Shark Fisheries Management and the Sustainable Seafood Movement: 

_A Possibility for Sustainable Shark-fin Soup?_

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2009
dedicated to the Lord Jesus Christ

Thank You
for carrying me
ABSTRACT

The human-shark relationship has varied throughout history from one culture to another. While some cultures attached a spiritual significance to sharks, or consumed shark fins with the belief in their health promoting properties, others, especially in the West, viewed them with fear. The current regimes and regulations for shark fishery management reflect the historical development of this relationship.

Policies at the international level that pertain to shark fishery management, such as the United Nations Convention on the Law of the Sea and the FAO Code of Conduct for Responsible Fisheries provide broad guidelines and principles, while regional and national legislation are more specific and enforceable. In spite of a great deal of legislation that has been passed within the past ten to fifteen years, shark populations are projected to continue declining in the face of various threats such as Illegal, Unreported and Unregulated fishing, and a large market demand for their meat, liver oil, cartilage and especially fins, which are expected to be increasingly sought after in Asia as its population becomes more affluent. While various policy recommendations have been made to address these threats, the lack of political will has resulted in delays in action on the part of governments.

Various non-governmental organizations have attempted to use market-based approaches towards the conservation of shark populations, more specifically through influencing demand for shark fins. With the help of various regional celebrities, WildAid has launched campaigns in Asia to urge consumers to stop consuming shark-fin soup. Another market-based approach that could be utilized would be to create a new product – sustainable shark-fin soup. From insights gained through the Sustainable Seafood Movement in the West and the Marine Stewardship Council certification, appropriate standards need to be set to ensure the sustainability of shark fisheries and the integrity of actors along the production chain. Finally, a marketing campaign also needs to be strategically executed to influence consumer preferences in Asia.
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INTRODUCTION

Recent reports suggest a rapid worldwide depletion in the populations of large marine predators such as tunas, billfish and large groundfish (Myers and Worm 2003) as a result of historical and ongoing overfishing (Jackson et al. 2001). More specifically, populations of sharks have been found to be decreasing in various regions around the world due to fishing pressure (Baum and Myers 2004; Baum et al. 2003). This decline is predicted to continue due to several reasons. First, shark fishing has been largely unregulated until very recently. This, coupled with the life history characteristics of many shark species such as low fecundity and slow growth rates, make their populations vulnerable to overexploitation through continued fishing (Musick et al. 2000). Second, fishing pressure on sharks is expected to increase due to an increase in demand for their meat, cartilage, liver oil and especially fins. The fins are sought after from around the world to feed the growing market for shark-fin soup in East Asia, where the dish is viewed by the Chinese as a symbol of status and wealth, and increasingly so by other Asian cultures such as the Japanese and Thai. Thus, as more of China and Southeast Asia become increasingly affluent, demand for this luxury good is expected to increase correspondingly (Forero 2006).

OBJECTIVES

This project is divided into two main parts. The objectives of Part I are to illustrate how the history of the human-shark relationship has resulted in the status of current shark fishery management regimes and regulations, and to review some threats that shark populations are facing, one of which is an increased demand for shark-fin soup.
The objective of Part II is to explore market-based approaches towards shark conservation and management. In this part, the objective is to recommend the creation and development of a new product – sustainably harvested shark fins – as a basis for improved shark fishery management and the continued marketing of shark-fin soup.

METHODS

In Part I, I will first provide the historical context within which shark fishery management has developed by tracing the history of man’s interactions with and perceptions of sharks through various cultures, and the rules and regulations that have evolved as a result of this human-shark relationship. I will then conduct a review of these rules and regulations at the global level and then at the national level with a case study of the United States, linking developments at both levels to each other where appropriate. Next, I will review the threats that shark populations are facing and summarize policy recommendations and actions that have been taken for improving shark fishery management.

While Part I will focus on the regulatory aspects of shark fishery management, Part II will investigate market-based approaches that have been designed, mainly by non-governmental organizations (NGOs), with the aim of ultimately reducing unsustainable fishing pressure on fish populations. I will take a look at two such movements that have attempted to influence consumers’ consumption of seafood. The first is a WildAid\(^1\) campaign that was launched in Asia, urging Asian consumers to stop consuming shark-fin soup, and the second is the sustainable seafood movement that has taken hold mostly in Europe and the US. As part of the latter movement, I will conduct a case study of the

\(^1\) A San Francisco based environmental NGO
Marine Stewardship Council (MSC) and its “MSC Certified” eco-label, analyzing its development and the difficulties and limitations of its certification. Finally, in light of the information that we have about the shark-fin production chain and the insights gained from the sustainable seafood movement, I will make recommendations towards the sustainable harvest of shark fins and the marketing of sustainable shark-fin soup.

PART I – THE MANAGEMENT OF SHARK FISHERIES

BACKGROUND: THE HUMAN-SHARK RELATIONSHIP

Even though the oceans are not man’s natural environment in which he feels the most comfortable, various cultures have, since prehistoric times, ventured out into the oceans. This has been to satisfy our species’ apparently insatiable curiosity for exploration, or for the day-to-day necessity of placing protein on the table. Needless to say, these voyages out over water have created opportunities for encounters with various inhabitants of the oceans, one of them being sharks. These encounters, occasionally violent and life-threatening in nature, have resulted in perceptions of sharks that have varied from region to region and from one era to another.

In the West, Phoenician sculpture and pottery as far back as 3000 BC held depictions of sharks and other marine animals, while the Greek Historian Herodotus in the fifth century BC recorded how sharks defeated a whole Persian naval armada (Toomey 2007). Sharks were thus perceived as “sea monsters” and were incorporated into various legends and stories. In Greek mythology, the two most famous sea monsters were slain by Perseus in Aithiopia and by Herakles in the Troad (Atsma 2008), and a
depiction of the latter battle shows a shark-like creature with a spiny back and undulating tail (Atsma 2007).

The sea-faring cultures of the Pacific Islands have attached a more mythical significance to sharks, incorporating them into ancient lore or at times conveying upon them mystical and divine powers. The Filipino creation myth includes a shark within its explanation for the origin of death (Gray 1979), while native Hawaiian legends tell of man-shark transformations and shark attacks occurring immediately after a warning given by a shark (Aranda 2008). While the shark in the Filipino creation myth seems to have played a symbolic role, those in Hawaiian tales take on a more spiritual role – they are worshipped as manifestations of aumakua. These aumakua have been described as being gods and demigods, half god, half man entities, or deified ancestors or ancestral guardians (Aranda 2008; Beckwith 1917). Depending on the place and story, they can be either good or evil, and at times will even do the bidding of their human “keepers,” inflicting disease on those with whom their keepers are displeased (Beckwith 1917).

In the east, the consumption of shark-fin soup in China has taken place at least since the Ming Dynasty (14th-17th Century) and has been a part of Chinese culture ever since. While the initial impetus for consuming shark-fin soup is unclear, it is highly possible the Chinese had attributed some medicinal properties to it, or believed that consuming a part of a powerful creature such as the shark would impart strength to their own bodies (Oceana 2008). Today, however, it has become more of an expensive delicacy that is viewed as a symbol of wealth and status (Forero 2006) and is traditionally served at wedding banquets and other occasions such as birthdays, reunion dinners and when hosting very important clients.
In more recent times, however, sharks are increasingly viewed by many through the lens of science and are seen as important functional predators in marine ecosystems (Dulvy et al. 2004). Attempts are continually being made to dispel certain myths that have arisen due to Steven Spielberg’s famous 1975 movie, “Jaws,” based on Peter Benchley’s novel of the same name. In the book, and subsequently the film, a Great White Shark (*Carcharodon carcharias*) was portrayed as being a calculating cold-blooded hunter, who was obsessed and out to “get you” (Toomey 2007). This seemed to have played a little too well upon the western world’s age-old fear and ignorance of sharks, leading to misconceptions about shark behavior and anthropomorphic assumptions of ‘motives’ behind shark attacks. To counteract these popular beliefs, various establishments such as the Florida Aquarium in Tampa, Sea World and Disney World in Orlando, and the Underwater Adventures Aquarium in Minnesota’s Mall of America offer educational dive or snorkel programs with sharks. These programs allow visitors to observe, in person, shark behavior that is more accurate and characteristic of these animals, with an aim to foster respect for them and knowledge of their place in the marine ecosystem (Bly 2005). Nevertheless, there is still much that we do not know about many species of sharks, and our fascination with them continues.²

Consequently, the development of policies regarding shark management and conservation has reflected this historical development of the relationship between humans and sharks. Much of current shark management policy has been drafted within the past 15 years as sharks have traditionally either been targeted not for conservation, but for

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² The millions of viewers that tune in for Discovery Channel’s Shark Week every year (Keveney 2008) does say something about our curiosity and fascination with these elusive creatures.
eradication, or have largely fallen under the radar as non-commercially viable fish.\(^3\) However, with the shift in science to more “ecosystem-based management,” especially within the western scientific community, and the heightened awareness towards the issue of finning\(^4\), sharks have very recently been catapulted into the limelight. The result is more specific legislation aimed at managing the take and method of take of sharks from the oceans. Because sharks are caught in virtually every major ocean of the world, the issue of shark fisheries management is international. Furthermore, with increasing globalization and trade in commodities, the trade of shark-fin for soup also knows no geopolitical boundaries. Thus, I would first like to review shark management policies on global, regional and national levels, how they have evolved over time, and the extent to which those policies have been adopted and implemented by various countries and entities.

