Sandbar & Dusky Sharks, *Carcharhinus plumbeus & C. obscurus*, Fishery Sustainability.

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Sandbar shark. Source: Elasmodiver.com

Dusky shark. Source: Elasmodiver.com

BIOLOGY OF THE ORGANISM

Both sharks are blue-grey to bronze on their backs with white undersides, but sandbar sharks are stout with tall dorsal fins and dusky sharks have long, slender bodies and short dorsal fins. Sandbar sharks average 1.8 to 2.4 m in length & 140 lbs, and dusky sharks average 3.8 to 4 m in length & 420 lbs [4]. Both eat small bottom fishes, molluscs, crustaceans, tuna, and small sharks & rays. The dusky shark matures around 20 years, the sandbar around 25, and both can live around 50 years. Sandbar sharks mate in spring-early summer with 8-12 month gestation periods and 6-13 pup litters; dusky sharks mate every 2-3 years with 18-22 month gestation periods and 3-16 pup litters. Both are seasonal migrators and have high fin-to-body weight ratios.

Both inhabit tropical & warm-temperate seas, but the sandbar is coastal to depths of 200 m, and the dusky shark is pelagic to depths of 400 m. Both have global distributions in the Atlantic, Mediterranean, Persian Gulf, and Hawaii. Sandbar sharks are also found in SE Asia & NW Australia, and dusky sharks are found near NE Asia & Australia. Both sharks have slow population growth rates, an average of 3% to 5% per year [1, 2]. The IUCN lists dusky sharks as “Endangered” and sandbar sharks as “Vulnerable”, and many of their Atlantic populations have been reduced by fisheries, as well as those of dusky sharks in the Indian Ocean and sandbar sharks in the NW Pacific and Australia [3, 2].

HISTORY OF THE FISHERY

Both sharks are used for human consumption (meat & shark-fin soup), leather, and liver oil [5], which came from demand for vitamin A in the late 1930s; efforts for which were abandoned in the 1950s due to synthetic vitamin development [18]. Other uses include traditional weapons, medicines, and tourist trinkets, such as shark tooth necklaces. Both are popular targets for recreational anglers due to their size; the dusky shark was once a primary tournament species.

The 1970s saw an increased global demand for fins, meat, and cartilage, leading to commercial fishery expansion and controversial finning practices, and stocks began showing signs of decline in the 1980s even as tuna and swordfish vessels began keeping higher amounts of shark bycatch [18]. These sharks are most often caught by pelagic longline gear, from 5-40 miles in length with 20-30 hooks per mile; bottom longline gear, which is the primary commercial gear for large coastal sharks (LCS); historically-used gillnets and strike nets; and hand-gears, such as harpoon, handline, and rod & reel, though these are less common [18]. Gear restrictions were added to the Consolidated Atlantic Highly Migratory Species Management Plan in 2007 to limit LCS gillnetting.

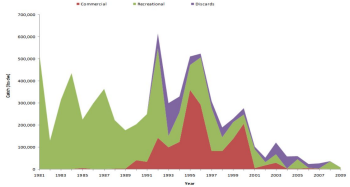

Figure 1. Total catches of dusky shark from the GOM & US Atlantic commercial & recreational fisheries, 1981-2009 (in pounds dressed weight) [18]. Red = commercial, Green = recreational, Purple = discards.

CURRENT CONCERNS

Sandbar and dusky sharks are targeted by sport and commercial fishers for a variety of uses, and are often caught as bycatch from other fisheries, like menhaden. Continued use of these sharks is concerning due to their slow growth and long reproductive cycles, making them vulnerable to anthropogenic disturbances and slow to recover from large population shifts. In the US, both are sustainably managed, but outside of the US there are fewer restrictions and catch is unsustainable. Figure 1 shows the total catches of dusky shark in the Gulf of Mexico and US Atlantic, separated into commercial catches, recreational, and discards (i.e. finning) from 1981 to 2009. Figure 2 shows total catches of sandbar sharks in the US Atlantic and Gulf of Mexico, including recreational, reported commercial, and unreported commercial catches from 1978 to 2008. In both cases, catch declined over time.

