The Relationship Between Overfishing and The Global Shark Population

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Abstract. Sharks are the oldest species on Earth. Fossil records show that they roamed the ocean at least 420 million years ago. And modern sharks have been around for about 100 million years, which means they once lived with dinosaurs. Currently, there are over 500 species of sharks in the world. The oceanic shark population is impacted heavily by human pollution and fishing activities, the most serious of them is overfishing. Overfishing has caused a great loss of the shark population. Sharks are the second-most endangered vertebrate lineage after amphibians. According to the International Union for Conservation of Nature's (IUCN's) first global assessment, which classified them as critically endangered, endangered, or vulnerable based on the Red List of Threatened Species' criteria, one-quarter of them were in danger of going extinct. Sharks are now really in jeopardy due to this setback. The fact that marine sharks have long generation periods and many of species have intrinsically poor rates of population expansion is another contributing cause to this loss. This makes them really weak while facing destructive human activities. The research will pay its attention on the relationship between the causes of the shark population's loss, the worldwide shark trade market, and how can human beings do to prevent the rate from keeping increasing. At last, this kind of activity can be stopped worldwide.

Keywords: Relationship; overfishing; global shark population.

1. Introduction

Since 1970s, the abundance of oceanic sharks and rays has decreased a rate about 71%, which represents an increase of about 18 times in relative fishing pressure. Which means, the main threat to sharks [1]. The vast majority of oceanic shark species are overfished and below biomass or natural abundance levels that could yield the greatest sustainable production (the equilibrium state of the exploited population sustaining the greatest yield, that is, catch rate), as well as under increasing relative fishing pressure (RFP) over time (measured as changes in catch rates relative to changes in the LPI), as well as under increasing perception as the time flows[2]. When the potential of shark population is exhausted, the breed rate of sharks is not able to follow the rate of they are caught or killed, which leads to an unsustainable situation [3].

As the research moving on, we found that the real number of shark's decreasing rate may be much more serious for three reasons. First off, the time-series does not include many unreported catches (including discards). When some fishermen catch the sharks, they do not tell their behavior to the local government. As a result, the researchers are not able to get the complete number, which leads to an uncompleted database. Secondly, traditional stock assessments could undervalue the fishing mortality. The method that the researchers used is not the latest, this may lead to a difference between the data and the real number, which leads to some mistakes. Finally, fishing levels were already uncontrollable about fifty years ago [4]. Which shows a fact that the high rate of overfishing during the last century had already impacted the oceanic system destructively. Additionally, the use of special nets and some long lines, the fishing techniques that capture the majority of marine cartilaginous fish, has increased more than twofold, contributing to the ongoing trend of overfishing [5]. Concurrently, oceanic shark fishing rates have nearly tripled since 1970, which will have a significant negative effect on shark populations [6].

2. The consumer market of sharks

Because of the high demand for shark items as a result of overfishing, the shark consumer market cannot be disregarded in the process since it stands to gain financially. This analysis revealed that the bulk of shark fins are consumed in a very narrow area of East and Southeast Asian nations and territories, including Singapore, Malaysia, Malaysian, Viet Nam and Chinese provinces of Hong Kong, Taiwan. To profit, several underdeveloped nations market shark items. The two regions of the world that consume the most Chondrichthyes body parts are South America and Europe, while the countries that import the most shark meat are the Republic of Korea, Spain, Italy, Brazil, and Uruguay.