EXISTING INTERNATIONAL POLICIES

**UNCLOS**

At the international level, policies tend to be more general and deal mostly with fisheries as a whole, or with groups of species. The United Nations Convention on the Law of the Sea (UNCLOS III, 1994) can be considered to be the first main set of policies which reflect customary law for the oceans at the international level. It was first offered for signature by the United Nations in 1982 after nine years of negotiations from the convening of the first conference, came “into force” after ratification by 60 signatory

\(^3\) That is not to say sharks are not targetted for their meat. Some species are caught and consumed in various markets like Europe, and I will touch upon this in Part II of this study.

\(^4\) The practice where fins are cut off sharks, at times while they are still alive, and the rest of their body thrown overboard.
countries in November 1994, and includes provisions that govern all uses of the world’s oceans and their resources. While it more specifically provided principles for the conservation and utilization of “living resources,” sharks were not singled out for special mention. Instead, these guidelines were broad and all-encompassing. An example would be Article 61, which could be more specifically applied to conservation of sharks:

The coastal State, taking into account the best scientific evidence available to it, shall ensure through proper conservation and management measures that the maintenance of the living resources in the exclusive economic zone is not endangered by over-exploitation. As appropriate, the coastal State and competent international organizations, whether subregional, regional or global, shall cooperate to this end. (UNCLOS III, Article 61.1)

Further sections of Article 61 (section 4) also called for the management of “associated or dependent species,” or bycatch, in these fisheries. Since sharks make up a substantial portion of bycatch in the tuna and swordfish long-line fisheries (Dulvy et al. 2004), their populations are supposed to be taken into consideration as well in the management of the target fisheries (UNCLOS III, Article 61.4).

As with many other marine organisms, some shark species are not bounded by political jurisdictions and freely move between various Exclusive Economic Zones (EEZs) and the high seas. Thus, these species (mainly the pelagics) have been placed into the “Highly Migratory Species” category together with other species that have similar behavioural characteristics such as tuna, marlin and cetaceans (UNCLOS III, Article 64). Management of these “transboundary,” “straddling,” and “highly migratory” stocks are covered under Article 63.1 in the Convention which imposes a duty on relevant coastal States to negotiate over management strategies and to cooperate in conservation

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5 Although the text of UNCLOS itself does not use the terms “transboundary” or “straddling” to describe various stocks, Annex I provides a list of “highly migratory species” which include oceanic sharks. The former two terms, however, are used in subsequent conventions such as the UN Fish Stocks Agreement.
measures. Currently, there are 157 States that are parties to the Convention. While these do not include a few of the 2006 top twenty shark catching countries as determined by the FAO (Table 1, below), namely Thailand, Iran and the United States (UN 2008b), it does not preclude the formulation and implementation of shark fisheries management strategies within these countries. I will touch upon this later with the United States as an example.

Table 1. Top 20 shark catching countries in 2006 according to the FAO (Lack & Sant, 2008).

<table>
<thead>
<tr>
<th>Catcher</th>
<th>2006</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>98,250</td>
<td>13.0</td>
</tr>
<tr>
<td>India</td>
<td>77,821</td>
<td>10.3</td>
</tr>
<tr>
<td>Taiwan Province of China</td>
<td>49,375</td>
<td>6.5</td>
</tr>
<tr>
<td>Argentina</td>
<td>40,293</td>
<td>5.3</td>
</tr>
<tr>
<td>Spain</td>
<td>40,057</td>
<td>5.3</td>
</tr>
<tr>
<td>Mexico</td>
<td>39,106</td>
<td>5.2</td>
</tr>
<tr>
<td>USA</td>
<td>31,976</td>
<td>4.2</td>
</tr>
<tr>
<td>Japan</td>
<td>26,178</td>
<td>3.5</td>
</tr>
<tr>
<td>Malaysia</td>
<td>22,240</td>
<td>2.9</td>
</tr>
<tr>
<td>Thailand</td>
<td>21,187</td>
<td>2.8</td>
</tr>
<tr>
<td>Pakistan</td>
<td>20,127</td>
<td>2.7</td>
</tr>
<tr>
<td>France</td>
<td>19,082</td>
<td>2.5</td>
</tr>
<tr>
<td>Brazil</td>
<td>18,389</td>
<td>2.4</td>
</tr>
<tr>
<td>Portugal</td>
<td>16,934</td>
<td>2.2</td>
</tr>
<tr>
<td>New Zealand</td>
<td>16,783</td>
<td>2.2</td>
</tr>
<tr>
<td>Iran (Islamic Rep. of)</td>
<td>15,015</td>
<td>2.0</td>
</tr>
<tr>
<td>Nigeria</td>
<td>14,444</td>
<td>1.9</td>
</tr>
<tr>
<td>Yemen</td>
<td>13,060</td>
<td>1.7</td>
</tr>
<tr>
<td>Venezuela, Boliv Rep of</td>
<td>11,294</td>
<td>1.5</td>
</tr>
<tr>
<td>Korea, Republic of</td>
<td>10,841</td>
<td>1.4</td>
</tr>
<tr>
<td>Others</td>
<td>156,046</td>
<td>20.6</td>
</tr>
<tr>
<td>Global catch</td>
<td>758,498</td>
<td></td>
</tr>
</tbody>
</table>

The UNFSA – An Implementing Agreement

Due to the lack of effective implementation of UNCLOS provisions, overexploitation of many highly migratory fish stocks continued to the detriment of their
populations. The Rio Earth Summit on Environment and Development in 1992 recognized the failings of UNCLOS to manage these fish stocks. The Summit resulted in Agenda 21, a document which laid out a comprehensive plan of action for managing human interactions with the environment, including the oceans. During the Summit, Canada called for the convening of a conference to address this issue (Caldwell 2002). The conference eventually adopted the UN Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Stocks (abbreviated as the “UN Fish Stocks Agreement” or UNFSA) in 1995, and finally came into force in December 2001 (UN 2008a). It is considered an “implementing agreement” and was intended to provide a detailed framework for subsequent regional fisheries agreements.

The UNFSA stipulates the wide application of a precautionary approach to conservation and management of highly migratory stocks towards the goal of protecting the marine environment (Barreira 2007). It also expresses a preference for forming and operating at the level of Regional Fisheries Management Organizations (RFMOs) when cooperating on conservation and management strategies, even going so far as to restrict access of relevant marine resources to members who are not part of the organizations:

4. Only those States which are members of such an organization or participants in such an arrangement, or which agree to apply the conservation and management measures established by such organization or arrangement, shall have access to the fishery resources to which those measures apply.

5. Where there is no subregional or regional fisheries management organization or arrangement to establish conservation and management measures for a particular straddling fish stock or highly migratory fish stock, relevant coastal States and States fishing on the high seas for such stock in the subregion or region shall cooperate to establish such an organization or enter into other appropriate arrangements to ensure
conservation and management of such stock and shall participate in the work of the organization or arrangement. (UNFSA, Articles 8.4 and 8.5)

Currently, 75 States are parties to this Agreement (UN 2008b), including 10 out of the 20 top shark-catching countries.

