

SHARK FINNING: ARE INDIAN WATERS BECOMING A GRAVEYARD FOR SHARKS?

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Introduction

The predator of the marine world may be much feared in the waters, but it seems the shark is the one that is living a fearful life in the Indian maritime environs. According to a report compiled by TRAFFIC-India, a global wildlife trade monitor and the Pew Environment Group, India has been ranked second in a list of top 20 shark catching nations of the world (Hanfee, 1997). Surpassed only by Indonesia, this is a ranking that will shame conservationists across the nation.

Sharks comprise about 7% of living fish species. They are found in all the world's oceans, as well as many inland waterways. Sharks are solitary animals and characterized by cartilaginous skeleton, five to seven gill slits on the sides of the head, and pectoral fins that are not fused to the head. They lack bones and swim bladder which most bony fish have. But they have huge livers, these contain oil which is lighter than water and therefore floats. Elasmobranchs comprise more than 490 species of sharks, along with around 630 species of skates and rays. Chimaeras, such as elephant fish and ghost sharks, are thought to comprise 50 species (Compagno, 2000).

Sharks range in size from the small dwarf lanternshark (*Etmopterus perryi*) a deep sea species of only 17 centimetres (6.7 in) in length, to the whale shark (*Rhincodon typus*) the largest fish in

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the world, which reaches approximately 12 metres (39 ft). While people fear the creature, most of them are actually critically endangered and on the verge of extinction. Looking at the threat to their survival, the Union Ministry of Environment and Forests had banned shark-fishing in 2001 but pressure from the fishing community led them to lift the ban in 2004. Since then, the sharks swimming in Indian waters have lived a scared life. Fishermen catch them mainly for their fins which are served in a bowl of shark fin soup costing upto \$100 in the international market. The fins are cut from live sharks and the dilapidated fish is thrown back into the waters for a painful death. This is done to avoid adding tonnage to the trawlers!

Current Status of Shark Fisheries

The global biomass of elasmobranchs before the era of modern fishing was estimated at 8, 62,60,000 tons (Jennings *et al.*, 2008). It is assumed that half of these are sharks in which a biomass of 4,31,30,000 tons of sharks was estimated before fishing. Global shark landings have increased 3.4 fold from 1, 20, 677 t in 1950 to 4, 14, 345 t in 1997 and since then have declined by 7.5% to 3, 83, 236 t in 2010 (Boris *et al.*, 2013). These figures are likely to be a gross underestimate, however, with one recent study claiming that the global shark catch in 2012 was 100 million t (BBC, 2013). The International Union for Conservation of Nature (IUCN)'s Red List designates 17% of assessed shark and ray species (of a total 1,045 assessed species), to be threatened (11% Vulnerable, 4% Endangered and 2% Critically Endangered), 13% nearly threatened, 23% of Least Concern and 47% data deficient (Camhi *et al.*, 2009).

With an annual average yield of over 25,000 t (during 1981-2012), India is responsible for 9% of the global catch of different shark species. Indonesia has a 13% market share and Spain follows India

with 7.3%. In 2008, India ranked three in the same list and the leap to the second spot is nothing to be proud of. These three shark fishing nations accounted for 25-40% of reported global catch between 2000 and 2004 (FAO, 2006). Other major shark fishing nations include Argentina, Brazil, France, Iran, Japan, Malaysia, Mexico, New Zealand, Pakistan, Sri Lanka, Taiwan, Thailand, the United Kingdom and the United States. These countries each report catches of more than 15,000 mt annually (FAO, 2006).

The Indian Scenario

Detailed studies on the shark fishery in the Indian Ocean are scarce. A key problem is the incomplete reporting of shark catches to the authorities which track the status of fisheries. Caught sharks are often not landed in harbours and are instead discarded at sea after removing the fins, with such discards not usually reported to national or international management agencies (UN-FAO) – unless there are trained observers on board. Among the annual production of elasmobranchs in India, sharks account between 60 and 70%. Tamil Nadu, Gujarat, Maharashtra, Kerala, Karnataka and Andhra Pradesh account for around 85% of the shark landings in India. The whale shark has become a regular fishery in successive years off Gujarat coast for its meat, fins, liver, skin and cartilage. Over 1,000 whale sharks have been hunted off Saurashtra coast in the year 1998. Totally 1,974 whale sharks have been caught in the Indian waters so far, with Gujarat contributing the highest percentage (94.6), followed by Tamil Nadu (2.0) and Andhra Pradesh (1.0) (Pravin, 2000). Most of the whale shark landings in Gujarat were by direct fishing, whereas the landings were incidental in the rest of the states. About 18 (*Carcharhinidae* and *Sphyrnidae* families) of the 70 species found in Indian waters are seen in commercial fisheries. Recently, IUCN included Ganges shark (*Glyphis gangeticus*) and the Pondicherry