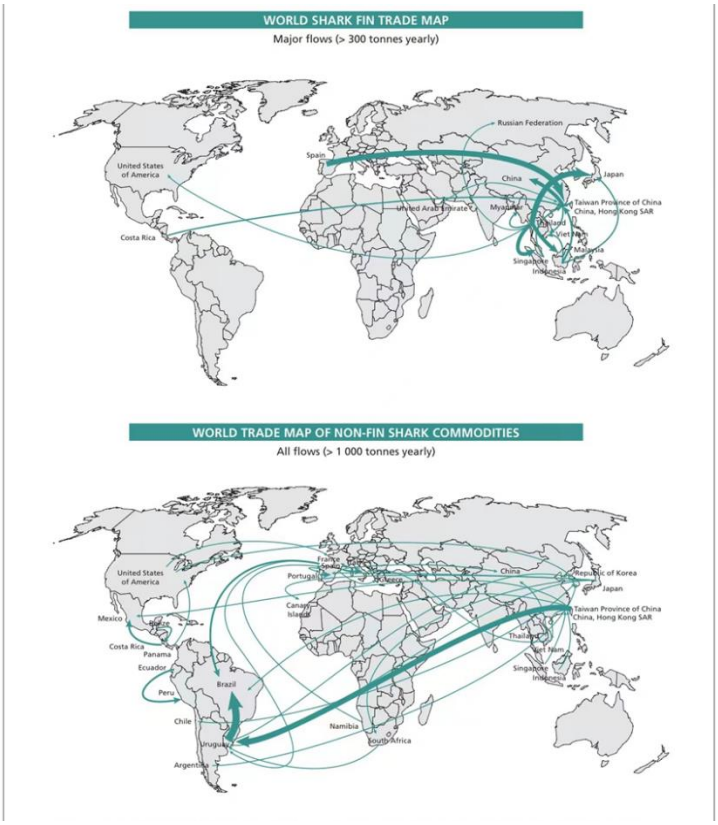


Figure 1. The trade route of the global shark trade market, the biggest consumers are countries in America and Asia [7].

The largest shark trade hubs are in Southeast Asia, South America, and Africa, and the majority of shark items are sent to Asia and North America. Additionally, the Hong Kong special administrative region has maintained its reputation as the world's largest trader of shark fins during the first decade of the twenty-first century, dominating the majority of international trade. Hong Kong purchased shark fins worth an average of 378 million dollars (10 480 tons of shark products) year at this time, accounting for about 80% of the global total in terms of value (and 62% of the entire volume). The equivalent yearly average for exports, which in the research instance of China, Hong Kong SAR, constituted primarily of re-exports, was over 110 million dollars (6594 tons of shark goods) every year, or 41% of the global total in value terms (38% by volume). Furthermore, Hong Kong Special Administrative Region of China has traditionally been the greatest exporter and importer of shark fins in the world, accounting for the majority of recorded imports and value since statistics first became available (Figure 1).

With an average annual export value of $7000000 in the 10 years, As the second-largest market for shark fin exports from China, Hong Kong Special Administrative Region, Japan plays a significant role. 200 tons were included in the average yearly volume. These exports had an economic unit of USD35/kg, which was over 9 times more than exports to Vietnam. 77% of the entire volume and 47% of the total value of "dried, unprocessed" fins and other goods shipped from China, Hong Kong SAR to Japan are made up of these products. Products classified as frozen or unprocessed

accounted for 14% of volume and 34% of value. With 102 metric tons (USD3.2 million) of frozen shark meat transported by China, Hong Kong SAR to Japan in 2012, at a high unit price of USD35/kg, it is highly likely that the majority of these exports are really shark fins [7]. More measures should be taken to stop the shark population in East Asia from decreasing since, as the research demonstrates, this region of the world has the biggest number of nations that produce sharks.

It is particularly challenging to describe in any depth the role of countries such as Costa Rica, which appear to not only produce shark fins domestically but also serve as key trading hubs for neighboring countries and other international fleets fishing in the local waters. These countries take part in exports as well as manufacturing. Actually, China's animal protection mechanism is imperfect, flawed and unreasonable in some respects, more complicated methods should be made.

3. The trend of shark trading

Theoretical predictions state that traded amounts would fluctuate parallel to harvested quantities, or maybe with a minor lag, when a market is fully using a particular type of resource. If this pattern were to continue, it would be predicted that trades in shark meat and fins will reach the highest point in 2003 when chondrichthyan capture production reached its highest point (roughly 896 000 tons) and then level off in 2008–2011 at levels that were roughly 17% below the maximum (roughly 746 000 tons). From 2000 to 2011, import and export volumes increased consistently at a pace of 4.5 percent annually [8]. The outcome can be attributed to one or more of the following: an increase in the amount of shark meat that is actually consumed; an increase in the volume of shark meat that is traded globally; and an increase in the volume of shark meat that is declared as such in global trade (as opposed to undifferentiated fish). Current data are insufficient to identify which of these elements was most important since it is impossible to validate the veracity of the data that are provided in this paper. However, a combination of data-based, circumstantial, and anecdotal evidence strongly supports the claim that the shark meat trade has actually increased. The results indicate that shark fin supplies are constrained by the current levels of chondrichthyan capture production, while shark meat is underused by worldwide markets, suggesting that the import-export trade may continue to grow. Though the market decreased a little bit, the global market will still increase because of varied factors.