The FAO Code of Conduct on Responsible Fisheries

As the UNFSA was being formulated, the UN Food and Agriculture Organization prepared a voluntary Code of Conduct on Responsible Fisheries (hereinafter “FAO Code”) which was intended as a complement to the UNFSA and which was also a response to past conferences and the Rio Earth Summit (FAO 1995). It calls upon a wide variety of actors to apply the FAO Code to a range of practices related to fisheries with a purpose to ensure effective conservation, management and development of living aquatic resources:

The Code is global in scope, and is directed toward members and non-members of FAO, fishing entities, sub-regional, regional and global organizations, whether governmental or non-governmental, and all persons concerned with the conservation of fishery resources and management and development of fisheries, such as fishers, those engaged in processing and marketing of fish and fishery products and other users of the aquatic environment in relation to fisheries (FAO Code, Article 1.2). (Emphasis mine)

However, due to its legally non-binding nature, this code allows for a wider scope of provisions than would otherwise be possible in a legally binding agreement:

The Code provides principles and standards applicable to the conservation, management and development of all fisheries. It also covers the capture, processing and trade of fish and fishery products, fishing operations, aquaculture, fisheries research and the integration of fisheries into coastal area management (FAO Code, Article 1.3).

IPOA-Sharks, Regional and National Plans

As a result of the FAO Code, the FAO Committee on Fisheries (COFI) decided
that it would be necessary to have some form of international agreements regarding the management of specific problems related to seabirds as bycatch, shark fisheries and fishing capacity. In 1999, COFI adopted an International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks). Like the FAO Code, IPOA-Sharks is a “voluntary instrument” designed to aid in the formulation and implementation of international agreements and other legal instruments towards conservation and long-term sustainable use by applying the precautionary approach. It applies to States (both members and non-members of FAO) as well as “fishing entities” such as RFMOs whose fishers engage in shark fisheries in both territorial waters and the high seas, and also to States whose waters support shark fisheries. Under the IPOA, RFMOs and States were encouraged to prepare Regional and National Plans of Action (NPOA-Sharks) by 2001, which should include stock assessments, past and present trends for fishing effort and yield, existing management measures, an assessment of their effectiveness and suggestions for modifications of these measures (FAO 1999). However, entities were slow to take heed of these suggestions, with few countries adopting NPOA-Sharks and no RFMO adopting a regional plan by the suggested 2001 deadline, much less ensuring effective implementation of them. This lack of action resulted in the UN General Assembly adopting a resolution in 2006\(^6\) which urged these entities to better and more fully implement the UNFSA, the FAO Code and the IPOA-Sharks (Barreira 2007).

**REGIONAL AND NATIONAL POLICIES**

At the regional level, there currently exists only one conservation and management plan for sharks: the Action Plan for the Conservation of Cartilaginous

\(^6\) A/RES/61/105
Fishes (Chondrichthyans) in the Mediterranean Sea, which was completed in 2003. Even though this plan was produced pursuant to the IPOA-Sharks, it was written under what is commonly known as the Barcelona Convention under the United Nations Environment Programme’s Regional Seas Programme, which covers not only shark conservation and management in the Mediterranean, but a broad range of issues including pollution and management of other organisms like monk seals and birds (UNEP 2003; UNEP 2008).

The only regional plan that could be said to have resulted directly from stipulations in the IPOA would be the European Community Action Plan for the Conservation and Management of Sharks, which was drafted by the European Commission and submitted to the European Parliament and Council in February 2009 and is thus currently in the process of gaining required official support (Commission 2009). The final version is expected to be released in April 2009 (EEA 2009). Thus, as of now, no regional Plan of Action or catch limits for sharks have been established by any RFMO for fishing on the high seas (Dulvy et al. 2008; Lack and Sant 2008).

However, it would be incorrect to say that no regulations exist at the regional level with regards to shark fishing. Instead, most management strategies take the form of finning bans, as opposed to comprehensive and more holistic plans which include research, shark assessment reports and quotas and limits on shark catch and bycatch (Dulvy et al. 2008). The European Union and nine RFMOs have implemented finning bans. These include the Inter-American Tropical Tuna Commission (IATTC), the International Commission for the Conservation of Atlantic Tunas (ICCAT), and the Indian Ocean Tuna Commission (IOTC) (Dulvy et al. 2008; Lack and Sant 2008). Such bans usually regulate for shark fin-to-carcass weight ratios (usually 2-5%) as opposed to...
requiring sharks to be landed whole. While the former method does help to reduce the incidence of finning, a 5% fin-to-carcass weight ratio is rather high, and depending on how fins are cut off sharks, would still allow fishermen to continue finning to a certain extent (Dulvy et al. 2008).

At a national level, it appears that around 20 States or less have produced NPOA-Sharks and this includes only four of the top 20 shark catching countries (Barreira 2007). Only 11 NPOA-Sharks are currently available on the FAO website\(^7\) but various other States have at one point or another reported that they have adopted the NPOA-Sharks. Report A/62/260 from the UN General Assembly on sustainable fisheries in August 2007 reported that Namibia and Thailand had already adopted their NPOA-Sharks and a few others were in the process of development. More recently, New Zealand’s Ministry of Fisheries approved its shark plan in October 2008 (MFish 2008) and Japan revised its plan in early 2009. Thus, while there appears to be some uncertainty and discrepancy between reports and websites from various organizations as to the number of NPOA-Sharks that are in existence and in the midst of development, it would seem reasonable to assume that around 20 or less have been produced and implemented.

*The USA as an example*

Shark fisheries management and conservation in the US gained importance towards the late 1980s and early 90s, a little before it appeared on the international radar. In fact, the US had a hand in pushing the shark management agenda at international levels. Currently, it can be considered one of the leaders in regulating shark fisheries and one of the countries that has relatively higher capacity to enforce regulations. It was one

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\(^7\) I will not go into details of each plan here, but they are available at the official FAO site: [http://www.fao.org/fishery/ipoa-sharks/npoa/en](http://www.fao.org/fishery/ipoa-sharks/npoa/en).
of the first few countries to prepare and submit its NPOA-Sharks in 2001, by which time some shark fishery management was already taking place at a domestic level in the US (FAO 2009a; NMFS 2001). Shark fisheries are managed by different organizations between the east and west coast. On the Atlantic side, there was a push in the late 1980s for an Atlantic Shark Fishery Management Plan (FMP) due to a lack of good landings data and the practice of finning that was being carried out by fishers to feed the shark-fin trade. This resulted in an FMP being drafted and implemented by the National Marine Fisheries Service (NMFS) for sharks of the Atlantic Ocean in 1993. The FMP covered 22 species of large coastal sharks, 7 species of small coastal sharks, and 10 species of pelagic sharks. The day-to-day responsibility for management was given to the Highly Migratory Species (HMS) Management Division of the Office of Sustainable Fisheries in NMFS. The objectives of the FMP were to prevent overfishing of shark resources, establish an effective data collection, research and monitoring program, and encourage management of stocks throughout ranges. Management measures such as commercial harvest quotas, annual permits for domestic commercial shark fishing vessels, recreational bag limits, prohibition of foreign fleets from fishing in the US EEZ for managed species, and a ban on the use of drift gillnets longer than 2.5 kilometres were put in place (Stone et al. 1998).

Possibly due to the FAO Code that was produced internationally in 1995, the US Congress passed the Sustainable Fisheries Act of 1996 a year later. This spurred NMFS to combine FMPs for sharks, tunas and swordfish as these fisheries often overlapped and would be better managed under an integrated HMS plan (Stone et al. 1998). This resulted in an FMP for Atlantic Tuna, Swordfish and Sharks that was prepared by the HMS
Management Division under the NMFS Office of Sustainable Fisheries which was published in April 1999. Since then, the FMP has undergone a few amendments and also been merged with the Atlantic Billfish FMP in 2006 to form the Final Consolidated Atlantic Highly Migratory Species FMP (NMFS 2006). Furthermore, annual Stock Assessment and Fishery Evaluation (SAFE) Reports have been produced since 2000 for Atlantic HMS (NOAA 2008). These documents are mandated by the Magnuson-Stevens Fishery Conservation and Management Act (M-SFCMA), and are supposed to provide the best available information about the most recent biological condition of the fish stocks and also the possible future condition of the stocks to help guide fishery management and regulations.  

On the Pacific coast, FMPs are developed not by NMFS but by three different regional councils – the Pacific Fishery Management Council (PFMC), the North Pacific Fishery Management Council (NPFMC) and the Western Pacific Fishery Management Council (WPFMC) (NMFS 2005). In 1981, initial attempts to draft a FMP for Pacific swordfish and pelagic sharks fell through. It was only in 2002 that the HMS FMP for US West Coast Fisheries was adopted by the PFMC and NMFS subsequently approved it in 2004. As with the Atlantic FMP, this management plan covered tuna, shark and billfish species and included precautionary annual harvest guidelines for some species of shark. Additionally, because most sharks in the Pacific were caught as bycatch, the FMP also designated some shark species as prohibited and mandated immediate release if caught. There also is a requirement for annual SAFE reports (PFMC 2008) as well as a thorough

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8 50 C.F.R. 600.315e(1)
9 The management structure for Highly Migratory Species differs between the east and west coasts of the US. I will not go into details regarding these differences but more information can be found at the Pacific Fishery Management Council website: http://www.pcfmc.org/.
review of FMP effectiveness every two years to allow for adaptation to new data.