shark (*Carcharhinus hemiodon*) in the critically endangered list and, Scalloped hammerhead (*Sphyrna lewini*), Great hammerhead (*Sphyrna mokurran*) and Broadfin shark (*Lamiopsis temminckii*) in the endangered list, whose populations have fallen drastically owing to indiscriminate fishing. In recent times, India has banned hunting sharks for only their fins in a move to protect endangered species from indiscriminate hunting (The Hindu, 2013). Shark landings in India between 1981 and 2012, are shown in fig. 1, below.

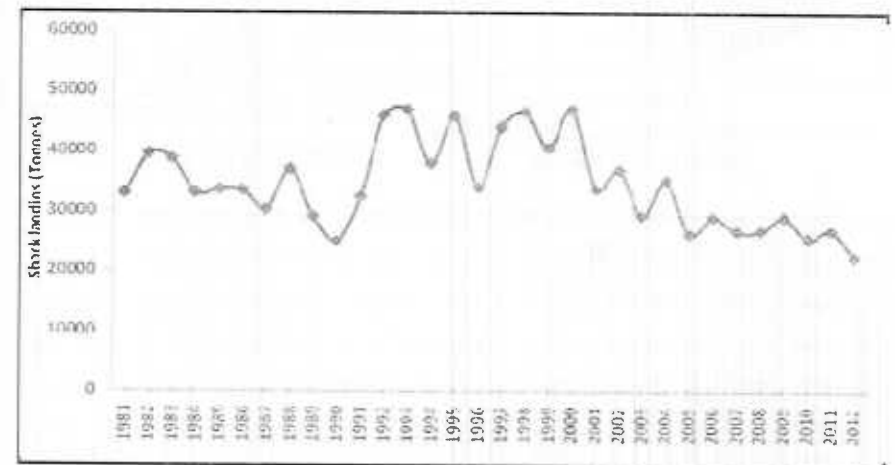


Figure 1
Shark Landings in India 1981-2012 (CMFRI, 2013)

There are several types of gear that take sharks as incidental catch; the most important among them are trawl net and gill net. There is no detailed information on the landings of sharks by gear type but data available on shark production by mechanized boats at major fishing centres showed that trawl nets account for 60% of the shark landings and gill nets account for 38%. But in Kochi Fisheries Harbour (major shark landing centre of Kerala), the multi gear (trawl/hook and line/gill net) contributed the highest catch of shark during 2002-2012 (Fig. 2).

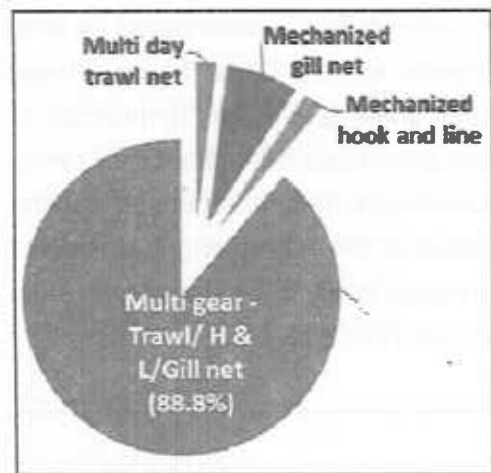


Figure 2

Gear wise shark landings, Kochi Fisheries Harbour, 2002-2012

Over the period 1985–2004, the reported production of chondrichthyan meat grew by more than 150%, from around 40,000 mt to 1,03,000 mt. Nevertheless, these figures still only represent around 10% of the reported catch (FAO, 2006). Country wise data on the chondrichthyan landings during 2004, is shown in the graph at fig. 3.