The shark flesh businesses will undoubtedly keep growing as long as the trend toward complete use of shark bodies persists, but the shark fin trade looks to be constrained by catch productivity. Humans switched their attention to some larger, more practical creatures when the potential of smaller aquatic animals had been used up, and they started to hurt their numbers.

Global trade records reveal that the commerce in shark meat has been growing gradually over the past eight to ten years, despite the fact that it seems like the trade in shark fins has drastically decreased since the 2000s. The need to meet the rising demand for seafood on a worldwide scale is likely a major factor in this rise, as there are very few alternatives for boosting production of wild marine fish populations. The widespread application of anti-finning laws, which mandate that shark corpses be landed with their fins, may also be contributing to this rise. For example, when sharks are caught for their fins, fishermen must remove the entire deceased animal from the ocean. Thus, the fishermen have to sell not only fins, but also other parts of the sharks, this leads to a growth of the shark meat trade.

As the results showed before, China is one of the biggest shark trade countries all over the world. One in these is the media's coverage of instances when fake shark fins were sold as genuine shark fins (Fabinyi and Liu). More than 85% of the samples examined, according to a CCTV (China Central Television) investigation report on the subject in January 2013, had less than 5% actual shark fin. He raised public complaints about misleading marketing, and there seems to have been a response from customers. Another possible cause is the Chinese public's rising knowledge of shark finning-related concerns, which has been substantially brought on by several initiatives to restrict shark fin consumption both inside and outside of China.

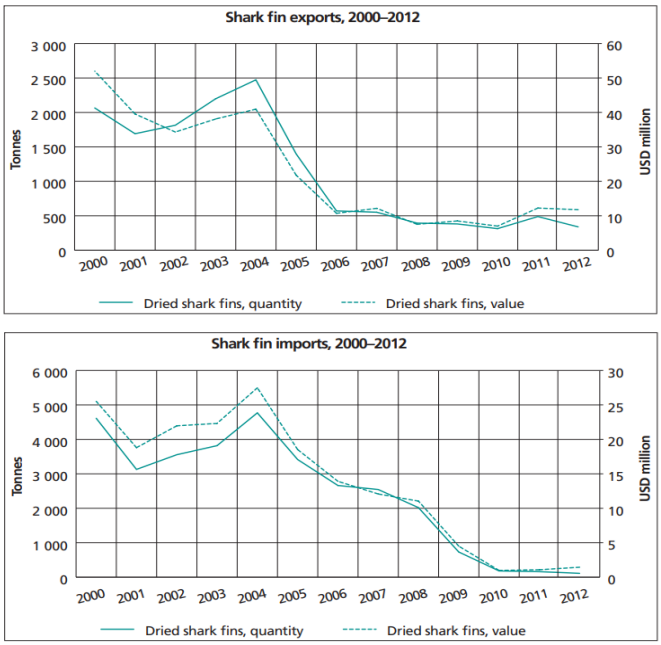


Figure 2. The shark trade rate in China is decreasing since 2004[9]

As previously mentioned, the general import and export statistics indicate that the fin trade in China started to decline in 2004 and has been minimal since 2010. Domestic production may also play a part in explaining some of this drop, in addition to the impact of trade reporting procedures. Prior to 2008, China's reported shark capture production was less than one thousand tons per year. By 2011, that number had risen to two thousand to three thousand tons per year, but it is unclear whether this increase is due to more sharks being caught or simply more species being reported as having been caught. Moreover, if demand had stayed constant during the whole time period, this level of growth would not have been enough to make up for the decline in trade (Figure 2) [9].