While the FMPs included language which prohibited finning in the various shark fisheries that were being managed, it was the Shark Finning Prohibition Act of 2000 that amended the M-SFCMA to include language to specifically target the act of finning. It was signed into law by President Bill Clinton and its goal was to “eliminate the wasteful and unsportsmanlike practice of shark finning”\textsuperscript{10} (NOAA 2005). However, as previously mentioned, since only fin-to-carcass weight ratios were used as a regulatory measure for this Act, it allowed for some finning to continue. The Act also called upon the Secretary of Commerce to initiate international discussions for the purpose of “developing bilateral or multilateral agreements with other nations for the prohibition on shark-finning”\textsuperscript{11} and to “urge other governments to prepare and submit their respective National Plan of Action for the Conservation and Management of Sharks.”\textsuperscript{11} The Act required annual shark finning reports to be submitted to congress which would help identify nations whose vessels conduct shark finning and also called for the establishment of a research program for Pacific and Atlantic sharks to gather data for stock assessments and to look into shark bycatch reduction measures.

Nevertheless, it was only earlier this year that an act that would effectively ban shark finning in US waters and on all US fishing vessels was passed. The Shark Conservation Act of 2009 (H.R. 81, 111\textsuperscript{th} Cong.) was passed in the House of Representatives in March 2009 and is now awaiting votes in the Senate. It amends the M-SFCMA and the High Seas Drifnet Fishing Moratorium Protection Act to improve, as a whole, the conservation of sharks. It now stipulates that sharks have to be landed whole,

\begin{footnotesize}
\begin{itemize}
\item[\textsuperscript{10}] “Shark Finning Prohibition Act of 2000” (Public Law 106-557)
\item[\textsuperscript{11}] “Shark Finning Prohibition Act of 2000” (Public Law 106-557), Sections 5(1) & (6).
\end{itemize}
\end{footnotesize}
with their fins still attached, and also prohibits US vessels from receiving and transporting fins from other vessels that have carried out shark finning (HSUS 2009; H.R. 81, 111th Cong. 2009). Various NGOs such as Oceana and the US Humane Society have lauded this Act as being a major step forward in US shark conservation, as they consider it to have closed loopholes in the 2000 Act (HSUS 2009; Oceana 2009).

Thus, there has been a great deal of legislation and regulations very recently with regards to shark fisheries management at the international and national levels. However, because these measures have only been in existence in some areas for the past ten to fifteen years, and are still in the midst of being developed in others, shark populations are still subject to heavy fishing pressures and habitat destruction, and in many cases are still experiencing population declines. I will now give an overview of these declines, the various reasons for them, as well as go into further detail about some issues and pressures that shark populations and fishery managers face in the present and near future.

CURRENT STATUS AND THREATS

Population declines

In recent years, especially within the past two decades, many scientists have published articles on the state of the world’s oceans and the problem of overfishing, which has led to collapses in fish stocks and, in some cases, altered the entire food web in a region, leading to the detriment of the marine ecosystem (Jackson et al. 2001). It is within this context of recognizing human impacts on the world’s fisheries at large that the plight of sharks has also been highlighted. Various global and regional analyses have been carried out on shark populations using information from present and historical
survey data and fishery landings. A meta-analysis of all available data on global predatory fish communities, which included sharks (Myers and Worm 2003), suggested that the global ocean has lost more than 90% of large predatory fish since pre-exploitation levels. More region-specific analysis on pelagic sharks in the Gulf of Mexico has shown decreases in oceanic whitetip and silky shark populations of approximately 99% and 90% respectively, while in the Northwest Atlantic, scalloped hammerhead, white and thresher sharks were approximated to have had at least a 75% decrease in population in the past 15 years (Baum and Myers 2004; Baum et al. 2003). Similar losses in large predatory sharks have been estimated in the Mediterranean Sea, with hammerhead, blue, mackerel and thresher shark populations having declined between 96 and 99.99% since pre-exploitation levels (Ferretti et al. 2008). Furthermore, the total global shark production reported to the United Nations Food and Agriculture Organization (FAO) was about 754,000 tons in 2006, which was a decrease since its peak at 890,000 tons in 2003 even in the face of similar or increasing fishing pressure (FAO 2008).

These declines and resulting small populations are postulated to be detrimental to the future of shark populations, especially in the face of current rates of exploitation. Projections using reproductive rates and mortality rates of elasmobranch species predict that unless fishing mortality is reduced by 40-80%, many large elasmobranchs and other slow-growing species will face extinction (Myers and Worm 2005). Furthermore, there is also concern that large widespread predator decrease might trigger unforeseen ecosystem effects, such as the disruption of top-down control and a release of midlevel consumers,
due to the existence of trophic cascades and other interactions within the marine food webs (Cox et al. 2002; Dulvy et al. 2008; Ferretti et al. 2008; Worm and Myers 2003).

**Global Status of Sharks – The IUCN Red List**

The IUCN Red List is a tool created by the International Union for the Conservation of Nature (IUCN) to assess and classify all organisms according to their vulnerability to extinction on a global scale, placing those that are threatened on its “Red List of Threatened Species.” For sharks, the Shark Specialist Group (SSG) is the IUCN Red List Authority on determining the status of shark species (SSG 2009). This is carried out through a series of regional assessment workshops which use the IUCN – World Conservation Union Red List Categories and Criteria (Dulvy et al. 2008; IUCN 2004). The 2008 assessment lists 126 out of 556 species of elasmobranchs (sharks, skates and rays) as being either critically endangered (CR), endangered (EN), or vulnerable (VU) and 185 species as being data deficient (DD) (IUCN, 2008). A separate analysis of just oceanic pelagic sharks and rays by a handful of the SSG members lists 52% of all oceanic sharks as threatened (in the CR, EN or VU categories) compared to only 21.3% of all elasmobranchs being threatened (Dulvy et al. 2008). This, together with current pressures that shark populations are facing, might paint a relatively bleak outlook for this group of species.

**Increased Shark-fin Soup Demand**

In many cases, and certainly in the case of oceanic pelagic sharks, fishing is the main activity that threatens shark populations (Dulvy et al. 2008). The amount of fishing pressure is in turn influenced by a variety of demands for products such as shark meat,
shark liver oil, shark cartilage and shark fins on the global market. Out of these shark products, NGOs, some national governments and conservationists have identified the demand for shark fins as a major factor that will influence fishing pressure and shark mortality in the future (Anderson and McCusker 2005; Lack and Sant 2008).

As previously mentioned, shark-fin soup consumption originated in China and its popularity is increasing in other parts of Asia. Due to China’s overwhelmingly large population numbers, mainland Chinese are predicted to exert the most pressure on demand for shark fins, which is intensified by a few other factors. Shark-fin soup had always been an imperial delicacy that was out of reach for the common man, and it was later banned during the communist Mao Zedong and early Deng Xiaoping eras. When the dish became more widely available from the mid-1980s (Oceana 2008), the impetus and appeal for consuming shark-fin soup was thus very strong, and many were and are jumping at the chance to savor this delicacy. This increasing ability to afford shark-fin soup by many Chinese thus causes it to behave like a “luxury good” in the market, and with projections of increasing affluence in mainland China, the demand for this good is projected to increase correspondingly (Forero 2006). This is expected to not only increase the number of sharks being caught, but to also increase the incidence of finning, as the per unit value of shark-fin is much higher than that of shark meat. Since shark fins account for about 7% of the volume of shark trade, but 40% of the value (Lack and Sant 2008), fishers would rather discard the shark bodies to make space for more fins than to land a whole shark. This would in turn likely increase the incidence of illegal, unreported and unregulated (IUU) fishing, which has been a major problem in many parts of the world.
Illegal, Unreported and Unregulated (IUU) Fishing

The issue of IUU fishing is prevalent worldwide and has been recognized by the FAO as being a major obstacle to effective and responsible management and utilization of global fishery resources. The International Plan of Action to Prevent, Deter and Eliminate IUU Fishing (IPOA-IUU) was developed in 2001 after more than two years of collaboration amongst the FAO members, as a result of IUU fishing activities that were undermining progress brought about by the FAO Code (FAO 2002). The IPOA-IUU defines the three components of IUU fishing in detail. Illegal fishing refers to fishing activities that violate national laws and regional or international obligations. Unreported fishing refers to fishing activities which have not been reported, have been misreported, or have been reported in the wrong manner to the pertinent authorities and organizations. Unregulated fishing refers to fishing activities in an area carried out by vessels without nationality or flying a flag that is not party to a regional agreement covering the area, or fishing for species which are not under any conservation or management measures (FAO 2001, Article 3). A fishing activity can fall under more than one category of IUU fishing depending on the situation and context.

