raise awareness with locals aimed to raise awareness and improve the status of conservation not only of whale sharks, but of the entire marine ecosystem. Coastal cleanup programs, that reinforces the understanding of waste pollution and promotes the green and clean lifestyle, might be organized. Littering is a relatively common form of behavior in Djibouti that creates an enormous cost to society and environments at local, regional, and global scales [15]. Djibouti also regularly releases untreated and improperly treated wastewater into the marine environment [16]. Coastal communities derive a variety of benefits from marine ecosystems and, consequently, they are strongly linked to the health of the coastal ecosystems on which they rely. Therefore, it is important to adopt a waste management system for reducing the entry of pollutants into the marine ecosystem. Industries should set up waste proper treatment plants, minimize waste by adopting suitable measures such as waste recycling and recovery of wastewater effluents [17].

Overall, considering the multiple threats to the whale shark survival and to the marine habitat health, there is an urgent need of implementing of current conservation initiatives. The use of the

whale shark as an umbrella species for the creation of effective MPAs could, in turn, generate great benefits to the whole marine ecosystem as well.

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DOI: [10.19080/IJESNR.2020.26.556178](https://doi.org/10.19080/IJESNR.2020.26.556178)

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