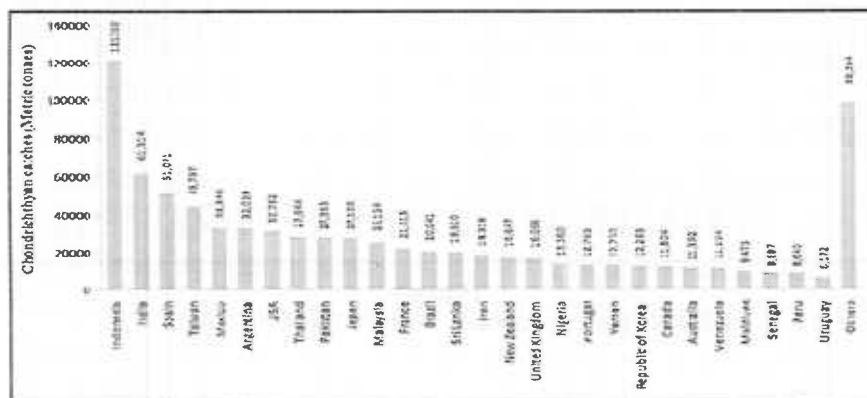


Figure 3

Country wise Chondrichthyan landings, 2004 (Wild Aid, 2007)

Factors leading to Overfishing of Sharks

Sharks are used worldwide for a variety of purposes. Many products derived from sharks include meat and fins for human consumption; liver oil to produce lubricants, cosmetics and vitamin A; cartilage as a purported medicinal treatment; skin for leather; and jaws and teeth for curios and trinkets. A number of factors are

responsible for overfishing of sharks, including improvements in fishing technology, processing and consumer marketing, expanding human populations and decline in other fish stocks, all of which have made sharks a more valuable fisheries resource.

Oceanic fishing fleets targeting valuable fish such as tuna and swordfish use thousands of baited hooks on miles of long-line, which often catch more sharks than their intended catch and can represent as much as 25% of the total catch. Bycatch is often not officially landed at ports; therefore data on the extent of the trade is limited. However, this bycatch is considered to be a major source of mortality for many shark species worldwide.

World Shark Fin Trade

A study in the Hong Kong shark fin market found that humans kill 26-73 million sharks each year, while reported world trade in fins has nearly tripled from 4,900 mt in 1987 to 13,600 mt in 2004 (Clarke *et al.*, 2006). This is the only comprehensive estimate of worldwide shark catches, and it is three to four times higher than the estimate of the UN-FAO. The disparity is probably due to the fact that the FAO records only shark landings and has no precise data related to shark catches or those which are discarded at sea. Shark fins are considered as one of the most valuable food items in the world, reaching prices as high as US\$700 per kg. Considering the high price they fetch, it is not easy to persuade fisherman to give up this 'catch'. Due to the rise in demand, high value and the lack of effective finning regulations in most countries, the average rate of shark finning in 2000 was 80% (9,08,000 t), while remaining 20% (2,27,000 t) were released alive but suffered post-release mortality due to injury and stress (Boris *et al.*, 2013).

Now sharks in all regions of the globe are sought solely for their fins. More than 90% of shark fin imports are accounted by countries

like Hong Kong (57%), China (36%) followed by Malaysia (2%), Indonesia, Taiwan, Thailand and others (1% each) (FAO, 2006). In 2004, Indonesia was the world leader in shark fin production (1,660 mt), followed by Singapore (1,000 mt) and India (455 mt). These three collectively account for 80% of shark fin production as reported to FAO. China is the world's largest consumer of shark fin but it reported shark catches of only 100–300 mt between 2000 and 2003 and negligible quantities in previous years (FAO, 2006). A survey conducted by Wild Aid and China Wildlife Conservation Association (CWCA) in 16 Chinese cities, found that 8,400 (35%) people out of 24,000 surveyed, had consumed shark fin soup and 2,200 (9%) reported taking it three times or more.

Shark fin Trade in India

Trawl nets account for major share of shark landings in India followed by gill nets. New Ferry Wharf and Sassoon Dock in Mumbai, Pudumanai Kuppam in Andhra Pradesh, Tuticorin in Tamil Nadu and Veraval in Gujarat are centres of shark landings by trawl net and gill net. Shakthikulangara and Kochi in Kerala are centres for gill net landings. There are more than 800 boats engaged in shark fishing in just one Thoothoor region of Kanyakumari District, Tamil Nadu. There are hundreds of merchants across the Indian coastline that carry-on this trade. Tamil Nadu, Gujarat, Maharashtra, Kerala, Karnataka and Andhra Pradesh are responsible for 85% of the shark killings in India. In Kerala, the highest shark landings (Figs. 4, 5), were recorded at Kochi Fisheries Harbour. Chennai and Mumbai are the major shark fin trading centres. But appropriate information concerning shark fin trade (Fig. 6) in India is lacking due to the paucity of authentic data.