The IPOA-IUU offers many tools and recommendations that countries can use to tackle IUU fishing at domestic as well as multinational levels and like the FAO Code, is voluntary in nature. Examples of tools and recommendations include establishing vessel monitoring systems and observer programs, developing and improving catch documentation schemes as well as inspecting vessels in port and at sea (FAO 2002). Despite efforts at tackling such fishing activities, IUU fishing is still reported to be
increasing in many areas and is now high on the global fisheries agenda, constituting an “environmental crime involving theft of resources” (FAO 2009b).

The reasons for fishers to engage in IUU fishing are varied and some economists have attempted to model such behavior and identify key drivers which lead to it. Sumaila et al. (2006) assume in their model that an individual would commit a crime if the expected benefits or utility from doing so exceeds the benefits from engaging in legal activity. Thus, in their model, they incorporated drivers and motivators such as the penalty for getting caught IUU fishing, the probability that the illegal activity is detected, and the cost to the fisher in avoiding being caught. However, they also incorporated social and moral factors into their model as these have been recently recognized to play a crucial role in influencing an individual’s decision whether or not to engage in an illegal activity.

Another major study that was undertaken by the Organization for Economic Co-Operation and Development (OECD) Committee for Fisheries, and which lasted three years, attempted to address the full economic dimensions of IUU fishing in an integrated and comprehensive manner and provide potential solutions to this problem (OECD 2005). The study identified four main causes for IUU fishing – economic causes, institutional factors, social factors, and the emergence of organized IUU fishing operations (Gallic and Cox 2006). It also provides recommendations to raise the cost of engaging in IUU fishing, through possibly enacting stricter penalties and fines for being caught, reducing the market price of IUU catch, better management regimes and quota distribution and increasing scope and level of sanctions through improving monitoring.
control and surveillance measures. If the cost to fishers exceeds the benefits of IUU fishing, they would thus be deterred from doing so.

When it comes to IUU fishing in shark fisheries, much is unknown regarding the numbers of sharks which are taken from the oceans. A recent report by the Australian government in conjunction with TRAFFIC (Lack and Sant 2008) reviewed current knowledge and action for IUU shark fishing. Even though it is not intended as a comprehensive review or a basis for quantifying the amount of IUU shark fishing, it highlights the lack of information on a global basis regarding the impact of such fishing on shark populations. One of the main reasons is that since most IUU shark fishing is illegal, it is also thus unreported. However, this report suggested, among other things, that certain “hot spots” for IUU shark fishing appear to be located off Central and South American, in the Western and Central Pacific Ocean, and in the waters north of Australia. It also suggests that much of the identified illegal fishing involves the act of shark finning and the subsequent retention of fins, and that species-specific data is rarely available, thus compounding the problem of a lack of accurate and reliable data.

*Lack of Data and Data Inaccuracy*

This problem is not new and was being recognized even as the IPOA-IUU was being developed. A report that was prepared on the consequences of illegal, unreported and unregulated fishing for fishery data and management made suggestions as to what measures should be included in the IPOA-IUU to collect as much fishery data as possible for the purposes of management. It also suggested that in the face of IUU fishing and the resulting data deficiencies, the precautionary approach that was explicitly proposed in the FAO Code should all the more be widely and liberally applied. Alternative approaches
were also proposed for data collection, including the utilization and analysis of market, trade and consumption information (Evans 2001). Recent applications of this approach in an attempt to estimate global shark catch has only served to illustrate the gross inaccuracies that are probably present in FAO shark production data. In 2006, the first fishery-independent estimate of global shark production was made by using the number of fins traded in the Hong Kong shark-fin market to statistically estimate the quantity of sharks that was represented by those fins (Clarke et al. 2006b). The resulting estimates placed actual shark biomass caught at quantities three to four times higher than the 754,000 tons reported to the FAO in 2006 (FAO 2008). As such, there currently exists very little reliable and accurate data on shark population numbers upon which to formulate truly “science-based” policies.

**RECOMMENDATIONS**

**Regulations and Enforcement**

Many recommendations have already been made to address the many aspects of shark fisheries management including the deficiencies and inaccuracies in scientific data, the lack of strict rules for shark finning, and the lack of enforcement of existing fishery management plans. At the international level, States have been urged to ratify the UNFSA, the FAO Code and the IPOA-Sharks, thus showing their support for these agreements and the willingness to abide by them. This gives the States a starting point and common ground to begin paving the way for adoption of guidelines and principles into national policies and the drafting and preparation of NPOA-Sharks (Barreira 2007; Dulvy et al. 2008; FAO 2009b; Lack and Sant 2008). At the regional level,
recommendations have been made that RFMOs draft and prepare Plans of Action for shark conservation and management pursuant to the IPOA-Sharks since none have done so to date, implement shark catch and bycatch limits for pelagic shark species where none exist, and strengthen finning bans by requiring sharks to be landed whole with fins attached (Dulvy et al. 2008). Finally, at the national level, countries are urged to adopt, into national policies, fishery management legislation which is deemed responsible and precautionary in approach.

The issues of IUU fishing and lack of scientific data for sharks are widely recognized and have solicited their share of recommendations for improvement, which often call for bilateral, multilateral and international cooperation. In many cases, countries are encouraged to work together through consultation and timely exchange of information to coordinate the efficient use of law enforcement resources to combat IUU fishing. This recognizes the limited capacity of many developing nations where IUU fishing is rampant to patrol its waters and coasts on its own (FAO 2002, 2009b). Various tools have been suggested to increase monitoring, control and surveillance measures that will not only increase the chance of being caught IUU fishing, but also contribute to data collection and more accurate stock assessments. These include vehicle monitoring systems, development and implementation of observer coverage programs, catch documentation schemes and vessel registration schemes (FAO 2002). Since IUU fishing occurs when the expected benefits outweigh the risks and costs of being caught, recommendations have also been made to increase these risks and costs of IUU fishing through policy changes. One such recommendation could be to enact stiffer penalties and fines for those caught IUU fishing. Another would be to reduce the market demand for
IUU catch through tariffs, which make them more expensive than legally caught seafood, both for the consumer and for the fishers to catch (Gallic and Cox 2006).

However, as pointed out during the development of the IPOA-Sharks, it is unlikely for recommendations dealing with technical matters, information procedures and development of sustainable fishery policy to be effectively resolved until enough countries accept and adopt the duties and responsibilities in the various agreements (Evans 2001). This latter process, as can be witnessed by the rate at which countries have signed on and adopted proposed guidelines, is unfortunately extremely slow. Thus, it now becomes an issue of political will for governments at the international level – to persuade more countries, especially fishing nations, to agree and sign onto the various agreements, at the regional level – to cooperate and agree on quotas that would benefit highly migratory shark populations as opposed to wanting to gain a larger share of the catch, and at the national level – to implement and enforce policies and fishery plans locally which place emphasis on the conservation and sustainability of shark populations.

PART II – MARKET-BASED APPROACHES

WILDAID’S CAMPAIGN

Oftentimes, this lack of political will in regulating shark fisheries and the delays in action on the part of governments have prompted NGOs to step in and push certain agendas forward and to speed up the otherwise slow process within the government. In terms of shark conservation, NGOs such as Oceana have played a role in lobbying and gathering support for the Shark Conservation Act of 2009 (Oceana 2009) and together with others like WWF, have brought the issue of shark finning to the attention of many in
the western world (Cripps 2007). Besides influencing the issue from a policy perspective, NGOs have also developed strategies to tackle the market aspect – more specifically the market demand for shark-fin soup. In recent years, WildAid has launched various campaigns in East and Southeast Asia which have highlighted the cruel practice of finning and have called upon consumers to boycott shark-fin soup (Pellissier 2003). As part of their campaigns, they have enlisted the help of various Asian celebrities such as Yao Ming, the Chinese basketball player, Tony Leung and Jackie Chan, famous Hong Kong actors, and Stefanie Sun, a Singaporean singer (Barboza 2006; Pellissier 2003).