4. The ways to protect sharks

Nevertheless, there are currently protection laws that are pertinent everywhere. The market is being destroyed as a protective measure in China by intercepting the majority of shark fins in Hong Kong. because Hong Kong is the primary exporter of shark fins to the globe. But the specifics still need improvement. authority of the pertinent fishing grounds and gear in particular. To reduce the catching rate to a level that is tolerable, more work should be remained [10].

This research report discussed several ways to protect the shark population that may be useful: (1) Improving the transparency of data records and trade records by reviewing the Harmonized System commodity codes for shark products and unify the codes with major trading partners. (2) Include any endangered shark species found in the international trade of shark products in Appendix II of the CITES (CITES) to restrict the import and outport of shark production in several countries. (3) Prioritize the use of trade data to combat illegal trade in sharks and shark products. (4) Encourage all projects related to shark conservation and promote animal conservation awareness among people. (5) Create shark sanctuaries to safeguard the sharks' native biological habitat. Shield the primary species that sharks depend on. (6) To grow their wild populations, properly raise artificial populations and develop their wilderness viability. (7) Make it illegal to manufacture fishing gear in particular areas. The shark population can be effectively protected using these techniques.

The Chinese Green Development Association has always attached great importance to the protection of the marine ecological environment and sharks and has carried out many works around this theme. The Green Society is promoting marine conservation knowledge, participating in relevant conferences, and making practical efforts to protect marine life. June 8th is World Oceans Day, and while calling for everyone to protect the marine ecological environment, the Green Society is actively

preparing to participate in the relevant matters of the United Nations Oceans Conference. June 26th is International Angel Shark Day, in response to the call of the United Nations Convention on the Protection of Migratory Species of Wild Animals (CMS Convention). The Green Society collects information and writes articles to popularize the biological characteristics of angel sharks and encourages everyone to participate in relevant actions to protect angel sharks.

On Shark Conservation Day in 2021, the RCEP working group of the Green Society held a relevant meeting with the theme of "Discussing the Ecological Value and Protection Measures of Sharks on Shark Day", inviting experts from both domestic and foreign countries to discuss together. After the United Nations Oceans Conference, the Green Society organized the draft declaration of the conference, promoting the transmission of the draft spirit of our oceans, our future, and our responsibilities. Contribute to promoting China's deep participation in global ocean governance.

5. Conclusion

The oceanic shark population has been significantly impacted by overfishing. Apex predators, sharks are essential for preserving the harmony of marine ecosystems. However, because of overfishing, their population has drastically decreased. The excessive demand for shark fins, which are valued as a delicacy in some cultures, is one of the primary causes of overfishing. Shark finning is now a common practice in which sharks are caught, their fins are cut off, and the remainder of the corpse is dumped back into the water. This wasteful practice has contributed to the decline in shark populations. Overfishing also affects sharks indirectly through the depletion of their prey species. As large predators, sharks rely on a healthy population of smaller fish and marine organisms for food. When these prey species are overfished, it disrupts the food chain and reduces the availability of food for sharks. The decline in shark populations has far-reaching consequences for marine ecosystems. Without sharks, the populations of their prey species can explode, leading to imbalances in the ecosystem. For example, an increase in the number of smaller fish can result in the overgrazing of algae, which can negatively impact coral reefs. Furthermore, sharks are slow to reproduce and have low reproductive rates, making them particularly vulnerable to overfishing. It takes many years for sharks to reach sexual maturity, and they produce relatively few offspring. This means that their populations cannot recover quickly once thehave been depleted. To address the issue of overfishing and protect shark populations, various measures can be taken. These include implementing stricter fishing regulations, promoting sustainable fishing practices, and raising awareness about the importance of sharks in marine ecosystems. Conservation efforts are crucial to ensure the long-term survival of sharks and maintain the health of our oceans. This global problem cannot be solved easily, but through research and investigations, many people can realize how serious the situation is and what they can to take part in the process of protecting sharks.

Authors Contribution

All the authors contributed equally, and their names were listed in alphabetical order.

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