Reasons for Overexploitation

Shark fin is one of the most expensive seafood products. Depending on the amount of fin in the soup, the price can range from



Figures 4 & 5

Routine shark landings, Kochi Fisheries Harbour



Figure 6

Removal of fins at a landing site

US \$10 to US \$100 per bowl of shark fin soup. A combination of two factors has led to an explosion in the demand for shark fin soup over the past twenty years. Firstly, the rapid expansion of

East Asian economies, particularly that of China, created a vastly increased middle class with disposable incomes. In China, because of its association with privilege and social rank, shark fin soup is served to celebrate important events such as weddings, birthdays or corporate functions and serving shark fin soup is related to the prestige of the community. Secondly, the consumption of shark fin soup in China, (discouraged under Mao Tse-tung) as an elitist practice, was politically "rehabilitated" in the late 1980s. The result is a massive surge in the international fin trade, prompting fishermen worldwide, to target sharks for their fins and to remove the fins from sharks caught as by catch in other fisheries. Fin traders systematically spread the word that fins are valuable to the world, often providing

equipment and monetary advances in order to secure fins. On 2nd July 2012, China State Council of the People's Republic of China declared that shark fin soup can no longer be served at official banquets. This ban may take up to three years to take effect because it is such a social dish in Chinese culture. China is the second Asian country to ban the dish, after Taiwan.

Shark Finning

Finning is the process of cutting off the fins of a shark and discarding the body at sea (Fig. 7). This wasteful and cruel practice contradicts all principles of sustainable shark fisheries management and conservation. Fins are easy to store, require no refrigeration and are worth significantly more than the meat, creating an economic incentive to retain the fins alone. During the finning process, a shark is hauled up on deck, its fins sliced off, and the animal – sometimes still alive – is thrown back into the sea to bleed to death. Unable to swim or pass water across its gills (if they are not in constant movement their gills cannot extract oxygen from the water), the shark

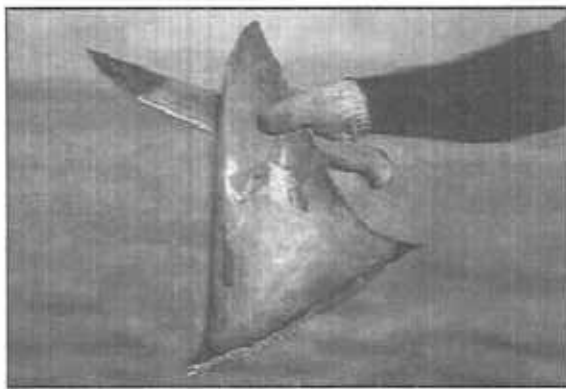


Figure 7
Finning at sea

dies from suffocation, blood loss or predation by other species. This practice is not only cruel; it is incredibly wasteful as finning only utilizes 1–5% of the shark's body-weight. Not only the finning of sharks is barbaric, but their indiscriminate

slaughter at an unsustainable rate is pushing many shark species to the brink of extinction.

Shark Fin Soup

Tens of millions of sharks are killed each year simply to supply the wasteful demand for shark-fin soup. Shark populations cannot sustain current slaughter rates. Unlike other fish species, many shark species are endangered and/or threatened due to the fin trade. For 1 ton of shark fins as many as 650 sharks are killed. Apart from this about 45,500 tons of shark fins come as incidental or by-catch by fishermen who are looking for tuna, swordfish and other fishes with trawl and gill nets. Consumers are largely under misconceived notions about shark fin soup. They wrongly believe in some cases that fins grow back, that shark fin is flavoursome and nutritious, and that it has medicinal properties. Since fins are essentially tasteless, the quality and texture of shark fin is important in making the soup. Fibres from fins give the soup a glutinous consistency and the flavour of shark fin soup lies entirely on the preparation of the broth, which is usually chicken or pork soup. The broth is prepared separately and they are combined just before serving. According to a leading chef in Singapore, the fins with their noodle-like tissues have no taste and are used only as a 'soup thickener'.