The response to these campaigns have been mixed. At least one of these celebrities – Yao Ming – has been criticized by a portion of the mainland Chinese population, mostly shark-fin dealers, for attacking Chinese cultural cuisine. Others, including several chefs, alluded to their support for his stance. The Chinese Communist Party, on the other hand, did not acknowledge his rather public and high-profile declaration, neither supporting nor clamping down on it (Barboza 2006).

In response to these protests taken by NGOs, a handful of companies and establishments have opted to take shark-fin soup off their menu. Hong Kong Disneyland took the dish off their menus in 2005 (Barboza 2006), while hotel chains such as the Fairmont decided to disallow it from being served at restaurants within their Singapore establishment in 2008.\(^\text{12}\) As part of their corporate social responsibility initiative, Resorts World at Sentosa, an upcoming integrated resort in Singapore, has announced in partnership with US-based NGO WildAid and local NGO ACRES\(^\text{13}\) that it will not serve the dish at its restaurants, except to high rollers in private rooms who might request it.

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\(^\text{12}\) From personal observation of a flyer at one of their dining establishments, March 2009.

\(^\text{13}\) Animal Concerns Research and Education Society
(RWS 2008). While some local groups (Tan 2008) have questioned the motives behind this partial ban as opposed to a full ban, the resort estimates that this would decrease its shark-fin purchases by up to 90% than if it were to freely allow its sale. Most recently, in February 2009, the Singapore Chefs Association decided to omit shark-fin soup from its annual Chinese New Year Lo-Hei dinner, thus sending a pro-conservation message which has attracted much media attention within the country (SCA 2009).

However, in the midst of these developments, shark-fin soup consumption in Singapore jumped from 182 tonnes in 2006 to over 470 tonnes in 2007 after four years of decline, even in the face of a 30% increase in the price of sharks fin from 2003-2008. A well-known local shark-fin restaurant saw an increase in soup sales of between 20-30% from 2003 to 2008, and the largest local shark fin supplier reported a 20% increase in sales in 2007 (Chow 10 May 2008). While one can assume that these figures might have decreased in the face of the current economic crisis, one can also assume that once the economy picks up, shark-fin soup will once again be on top of the list for Asian consumers. Thus, there needs to be constant effort put towards education, increasing awareness and coming up with innovative ideas to influence market demand.

**CREATION OF A NEW PRODUCT**

A relatively unexplored idea that could be developed and implemented to decrease market demand for unsustainable shark-fin soup was mentioned in passing by Peter Knights, Executive Director of WildAid, in an interview he gave to The Straits Times Singapore, and is worth examining in further detail (Kesava 28 June 2008). It essentially involves the creation of a new product, one that Knights referred to as

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14 Personal communication with Lee, L., from Resorts World at Sentosa, July 2008.
“certified (sustainable) shark’s fins,” which can then be sold in restaurants as sustainable shark-fin soup. Thus, while WildAid’s current campaign focuses exclusively on boycotting shark-fin soup, the creation of a sustainable version would allow for continued consumption while at the same time ensuring the sustainability of shark populations.

THE SUSTAINABLE SEAFOOD MOVEMENT

The sustainable seafood movement was and is emerging at a time where there has been a weakening of the State’s regulatory capabilities, and a concurrent increase in the role of the private sector in regulation. It is what some political economists are characterizing as a shift from government to “governance,” which includes the formation of regulatory networks of which the State is simply one of the many actors (Konefal 2006). While I will not elaborate on the discourse surrounding and against this phenomenon, it appears that consumption increasingly represents a potentially powerful form of political agency and has become a new tool with which socially oriented organizations can apply pressure to corporations and governments. As government regulations are slow to keep up with the fast pace of market developments, which as previously mentioned, is perceived to be an issue with shark-fin soup consumption, these socially oriented organizations are bypassing the State and using market- and consumer-based strategies to target corporations directly (Konefal 2006). Various such organizations have employed these strategies in both the US and the UK.

In the US, the sustainable seafood movement began in the late 1990s with a number of single-species campaigns. In 1997, the National Environmental Trust launched a “Take a Pass on Chilean Sea Bass” campaign calling on consumers to boycott the fish
at restaurants, as it was in reality, the slow growing and heavily exploited Patagonian Toothfish (Iles 2004). Concurrently, the David and Lucile Packard Foundation launched a “Seafood Choices Initiative” as a result of the slow progress that their traditional approach at policy reform was taking (Konefal 2008). The initiative aimed to “harness the power of consumer choice and market forces in favor of ocean conservation,” and partially worked towards this goal by producing seafood cards to educate consumers. In 1998, with support from the Foundation, Seaweb and the Natural Resources Defense Council (NRDC) took advantage of the celebrity chef craze that gripped much of the US to partner with top chefs on the east coast to launch the “Give Swordfish a Break” campaign (Brownstein et al. 2003; Konefal 2006). Over 700 chefs stopped serving Atlantic swordfish in their restaurants and the drop in price was so significant that the International Commission for the Conservation of Atlantic Tuna (ICCAT, which also manages Atlantic swordfish stocks) finally decided to cut catch quotas to more sustainable levels (Brownstein et al. 2003; Seaweb and NRDC 1998). Other single-species campaigns have included the “Caviar Emptor” and the “Farmed and Dangerous” salmon campaign, with various other organizations such as Environmental Defense, the Audubon Society, and the Monterey Bay and New England aquariums getting involved in the movement (Brownstein et al. 2003; Iles 2004; Konefal 2006).

Besides these single-species campaigns, the sustainable seafood movement has also adopted the concept of eco-labelling as a means of educating and providing more information about seafood products to consumers. In recent years, the Monterey Bay Seafood Watch Program has developed extensive guides to seafood sustainability in the

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15 Konefal (2006) carried out a case study of the development of the “Farmed and Dangerous” salmon campaign.
US based on a set of sustainability criteria. Each fishery is rated taking into account factors such as catch method, stock size, and location (MBA 2009b). The Aquarium then attempts to make the information widely accessible to consumers by creating pocket guides which are distributed for free, with species grouped under one of three final categories: Best Choices (green), Good Alternatives (yellow) or Avoid (red). This method of information dissemination is employed because pocket guides increase the convenience at which consumers can have information on hand, since they fit easily into a wallet or purse, and also because having only three categories allow consumers to quickly make sense of the information and decide what to order at a restaurant (MBA 2009a).

Another example of a US-based eco-labelling program would be FishWise, a non-profit organization that works towards improving the sustainability and financial performance of seafood retailers, distributors and producers (FishWise 2009). It utilizes criteria developed by the Monterey Bay Aquarium and the Environmental Defense Fund to assess wild fisheries and aquaculture on a sustainability scale. Subsequently, it labels the assessed seafood products at supermarkets using green, yellow and red color-coded labels (green for high sustainability, red for low), together with details about catch method and location of catch, so that the information is readily available to shoppers at the store (EcoFish and FishWise 2006). Currently, FishWise efforts seem to be concentrated mainly on the West Coast, and even within the US, is not as well-established as the Marine Stewardship Council (MSC) label that is based out of the UK. Unlike the FishWise eco-label which operates on a gradient of sustainability, the MSC eco-label operates on an “either-or” basis. Thus, if a product carries the MSC eco-label, it
has been certified sustainable according to MSC standards and consumers can be assured that those fishery stocks are sustainable.