ECONOMIC CONSIDERATIONS

There are effectively two separate markets for shark fins and meat [5]. Constituting 5-16% of the animal’s mass but producing most of the economic returns, the main drivers of the shark trade are the fins [10], which, by far, are mostly imported by a few Asian countries where they hold an important cultural value. Conversely, major importers of shark meat are European and South American countries, like Brazil, where this product is often a cheaper alternative than other over harvested species [5]. Western countries, including the US, also participate in the shark fin trade (legal and illegal) by scarcely inspecting large quantities of seafood travelling to and from Asia, parts of which have been revealed to be dried and salted fins [6]. These sharks are also important for tourism in some countries, i.e., trinkets or shark diving.

Major importers of shark products include Indonesia, India, Spain, Singapore, & Taiwan [5]. With the exception of Spain, the other countries’ fisheries are often small, unmonitored, and located in poor regions [7]. Research shows that 65% of the decreasing shark catches in Indonesia are represented by young individuals not having reached sexual maturity, which suggests the unsustainability of these fisheries [8,9].

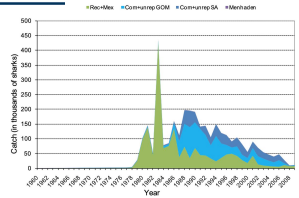

Figure 2. Catches of sandbar shark (in thousands of sharks) by fleet, separated into four fisheries: commercial & unreported catches in the Atlantic (dark blue), commercial & unreported catches in the GOM (light blue), menhaden fishery discards (purple), and recreational & Mexican catches (green), 1978-2008 [19].

SOCIAL AND CULTURAL CONSIDERATIONS

Shark fins are the cultural and economic driver of global shark material trades. 90% of fins are imported by Hong Kong and China to be used in their traditional “shark fin soup,” a luxurious and expensive plate offered at public events, like marriages, funerals, and official banquets, as a symbol of generosity, status, and power [10]. Most shark fisheries are located in the poor regions of developing countries, where fishermen rely on them for their livelihood. In Indonesia, despite targeted shark catch being banned, fishermen tend to ignore the ban as this activity is one of the only practices able to sustain them economically [7]. Relevant to the issue is also the sharks’ reputation as voracious apex predators as this increases the prestige of their catch and enhances the trade value; on the other hand, it also inspires respect and the need for conservation.

POLITICAL AND GOVERNMENTAL CONSIDERATIONS

Several national and international efforts have been made to protect dusky and sandbar sharks. In 2017, the dusky shark was added to the Conservation of Migratory Species’ (CMS) Appendix II, which granted them increased commercial trade monitoring as a vulnerable species [11]. In 2010, a motion to add the sandbar shark to the Convention on International Trade in Endangered Species’ (CITES) Appendix II was rejected [12], inhibiting the protection of these sharks.

In 2003, the EU passed the Removal of Shark Fins Regulation to stop shark finning; however, recent studies have shown that this policy has not been adequately enforced [13], particularly in Spain. In the US, commercial quotas regulating shark fishing are announced yearly by the National Marine Fisheries Service (NMFS), but in 2019, quotas concerning sandbar sharks were absent [14], while the dusky shark is still protected under CMS. Shark-fishing regulations by developing countries like Ecuador and Indonesia have been ineffective due to high demand for and value of shark fins, as well as the poor economic conditions of the fishermen involved in the trade [7, 10].

PROPOSED SOLUTION

Many shark species, dusky and sandbar included, are crucial to the health of their ecosystems and their extinction may cause major disruptions in the balance of these environments and may potentially pose issues to human fishing activities [17]; conservation efforts must be made to prevent this from occurring. While useful in many situations, governmental regulation and species-specific fishing bans may not be the most effective option due to the wide distribution of these organisms and location of many international fisheries in poor and unmonitored regions [7]. Instead, since the demand fueling the shark trade is concentrated in Asia, a relatively limited region, and that the main driver for demand is a traditional belief, structured cultural campaigns aiming to educate Asian consumers are suggested as the most viable and effective approach. Relevant leveraging points include the important roles of these species in their habitats, their vulnerability to anthropogenic disturbances, and the brutality of practices like shark finning [10]. In parallel to these efforts, alternatives to shark fin soup can be promoted instead, such as other expensive and luxurious dishes [15], or soups substituting real fins with artificial replicas that are indistinguishable in taste and texture to the consumer [16].

We also propose that the dusky shark be added to the US Endangered Species Act due to its decreasing population status and vulnerability [3, 4] but not the sandbar as its US populations are not as threatened [2].

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