Fin Processing

The processing of raw shark fins has multiple stages which involve removal of the skin, cartilage and any attached meat to leave only the fine collagenous fibers known as "needles". First, fins are blanched in hot water and the skin scraped off. Next, they are placed in ice water to remove cartilage, and then sun-dried on racks (Fig. 8). Then they are transferred to a cool drying room to prevent softening and, finally, refrigerated. Fins are also usually bleached to give them a desirable whitish color - methods involving smoking with sulphur overnight or treatment with hydrogen peroxide. At the cooking stage, the fins are soaked again to remove their fishy odour after they have

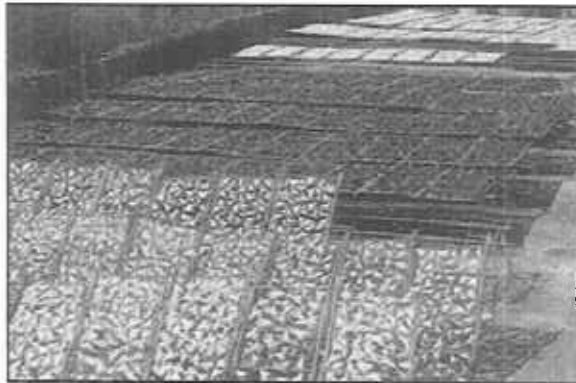


Figure 8

Fins being sun-dried (picture courtesy: Wild Aid)



Figure 9

Shark fin soup with crab meat (courtesy: Wild Aid)

softened and the soup can also be served with accompaniments (Fig. 9). Shark fins can be sold in several forms, including wet, raw, semi-prepared and fully prepared; fin nets; and ready-to-eat' form. Fins are graded by type, size and colour, each of which affects their price.

Usage of Shark Body except Fin

Commercial fisheries targeting sharks exist

throughout the world. Sharks are targeted primarily for their fins but also for their meat, cartilage, liver and skin.

Meat. Shark meat has become more popular but is less economically valuable than shark fins or meat from other more popular pelagic fish species such as tuna and swordfish. U.S. exports of shark fins in 2006 had a value of US\$93.68 per kilogram, compared to fresh and frozen shark meat (US\$2.09 per kg and US\$1.94 per kg, respectively) (National Marine Fisheries Service, 2006). Shark meat is more difficult to process than meat from most fish species because

of its high urea content, which also makes it less marketable in many areas.

Cartilage. Shark cartilage is increasingly marketed as a health supplement and alternative cure for certain diseases, including asthma, arthritis and even cancer – claims which have little or no scientific basis. Chondroitin, derived from shark cartilage, has been used as an ingredient in artificial skin for burn victims.

Skin. Tanned shark skin is used to make leather, the main markets for which are the USA, Germany, France and Japan. Untanned skin, called Shagreen, is used as sandpaper in the wood-working industry.

Jaws and Teeth. The jaws and sharp pointed teeth of sharks are used to make traditional weapons and jewelry, trinkets, curios and souvenirs for tourists.

Liver. It has been estimated that about 10% of the body weight of whale shark is contributed by its liver. The extracted oil is used for coating on the wooden hull of boats, as it acts as a crude preservative. The liver contains 60 to 70% of oil. About 600 to 700 litres of oil can be extracted from the liver of a 12-m shark. The cost of the liver and liver oil is Rs 25 and Rs 30 per kg, respectively.

Threat to Shark Population

What makes the shark population more vulnerable is that they mature late and breeding is slow. They take a long time to mature i.e. to reach the reproductive age, at times even up to 15 years or more; have a long gestation period (12 months or more) and thus do not reproduce frequently. As a result, they become much more prone to depletion than other species. If we keep killing sharks faster than

they can reproduce then there will soon be no sharks left. Sharks are likely to be in the first round of marine extinctions caused by human activity. They produce only a handful of young and take a long time to mature. Whenever faced by direct fishing pressure, some populations have crashed, taking decades for a stock to recover, if ever.