The Marine Stewardship Council

It was in early 1996 that World Wildlife Fund (WWF), one of the big international NGOs, and the Anglo-Dutch firm Unilever, one of the world’s largest seafood retailers, came together to discuss the problem of declining fish stocks worldwide. The WWF sought to conserve fish stocks and save them from catastrophic decline, while Unilever wanted to ensure a viable source of seafood for its frozen fish products for the long-term. The latter is one of the world’s largest buyer of frozen fish and the manufacturer of many well-known frozen-fish products with brands such as Birds Eye and Igo (Constance and Bonanno 2000). The result, which was influenced by WWF’s past experience with the Forest Stewardship Council, was a joint venture called the Marine Stewardship Council (MSC), an organization that would set standards and determine the process for wild-caught fisheries to be certified sustainable, and subsequently carry the MSC label of sustainability. While it was formed in 1997 as an NGO-business partnership, it later became an independent not-for-profit in 1999 (Constance and Bonanno 2000; Cummins 2004; Howes 2005; Jacquet and Pauly 2007). The first few years were spent developing plans and standards. From 1996 to 1997, WWF and Unilever hired an international consulting firm to develop implementation plans, and also held eight workshops and two expert drafting sessions worldwide to consult scientists, fisheries experts and other stakeholders who were interested in the long-term preservation of fish stocks. The result was the MSC’s “Principles and Criteria for Sustainable Fishing,” announced in 1998, which defines the main standards that a
sustainable fishery should be based upon (Constance and Bonanno 2000; Cummins 2004). These are:

a. The maintenance and re-establishment of healthy populations of targeted species;
b. The maintenance of the integrity of ecosystems;
c. The development and maintenance of effective fisheries management systems, taking into account all relevant biological, technological, economic, social, environmental and commercial aspects; and
d. Compliance with relevant local and national local laws and standards and international understandings and agreements (MSC 2002)

The MSC decided to operate along the lines of the third party verification model, and thus its role in the certification process is to accredit independent certification bodies which in turn assess fisheries according to MSC’s principles (Cummins 2004). For the purpose of verifying the competence of these independent bodies, the MSC also launched a Fisheries Certifiers Accreditation Scheme (Constance and Bonanno 2000). Figure 1 below shows the process for getting MSC certified, which has undergone development and modification since its inception. The process includes stakeholder involvement and feedback from people on the Stakeholder Council, as well as input from fisheries and ecological scientists on the Technical Advisory Board (Cummins 2004). To date, there are 42 fisheries that have been certified by MSC, a significant increase from just seven in 2003 (Cummins 2004; MSC 2009a).
In order to make recommendations that are as realistic as possible for certifying shark fins as sustainable, it would be wise to be aware of some of the criticisms of the MSC label in achieving its purpose to conserve fish stocks. First, the MSC has been criticized for certifying some fisheries that might be ecologically unsustainable in reality. These particular certifications were accomplished in the early years of the program, and prompted the University of British Columbia’s Fisheries Centre to withdraw its corporate support for it, pending reconsiderations (Sumaila et al. 2005). A blanket approval had been given to the Alaska salmon fishery (first certified March 2001) regardless of gear types and individual stocks, but finer-scale assessment dividing the fishery into 16 different units was carried out when re-certification occurred in November 2007 (MSC
The Australian rock-lobster (first certified March 2000) and New Zealand hoki fisheries (first certified March 2001) have also been the subject of much contention as to their sustainability, with the latter reporting significant stock declines in 2004 (Greenberg 23 October 2005; MSC 2009b). Second, there was a lack of transparency in the scoring process, which in turn decreased the amount of feedback and input stakeholders could provide on the outcome of the certification (Howes 2005). Consequently, various spokespersons for the MSC have called these early attempts “test cases” during the early “learning phase” and further emphasize that the council has since then taken actions to address these issues and improve certification standards and processes (Cummins 2004; Howes 2005). Third, the MSC has also been criticized for not focusing much effort on measuring campaign effectiveness by monitoring for changes in the market (Jacquet and Pauly 2007). Thus, while the theory behind MSC certification may appear sound, there could be a lack of expected market effects in reality.

Fourth, the standards set by the MSC seem to favor certain types of fisheries for certification. These fisheries (1) are highly selective for target species, (2) have limited access, (3) have stocks that occur within areas for which there are exclusive national access rights, (4) are well regulated and enforced, (5) often involve co-management between governments, scientists and fishers, and (6) are either relatively small or large, and not intermediate in size (Kaiser and Edwards-Jones 2006). While this means that the standards for sustainability are high, there is a possibility that it is too high and will deter a large proportion of fishers from applying for an expensive certification, as majority of the world’s fisheries might not actually fit into every single one of these criteria. Indeed, in the case of the brown crab fishery off the south coast of Devon, the only reason it
cannot be MSC certified is because the species is highly migratory and at times are subject to fishing pressure by fishers that operate outside the south Devon area (Kaiser and Edwards-Jones 2006).

Last but not least, the MSC focuses its efforts mostly in Europe and more recently the US, thus leaving out a large number of fisheries that occur in Asia and Africa. Only two African and two Asian fisheries have been MSC certified to date – the snow crab and flathead flounder fisheries in Japan, and two hake trawls in South Africa (MSC 2009b).

Criticisms & Limitations of the Sustainable Seafood Movement

At the broader level, the sustainable seafood movement has also been critiqued on a number of fronts and its limitations have similarly been recognized. On an international level, Constance and Bonanno (2000) reviewed some social justice issues that have arisen from certification standards and the underlying philosophy behind these standards. Since eco-labelling and certification programs were initiated in the West, it has been suggested that they tend to favor fisheries located in the global North, and these programs impose the North’s view of what a responsible fishery should be onto developing countries, where fisheries operate under vastly different contexts. Thus, there is very little possibility for fisheries in less-industrialized countries to be certified. They also question the market-based philosophy behind the movement and the faith that organizations such as the MSC put in the “magic of the market,” likening it to a new breed of “Northern eco-imperialism” that is being imposed on the global South (Constance and Bonanno 2000).

On the side of the production chain, the lack of traceability of certain seafood products has been commonly mentioned as a major barrier to certification since seafood products are traded at a global scale on the market. For example, since the MSC requires
Chain of Custody standards of its fisheries, this excludes the bulk of artisanal fisheries where traceability is an issue. Of course, IUU fishing compounds the problem of untraceability (Iles 2004; Jacquet and Pauly 2007, 2008). This untraceability, together with the financial incentive associated with selling eco-labelled products, has made renaming and mislabeling of seafood a problem (Jacquet and Pauly 2007, 2008). There are various properties of seafood that can be mislabelled: species’ identity, country of origin, production method and overall sustainability (Jacquet and Pauly 2008). For example, Nile perch fillets from Lake Victoria are sold with a self-attributed eco-label which claims the fish are caught within the guidelines of the FAO Code (Pitcher 2003). However, there is neither accountability nor independent verification by an external entity of this claim.

The global seafood market itself might also limit the effectiveness of the campaigns and movements. Since Asian consumption of seafood is at least two-thirds of global production and expected to increase, targeting these consumers is imperative to having a measurable impact on the industry. Yet this presents a significant problem because few Asian consumers discriminate between products according to environmental sustainability, and the same can be said for Latin American and African consumers, who are also expected to increase their consumption of seafood in the near future. This means a large proportion of people, globally, are not likely to respond to eco-labelling, and eco-labels may end up being marginalized and only taking up a niche market, thus failing at their conservation goals (Jacquet and Pauly 2007). Also, sustainable seafood marketing has been criticized as targeting only a narrow band of upper-class consumers who may already be “green” consumers, thus adding to the danger of creating a niche market, and
alienating the majority of other consumers who make up a big part of total consumption (Iles 2004; Rex and Baumann 2007). Thus, in light of all these limitations and problems associated with eco-labelling and the sustainable seafood movement, the stark reality is that proliferation of eco-labels may not necessarily lead to conservation of fish stocks (Jacquet and Pauly 2007).

**RECOMMENDATIONS TOWARD SUSTAINABLE SHARK-FIN SOUP**

This is not to say, however, that the possibility for sustainable shark-fin soup should not be explored. I will now give recommendations taking into account the various management issues associated with shark fisheries and the problems and limitations associated with the sustainable seafood movement and eco-labelling that I have mentioned above. The major goals to work towards to achieve the final product of sustainable shark-fin soup are setting standards to ensure both the sustainability of fisheries through appropriate fishery management and the traceability of the shark-fin along the production chain, as well as undertaking measures to ensure the viability of sustainable shark-fin soup in the seafood market.

*Setting Appropriate Standards – Shark Fisheries*

Standards that define sustainability for shark fins need to be set for the fishing industry. As previously mentioned, the MSC appears to favor fisheries with certain characteristics, and unfortunately most shark fisheries have characteristics that are the exact opposite of what the MSC looks for. Many shark species are highly migratory and often caught in multi-species fisheries, and thus fishing does not occur where there are exclusive national access rights nor is it highly selective. There is also rarely limited
access to these fisheries due to the unregulated expanse of the high seas as well as the problem of IUU fishing. Many sharks are also caught in small artisanal fisheries, and the MSC standards cannot simply be applied to these fisheries. Thus, a set of standards unique to shark fisheries and different from current MSC principles needs to be created.