The diminishing population of sharks calls for immediate regulatory measures – primarily sustainable fishing. Uncontrolled fishing has been the major cause of threat to sharks all over the world. In many areas, shark has declined due to the arrival of modern long-liners and trawlers, many foreign-owned and illegal fishing mechanisms. Since they are often the “apex”, or top predators in their ecosystems, the depletion or removal of sharks is likely to affect marine ecosystems. Many marine experts believe that sharks are vital in maintaining marine biodiversity and are concerned that some species may become extinct before their ecological role is fully understood. Recent stock assessments and a variety of studies in the Northwest Atlantic have found a decline in many shark species (sandbar shark, dusky shark, hammerhead shark, blacknose shark, porbeagle shark, shortfin mako shark, spiny dogfish, silky shark, oceanic whitetip shark and longfin mako shark).

Artificial Shark Fin

Artificial shark fin is commonly known as ‘Mock shark fin’ which can be made from various ingredients, mainly by gelatin. Vegetarian shark fin can be made from soy which is commonly available in the market. A Japanese company produces the fins using pork gelatin. Low cost ‘fake shark fin soup, made using vermicelli is widely available in Chinese eateries. These kinds of substitutes can be used and can therefore reduce the demand for shark fins.

Conservation Measures

- Indiscriminate fishing could wipe out a whole generation of sharks. So it is necessary to enforce regulatory limits on the size of sharks which would in turn provide a chance for the immature sharks to mature and reproduce.
- India needs to take some regulations and only allow for trade in shark products such as meat and fins that have been captured under a sustainable balance.
- India’s natural heritage does not start and end with tigers. There are a number of other species too that need immediate attention and if India does not gear up right now, there is much to be lost very soon.
- As shark populations plummet worldwide, marine reserves are the new target of illegal fisheries. So necessary steps should be taken to protect them from the hands of such poaching.
- Implement shark-based ecotourism operations which have developed during the past decade in numerous locations. Some of the most vocal calls for global shark conservation come from nations that have a developed or developing marine tourism industry today.
- CITES currently protects three of the most charismatic species – the whale, basking, and white sharks. These species are well-known and support large dive and ecotourism industries hence there is also an economic incentive for their protection.
- Live sharks have a significant value for marine ecotourism (for example, recreational diving, shark feeding and shark watching from boats) that is typically more sustainable and often more valuable than their individual value to fisheries. Tourists are prepared to pay huge sums of money to view and even dive with sharks. *Whale shark tourism (snorkeling or diving with*

them), for example, is estimated to be worth \$47.5 million worldwide.

- Establishing the fishing ban in some areas during particular seasons and identifying and protecting shark pups and nursery grounds should also be prioritized.
- Sharks will face increasing environmental pressures from pollution, global warming, ozone depletion, etc. Allowance should be made for these factors when using a precautionary approach to shark management.
- One of the greatest challenges to the conservation of sharks is overcoming the current poor state of knowledge about the life history and, growth rate, reproduction potential, distribution movement and interaction with other species.
- Establish shark sanctuaries within their waters, including their exclusive zones, where sharks are fully protected from exploitation.
- Adopt gear modification and other measures to ensure that by-catch of sharks are minimized as much as possible.
- Protection of elasmobranchs should begin with education and awareness.

Conclusion

The proportion of sharks that are killed for their fins is well known since the early 2000s. However a number of regions now have anti-finning legislation that may reduce the incidence of finning and discarding of carcasses, and hence possibly reduce the mortality of sharks. Yet, despite these legislative changes there is presently no apparent sign of leveling off in the global fin trade. The exploitation of sharks in commercial fisheries for their fins, meat, liver oil, cartilage and other parts has led to large decline in the population size of many species of sharks worldwide. Finning causes the death of tens of

millions of sharks. This potentially threatens the survival of rare and vulnerable species and, by removing large numbers of top predators from the oceanic system, may have dramatic and undesirable ecological impacts that could potentially threaten yields of other species. The overall effects of these losses are not well known, hence, a detailed authentic study is necessary to evaluate the population of shark disseminated in the world oceans and current status and effects of commercial exploitation of shark populations. In particular, as a conservationist, it is essential to avoid shark-fin soup, refuse to patronize restaurants that serve this, avoid medicines or supplements that profess to utilize the healing power of shark cartilage or any other part of a shark and to avoid purchase of shark teeth, shark jaws or any items made with shark skin. Through these measures, we can try to save these valuable fishes from extinction.

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