A very basic standard would be to not utilize fins that have been acquired as a result of finning, meaning that only fins from sharks that are landed whole can be eligible for certification. These sharks should have not been targeted specifically for their fins, but for other uses as well including for their meat, liver oil, cartilage and skin, in order to minimize waste. There is apparently a relatively large market for shark meat in Europe (Oceana 2008). In turn, these sharks that have been caught should be from shark fisheries that are sustainable, which as I have illustrated in Part I, proves to be a relatively daunting task. The problem of IUU fishing has to be aggressively tackled before these fisheries can approach sustainability, or begin to undergo the process of certification. The issue of shark bycatch has to be addressed, with more data needed on the amount of each species that gets fished. Also, various international agreements which list threatened shark species such as CITES (Convention on International Trade in Endangered Species) and the IUCN Red List should be taken into account when setting standards for determining the sustainability of a shark species and population.

*Setting Appropriate Standards – The Production Chain*

Standards also need to be set for steps along the production chain. The MSC’s Chain of Custody standard requires every business in the production chain from the fishery to the final point of sale or packing to have a Chain of Custody certificate. This audits the businesses for effective storage and record-keeping systems so that only
seafood from a certified fishery carries the MSC eco-label (MSC 2005). This helps to prevent any mis-labeling or renaming of products at any point along the production chain, and increases the traceability of the final product. However, with shark fins, it might be easier to create a separate production chain specifically for sustainable fins first than to try to apply the Chain of Custody standard to existing actors in the chain. This is due to the highly global and dispersed nature of the chain, a large proportion of which occurs in Asia, and an apparent lack of vertical integration in the chain which leads to a lack of transparency in the flow of the commodity. There have, however, been past studies that were undertaken to provide glimpses into the global nature of the shark-fin trade as well as the movement of shark fins across borders.

Sharks are caught in large and small-scale fisheries around the world. The fins are either retained on the vessel by finning or the whole shark is landed after which the fins are cut off on land. Depending on where these sharks are caught, they can be processed in the country of origin, or sent to processing centers in China via Hong Kong or Singapore before being re-imported. In the Hong Kong shark-fin market, which is estimated to handle 50% to 85% of the global fin trade (Clarke et al. 2006b), traders receive fins from at least 85 countries and territories, usually in poorly sorted shipments. These shipments are then either immediately sorted into trade categories and auctioned off to wholesalers, or sent directly to China for further processing. In a genetic study conducted by Clarke et al. (2006a), it was revealed that traders had their own names for various types of fins, and that they were able to more correctly identify some species than others. While the 11 trade categories that were sampled showed relatively high uniformity in terms of species indicating fairly accurate differentiation between those species, these 11 consisted of
higher priced fins and were but a handful of 100 or so possible trade categories, of which a substantial portion consisted of lower value fins in highly mixed-species categories. The most abundant shark species according to auctioned fin weight was the blue shark (*Prionace glauca*) while 14 species made up 40% of the total auctioned fin weight (Clarke et al. 2006a).

The many processors located in mainland China that receive these fins further process them using various methods. Depending on the methods used, fins of varying quality are produced, which in turn also influence their market price. Generally, the fins have already been dried at the country of origin. This can be done through a variety of methods such as spreading them out in the sun, hanging on a pole, or with an artificial dryer. Depending on available infrastructure, drying can occur with or without the application of salt, and it is the former that will produce fins of better quality. After these fins are dried, they can be further processed locally or sent to China and Southeast Asia. The next steps consist of rehydration to remove the surface skin, to clean and separate the layers of cartilaginous fin needles and deodorization to remove its smell (Vannuccini 1999). For example, Figure 2 below illustrates how fins are caught illegally in northern Australian waters and processed for consumption in various countries around Asia, as well as in Asian communities in the West. Other territories such as the Maldives have specifications and standards for the domestic production of dried shark fins (MSMC 2006) while at least one Japanese company has patented a process for the reconstitution and deodorization of shark fins (Suzuki 1992).
Figure 2. Stages in the illegal shark fin commodity chain (Anderson and McCusker 2005).

With the highly widespread nature of the trade, the multiple routes that a shark-fin can take from the time it is cut off a shark and served in a bowl of soup, and the lack of accurate species identification and differentiation in the production chain, I would thus recommend the creation of a separate production chain to begin with for simplicity’s sake. In the meantime, more field and market research needs to be carried out to attempt to map the direction of the commodity movement amongst the various actors to elucidate and identify any possible pattern and structure to the flows, so as to be better able to influence important actors and links within the trade flow. To begin to influence actors in the current production chain, I would recommend trying to get retailers and restaurants to source out sustainable shark fins, much like how Walmart has pledged to source all its wild-caught fish from MSC certified sources within the next four or five years (Wal-Mart 2006). This would not only place demands on traders and processors, but also reduce product misrepresentation, which usually occurs towards the end of the production chain (Jacquet and Pauly 2008).
Environmental Marketing

Last but not least, publicity campaigns need to be carried out with the aim of shifting consumer preferences in favor of sustainable shark-fin soup. Since Kotler and Zaltman (1971) termed the application of marketing to the resolution of social problems as “social marketing,” it would thus be apt to call the similar application of marketing to the resolution of environmental problems, “environmental marketing.” Indeed, the current sustainable seafood movement is an example of environmental marketing. However, in addition to the shortcomings of the sustainable seafood movement that I have previously mentioned with regards to the market in the West, a new layer of complexity is added to the situation by targeting the Asian market. This is mainly a question of operating within a non-Western context and having to influence people of a different social and political culture. It is unclear if the current WildAid campaigns in Asia are effective in their methods, but perhaps examining in greater detail the basis behind marketing in the US would help in designing effective market research questions and eventually campaigns for the Asian market.

The sustainable seafood movement in the US has revealed certain facets of American political and social culture. American political culture is unique as it demands public, scientifically-based demonstrations of evidence used to justify claims. Thus NGOs have followed in the stead of American political actors who have used the “cognitive and institutional authority of science” in support of their regulatory decisions by using this same authoritative science to define sustainability and to justify changes in consumption patterns (Iles 2004). This encouragement of sustainable consumption by NGOs has also reinforced a new ideology of “consuming citizens,” which is a reflection
of a wider shift in contemporary American culture towards defining identity through consumption (Iles 2004). As mentioned before, there is also a faith that free-market mechanisms are able to apply sufficient pressure to cause some form of change (Jacquet and Pauly 2008). Last but not least, various authors have alluded to the power that citizens of a democratic country have to exercise individual freedoms and participate in political power for change (Constance and Bonanno 2000; Iles 2004). Thus, consumer awareness campaigns, which have shown to increase awareness and profile of fish in the US, can be seen as an important tool to influence decision-making in a democracy (Jacquet and Pauly 2007).

On the contrary, much of Asia, and especially China, are very different politically, socially and culturally from the West. Identity could be wrapped up more in ancestry and place of birth as opposed to what is consumed, and citizens may be more trusting of the government than NGOs even in the face of an absence of scientific information on the government’s part. However, when it comes to consuming shark-fin soup as a status symbol, certain facets of American culture such as the purchase of branded goods and fast cars might be applicable to this particular action. Nevertheless, I would recommend that more research be carried out with regards to the social, political and economic drivers behind shark-fin soup consumption. I would also recommend looking at the history of significant cultural changes in China and what initiated these changes, as well as the direction that Chinese society appears to be moving in now.  

While these campaigns could include a focus on the exclusivity of sustainable shark-fin soup, which

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16 In the event that Chinese society is shifting towards a consumerism-based identity, eco-labelling might then prove to be an influential option.
might increase its appeal, it would be desirable to attempt to increase the environmental consciousness of the Chinese as well for the benefit of long-term shark conservation.

CONCLUSIONS

Globally, shark fisheries have only begun to be managed for human use and conservation in the past two decades. The practice of consuming shark-fin soup, however, has been in existence and ingrained in Chinese culture for centuries. While marketing campaigns to reduce demand for unsustainable shark-fin soup might help, changing a culture usually occurs on the timescale of generations, and it is unclear if shark populations will be able to hold out for that amount of time. Nevertheless, there are signs even today which show that certain portions of the Asian population are open to dispensing with this tradition. This result has been attributed to increased education and awareness of shark finning, as well as the current green wave that seems to be sweeping corporations towards being more socially and environmentally responsible (Jennings and Cheong 2009; RWS 2008). While it is unclear whether the current decrease in demand due to the economic crisis will change once the economy picks up again, I recommend that countries and territories continue to work together towards better management of shark fisheries and that market research be carried out to create more effective environmental marketing campaigns.
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